

THE EFFECTS OF COPING, SOCIAL SUPPORT,  
ATTRIBUTION AND COGNITIVE ILLNESS  
REPRESENTATION ON OUTCOME MEASURES OF  
PAIN, DISABILITY AND PSYCHOLOGICAL WELL-  
BEING IN RHEUMATOID ARTHRITIS PATIENTS

by

PAMELA NAIDOO

A dissertation submitted for the degree of Doctor of Philosophy in the Faculty  
of Human and Management Sciences at the University of Natal

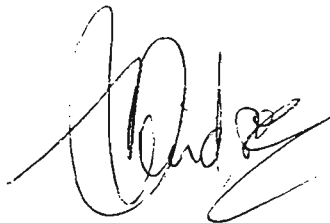
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## Declaration

I declare that this thesis is my original work and is submitted for the first time.



Pamela Naidoo

Date: 12/12/2001

As the candidates supervisor, I have/have not approved this thesis for  
submission.

Professor G C Lindegger

Date:.....

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"Our sacred scriptures tell us that the world came out of the power of the mere thought of the Creator. They tell us that bodily functions are influenced by our thoughts. The real sickness is in the mind. The diseased mind must first be made healthy and harmonious by means of pure thoughts and desires. Then the body will fall in line and be free from disease" (Sivananda, 1987, p. 304).

## Abstract

This study investigates the psychosocial aspects of rheumatoid arthritis (RA), a chronic debilitating disease. It explores the quality of life in a low socio-economic group of clinic-based adult RA patients. The aims of the study were as follows: (1) to assess the impact of both socio-demographic and psychosocial factors on RA health outcome, (2) to develop a multivariate, predictive model for RA, and (3) to assess the moderating role (or stress-reducing function) of psychosocial factors between the objective experience of RA and the subjective experience of RA. A sample of 186 RA patients with a mean age of 49.51 years and a mean duration of RA of 10.80 years were subjected to a series of self-administering questionnaires to assess their subjective experience of the disease. Coping, social support, causal attribution, cognitive illness representation, pain and functional status were assessed. The objective experience of RA was based on those health status measures that included the following: firstly, ESR levels (a laboratory measure), and secondly, class (classified level of disability) and joint status (severity of joint inflammation) which were assessed and recorded by the rheumatologist. The data obtained were subjected to a systematic statistical analysis to assess the following: (1) the relationships between the socio-demographic factors, psychosocial factors and factors representing RA health outcome using correlational analysis (Pearson  $r$ ), (2) the value of socio-demographic and psychosocial factors in predicting subjective and objective RA health outcomes using step-wise hierarchical multivariate regression analysis, and (3) the moderating or stress-reducing effect of psychosocial factors between the objective and subjective health status measures using moderated regression analysis. Findings revealed that psychological factors, especially coping, were more significant predictors than socio-demographic factors of RA health outcome (quality of life of RA individuals). Furthermore, the psychosocial factors coping, network social support, helplessness and causal attribution were found to play a moderating role in RA health outcome. The results of the study confirm both the health-sustaining and the stress-reducing function of psychosocial factors. Theoretically, the study is located within the stress and coping paradigm of Lazarus and Folkman (1984).



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# CHAPTER ONE

## INTRODUCTION

### 1.1 Motivation

There has been a proliferation of studies in developed countries on the medical and psychological aspects of rheumatoid arthritis (RA), and more recently on the psychoneuroimmunological aspects of the disease. RA is a chronic and disabling disease with serious clinical, psychosocial and economic effects. Despite investigation into ways of improving the quality of life of individuals with RA, it is difficult to contain the overall cost of this debilitating illness. One possible explanation for not being able to control the economic effects of the disease rests on the unclear etiology of RA. Attempts to prevent the disease from manifesting have been futile thus far. Consequently, the cost of the disease to the individual, his workplace and to the health care system remains high. While the cost to the individual and to the workplace must not be underestimated, the economic burden placed on the health care system by disabled individuals must be taken seriously. At a time when other incurable diseases such as “Acquired Immunodeficiency Syndrome” (AIDS) has reached epidemic proportions costing the health care system millions of rands, it is becoming increasingly difficult to provide quality health care to people using state health services.

While the search to find the cure for RA continues, preserving the quality of life of individuals afflicted with the disease remains the focus of much research because the negative effects of RA are well recognised. Whilst research on RA has been carried out in South Africa, few studies have conducted a comprehensive investigation into the way in which psychosocial factors are associated with socio-demographic factors, disease factors, and health related quality of life (health outcome) factors in RA. This psychosocial study has been conducted on a sample of African and Indian South Africans of low socio-economic status. Current research trends in the area of chronic illness is increasingly focused on the importance of both socio-demographic and psychosocial factors in disease outcome (e.g. Holm, Rogers & Kwoh, 1998). Conducting this study in a lower socio-economic group in South Africa, therefore, adds value to an existing body of knowledge in this field. A sample obtained from a developing country, such as South Africa, with its unique sociological

patterns around family structure, cultural practises, religious beliefs and economic disparity between different groups of people, would differ from a sample based in a developed country such as North America.

While it is acknowledged that it is equally important to investigate the psychosocial profile of White and Coloured (people of mixed race) RA patients, Africans and Indians were prioritised because they are the two dominant race groups in the greater Durban area in the province of Kwa-Zulu Natal, South Africa. In addition, the teaching hospital in Durban from which the sample was drawn is mostly attended by African and Indian patients of lower socio-economic status.

The only psychological study conducted on RA in South Africa has investigated the effectiveness of cognitive-behavioural intervention for individuals with RA (Germond, 1991). There are no known studies that have explored the fundamental psychological processes associated with disease outcome in South Africa. This cross-sectional study seeks to obtain an in- depth psychological understanding of patients with RA and provide the impetus for improved health care delivery with specific reference to the psychological needs of this group of patients. Given the limited social, financial and other general resources of the participants in this study, the role of psychological factors in medical and psychological outcome will be investigated. Consequently, the contribution of psychological factors to the overall quality of life of RA patients will be highlighted.

This psychosocial study addresses a gap in research on RA as it seeks to emphasise the role of psychological factors within an under-investigated group of patients. While most of the studies quoted in the literature were conducted on Western, Caucasian, middle-class samples, this study was conducted on a lower socio-economic, clinic-based, group of RA patients in a developing country.

## **1.2 Objectives**

The three main objectives of the study were as follows:

- To explore the role of the psychosocial factors, namely, coping, social support, causal attribution and cognitive illness representations in RA health status (quality of life)



measures of pain, functional status and psychological well-being in low socio-economic status RA patients.

- To construct a model that explores the interaction between disease factors, psychosocial factors, and medical and psychological illness outcome in low socio-economic status RA patients.
- To investigate the role of socio-demographic factors in medical and psychological illness outcome in low socio-economic status RA patients.

Psychosocial as well as biomedical disease factors often account for variance in disease outcome measures. Although results from studies have varied, general support has been found for the disease-course hypothesis that takes into account the psychological response to RA experience.

Understanding the relationships and interrelationships between the biological, psychological, social and economical variables is critical in planning a multidisciplinary intervention programme(s) for RA patients. Due to the complexity of the disease, the ill-understood nature of its aetiology, and the physical and psychological consequences experienced by individuals with RA, it is imperative that rheumatologists, nurses, psychologists and other health professionals collaborate in researching not only medical and psychological aspects of the disease, but also in planning programmes to assist individuals afflicted with the disease. The management goal of any multidisciplinary team should be to improve the quality of life or general health status of RA patients.

This cross-sectional study was designed to provide a comprehensive psychosocial profile of a sample of South African RA patients and to examine predictors of disease outcome. Specifically, the predictive and moderating role of psychological factors including coping, perceived social support, causal attribution, and cognitive illness representation in RA health outcome will be investigated. The results obtained will help clarify the role of psychological variables in managing individuals with the disease and highlight the contribution of psychological factors to the quality of life of individuals with RA.

This thesis comprises a total of seven chapters. An overview of the medical aspects of RA, the effects of the disease, the concept of quality of life (QOL) and an introduction to the

psychology of RA is presented in Chapter Two. Chapter Three details the conceptual framework within which this study is located. A review of the literature is presented in Chapter Four. The review of literature focuses on the psychological, behavioural and social effects of RA. In Chapter Five the design of the study is explained. The results are presented in Chapter Six. A discussion of the results in Chapter Seven demonstrates how this study contributes in a meaningful way to an existing body of literature on the psychological aspects of RA, a chronic illness condition. Recommendations about future research possibilities are made and other relevant aspects that might enhance the psychological understanding of individuals with RA are discussed.

Please note that to avoid the use of sexist language, the terms referring to gender (e.g. his and her) are alternated throughout the thesis. Thus, there is no bias in favour of males or females in the writing of this document.

## CHAPTER TWO

### RHEUMATOID ARTHRITIS

#### 2.1 Description and History

Rheumatoid arthritis (RA) is a systemic autoimmune disorder of unknown etiology which is disabling and chronic. The synovial membranes of multiple joints are usually affected with the formation of chronic synovitis leading to bone and cartilage damage (Shearn & Hellman, 1990). The most common outcome of the established disease is the progressive development, in varying degrees, of joint destruction, deformity and disability.

The primary cause of RA is unknown and has, therefore, been described as “one of modern medicine’s major enigmas” (Buchanan, 1994, p. 289).

It is believed by some investigators that certain individuals are genetically predisposed to RA and that different arthritogenic agents trigger the manifestation of the disease (Schumacher, 1993). Bacteria and viruses are thought to play an etiological role although there is no substantial evidence to draw any conclusions. Medical investigations concerned with the etiology of RA have looked increasingly at the interrelationships of infectious agents, genetics and autoimmunity. To date it is not possible to draw conclusions about the etiology of the disease.

Buchanan (1994) explores whether RA is in fact another “new world” disease given its first clear description in Europe in 1800 by Landre’ Beauvais. Prior to this period there appears to have been no medical writing on RA. In the 17th century, Thomas Sydenham provided some detail. Sir Alfred Baring Garrod gave the disease its name in 1859.

There has been some suggestion, based on works of art, that RA was in fact an “old world” disease, although the evidence again remains fairly inconclusive. Rothschild, Turner and De Luca (1988) have gathered more convincing evidence of the disease in Archaic Amerindians, supporting the hypothesis that RA is a “new world” disease. They find that RA spread throughout the world when European immigrants came into contact with Amerindian tribes

who were affected by the disease. Indeed, a high prevalence of RA has been found in contemporary Amerindians (Del Puente, Knowler & Pettitt, 1989), almost five times greater than the 1% reported in Caucasian populations in Europe and America (Lawrence, 1994). African and Asian populations show much lower prevalence rates to Caucasians (Mijiyawa, 1995), suggesting that the disease originated in North America and then spread to Europe and other parts of the world (Rothschild, Woods, Rothschild & Sebes, 1992).

In Africa there have been no known works of art depicting RA, nor has the disease been mentioned in indigenous histories. This strongly suggests that the disease is a 20th century one in this continent (Adebajo, 1995). The first documented cases of the disease were in Malawi in southern Africa, recorded by Goodall in 1956 (Adebajo, 1995). Subsequently, cases of RA were reported in West and East Africa in 1957 (Malawista, Doros & Seides, 1959; Shaper & Shaper, 1958).

Whether RA is an “old world” or a “new world” disease remains a contentious issue because of the lack of convincing evidence to support either hypothesis.

## **2.2 Epidemiology**

It has been reported that the usual age of onset of RA is between the ages of 20 to 40 years with about 1 to 2% of the general population suffering from the disease and female patients outnumber male patients by a ratio of 3:1 (Shearn & Hellman, 1990). Although these figures were found in studies conducted among Caucasians, they have led to generalisations globally (Shearn & Hellman, 1990).

Over the past two decades, several epidemiological studies have shown that the pattern of prevalence of RA throughout the world is not consistent with the figures commonly quoted (Del Puente, Knowler, Pettitt & Bennett, 1989; Mijiyawa, 1995). Overall, the disease seems less prevalent in the developing countries than in the developed countries. In South Africa a similar epidemiological pattern to the developed countries has been found among urban Africans, while for rural Africans the prevalence of RA is significantly less as noted in the following reports. In an urban African population Solomon, Robin and Valkenburg (1975) reported the prevalence of definite RA to be 0.9% as compared to 0.12% in a rural Tswana

population (Beighton, Solomon & Valkenburg, 1975). West Africans appear to share a low prevalence rate with rural South Africans (Adebajo & Reid, 1991), whilst East Africans and Lesotho's rural people reflect a pattern closer to that in developed countries (Kanyerezi & Lutalo, 1984; Moolenburgh, Moore, Valkenburg & Erasmus, 1984).

A lower prevalence rate of RA of around 0.3%, has been found in Asian studies, including those conducted on adult populations in China and Taiwan (Beasley, Bennett & Lin, 1983; Chou, Pei, Chang, Lee, Schumacher & Liang, 1994; Wigley, Zhang, Zeng, Shi, Hu, Couchman, Duff & Bennett, 1994). A similar finding prevails in Indonesia (Darmawan, Muirden, Valkenburg & Wigley, 1993). In India, however, prevalence was higher than in other Asian populations. In a study of a north Indian population conducted by Malaviya, Kapoor, Singh, Kumar and Pande (1993), a prevalence rate of 0.75 % was found, closely approximating the rate of 1 to 2 % found in developed countries. In Pakistan a variation in prevalence between urban and rural areas was observed. A rate of 0.2% was found in an affluent area in Karachi, which was twice the rate found in a poor urban area in the same city (Hameed, Gibson, Kadir, Sultana, Fatima & Syed, 1995).

Further variation in the pattern of occurrence of RA in African and Asian populations, as compared to Caucasian populations, has been observed. A female to male ratio as high as 9:1 has been found in India (Malaviya *et al.*, 1993), a ratio substantially higher than that quoted in Western based studies. Peak age prevalence of RA has been found to vary from 25 to 29 years in the Indian study to 30 to 49 years in Taiwan (Chou *et al.*, 1994). A peak onset of RA in the fifties has been found in a Western-based study (Linos, Worthington, O' Fallon & Kurland, 1980), an average age which is substantially different from the peak ages found in the Asian studies.

From the preceding discussion, the variability of RA in different populations with respect to the occurrence of the disease, its severity and manifestation appear to be evident. RA appears to be more common and severe in Caucasians than in African and Asian populations. However, recent evidence reflects a change in the pattern of the disease with a decrease in its occurrence and severity in Caucasians and an increase in Africans and Asians. Further, differences in urban and rural populations have been noted. Studies conducted in certain urban African and Asian populations show prevalence rates similar to Europe and North

America. These epidemiological observations provide etiological clues. The variability of RA in different populations may be understood by noting how factors such as climate, diet, cultural patterns, increasing urbanisation and genetics influence the onset of the disease.

### 2.3 Genetic Factors

Certain individuals are more susceptible to the development of RA than others because of genetic factors. Genetic analysis has helped to confirm associations between certain human leukocyte antigens or HLA (cell surface markers on white blood cells) and several diseases. In RA patients, there is an increased occurrence of HLA-Dw4 or HLA-DR4 as compared to patients without RA (Firestein, 1997). About 25% of the general Caucasian population test positive for these antigens as compared to 56% of RA patients (Miller & Glass, 1981 in Anderson, Bradley, & Wise, 1985). The genetically encoded susceptibility to RA may be due to the presence of a functional epitope which is shared by the DRb (beta)1 chains of several RA associated alleles. This epitope is present in 89% of white RA patients in the United Kingdom compared with 46% in controls. In Johannesburg, South Africa, similar results were obtained with respect to DRb (beta)1 epitope, which was detected in 78% of black patients compared with 24% of controls (Mody, 1995).

In Durban, South Africa a survey of 100 individuals of Zulu descent with classical and definite RA indicated a significant association of HLA-DR4 with RA (Mody, Hammond & Naidoo, 1989). Further, the frequency of DR4 was found to be 44% in RA and 10% in controls (relative risk 7.4). Similar findings in a survey conducted in Cape Town, South Africa, confirmed the association with DR4 which was detected in 38% of patients and 13% of controls (relative risk 3.9) (Martell, Du Toit, Kalla, & Meyers, 1989). In Johannesburg DR4 association was confirmed in a survey of individuals of Zulu, Sotho and Xhosa descent (Pile, Tikly, Bell & Wordsworth, 1992 in Mody, 1995). The decreased frequency of RA in Nigeria may be accounted for by the fact that HLA DR4 is detected in less than 1% of the population (Mody, 1995).

Genetic analyses in different populations have yielded dissimilar findings. Certain African, Japanese and Latin American's show a similar association between HLA and RA which is not found in Jewish and Asian Indian populations (Miller & Glass, 1981 in Anderson *et al.*,

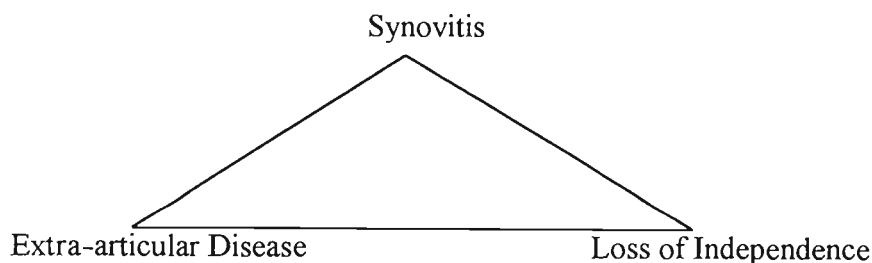
1985). While genetic investigations have confirmed that certain individuals are susceptible to developing RA, these studies have also shown that certain populations are more similar to each other than to other groups.

## 2.4 RA – The Disease Course

### 2.4.1 Introduction

The natural history of rheumatoid arthritis may be divided into three periods: *disease onset, its clinical course and the end result (outcome)*. Although negotiating the course of the disease poses the biggest challenge to individuals with RA, there is a proliferation of research on onset and outcome because of the relative ease in measuring and evaluating these aspects (Scott & Huskisson, 1992).

Investigating the course of RA is difficult because of the clinical features of the disease and its chronic nature. Scott and Huskisson (1992) explain that the course of rheumatoid disease depends on the interrelationship between the severity of the synovitis, the presence of extra-articular disease and the resulting loss of independence, depicted in the form of a triangular relationship (Figure 21).



**Figure 2.1: Triangular relationship of synovitis, extra-articular disease and loss of independence in rheumatoid arthritis.**

### 2.4.2 RA Onset

In 55-75% of cases, RA onset is insidious. Characteristically, the patient presents with an inflamed synovitis which includes joint swelling, joint tenderness and morning stiffness,

usually involving multiple sites in a symmetrical distribution (Harris, 1997). Fatigue and diffuse musculoskeletal pain are accompanying features. Morning stiffness may appear even before pain is experienced and the accumulation of edema fluid within inflamed tissues during sleep ultimately affects the muscles. Muscle atrophy develops around affected joints leading to decreased strength and weakness, often out of proportion to the pain (Harris, 1997). Everyday activities such as opening doors, climbing stairs and performing certain household chores, or carrying out responsibilities for paid work become increasingly difficult. Consequently, RA patients are often found to be depressed or anxious.

Acute onset, which is relatively infrequent (8% to 15% of cases), is sometimes triggered by a stressful situation such as infection, surgery, trauma, emotional strain or a postpartum period (Shearn & Hellman, 1990). In an acute onset individuals have to contend with the rapid onset of symptoms over a few days. Intermediate onset of RA applies in about 15% to 20% of cases. The disease in this case develops over days and weeks (Scott & Huskisson, 1992).

Understanding joint involvement and associated clinical features is crucial to recognising the effects of RA. Joints of the hands, wrists and feet are commonly involved early in the course of the disease. More severe disease is associated with early wrist and metatarsophalangeal joint involvement. Changes in the small joints of the hands and feet and metatarsophalangeal joints are noticeable on radiographs (Scott & Huskisson, 1992). Variants at the time of onset of RA include unusual patterns such as monoarticular, palindromic, polymyalgic and adult-onset Still's disease (Scott & Huskisson, 1992).

### **2.4.3 RA Disease Course**

The course of RA has been essentially divided into three patterns:

- progressive disease;
- intermittent course; and
- long clinical remissions.

More than 70% of cases have progressive RA, i.e. the clinical manifestations of the disease worsens over time and regardless of whether there is slow or rapid disease course, disability results (Harris, 1997). In the intermittent pattern patients have brief attacks, and finally there



are patients who have long remissions. A fourth pattern, referred to as “malignant” disease, is rare and patients present with severe extra-articular disease.

In a retrospective study of 44 patients, Roberts *et al.* (1988 in Scott & Huskisson, 1992) found that there are three types of joint involvement in classical disease. The first type is when a large group of joints involved in the first year of the disease remains active throughout the disease course. In the second type a smaller group of joints involved at the beginning remains relatively inactive thereafter. Finally, in the third type, a few uninvolved joints following the onset of RA may become involved at any point during the course of the disease.

## **2.5 Laboratory and Radiographic Findings**

### *Rheumatoid Factor (RF) and Erythrocyte Sedimentation Rate (ESR)*

“There is no laboratory test, histologic, or radiographic finding that conclusively indicates a definitive diagnosis of RA” (Schumacher, 1993, p. 90). This fact emphasises how important it is for the rheumatologist to combine her clinical assessment according to an established set of criteria such as the 1987 revised American College of Rheumatology (ARA) criteria, with other markers, to arrive at a diagnosis of RA.

Although a number of laboratory tests have been developed to measure disease process, RF and ESR values have proved to be the more reliable indicators (Wollheim & Eberhardt in Scott, 1992). Serum protein abnormalities and rheumatoid factor (RF) are often present in blood samples taken from RA patients. High titres of RF are commonly associated with severe rheumatoid disease. During the acute and chronic phases, the ESR and the gamma globulins (IgM and IgG) are typically elevated. Joint fluid examination reflects abnormalities that are associated with varying degrees of inflammation.

### *Imaging*

Typically, RA affects the hands first (Katz, 1982). Early radiographic signs are periarticular soft tissue swelling, osteoporosis around the involved joint, and erosion of the peripheral

“bare space” of bone surface that is not covered by cartilage.

Later, extensive erosion of cartilage causes joint space narrowing. Bony cysts result from invasion by granulation tissue. The destruction of the bone and cartilage may eventually result in the destruction of a joint, with associated subluxation and deformity.

## **2.6 Additional Clinical Features**

### *Articular Manifestations*

The articular manifestations of RA are two-fold. Firstly, there are reversible signs and symptoms related to inflammation synovitis. Secondly, there is irreversible structural damage due to synovitis (Schumacher, 1993). Structural damage usually occurs within the first or second year of the onset of the disease and those cases that go into remission prior to structural damage occurring will become almost free of disease symptoms.

### *Development of Joint Deformities*

Joint deformities may occur from the following:

- synovitis and pannus formation;
- cartilage damage; and
- patient avoiding pain by posturing in the least painful condition.

The mechanisms involved in the development of joint deformities include joint immobilisation, muscle spasm and shortening, bone and cartilage destruction, ligamentous laxity and altered tendon function (Schumacher, 1993).

### *Structural versus synovitic symptoms*

With disease progression, RA patients will have manifestations of the disease related to structural damage as well as those relating to the ongoing synovitis. The clinical management of synovitis is pharmacological and non-surgical because of its reversibility. However, when structural damage occurs, the patient may choose to live with the consequences of the severe

form of the disease or may opt for re-constructive surgery.

The clinical features related to the activity and presence of synovitis include morning stiffness and the appearance of warm, swollen, and inflamed joints seen only in the most active phases of inflammatory synovitis (Schumacher, 1993). When there is structural damage there is progressive deterioration of function accompanied by anatomical changes.

### *Joint involvement and extra-articular features*

Although synovitis has the ability to cause joint deformity and destruction to all joints, there are features unique to certain joints. The joints include those in which inflammation is not easily detected through a clinical examination, such as the cervical spine, shoulders and hip as well as those joints in which inflammation is readily detected, such as the elbow, hand, knee, foot and ankle (Schumacher, 1993).

Fatigue, an extraarticular manifestation, is commonly experienced by most individuals with RA. Significant inflammation of other organ systems is found in those individuals who have rheumatoid factor (RF) in their serum, the presence of rheumatoid nodules, the severity of the articular process and certain genetic factors (Schumacher, 1993). Body systems affected include the following: (1) skin (presence of rheumatoid nodules), (2) the eyes, (3) respiratory, (4) cardiac, (5) gastrointestinal, (6) renal, (7) neurological, and (8) hematological.

## **2.7 Treatment**

Schumacher (1993) makes the following statement about treating RA:

The aim of present therapy is to provide pain relief, to decrease joint inflammation, and more importantly, to maintain or restore joint function and prevent bone and cartilage destruction (p. 96).

The basic treatment plan for RA consists of patient education, balance between rest and exercise, and the use of anti-rheumatic drugs. The most effective form of treatment in RA appears to be drug therapy although its use has both positive and negative effects. There are

four categories of anti-rheumatic drugs used in the short-term:

- non-steroidal anti-inflammatory drugs (NSAIDs),
- slow-acting anti-rheumatic drugs (SAARDs),
- corticosteroids and
- cytotoxic drugs.

The benefits in the short-term (6-18 months) of anti-rheumatic drugs over placebo's has been proven by numerous clinical trials conducted using NSAID's such as injectable gold (Co-operating clinics of the ARA, 1973), D-penicillamine, methotrexate and auranofin (Dawes & Symmons in Scott, 1992). Side-effects of the NSAID's (also known as first-line agents) include gastrointestinal upset, renal insufficiency, and other idiosyncratic reactions such as skin rashes (Dawes & Symmons in Scott, 1992). SAARD's (second-line drugs) such as methotrexate and intramuscular gold have also found to be beneficial with fewer serious side-effects if carefully monitored (Dawes & Symmons in Scott, 1992). Corticosteroids and cytotoxic drugs also have side-effects. Steroids are often combined with SAARDs as a choice of treatment whilst the cytotoxic drugs are used for severe, aggressive joint disease or for systemic manifestations (Dawes & Symmons in Scott, 1992).

Disease-modifying anti-rheumatic drugs (DMARDs) were developed for the long-term treatment of RA. Although these drugs are expected to modify the long-term course of the disease, improve life expectancy, disability and overall quality of life, its use cannot stop the devastating effects of the disease over time (10-25 years). RA continues to cause high rates of mortality and morbidity (Rasker & Cosh in Scott, 1992). Rasker and Cosh (in Scott, 1992) found that a minimum of 59% of RA patients would eventually require the use of a wheelchair or become extremely dependent on others having reached functional capacity grades III or IV. These investigator's assert that long-term prospective studies are required to assess more accurately the effects of DMARDs over the chronic course of the disease.

### *Non-adherence*

Studies of non-compliance show that non-adherence to medication in RA patients have ranged from 22% (Ferguson & Bole, 1979) to 67% (Geersten, Gray & Ward, 1973).

Anderson *et al.* (1979) state, however, that these figures should be interpreted with caution as the earlier studies did not control for factors such as type of medication, duration of illness and disease severity. Instead they relied on patients self-report.

Methodologically improved studies have found that adherence varied significantly as a result of these factors. Low adherence rates have been reported for drugs such as aspirin and higher adherence rates for prednisone (Deyo, Inui & Sullivan, 1981; Inui, Carter, Pecoraro, Pearlman & Dohan, 1980 in Anderson, 1985).

Although physical therapy is considered to be an important aspect of treatment in RA because of the negative physical manifestations of the disease, which leads to retarded and limited movement, compliance is poor. However, compliance with medication is greater because of the patient's belief in the efficacy of drugs for treating the disease (Anderson *et al.*, 1985). To validly assess compliance, many factors must be considered. Patient's beliefs in alternative care suggesting a special diet or herbal preparations may also influence adherence rates to conventional medical treatment Anderson *et al.* (1985).

## **2.8 Predicting Disease Course and Outcome**

It is difficult to define prognostic terms for RA due to its chronicity and the variability of the disease. However, there are factors that help to predict disease outcome. These factors include the following:

- severe RA;
- persistently high ESR;
- strongly positive RF; and
- severe extra-articular disease (Scott & Huskisson, 1992).

Age and sex also influence disease outcome, with older women having a less favourable outcome.

## **2.9 Economic Impact of RA**

Measuring the economic impact of any chronic illness, including RA, is difficult because

there isn't a standardised calibrated method that can be used like the instruments used when measuring height or weight. The World Health Organisation's International classification of impairments, disabilities and handicaps (see table 2.1) is considered to be a valuable guideline in measuring health outcome (WHO, 1980) because of its recognition that the outcome of disease can be expressed in structural, functional and behavioural terms (Fenn & McGuire in Macbeth, 1996).

In accordance with WHO's (1980) system of classification, the direct and indirect costs of RA must be considered. Health economists define *direct costs* as the cost of treating the illness and *indirect costs* as those costs due to the lost productivity as a result of morbidity and mortality (Yelin in Schumacher, 1993).

### *Direct Costs*

Direct costs include the cost of medical care that was shown in a survey in America to be three times the national average (Meenan, Yelin, Henke, Curtis & Epstein, 1981). In their analysis of the economics of RA, Lambert and Hurst (1995) take the following into account:

- the economic evaluation of drug treatment,
- the economic evaluation of surgery, and
- the economic evaluation of in-patient and day-patient regimes for active RA.

In a prospective randomised controlled trial of DMARD therapy, an economic evaluation was included, comparing the use of oral gold with a placebo over a six-month period (Thompson, Read, Hutchings, Paterson & Harris, 1988). RA patients receiving the oral gold showed an improvement of 0.14 in functional status measured by the Health Assessment Questionnaire (HAQ) as compared to those given a placebo. Despite this finding it is still important to consider whether the cost of the drug is justified in relation to the degree of improvement in functional status.

A few have found surgical intervention to be cost beneficial (Jonsson & Larsson, 1991; Patilala, Niemala & Laurinkari, 1976). These studies demonstrate that return to work following surgical intervention off-sets the cost of the treatment method used.

In-patient care has been shown to account for most of the direct cost of medical care in the United States (Jacobs, Keyserling, Britton, Morgan, Wilkenfeld & Hutchings, 1988) and in the United Kingdom (Bedi, Crook, Dick, Griffiths & Platt, 1987). Day care has been considered as a less expensive alternative to in-patient care. Based on the results of a pilot study, Lambert, Hurst, Lochhead, McGregor, Hunter and Forbes (1994) assert that day-patient care produces good short-term clinical outcome and may prove to be more cost effective when compared to in-patient care.

### *Indirect Costs*

Indirect costs are associated with the loss of income that has to be endured by individuals with RA when they become vocationally disabled, and the equivalent in wages of homemakers when they are unable to fulfil their role. In addition non-paid activities that have to be stopped as a result of the illness must also be taken into account. LaPlante (1989 in Shaul, 1994) reported that in the United States, although RA was not the most prevalent chronic illness, it ranked third in causing disability. In a survey of 245 RA patients conducted in America by Meenan, Yelin, Nevitt and Epstein (1981), it was found that 59% of the patients who had jobs at the time the illness was diagnosed were no longer working. Those who were still employed were earning only 50% of their expected income. Yelin and Katz (1991) evaluated the trend in work disability among people with arthritis in the United States and found that the proportion of working age individuals in the work force declined by 16% between 1970 to 1975 and 1982 to 1987. The age group most affected was the 55 to 64 year olds.

In South Africa a study conducted by Mody, Shaw and Ramchurren (1988) with a randomly selected group of 135 Black and Indian RA patients, only 24% were employed and 35% were dependent on financial support from the state. Of the total sample 50% had worked in the past and two-thirds had stopped working due to their poor health status which was attributed to arthritis.

Since women are three times more likely than men to be diagnosed with RA, it is important to consider the economics of RA in gender specific terms. Women with chronic illness earn

less than men and live longer (Shaul, 1994). Women with a chronic illness such as RA, therefore, become dependent and experience greater deprivation as they get older, often leading to decreased psychological well-being (Shaul, 1994).

## **2.10 Quality of Life (QOL)**

The World Health Organisation (WHO) has defined QOL as “the individual’s perceptions of their position in life, in the context of the cultural and value systems in which they live, and in relation to their goals, expectations, standards and concerns” (in Scott & Garrod, 2000, p. 663). A preference for demarcating the area of health-related QOL has been shown, as opposed to utilising the general definition provided by the WHO. Health related QOL can be defined as an optimum level of mental, physical, role and social functioning (Bowling, 1991 in Long & Scott, 1994).

The effects of RA constantly threaten the quality of life of individuals afflicted with the disease. Any instrument constructed to assess a range of factors related to health status in RA should include perception of health and health status, functional ability, pain, coping ability, and social functioning. Long and Scott (1994) also emphasise that health status measures must include both the practitioners as well as the patient’s perspective.

The World Health Organisation (WHO, 1980) has described the impact of disease in terms of impairment, disability and handicap. The definitions of these terms are presented in Table 2.1.



**Table 2.1**

**Definitions of Impairment, Disability and Handicap according to WHO**

<b>Impairment</b>	Any loss or abnormality of psychological or anatomical structure or function
<b>Disability</b>	Any restriction or lack (resulting from impairment) of ability to perform an activity in the manner of within the range considered normal for a human being.
<b>Handicap</b>	A disadvantage for an individual resulting from an impairment or disability that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and cultural factors) for that individual.

The relationship between impairment, disability and handicap is important within the context of RA because there isn't a cause-effect relationship between biological factors and disease outcome. It is known that factors other than disease process are important in determining the impact of the disease on an individual (Carr & Thompson, 1994). The measurement of impairment in RA is conducted by using laboratory measures of ESR and RF levels, X-rays to assess joint destruction, and clinical examination.

Disability may be assessed by the use of one of the many instruments such as HAQ and AIMS2. Handicap is measured by QOL questionnaires such as the Quality of Well-Being Scale (QWB; Kaplan & Anderson, 1988) and the Schedule for the Individual Quality of Life (SEIQoL; O'Boyle, McGee, Hickey, O'Malley & Joyce, 1992).

When measuring handicap in RA, Carr and Thompson (1994) emphasise that it is important to distinguish between patient-perceived handicap and society-perceived handicap. Patient-

perceived handicap is an indication of the specific way an individual feels handicapped by the disease and should be taken seriously in treating RA. In addition to drug therapy, taking cognisance of patient's perceptions helps to tailor treatment to individual needs. Society-perceived handicap on the other hand, measures the handicap state of an individual by comparing it with the "normal" activities /lifestyle of someone of a similar age, sex and background who does not have health related difficulties (Carr & Thompson, 1994).

Functional impairment in the activities of daily living (ADL) is a frequent and important consequence of RA. In a national survey conducted by Felts and Yelin (1989), 31% of RA patients reported varying degrees of limitation with ADL. Almost 60% had to stop engaging in paid work within 10 years of disease onset. RA patients reported a significant reduction in 39 of 75 specified activities, compared to patients with other musculoskeletal disorders that were less affected.

Various measures of functional impairment may be used with RA patients. A system of classification for functional status widely used by rheumatologist's is the one outlined by the American Rheumatism Association (ARA, 1987). This system has four classes with Class IV (see Table 5.2) representing the worst health status. A criticism levelled against the ARA's classification system is that it detects only major changes in functioning (Young, 1992). Self-report questionnaires such as the HAQ, the AIMS2 and the Sickness Impact Profile (SIP; Bergner, Bobbitt, Carter & Gilson, 1981) are recommended because they provide valuable information regarding aspects of physical and psychosocial functioning.

## **2.11 RA: Psychological Aspects**

Psychological factors have also been implicated in RA onset. Research on the psychological "causes" of the disease has focused attention on the following:

- the "arthritis personality" and
- psychological stress including psychophysiological and psychoneuroimmunological factors.

### 2.11.1 The Arthritic Personality

Research conducted from the early 20th century up to the mid-1960s focussed on the “arthritic personality” which, it was hypothesised, was present prior to the onset of the disease and predisposed certain individuals to the onset of RA (Anderson *et al.*, 1985).

In a critical review of the psychological factors implicated in the etiology, course and treatment of RA, Lerman (1987) states that early studies investigating the arthritic personality found patients to be depressed, had dependent personality features and difficulty expressing feelings, particularly those of anger and hostility. Conflicting evidence was found in controlled studies of the “RA personality”, according to Lerman (1987). Objective measures of personality in these studies showed RA patients to be “neurotic” and to have a more “psychologically disturbed” personality profile as compared to controls. In contrast, other studies indicate that RA patients are indistinguishable to healthy controls.

Spergal, Ehrlich and Glass (1978) propose a “chronic disease personality”, suggesting that the psychological characteristics observed in RA patients may be a reaction to the disease process. Other studies have attempted to match biological markers of RA, such as seropositivity or seronegativity, with particular personality profiles (Lerman, 1987).

Research conducted on the “arthritic or RA personality” has been inconclusive because of numerous methodological flaws, as noted by Anderson *et al.* (1985). The important methodological inadequacies include the following:

- Difficulty in comparing findings across studies on the arthritic personality because of the differences in theory and assessment techniques.
- Researchers have failed to control for sociodemographic and disease factors.
- Many studies focussed only on the negative personality characteristics of RA patients and failed to provide an understanding of the adaptive responses of patients to the disease. The negative personality characteristics of arthritic patients could be explained as reactions to a chronic disease rather than as causal factors related to the onset of the

disease.

- A control group from a normal population as opposed to a medical group or one with another form of chronic disease is usually used making it difficult to evaluate whether findings are distinctive of RA or are associated with chronic illness in general.
- Retrospective studies do not always convey an indication of the premorbid personality of the RA patient.
- The studies mainly used correlational designs that did not allow for causal explanations between personality factors and disease.

There has been little support, therefore, for the notion of a premorbid “arthritic” personality that is associated with disease onset. The lack of longitudinal studies makes it more difficult to determine whether observed personality features are causes or effects of RA. It is more likely that the specific personality traits (particularly negative ones) found in RA patients, are indicators of the patients reaction to the disease and do not predate it (Anderson *et al.*, 1985). Further, even where an association is demonstrated between personality and RA, the likely pathways of association are unknown.

### **2.11.2 Psychological Stress**

Psychological stress has also been linked to the etiology of RA, again inconclusively. Evidence suggests that RA patients have experienced a significant amount of psychological stress prior to the onset of the disease (Baker & Brewerton, 1981; Cobb, Bauer & Whiting *et al.*, 1939), although this does not imply a causal relationship between stress and RA. Stress may play a role in the onset of disease when a predisposition to the disease exists.

In an early study, Cobb *et al.*(1939) found a close temporal relationship between life stress and the worsening of RA symptoms. Sochet, Lisansky, Schubart, Fiocco, Kurland and Pope (1969) reported a high incidence of life stressors among their 12 RA patients. More recently Baker and Brewerton (1981) found that of 22 RA patients, 12 had experienced emotionally traumatic life events as compared to only 3 controls. A few studies have indicated that family

history plays an important role in the onset of RA and in the exacerbation of the symptoms of the disease (Baker, 1982; Heisel, 1972).

Some studies have shown how life stress can play a crucial role in subgroups of RA patients. Lerman (1987) reports that patients with insidious onset RA and slow disease course, combined with a positive family history of RA, did not show evidence of psychological stress prior to the onset of the disease. Patients with negative family history presented with acute symptoms and rapid disease progression and with evidence of a major psychological conflict prior to disease onset.

Much research into the role of stress in the development of RA has been flawed with methodological difficulties. Most investigations have been retrospective and correlational, precluding an understanding of possible causal pathways between psychological stress and its pathogenic effect on RA disease activity. There has also been controversy surrounding the criteria used to diagnose the disease, as well as the constructs of psychological stress (Anderson *et al.*, 1985; Lerman, 1987).

In an attempt to improve on the methodology of previous studies, Conway, Creed and Symmons (1994) investigated the relationship between life events and the onset of RA, and found little support for the proposition that life events play a significant role in any particular subgroup of RA patients. There has been increasing interest in the effect of “daily hassles” on illness onset. Research has been conducted on daily coping with minor stressful events (Kanner, Coyne, Schaeffer & Lazarus, 1981) although measuring day-to-day stress is difficult because stress is often confounded by psychological and physical symptoms (Dohrenwend, Dohrenwend, Dodson & Shrout, 1984).

Hendrie, Paraskevas, Barager and Adamson (1971), in a study linking psychological stress, depressed immune system activity and the initial manifestation of arthritic symptoms do not provide convincing evidence that arthritic patients, in contrast to the general population, experience greater or more traumatic life events prior to the onset of disease. Considering the evidence from a variety of studies, Wallace (1987) argues that it is important to consider the role of stress in inducing, exacerbating and affecting the ultimate outcome in RA, as stress can affect RA through altering immune responsiveness.

## *Psychophysiological factors*

Psychophysiological explanations take into account the biological mechanisms by which stress pathologically affects RA disease activity. Studies in this area suggest that muscle tension serves as the causal link between stress and RA pathophysiology (Lerman, 1987). Early investigators viewed RA as a disease of the joint and therefore recorded physiological responses of the affected joints (Anderson *et al.*, 1985). The most frequently selected physiological response was electromyographic activity (EMG).

Summarising the evidence presented in several studies, Anderson *et al.* (1985) state that RA patients, as compared to normal individuals and patients with other chronic medical disorders tend to:

- maintain higher EMG levels near affected joints,
- show greater EMG increases and slower return to usual EMG levels in response to psychological stress, and
- show greater increases in electrodermal activity with psychological stress.

Although the evidence from these studies regarding the relations among stress, EMG levels, electrodermal activity and RA activity may appear convincing, it is important to consider that stressors induced in a laboratory setting are qualitatively different from the stressful life events experienced by RA patients (Anderson *et al.*, 1985).

## 2.12 Conclusion

RA is a systemic autoimmune disease of unknown etiology, which is chronic and progressive, causing disability in many patients. Although there is controversy regarding the origins of the disease, Rothschild *et al.* (1988) are convincing in their argument that RA is a “new world” disease that spread throughout the world when European immigrants came into contact with Amerindian tribes who were affected by the disease.

Studies conducted over the past two decades have shown that the occurrence of RA is not uniform throughout the world as was previously thought. African and Asian populations

differ from Caucasians in the occurrence, severity and manifestation of the disease. Differences between urban and rural populations have also been found, while similar prevalence rates have been found between certain urban African and Asian populations, and Europeans and North Americans.

The cause of RA remains unknown despite extensive investigation into medical and psychological factors, and more recently into the interaction among the central nervous system, endocrine, and immune systems. Recent epidemiological observations have, however, provided some etiological clues.

Research in RA has focussed on disease onset, its clinical course and disease outcome. Research findings have helped to inform the holistic management of individuals afflicted with the disease. While advances have been made in discovering the factors associated with RA etiology, the emphasis remains on the treatment of individuals who have to endure this chronic and disabling disease.

Psychological research on RA is also fairly inconclusive. While earlier studies have shown that there is an association between pre-morbid personality and RA disease onset, these findings have not contributed significantly to the understanding of how psychological factors are related to the etiology of RA, nor do they provide any indication of how psychological factors interact with other factors, such as biomedical ones, in the onset of RA.

Although psychological and social factors are often seen to mediate the relationship between RA and RA outcome, the role of psychological factors in RA disease outcome remains ill understood. One of the primary objectives in this study, therefore, is to investigate the role of psychological factors including coping, social support, cognitive illness representation, and causal attribution in RA outcome (both medical and psychological), in low socio-economic RA patients in a developing country, South Africa.

# CHAPTER THREE

## THEORETICAL FRAMEWORK

### 3.1 Introduction

If psychology were viewed as a science, then developing theoretical models would be important and essential in that it serves to present a framework within which research findings may be interpreted. Feist and Feist (1998) define scientific theory as follows:

A set of related assumptions from which, by logical deductive reasoning, testable hypotheses can be drawn (p. 4).

Aspects of a theory may change if observations made during investigations are not entirely consistent with existing ones.

The primary aim (s) of this study is to develop a predictive, multivariate model for RA outcome, and to explore the moderating role of psychosocial factors in RA health outcome, in a South African sample of RA patients of low socio-economic status. Constructing a model for the group under study would contribute to the expansion of the existing theories in health psychology that has generally been developed and revised in developed countries such as the United States and Britain. The model would incorporate the experience of RA patients from a different social, economic and political structure to the developed countries. According to Brannon and Feist (2000) the term model is used, when a theoretical framework has not been adequately developed, although the terms' theoretical framework and model have often been used interchangeably.

### 3.2 Health and Chronic Illness

In the United States the leading cause of death, during the 20<sup>th</sup> century has changed from infectious diseases, such as typhoid fever and pneumonia, to those that may be attributed to unhealthy behaviour and lifestyle, such as cancer and coronary heart



disease (Brannon & Feist, 2000). These so-called life-style diseases are chronic in nature and often lead to disability and ultimately, death. Many factors have been identified as increasing the risk for mortality. Middle-aged and older people, as well as individuals of a particular ethnic background, such as African-Americans, are vulnerable (Dwyer, 1995). Pappas (1994) states, however, that social class is more important than ethnic background in predicting health risks. Income, education and occupation (indices of socio-economic status) are, therefore, seen to impact on health outcome or the quality of life of individuals with a chronic illness. Chronic illness, as Lindegger and Bosman (1990) point out, has similar characteristics to acute illness and illness in general, but is also distinctly different with unique biological, psychological and social features depending on the category of chronic illness. Chronic illness may be terminal (such as cancer), life-long (such as diabetes and RA), or may occupy a significant period in an individual's life (such as a spinal cord injury, which has an organic basis, and hypochondriasis which does not have an obvious organic basis) (Lindegger and Bosman, 1990). The chronicity of the experience in chronic illness conditions poses a specific challenge to the victims as it impacts, over a prolonged period, on their quality of life.

Models of health, as discussed in the following section, have evolved from the biomedical model, which emphasised a unidirectional relationship between the pathogen and the disease, to a biopsychosocial one, which emphasises the interrelationships between biological, psychological, and social factors in health. Chronic disease, or life-style diseases that are chronic in nature is best located within the biopsychosocial model as this model takes into account factors other than just biological ones, such as psychological and social factors that are involved in the onset, progression and outcome of disease. The quality of life (health outcome) of individuals with a chronic disease such as RA, may best be understood within the framework of a biopsychosocial model.

### **3.2.1 Models of Health**

The biomedical model dominated during most of the 20<sup>th</sup> century. The basic premise of this model is that illness or disease is caused by a pathogen, suggesting a

unidirectional relationship between the pathogen and the disease. The main inadequacy of the biomedical model is that it does not adequately consider the complex nature of disease process, and does not pay sufficient attention to psychological, sociological and cultural influences in the health-disease relationship. It is more orthodox, running the risk of reductionism and views the biological constitution of the individual as the only explanation to somatic complaints and illness experience (Kleinman, 1995).

Engel (1977) expresses what the pertinent aspects of a medical model should be. In doing so he further exposes the limitations of the biomedical model. According to Engel (1977):

To provide a basis for understanding the determinants of disease and arriving at rational treatments and patterns of health care, a medical model must take into account the patient, the social context in which he lives, and the contemporary system devised by society to deal with the disruptive effects of illness, that is, the physician's role and the health care system (p. 132).

The biopsychosocial model of health and disease was developed by Engel (1977) as an attempt to address the complexity of health and illness. The model gained prominence because it took into account "stress" and environment-person transactions, as well as physical phenomena. Unlike the biomedical model, the biopsychosocial model presents the concept of multiple causation and bi-directional interaction between factors internal to the individual, and between the individual and the environment.

Criticism has, however, also been levelled against the biopsychosocial model. The model fails to clearly define the exact nature of the interactions between the biological, psychological and social aspects, and is consequently difficult to apply (Cott, 1986). Further, McHugh and Vallis (1986) contend that the biopsychosocial model developed within a medical framework and consequently, is seen to belong in the domain of medicine, without the active involvement of social and behavioural science.

### 3.3 Psychology's Role in Health

#### *Psychosomatic medicine, behavioural medicine and behavioural health*

Individual behaviour and life-style are considered, among other factors, to be associated with the cause of chronic illness and chronic illness outcome. Psychology or the study of behaviour, therefore, plays a significant role in health research (Brannon & Feist, 2000).

The field of psychosomatic medicine was the first to acknowledge psychological factors in disease. Psychosomatic medicine is concerned with the emotional and psychological components of physical diseases and the way in which psychological and somatic factors interact to produce diseases (Kaplan, 1985). Freud (1917) asserted that unconscious psychological factors contributed to the development of physical symptoms. The theory of the unconscious could not be tested through scientific methods, however. Cannon's research in 1932 demonstrated the physiological effect of emotion indicating that emotion may cause physiological changes, which in turn can cause disease (Kimball, 1981). Other theoretical positions that arose out of the field of psychosomatic medicine include that, which emphasises the association between personality and disease in general (Dunbar, 1943), and personal conflicts and the development of specific diseases (Alexander, 1950). A criticism levelled against psychosomatic medicine is that the field still remains in the domain of medicine and does not adequately integrate psychological and physiological aspects (McHugh & Vallis, 1986).

Behavioural medicine is a field that was developed out of the continued awareness of the association between behaviour and disease, and the use of effective psychological techniques to change behaviour and improve health outcome (Brannon & Feist, 2000). Schwartz and Weiss (1978) provide the following definition of behavioural medicine:

the interdisciplinary field concerned with the development and integration of behavioural and biomedical science knowledge and techniques relevant to health and

illness and the application of this knowledge and these techniques to prevention, diagnosis, treatment and rehabilitation (p. 250).

The field, therefore, offers an interdisciplinary approach to illness and illness behaviour, requiring the collaboration of the behavioural sciences and medicine. Behavioural science has been afforded a place in this collaborative venture (McHugh & Vallis, 1986).

Behavioural health as a discipline emerged around the same time as behavioural medicine. The emphasis in behavioural health is on health improvement and prevention of disease in healthy individuals. Individuals are expected to take responsibility for health and wellness and there is less focus on doctor-based diagnosis, treatment and rehabilitation (Mettarazzo, 1994).

### *Health Psychology*

The formation of health psychology as a sub-discipline of psychology can be traced back to the late 1970s when the American Psychological Association (APA) set up a health section in 1979 followed by the British Psychological Society (BPS) formally constituting a Health Section only in 1986 (Pitts, 1991). The definition of health psychology is an important one in the context of this study because its components are reflective of the multifaceted nature of this sub-discipline of psychology.

Matarazzo (1980) defines health psychology as follows:

the aggregate of the specific educational, scientific and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, the identification of etiologic and diagnostic correlates of health, illness and related dysfunction, and the analysis and improvement of the health care system and health policy formation (p. 815).

The above definition reflects the multifaceted nature of the involvement of psychology in health. Ultimately, psychology's contribution to health is to improve

the quality of life of individuals by facilitating the improvement of the health care system and guiding the formulation of health policy. The concept of quality of life is an important one in illness conditions, particularly in chronic illness, which is often progressive. Health outcome in chronic illness, therefore, is of concern to health care professionals because the goal of management is to improve the quality of life of those individuals afflicted with a chronic disease such as cancer, diabetes or RA. An in-depth analysis on quality of life, which is one of the central areas of focus in this study, is presented in section 3.4.

### **3.4 Quality of Life (QOL)**

The quality of life concept has become central to health care. According to Kaplan (1984), the goal of a health care worker, which presumably includes a health psychologist, is to extend the duration of life, improve the quality of life and promote health status. In chronic illness conditions, maintaining or improving quality of life is a task for the individual diagnosed with the disease, as well as for the health practitioner.

By virtue of the definition of quality of life, which is discussed in greater detail below, it is implied that there has to be collaboration between health care workers to enable individuals with chronic illness achieve a reasonable quality of life. A common, conceptual understanding of the quality of life concept by health care workers, therefore, will presumably facilitate the management of ill individuals, including those with chronic illness. In the discussion that follows, an attempt is made to unpack the concept of quality of life. This concept is then located in a health context, specifically in chronic illness conditions.

The numerous definitions offered to help conceptualise quality of life is reflective of the multi-dimensional nature of this concept and the difficulty in arriving at an agreement on what constitutes a comprehensive definition. Quality of life defined as the subjective assessment of all dimensions of a person's life (Diener, 1984) is but one of the definitions. According to this definition, quality of life is determined by numerous factors. In an attempt to unpack the quality of life concept, Andrews and

Withey (1976) have emphasised both cognitive and affective factors and identify the following three components as important:

- Cognitive judgement,
- Positive affect, and
- Negative affect.

The cognitive component refers to the patient's judgement of life as a whole and whether or not she is satisfied with life. The affective or emotional component is not viewed as a single component but is reflective of both the positive and negative aspects of emotion (Andrews & Withey, 1976). This implies that individuals may experience positive affective states and/or negative affective states depending on contextual factors. Folkman and Moskowitz (2000) report that there is in fact increasing evidence that positive affect co-occurs with distress.

Kaplan (1994) also provides a comprehensive understanding of the concept of quality of life, although individual behavioural factors and not cognitive and affective factors are seen to inform this understanding. Quality of life is defined by Kaplan (1994) as "behavioural functioning or being able to do stuff" and "is the central concept that is linked to health outcomes" (p. 451). Health outcomes in turn are inextricably linked to health status. For conceptual clarity Kaplan (1994) states that presenting a theoretical model of health status is necessary. Central to the health status model are mortality (death) and morbidity (health-related quality of life). The general health policy model, however, separates health status into the following components (Kaplan, 1994):

- (1) Life expectancy (mortality),
- (2) Functioning and symptoms (morbidity),
- (3) Preference for observed functional states (utility), and
- (4) Duration of stay in health states (prognosis).

The Quality of Well-Being Scale (QWB; Kaplan & Anderson, 1988) was devised as a measure of evaluating selected components of the general health policy model and is a patient-oriented-outcomes-based approach.

Particular attention should be paid to terminal diseases such as cancer and chronic debilitating diseases such as RA because continued monitoring of health status will help provide indices for quality of life measures. In RA the two groups of variables that can influence quality of life are as follows:

- Disease-related variables (including process and outcome variables), and
- Socio-demographic variables (such as income, age and gender) (Van Riel & Van Lankveld, 1993).

Factors that mediate health status such as coping and the benefits or ill effects of social support must be considered because these factors ultimately impact on quality of life. Van Riel and Van Lankveld (1993) in a critical appraisal of research conducted on quality of life in RA make the point that many studies have considered the presence of depression (negative affect) in individuals with RA as an indication of “impaired” quality of life. According to Van Riel and Van Lankveld (1993) sufficient attention has not been paid to positive affect.

In this study a comprehensive assessment was conducted taking into account both the subject’s self-ratings and the physicians evaluation of the subjects health status among hospital-based RA patients. Although a disease-specific quality of life measure was not used, the collection of individual measures could be considered as a measure of quality of life of RA individuals. This investigation is a cross-sectional one, in keeping with one of the aims of the study, which is to establish “baseline” data in a group of RA individuals who have not previously been participants in psychological research. It is important to bear in mind, however, that RA is a chronic condition with an unpredictable disease course. Consequently, quality of life and health outcome must, therefore, be measured against change in health status over time.

The theoretical underpinnings of the health related quality of life components that include perception of health status, pain, functional ability, and psychological and social functioning are presented in section 3.5. A select number of psychosocial factors that are conceptualised as being predictors of quality of life (health status), or as moderating the relationship between disease factors, social and economic factors,

and quality of life (health status) in individuals with chronic disease are presented in section 3.6. These psychosocial factors include stress and coping, social support, attribution and cognitive illness representation.

### **3.5 Health related Quality of Life Components in Chronic Illness**

Health related quality of life components, particularly in chronic illness conditions, comprise of the subjective experience of pain, the presence and extent of disability, and psychosocial factors that include psychological well-being. Quality of life is an important concept in chronic illness conditions because of the prolonged and often permanent nature of the disease in question.

DiMatteo (1991) captures the essence of chronic illness well. DiMatteo (1991) defines chronic illness as follows:

Chronic illness or handicap involves one or more impairments or deviations from normal structure and functioning that, whether extensive or not, remain permanent. Chronic conditions are caused by pathological alterations that are not reversible, and they are usually accompanied by some sort of residual disability (p 372).

Individuals who are afflicted with a chronic condition have to make psychological and social adjustments over an extended period of time. Each stage of the disease poses a new or an additional demand. Consequently, for both the individual diagnosed with a chronic disease as well as the health practitioner, maintaining the quality of life of the sufferer becomes the central focus.

#### **3.5.1 Pain**

Historically, the mechanistic nature of pain was emphasised. This view of pain was perpetuated for almost three hundred years, according to Horn and Munafo (1997). The philosopher Descartes is considered to be one of the earliest writers on pain. He regarded pain as a response to a painful stimulus and stated that there was a direct pathway from the source of the pain to the area of the brain, which detected the



painful sensation (Ogden, 1996). Two other theorists of note were Von Frey (1895) and Goldschneider (1920) who developed the specificity theory of pain and the pattern theory of pain, respectively (Crossley, 2000). The specificity theory of pain was based on a stimulus-response model but also introduced the notion of specific sensory receptors that transmit warmth; pain etc. and each of these receptors are sensitive to specific stimulation. Finally, the pattern theory suggests that nerve impulse patterns determine the degree of pain and the messages from the damaged area are sent directly to the brain via nerve impulses.

All of the above theories of pain have the following common assumptions: that tissue damage is seen to cause pain, psychology has no causal influence and is only a consequence of pain, pain is an automatic response to a single external stimulus, and pain is categorised as being either psychogenic (in the patients mind in the absence of organic findings) or organic ("real pain" following tissue damage) (Ogden, 1996).

During the twentieth century, the role of psychology in pain was recognised following particular observations (Ogden, 1996). The first observation was that medical treatment for pain was effective only in instances of acute pain and not chronic pain. This implied that chronic pain conditions, particularly, cannot be conceptualised within the stimulus-response model. Secondly, it was observed that individuals with the same extent of tissue damage reported their pain sensation differently. The meaning that individuals attached to the pain sensation was seen to mediate the pain experience. Thirdly, the phenomenon of phantom limb pain was observed. A proportion of patients reported feeling pain in an absent limb.

As the subjective experience of pain became increasingly recognised, the theories of pain became more sophisticated taking into account the psychology of pain as well as the biomedical aspects of the pain experience.

In the context of this investigation on a chronic illness condition, it is important to make a distinction between acute and chronic pain. Acute pain is a relatively brief sensation, usually defined as lasting less than six months, and it is related to the potential for or extent of injury (Turk, Meichenbaum & Genest, 1983). Chronic pain is pain that lasts for more than six months, and belongs in one of the following three

categories: (1) chronic recurrent pain (has its origins in a benign condition, and consists of alternating periods of intense pain followed by pain-free periods), (2) chronic intractable-benign pain (persistent pain with no pain-free periods, and (3) chronic progressive pain (originates from an organic condition that is malignant and is persistent, and worsens as the disease condition worsens) (Turk *et al.*, 1983). Chronic progressive pain is of particular relevance to this study because the pain experienced by individuals with RA falls into this category.

Chronic pain is known to impair the social and psychological functioning of those individuals experiencing such prolonged periods of pain. These individuals often experience learned helplessness, hopelessness and depression. They are also unable to carry out social and occupational roles (Bernard & Krupat, 1994).

Since psychological factors are seen to contribute to the subjective experience of both acute and chronic pain conditions, the role that psychological factors play in the experience of pain is presented in section 3.5.1.1.

### **3.5.1.1 The Role of Psychological Factors in the Experience of Pain**

The psychological aspects of the pain experience are demonstrated in the theoretical formulations presented below.

#### *The Gate Control Theory of Pain*

The gate control theory (GCT) of pain, developed by Melzack and Wall (1965, 1979, 1982 in Wall & Melzack eds., 1999), introduced psychological aspects into understanding the pain experience. According to the GCT pain must be understood within the framework of a complex stimulus-response pathway, and a network of interacting processes, which mediates this pathway. The role of psychological factors is clearly demonstrated in the GCT of pain.

Two components are essential to the GCT of pain: input to the gate and output from the gate that exists at the spinal cord level. The gate receives input from different

sources. The peripheral nerve fibres is the site of injury and sends information about pain, pressure or heat to the gate. Information is also sent to the gate, by the brain, regarding the psychological state of the individual. Psychological state includes behavioural and emotional states, and previous experience of self-efficacy in dealing with the pain. Finally, large and small fibres constitute part of the physiological input to pain perception. All the information regarding input into the gate is integrated and an output is produced. This output from the gate relays information to an action system that results in the perception of pain.

There are important differences between the GCT and earlier models of pain. GCT views pain as a perception and experience rather than a sensation. Individuals are active in interpreting their pain experience and are not simply the passive recipients of a stimulus that triggers the pain sensation, and individual variation depends on the degree to which the gate is opened or closed. Further, numerous factors are involved in pain perception, not just a single factor. GCT clearly suggests an interaction between the mind and the body.

Physical, emotional and behavioural factors are involved in the opening and closing of the gate. The more the gate is opened, the greater the pain perception while the closing of the gate reduces the perception of pain.

While the GCT of pain has made a significant contribution by introducing psychological aspects as being an essential aspect, the theory is not entirely convincing in its attempt to integrate mind and body (Ogden, 1996). Although it is suggested that there is an interaction between mind and body, the GCT still sees the mind/body component as two separate components. The theory still assumes an organic basis for pain, which is then mediated by physiological and psychological factors. Another major criticism of the GCT is the lack of evidence of the existence of a gate.

## *Developments in the Theory of Pain*

The following definition of pain by Melzack and Katz (1999, p. 409) illustrates its multifaceted nature:

Pain is a personal, subjective experience that comprises sensory-discriminative, motivational-affective and cognitive-evaluative dimensions.

Pain reports often have a cognitive component and an affective component, as pointed out by Wall (1999), which indicates that pain is not isolated from affect as classical theory led us to believe.

The quality and intensity of pain differs. Pain reported as a result of tissue damage following surgery, for example will be experienced differently because of the expectation of repair and healing as compared to persistent and escalating pain in a slow-onset disease such as arthritis (Wall, 1999). Patients with “new” or acute pain usually become anxious because of their lack of awareness of what is causing the pain and patients with chronic pain are often found to be depressed because they view their pain as a life-long condition especially when medical treatment fails them. Wall (1999) asserts, however, that the way an individual learns to cope with his pain will impact on his quality of life.

A basic understanding of the anatomy and physiology of pain (sensory-discriminative dimension) is essential in order to comprehend how the complimentary dimension (affective-emotional) work as parallel processing mechanisms.

### *Sensory-Discriminative Dimension of Pain*

Pain receptors are nerve endings present in body tissue that only respond to damaging or potentially damaging stimuli (Osterweis, Kleinman & Mechanic, 1987). The negative stimuli trigger a message that is transferred to the spinal cord via certain identified nerves. The nerve ending in the tissue and the nerve attached to it form a unit called the primary afferent nociceptor. This unit contacts second-order pain

transmission neurons in the spinal cord. The second-order cells relay the message through well-defined pathways to higher centres, including the brain stem reticular formation, thalamus, somatosensory cortex and limbic system (Osterweis *et al.*, 1987).

### *Motivational-Affective Dimension of Pain*

The concept of pain as a sensation has for decades taken precedence over the affective and cognitive dimensions of pain Melzack (1983). Advances in pain research has taken cognisance of pain as a perception, a subjective experience recognising past experience, and other cognitive determinants of sensory quality and intensity (Melzack, 1961 in Melzack, 1983). The motivational dimension of pain was the last to be recognised. Most individuals in pain not only attempt to find the cause of their pain but are also motivated to stop the pain.

It has been established that in individuals who are experiencing pain from disease or injury, there is no clear relationship between the amount of tissue damage and the degree of discomfort or functional limitations (Osterweis, *et al.*, 1987). In chronic conditions the pain experience is highly variable. Some people who are severely impaired experience a moderate degree of pain while those with severe pain continue to function normally. The pain experience and its manifestations therefore, depend on a complex interaction among physiological, psychological, social and cultural variables. In addition past pain experiences and the way medical and other relevant personnel intervened to help manage pain are also important in shaping current pain experience (Osterweis, *et al.*, 1987). Male-female differences have also been found in response to pain. Biological, psychological and social factors may be seen to account for the gender variation (Derbyshire, 1997). Women are seen to be more sensitive to the pain experience, and therefore utilise health care facilities more often than men do.

### *Cognitive-Evaluative Dimensions of Pain*

Turk and Rudy (1992) focus on the subjective experience of pain and review the role of cognitive variables as mediators of pain perception and response, through the use

of three constructs, namely, cognitive schema, cognitive processes and cognitive content. The first construct “cognitive schema”, is explained by Turk and Rudy (1992) as the patient’s beliefs, appraisals and expectancies about their pain, their ability to cope, their social supports, their disorder, the medico-legal system, the health care system and their employers as important factors which may facilitate or disrupt the patient's sense of control and ability to manage pain. Cognitive illness representations, therefore, will determine an individual’s pain coping strategy. A perceived lack of personal control may lead to unsuccessful attempts at pain control.

Turk and Rudy’s (1992) second construct, “cognitive processes”, refers to the manipulation of information. Individuals are able to modify information obtained in the past by considering newly acquired information that will enable them to decide on how to act on their plans. In processing information there is reliance on the use of preconceived thoughts without conscious awareness, which may lead to automatic cognitive distortions with behavioural and emotional effects. Cognitive distortion plays an important role in mediating the pain-depression association in chronic pain patients. The final construct, “cognitive content”, refers to the specific thoughts and feelings that patients experience prior to the worsening of pain and during an intense pain episode, as well as following a pain episode, all of which contribute to the present pain experience and subsequent episodes (Turk & Rudy, 1992).

Self-efficacy, a term coined by Bandura (1977) suggests that given the right amount of motivation to engage in a behaviour, it is an individuals self-efficacy beliefs that will determine how he will progress to the completion of goals in the face of adversity. Self- efficacy beliefs are influenced by various sources of information but for chronic pain patients in particular, physiological states are an important source. The learned helplessness model, which refers to the belief that effective solutions are not available to reduce the source of stress may lead to emotional, motivational and cognitive deficits in coping with stressors. This model has been widely used to understand how learned helplessness is induced in RA patients because of the chronic, unpredictable and uncontrollable waxing and waning of physical symptoms characteristic of the disease (Nicassio, Wallston, Callahan, Herbert & Pincus, 1985). When learned helplessness is induced in certain RA patients, they are often found to



be depressed because of their perception that their physical symptoms are uncontrollable.

The way an individual copes with chronic pain may serve to exacerbate or reduce the severity of pain experienced. Cognitive coping strategies play a significant role in this regard. Adaptive coping strategies and decreased catastrophizing (negative thoughts likely to increase distress) have been associated with decreased disability and reduced pain intensity in back pain patients (Rosentiel & Keefe, 1983; Turner & Clancy, 1986).

### *Alternate View on Pain*

Several alternate views have been proposed to understand the complexity of persistent pain and disability. The biomedical model, which takes a linear view between symptom perception and biological state, has been found to be inadequate. The “pain-prone personality” (Engel, 1959), which represents the psychogenic view of pain, suggests that individuals who present with persistent pain complaints are predisposed to experience pain because of various social and psychological factors. Turk and Rudy (1992) describe the motivational view as an individual’s attempt at secondary gain from reporting pain, although there is insufficient tissue pathology to justify the reported severity of pain. The assumption is that these individuals are motivated by financial gain, because they would receive monetary compensation for their pain experience. In the operant conditioning view (Fordyce in Turk & Rudy, 1992) it is suggested that when an individual is exposed to a stimulus that causes tissue damage, the immediate response is to attempt to escape from noxious sensations. The operant conditioning model is concerned with the overt manifestations of pain (or pain behaviours) that are subject to the principles of operant conditioning. Finally, the gate control model of pain (Melzack & Wall, 1983) provides a physiological basis for the role of psychological processes in chronic pain.

### 3.5.2 Functional Impairment

Acknowledging Pope and Tarlov's (1991) view, Parker and Wright (1997) state that functional impairment or disability may be seen as a process which evolves from a pathological biomedical state into a social situation that may be influenced by a multitude of factors, including psychological ones. This is in accordance with WHO's (1980) definition which states that disability is any restriction or lack (resulting from impairment) of ability to perform an activity in the manner within the range considered normal for a human being.

The Institute of Medicine in the Academy of Sciences describes the process of disability in four stages (in Parker & Wright, 1997). Firstly, there is damage to the cells or tissues in the body because of the disease process or from severe injuries sustained, although these body conditions do not imply a disability. The evolution of the pathological body state, the second stage, into an impairment of one or more organ systems does not automatically lead to disability. Thirdly, organ system impairment may develop into functional limitations, which, with the correct type of intervention, may still not lead to disability. In the fourth and final stage, the consequences of certain functional limitations may be the restricted ability to enact necessary social roles, for example, the inability to utilise public transport, meeting with prejudice, and uncompromising attitudes at work which prevents the modification of one's work schedule due to physical limitations. It is in this context that disability occurs, as the individual is prevented from full participation in valued social activities. Psychological and social variables play an important role in the way disability progresses (Newman & Mulligan, 2000). These psychosocial factors are in turn related to demographic factors such as education and the status of employment.

Many disabled people may have to cope with unemployment, loss of income, social isolation and a certain degree of dependency on others (Locker, 1983; Anderson *et al.*, 1985). RA patients and other patients with chronic and disabling conditions have to initially learn how to cope with severe physical symptoms before they consider the social consequences of the disease. RA patients are also faced with disability caused by tissue damage in the joints, making them stiff and limited in their range of



movements. Pain may at times be worsened by disease activity, which means that RA patients are often faced with intense levels of pain as well as disability, that restricts their physical capacity to engage in activities of daily living. Functional disability is established within the first year of the onset of the disease (Meenen, Kasiz, Anthony & Wallin, 1991) and tends to deteriorate with the disease course.

### **3.5.3 Affective Components: Learned Helplessness and Depression**

Psychological well-being forms an important component of the quality of life of individuals living with a chronic illness. The affective states depression and learned helplessness are often present in individuals who have to face the chronicity of their illness experience.

Pioneering work on learned helplessness has been conducted by Seligman (1975). Seligman (1975) proposed that when an individual is unable to control the events in her life, she learns that she cannot affect outcomes and, therefore, ceases to try. The reaction to repeated exposure to uncontrollable events that does not allow the individual to affect change, is called learned helplessness.

According to Seligman (1975), the main cause of learned helplessness is the recognition that response and outcome are independent (i.e. the probability of achieving a given outcome is the same whether or not responses are made). In the context of chronic illness conditions, individuals may develop learned helplessness when they fail to affect outcome (i.e. improved health status) despite trying over a prolonged period of time. The phenomenon of learned helplessness is particularly useful in trying to understand the affective status of an individual afflicted with a chronic, progressive, debilitating disease, such as RA.

Seligman (1975) has also suggested that learned helplessness may also be associated with depression. He argues that there are similar factors that produce depression and cause helplessness. Both learned helplessness and depression are characterized by passive behaviour, negative expectations, and hopelessness. Individuals who do not have control over their lives and cannot effect change develop a conditioned

helplessness response, as well as depressed mood. Helplessness may then develop into depression (Seligman, 1975).

Being diagnosed with a chronic disease often causes emotional distress in the affected individual. In many cases the extent of the distress decreases over time as the person adapts to the illness condition (Rodin, Craven, & Littlefield, 1991). A sub-group of individuals, however, do not fare well and their continued state of emotional distress leads to the onset of depression. Depression is the most common psychological disturbance associated with medical illness (McEvoy & DeVellis, 1993).

The presence of depression in the rheumatological diseases is difficult to detect because the symptoms of depression overlap with the symptoms of the illness condition. Depression may cause the worsening of a medical condition, which is often confused with a deterioration of the disease state, causing doctors to change their treatment plans and often over-medicate. Functional decline in rheumatological disorders is often associated with depression.

Depression can be debilitating as demonstrated in a study on the impact of depression on functioning by Wells *et al.* (1989). They found that people with depressive disorder or depressive symptoms, in the absence of comorbidity, had functioning comparable to, or worse than individuals with eight chronic conditions, including arthritis.

### *Depression and RA*

Bishop (1988) notes the complexity of trying to understand the onset of depression in any chronic illness, including RA. The author suggests six possible factors related to the onset of depression in RA. *First*, depression in RA may be related to the normal mood changes that individuals experience, generally. *Second*, depression may be the result of a “depressive personality” when individuals tend to look at life pessimistically. *Third*, depression may be related to a particular psychiatric disorder such as a Major Depressive Disorder in a sub-group of patients. *Fourth*, psychological distress may be the psychosocial response to RA. *Fifth*, the stress associated with RA

may exacerbate depression in an individual who has a premorbid depressive style. *Sixth*, depression may be attributed to biological changes, which may cause disability or may be secondary to medication. It is important, therefore, to consider the possible combination of factors when assessing depression in RA or other chronic illness.

Certain sub-groups of RA patients may be more at risk for developing psychological disturbance such as anxiety and depression. A sample of female patients whose blood serum was negative for rheumatoid factor tended to score higher on the Middlesex Hospital Questionnaire than serum-positive females Crown *et al.* (1975). In addition both male and female RA patients with serum negative blood results received higher scores on the questionnaire than did the serum-positive patients. In another study conducted by Vollhardt *et al.* (1982) it was found that despite the fact that RA patients were matched for duration and severity of illness, serum-negative patients tended to score higher on the Profile of Mood States (POMS) and the Brief Symptom Inventory than serum-positive patients. These findings indicate that the pathways between disease, psychological and other biological mechanisms must be considered when assessing the presence of depression in RA. Perusal of the literature indicates, however, that there isn't to date a theoretical framework within which depression and RA might be understood. In addition numerous studies have focussed on the prevalence of depression in RA, with fewer studies concentrating their efforts in trying to understand the possible direct and indirect pathways that exist between the disease and psychological state.

### **3.6 Psychosocial Factors affecting Quality of Life**

Psychosocial factors have been considered to play an etiological role in the onset of disease, and a mediating role between disease and disease related quality of life. Substantial evidence has been gathered in support of existing theory about the mediating and moderating effects of psychosocial factors such as cognition, coping and social support in illness outcome, including chronic illness outcome (health related quality of life).

In this chapter the theoretical underpinnings of the link between psychological constructs and illness, including chronic illness are presented. This precedes a review of the background literature relevant in this study, in Chapter Four, which contains a large body of research presented, critically, in order to assess its contribution to the theories developed in the field of health psychology.

### **3.6.1 Stress, Illness and Coping**

#### **3.6.1.1 Theories of Stress**

According to Brannon and Feist (2000) the term stress has been defined, in everyday use, in three different ways: as a stimulus (an environmental stimulus), as a response (a physical response) and as an interaction (interaction between environmental stimuli and the person).

Selye first introduced the term stress in 1936 and researched stress as stimulus at first and later as a response. The response based view of stress focused on the biological aspects of the stress response. Selye (1974) adopted a generalist's position and defined stress as the non-specific response of the body to any demand made upon it (Chohan, 1984). He researched the effects of stress on physiological responses and attempted to connect these reactions to the development of illness. Selye (1974) used the term stressor to refer to the stimulus and stress to mean the response.

#### *The General Adaptation Syndrome (GAS)*

The body's generalised attempt to protect itself against noxious stimuli was referred to by Selye (1974) as The *General Adaptation Syndrome (GAS)*. The three stages initially proposed for GAS were as follows: *alarm, resistance and exhaustion*. In the first stage (alarm) the body's defenses against a stressor are set in motion through the activation of the sympathetic nervous system. This system prepares the body for a "fight or flight" response. Adrenalin is released, heart rate and blood pressure increase, respiration becomes faster, blood is diverted away from the internal organs

toward the skeletal muscles, sweat glands are activated and the gastrointestinal system decreases its activity.

In the resistance stage, the organism adapts to the stressor. The duration of this stage depends on the severity of the stressor and the adaptive capacity of the organism. The greater the adaptive capacity, the longer the resistance stage will continue. Continued stress Selye (1974) states may lead to the onset of diseases of adaptation such as peptic ulcers and hypertension. Further, resistance to stress would cause changes in the immune system, increasing the risk of infection (Selye, 1974).

In the exhaustion stage, the parasympathetic division of the autonomic nervous system is activated. Exhaustion and death may occur when bodily resistance to the alarm raised in response to a threat, is inadequate. In the 70s Selye (1974) conceded that GAS does not occur in all stressful encounters but only in certain ones (Lazarus, 1974) and that there are specific and non-specific aspects of stress.

Selye's view of stress prompted many investigations in this area of study and also led to the development of stress measures. Holmes and Rahe (1967), and Pearlin and Schooler (1978) have identified a large number of stressful events including divorce and death of a loved one (refer Holmes & Rahe's Social Readjustment Rating Scale, 1967) and marital strain and parental strain (refer study by Pearlin & Schooler, 1978). Another approach to studying stressors is to focus on minor, everyday "hassles" as being significant in health outcomes as opposed to major events (refer to Hassles and Uplifts Scale: Kanner, Coyne, Schaefer, & Lazarus 1981 in Feurstein *et al.*, 1986).

### *Stress and Disease*

At the time Selye was working on his stress formulation, Wolff (in Feurstein, Labbe, & Kuczmierczyk, 1986) began to describe a number of diseases that were considered to be influenced by life stress. Presently, there is a growing body of evidence that suggests a relationship among the nervous, endocrine and immune systems (Brannon & Feist, 2000). There are numerous pathways through which stress might produce disease (Herbert & Cohen, 1994). Stress effects are both direct and indirect. Direct



effects could occur through the effects of stress on the nervous, endocrine and immune systems. Indirect effects could occur through health behaviours that can increase the risk for disease.

Stress research has linked major life events to illness onset in the Holmes and Rahe (1967) tradition in physical conditions such as CHD and cancer (Pitts, 1991). Minor, everyday life events commonly referred to as “daily hassles” have also been found to be predictors of psychological distress (Kanner *et al.*, 1981), although there isn’t sufficient evidence that “daily hassles” predicts illness.

Zegans (1982) has proposed a model linking stress to illness, viewing stress as a response variable (McHugh & Vallis, 1986). The stress response involves multiple stages including appraisal of the event, attempting to find coping strategies, the actual stress response, and finally the way in which the response alters body functioning. An individual’s failure to cope may lead to illness.

One of the major criticisms of Seyle’s (1974) approach to stress is the overemphasis on physical responses. Insufficient attention has been paid to psychological factors, including emotional factors, and the subjective interpretation of stressful events (Mason, 1971). Both Mason (1971) and Lazarus (1977) have opposed Seyle’s (1974) general theory of stress, proposing one of specificity, as outlined below. Their argument for this is two-fold. Firstly, Mason (1971) states that the response of the body may vary according to the nature of the stressor or “assault” on it. Secondly, “GAS may depend on psychological mediators rather than on physiologically noxious stimuli” (Lazarus, 1977, p. 17).

Three factors are important in the specificity theory of stress (Lazarus, 1974). These are:

- (1) the exact nature of the environmental demands
- (2) the quality of the emotional reaction to the demands and
- (3) the process of coping activated by the stress.

Lazarus (1974) concludes the generality/specificity debate by stating that an integrated approach is most desirable, although a strong point in favour of the specificity view of stress is its allowance to seriously take cognisance of psychological factors, such as personality features of the individual concerned and her coping mechanisms.

Lazarus's (1974) theory of stress and coping is an important one in this study because the cognitive and behavioural aspects of coping are hypothesised to predict quality of life (or health outcome). Coping is also hypothesised to moderate the relationship between RA, a chronic illness condition, and health related medical and psychological quality of life components. Coping in this study is conceptualised within the stress and coping paradigm of Lazarus (1974), which is presented in section 3.6.2.2.

### 3.6.1.2 Stress and Coping

#### *Definition and Conceptualisation*

Since the early 1970s there have been many research attempts to assess the basic dimensions of coping. Taylor (1990) points out that until recently studies on coping were not conducted with sufficient scientific vigor and that researchers studied the same phenomena in different ways using different concepts, measures and methods. The field of health psychology, however, has provided the framework within which psychologists could contribute towards achieving greater conceptual clarity with respect to the concept of coping.

Research has been conducted in refining the concept of coping, arriving at greater conceptual clarity and developing measures. Studies carried out by Pearlin and Schooler (1978), and Folkman and Lazarus (1980) have been widely recognised and quoted in the literature. Pearlin and Schooler (1978) assert that in order to contextualise coping, distinction needs to be drawn between *social resources*, *psychological resources* and *specific coping responses*. Interpersonal networks such as family and friends, present actual and potential social resources. Psychological resources are the personality characteristics, such as self-esteem, self-denigration and

mastery that people utilise during stressful episodes. Coping responses “represent some of the things that people do, their concrete efforts to deal with the life-strains they encounter in their different roles” Pearlin and Schooler (1978, p. 5). Another important concept is that of coping efficacy, which Pearlin and Schooler (1978) explain to be the effectiveness of people to deal with “life-strain”. A cross-sectional study conducted by Pearlin and Schooler (1978) investigated adult’s ability to cope with stressful situations. Three major coping styles were identified:

- (a) responses that change the situation,
- (b) responses that change the appraisal of the stress, and
- (c) attempts aimed at controlling distress.

Pearlin and Schooler (1978) conclude that the importance of social context must also be recognised. When coping attempts fail, it might be an indication of the failure of the social system of which the individual forms part.

A widely used model of coping in health research is embedded in the cognitive-phenomenological theory of psychological stress developed by Folkman and Lazarus (1980). Attention is given to the psychological and environmental context in which coping take place. Within the theoretical framework of stress and coping, stress is conceptualized as “a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering well-being” (Folkman, Lazarus , Gruen & DeLongi, 1986 , p. 572 ), and coping as “the cognitive and behavioral efforts made to master , tolerate , reduce external and internal demands and conflicts among them” (Folkman & Lazarus, 1980, p. 223).

If the concept of coping includes ego-defences, which deal with threats to one’s psychological integrity, it may be seen to originate in psychoanalysis (Lazarus, 1993). The psychoanalytic premise is that psychopathology is associated with a particular defensive style. Freud’s psychosexual theory underpins the notion of defensive style. The following three developmental variables have been identified as playing an important role in determining defensive style in Freud’s psychosexual theory: (a) the psychosexual stage of development at which a child undergoes trauma, (b) the



primary impulses and conflicts of each particular stage, and (c) the child's cognitive functioning at each stage which shapes the defensive style. Lazarus (1993) argues however, that this formulation is conceptually "neat" but is not often seen in clinical practise.

Using the developmental psychoanalytic formulation as a basis for theoretical development some researchers proposed a hierarchical approach to coping (Haan, 1969; Vaillant, 1977, in Lazarus, 1993). Coping was seen by Haan (1969) to be the healthiest process of adaptation, with defense as a neurotic process and ego-failure as the most severely regressed adaptive process Lazarus (1993).

In keeping with the above view of coping it is clear that the concept was originally used to understand the underlying mechanisms involved when individuals are faced with a stressful encounter, such as the death of a significant other. This concept of coping was soon extended to the health psychology arena and was used to explain how this psychological construct mediated between acute, terminal, chronic and other categories of illness, and health outcome measures.

### *Process Approach to Coping*

In the 1970s there was a shift in focus on the concept of coping from a style to a process approach in which temporal and contextual dimensions were emphasised. Coping changes over time according to the situation in which it occurs. Coping as process is central to this investigation.

In the stress and coping theory of Folkman and Lazarus (1980), cognitive appraisal and coping are recognized as two processes which are important mediators of stressful person-environment relationships and their immediate and long-term outcomes.

*Cognitive appraisal* is a process through which an individual evaluates his or her experience with the environment. In *primary appraisal*, the individual attempts to evaluate whether there were personal losses or gains in his or her encounter with the environment. In *secondary appraisal*, the individual attempts to evaluate whether

some action may be taken to overcome a potentially harmful situation or whether positive action may be taken to enhance a potentially beneficial situation. An individual's primary appraisal is followed by the secondary appraisal to determine whether her encounter with the environment will have a bearing on her sense of well-being. The encounter may pose as a threat or as a challenge. According to Folkman *et al.* (1986), an individual's coping efforts must not be viewed as good coping or bad coping: coping should be defined as an individual's efforts to manage demands, whether or not the efforts are successful.

The theory of coping emphasises that there are two functions of coping: *problem-focussed* and *emotion-focussed* (Folkman *et al.*, 1986) These two theoretically derived functions of coping were subjected to empirical analysis. In a study of how a middle-aged community sample coped with stressful events over a twelve-month period, Folkman and Lazarus (1980) found that both problem and emotion focussed coping were used and that generally people were more variable than consistent in their coping patterns. In addition, work contexts favoured problem-focussed coping and health contexts favoured emotion-focussed coping. In a separate study concerning the self-reports of how college students coped with a stressful examination, also confirmed the problem – and - emotion focussed functions of coping (Folkman & Lazarus, 1985).

On further exploration of the stress-coping paradigm, Folkman and Lazarus (1988) acknowledged the importance of considering coping as mediating the emotional outcome in a stressful encounter. Coping as a mediator of emotion in two community based samples was associated with changes in all four sets of emotions evaluated; some forms of coping were associated with increases in positive emotions and others with increases in negative emotions.

The following five principles sums up of the process approach as elucidated by Lazarus (1993):

- (1) Coping thoughts and actions must be measured separately from their outcomes so that their adaptiveness or maladaptiveness can be independently measured.

- (2) The context in which a stressful encounter occurs and what an individual does to cope is important. The way an individual copes will change over time as particular aspects of the stressful experience will also change. A case in point is a chronic illness such as RA as the course of the disease is unpredictable and the sufferer has to cope with periodic flare-up of symptoms. The different stages of the disease, therefore, will present certain challenges (the stressful encounter) to the individual with RA.
- (3) Coping measurement should include a description of what a person is thinking and doing in the effort to cope with stressful encounters. An emphasis on contextual features and coping inconsistency over time and across encounters implies a process approach as opposed to the trait approach, which emphasises coping consistency over time and across encounters.
- (4) The definition of coping as “ongoing cognitive and behavioural efforts to manage specific external and /or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus, 1993, pp 237) provides the impetus to research coping independently of the outcome.
- (5) The two major functions of coping are problem-focussed and emotion-focussed. Lazarus (1993) states that the function of problem-focussed coping “is to change the troubled person-environment relationship by acting on the environment or oneself”; and the function of emotion-focussed coping “is to change either a) the way the stressful relationship with the environment is attended to (as in vigilance or avoidance), or b) the relational meaning of what is happening, which mitigates the stress even though the actual conditions of the relationship have not changed” (p. 238).

Another crucial aspect of the transactional approach to coping, which emphasises the dynamic interaction between person and environment, is that it addresses the relationship between coping and the emotions. Folkman and Lazarus (1988) have proposed the theory that coping is a mediator of the emotional response. They state that the relationship between the emotions and coping in stressful situations is bidirectional, with each affecting the other. This is a shift from previous theoretical

models which have viewed emotions and coping as having a unidirectional, cause-effect relationship.

An individual's appraisal of an apparently stressful encounter is significant in the bidirectional model of emotions and coping. The process of appraising a situation as harmful, beneficial, threatening or challenging generates emotion. The appraisal and the associated emotions influence the coping processes, which in turn alters the person-environment relationship. This altered person-environment relationship is re-appraised, a process which leads to a change in the quality and intensity of the emotion. In the final analysis therefore, coping is seen as mediating the emotional response.

When developing instruments to measure coping, the focus should be on what an individual is thinking (cognitive aspects of coping) and doing (behavioural aspects of coping) in an effort to cope with the stressful encounter (Lazarus, 1993). In keeping with Lazarus and Folkman's (1980) stress and coping paradigm, the Ways of Coping Questionnaire was devised (Lazarus *et al.*, 1980) using factor analysis, which yielded a number of different coping dimensions. Within this framework contextual influences and coping inconsistency over time and across stressful encounters are considered. The eight empirically derived factors contained in the questionnaire were:

- Confrontive coping (when an individual verbally asserts her rights)
- Distancing (emotional and cognitive distancing from the stressful situation)
- Self-controlling (privatising feelings and the negative aspects of the stressful situation)
- Seeking social support (actively seeking the help of others by disclosing feelings)
- Accepting responsibility (cognitive re-structuring to accept responsibility)
- Escape-avoidance (wishful thinking and negative behavioural attempts to improve mood state)
- Planful problem solving (cognitive and behavioural problem-solving attempts)
- Positive reappraisal (assessing personal growth experience following the stressful event)

Many questionnaires have since been devised based on the process approach to coping that is located within the stress and coping paradigm of Lazarus and Folkman (1980). These include generalised scales such as the COPE measure (Carver *et al.*, 1989), and specific measures developed for use in illness conditions such as RA (London Coping Scale: Newman *et al.*, 1990).

### **3.6.2 Social Support**

Social support, a coping resource, has generated a proliferation of research on its beneficial and ill-effects. Revenson (in Giles, 1990) provides a succinct definition of social support which takes into account both psychological and physical well-being. She defines positive social support as:

the processes by which interpersonal relationships promote psychological well-being and protect people from health declines, particularly at times when they are facing stressful life circumstances (p. 93).

The beneficial effects of social support have been well researched although Cohen and Wills (1985) point out that variation in the conceptualisation and measurement of social support exists, yielding conflicting results. In addition they say that the inconsistencies in findings may be attributable to aspects of methodology and statistical technique.

Specifically, many prospective, epidemiological studies have shown that social support is related to mortality (Berkman & Syme, 1979; Blazer, 1982; House, Robbins & Metzner, 1982). While the exact relationship between social support, mental health outcomes and physical illness outcomes remains unclear, there is evidence that a lack of positive social support leads to negative psychological states such as anxiety and depression (Cohen & Wills, 1985). The negative psychological states may then influence physical health either through a direct effect on physiological systems that influence vulnerability to disease, or through behavioural patterns that increase risk for disease and mortality.

In a review article on the buffering effect of social support during stressful episodes, Cohen and Wills (1985) conclude that the positive association between social support and well-being has been supported, both, by the *main-or direct-effects model* (which evidences support for the overall benefits to social support), and the *buffering model* (which evidences support for the persons of potentially stressful episodes). Support as main effect may be explained by the fact that beneficial effects of social support occur because large social networks provide the recipient of support with regular positive experiences and a sense of stable and reinforced relationships with significant others in their social structure. This helps to increase an individual's self-worth and decrease the possibility of the onset of a psychological or physical disorder. Within the context of the "buffering model", social support is viewed as a form of protection from the ill-effects of a stressful situation. Stress in this instance may be viewed as arising when one appraises a situation as threatening and does not have the appropriate coping responses (Lazarus, 1966; Lazarus & Launier, 1978). The way in which an individual appraises a stressful event may lead to negative outcomes such as negative affect, elevation of physiological responses and behavioural adaptations. In extremely stressful encounters, which exhaust the individual's capacity to cope, stress may disrupt the neuroendocrine and immune system functioning and may lead to the onset of destructive health behaviours such as excessive alcohol use (Cohen & Wills, 1985). Social support effects, therefore, may disrupt the causal link between stress and illness as outcome by its positive influence on the individual exposed to the stressor.

House and Kahn (1985) suggest three categories of support measures: social networks, social relationships and social supports. Social networks refer to measures originating from formal network theory, including measures of network size, density, multiplexity, reciprocity, intensity, frequency and homogeneity. Social relationship measures examine the existence, quantity and type of existing relationships and, finally, social support measures examine resources provided by others with various measures assessing type, source, quantity, or quality of resource.

Studies measuring support in terms of social network support report direct effects as compared to studies that have looked at aid, resources and emotional support from specific people in the network of support that have reported buffering effects (Cohen

& Wills, 1985). Support benefits are pertinent to the elderly as they are more likely to be socially isolated and suffer chronically debilitating illnesses, and are more at risk to suffer health decline as a consequence of an inadequate support network.

Cohen and Wills (1985) distinguish between structural and functional support measures. “Structural” referred to the measures, which described the existence of, and interconnections between social ties, and “functional” referred to measures, which assessed whether interpersonal relationships served particular functions. Lieberman (1986) has observed that there has been a move away from structural perspectives towards functional aspects of social support as psychology has become increasingly interested in the nature of the relationship between those who provide help and those who receive it.

Insightful and in-depth research on social support has found evidence for complex social interactions and has refuted the view that all social support is beneficial. Non-supportive social relations must also be considered. Individuals respond differently to positive and negative experiences, weighting negative information about others more heavily than positive information. Researchers in this area of social psychology have put forward the argument that negative experiences have greater impact because they are more rare and therefore more salient. In a study investigating the negative side of social interaction and its impact on older women’s psychological well-being, Rook (1984) found that negative social interactions have more potent effects on well-being than positive social interactions. In a study of cancer patients Dunkel-Schetter (1984) concluded that for social support to be considered adequate, one must take into account not only the amount of support an individual receives but also the type of support offered. Different kinds of social support such as emotional, tangible, informational and appraisal support have been found to be beneficial only in particular situations (Cohen, 1988; Dunkel-Schetter, Folkman & Lazarus, 1987). In addition people tend to use their support resources differently, some under-utilising it (Dunkel-Schetter *et al.*, 1987).

Another interesting development in social support research is that some people hold negative perceptions of what appeared to be well-intended positive social support (Rook, 1984). In a study of 120 widowed women between the ages of 60 and 89 Rook

(1984) found that negative social outcomes were strongly and more consistently related to well-being than positive social outcomes. Revenson (1990) (in Giles, 1990) provides the following explanation for the term negative support:

The term 'negative support' has been used to describe the provision of support that does not meet the recipient's needs or is perceived by the recipient as non-supportive (i.e., harmful or inconsequential) (p. 95).

### **3.6.2.1 Social Support in Chronic Illness Conditions**

The mediational role of social support has been extended to examine the etiology of physical illness and the way it mediates psychological outcome in individuals with poor quality of life. While there is convincing evidence that social support is positively associated with positive health outcomes, its role in illness, including chronic illness, onset remains inconclusive (Holahan & Moos, 1986; Sarason & Sarason, 1984; Wallston, Alagna, De Vellis, & De Vellis, 1983).

An individual's perception of support from her social network without any actual support being received, may have greater impact in facilitating adjustment to stressful life events and in predicting health outcomes (Kutner, 1987). Other factors related to the quality of social support received are gender, socio-economic status and the nature of the physical and/or psychological disadvantage that an individual has (Kutner, 1987). Further, while it has been generally accepted that social and community ties may protect against a wide variety of disease outcomes, it is important to understand the dynamics of the relationship between social networks and health status. Berkman and Syme's (1979) study suggests that social circumstances such as social isolation may have pervasive and adverse health consequences and that certain social factors may influence host resistance and affect vulnerability to disease in general.

Microgenetic research into the effects of social support in samples with different characteristics is crucial because the availability of resources most often dictated by socio-economic status will determine the type of support and the extent of the support given. Despite the extensive research conducted in this area, controversy still exists as



to the best way to measure support and identify the psychological and biological pathways that affect health (Cohen, 1988). Social support is one of the important psychosocial variables that impacts on the quality of life of individuals afflicted with a chronic illness condition.

### **3.6.3 Cognitive Factors in Chronic Illness Conditions**

As has been stated earlier, psychosocial factors, which include cognitive factors, are known to impact on the quality of life in chronic illness. An individual's cognitive construction of her illness may act independently to influence quality of life, or may interact with other psychosocial factors, such as coping, to influence quality of life. Illness cognition may, for example, impact on the cognitive aspects of the coping process, which will ultimately affect psychological and "medical" illness status. There are various interacting pathways between socio-demographic factors and disease factors, psychosocial factors (including illness cognition), and health related quality of life.

#### **3.6.3.1 Illness Cognition**

##### *Conceptualising Illness Cognition*

Definitions of illness cognition indicate that individuals are not passive victims of illness but actively process, interpret and act upon illness-related information. Illness cognition is defined by Croyle and Ditto (1990) as follows:

Any mental activity (e.g. appraisal, interpretation, recall) undertaken by an individual who believes himself or herself to be ill, regarding the state of his or her health and its possible remedies (p. 32).

Croyle and Barger (1993) point out, however, that Croyle and Ditto's (1990) definition of illness cognition is not broad enough and does not encompass aspects of

cognition related to illness (i.e. illness-related beliefs) in, for example, well populations.

Marteau (1989) has pointed out that the beliefs and attributions that people hold can influence their health indirectly by affecting their behaviour, which in turn affects a physiological system such as the immune system. Three cognitive models of behaviour based on an expectancy-value approach to motivation may be applied in a health context (Marteau, 1989). These models assert that individuals are motivated to maximise gain and minimise losses.

The first of these theories is Rotter's social learning theory, from which the concept "locus of control" derives (in Marteau, 1989). Locus of control, a generalised expectancy, refers to whether one's own behaviour (internal control) or forces external to oneself (external control), control reinforcements. The second theory is Fishbein's theory of reasoned action, which asserts that most human behaviour is under voluntary control and is, therefore, largely guided by intention, has become a major model in health promotion. It is the individual's attitude towards a behaviour as well as factors in the social environment that are important predictors of behavioural intention (Fishbein & Ajzen, 1975). One of the main limitations of their original model was the fact that intention does not automatically lead to the appropriate behaviour (Pitt, 1991). A modification of the original theory became known as the theory of planned behaviour, which incorporates "individual's perception of control or potential control which may modify behaviour directly or indirectly via the link to intentions" (Fishbein & Ajzen, 1985).

The third and final model is Becker's (1974) Health Belief Model (HBM) that was developed specifically to explain and predict behaviour in health contexts. It is the contention of the HBM that whether an individual decides to take a particular course of action will depend on numerous factors including the perception of their susceptibility to the illness, the seriousness of the illness, and the cost-benefit ratio of taking a particular course of action. While the model has been successfully applied to predict preventative health behaviour, for some behaviours perceived severity may be less important for preventative behaviours than either perceived vulnerability or cost-benefit considerations (Cleary, 1987 in Pitts, 1991).

Ogden (1996) presents a more comprehensive criticism of the HBM and raises other issues such as the model's failure to include the role of emotional factors, its static approach to health beliefs, and the fact that it did not take into account the interrelationship between the different core beliefs. Becker and Rosenstock (1987) revised the HBM to include alternate factors that might predict health behaviour such as the concept of self-efficacy. The protection motivation theory (PMT) developed by Rogers (1985) expanded the HBM. PMT views health-related behaviours as a product of the following four components, which predict behavioural intentions:

- Self-efficacy,
- Response effectiveness,
- Severity, and
- Vulnerability.

Rogers (1985) has introduced fear, in response to education or information, as the fifth component. PMT describes severity, vulnerability and fear as relating to threat appraisal and self-efficacy and response effectiveness as relating to coping appraisal. Two sources of information, according to the PMT, are environmental and intrapersonal, that influence the five components of PMT, which in turn elicit either an "adaptive" or "maladaptive" coping response.

While there has been support for the PMT (e.g. Rippetoe & Rogers, 1987), criticism has also been levelled against the theory. Of note is the fact that PMT assumes that all individuals process information rationally. Also, it does not take into account social and environmental factors.

Other models that explain predictions in health behaviours include social cognition models and the health action process approach. Both these models will be discussed, briefly. Social cognition models examine factors, which predict behaviour and/or behavioural intentions. The model also examines why individuals fail to maintain a behaviour, which they are committed to. Bandura (1977, 1986) developed the social cognition theory that suggests that behaviour is governed by expectancies, incentives,

and social cognitions. Social cognitions are key to social cognition models that attempt to place individuals within the context of other people and a broader social structure. Schwarzer (1992) developed the health action process approach. After reviewing the literature, Schwarzer (1992) emphasised the need to include a temporal element in the understanding of beliefs and behaviour. The importance of self-efficacy as a determinant of both behavioural intentions and self-reports of behaviour is also emphasised. This approach differs from the other theories in that it makes a distinction between a decision-making/motivational stage and an action/maintenance stage. Individuals initially decide whether or not to carry out a behaviour (motivation stage) and then make plans to initiate and maintain this behaviour (the action phase).

### **3.6.3.2 Cognitive Process in Illness**

#### *Attribution*

Illness cognition can be understood within the context of attribution theory. Attribution theory, according to Kelly and Michela (1980) is “the study of perceived causation ... , the term attribution referring to the perception or inference of cause (p. 458). Attribution involves systematic assessment and/or manipulation of antecedents (which refers to the information gathered and the beliefs and motivation of the individual). Research in attribution is concerned with the consequences of attributions. The consequences refer to the assessment and/or manipulation of perceived causes and measurement of their effects on behaviour, feelings and expectancies.

Causal explanations, which are centrally linked to attributional process, have been fairly extensively researched within the health context. In patients with chronic illness such as diabetes and rheumatoid arthritis, causal attributions are made about the onset of the illness as well as the recurrent acute episodes that they experience. Causal attributions, therefore, may differ from day to day or during each illness episode. Lowery, Jacobson and Murphy’s (1983) study on causal thinking of arthritic patients found that 15% of these patients did not have a causal explanation for their illness and were found to be significantly more anxious, depressed and hostile than those giving

causes. For those patients who did provide a cause for the illness, it was attributed to external factors, in keeping with Weiner's (1979) theory that people tend to ascribe failures externally to help maintain a positive view of themselves.

The attributes of an illness cognition affects the way in which a patient copes with an illness and also plays a crucial role in appraising coping outcomes (Leventhal, Diefenbach & Leventhal, 1992). Cultural and personality factors are also important contributors to the way in which an individual constructs explanations for his or her illness as well as the way he or she copes with it.

### *Common-Sense Models of Illness*

It is important to take cognisance of the individual's understanding of his disease, as it is often not consistent with medical points of view. The way in which an individual copes with his illness is also integrally related to the personal meaning the illness holds. Individuals generally attempt to solve difficulties they are faced with and are not passive recipients of problems they encounter. The way in which an individual attempts to resolve a problem is determined by his perceptions and interpretations of that specific situation. Leventhal, Meyer and Nerenz (in Rachman ed., 1980) have referred to the individual's development of perceptions and reactions to the threat of illness as "common-sense models of illness".

Leventhal and Nerenz (in Karoly ed., 1985) have emphasised the importance of the concept of content in developing a theory of illness cognition. They describe three stages of processing that underlie the development of a common-sense model. *Problem representation* is the first stage, which involves a set of attributes that identify the features of the problem and goals for action. *Action plan*, the second stage, refers to the coping responses of individuals to the problem representation. The last stage, the *process of appraisal* refers to the evaluation of progress or the lack of it towards certain goals.

Within each stage of the common-sense model proposed by Leventhal and Nerenz (in Karoly ed., 1985), additional variables need to be considered. With specific reference

to illness representation, four attributes were identified: *identity*, *consequence*, *causes* and *time line*. Identity refers to the factors that identify the presence or absence of the illness and consequence to its perceived physical, social, economic and emotional consequences. The perceived causes of the disease refer to both internal factors such as genetic factors and poor diet, and external factors such as negative factors in the environment like bacteria and viruses. Time line is the attribute that refers to the perceived time frame for the development and duration of the illness threat.

To test the common-sense model Lau and Hartman (1983) conducted an investigation among college students who had recently suffered a minor illness like influenza and found evidence for a fifth attribute, how most people think about their illness. The steps that an individual takes to recover from an illness they refer to as, “cure”. Bisop, Briede, Cavazos, Grotzinger and McMahan (1987) found evidence for all five attributes of illness cognition among a group of students who were asked to comment on hypothetical illness situations. Pitts (1991) however, points out that despite the portrayal of the individual as a dynamic being evaluating her actions, the common-sense model has not triggered much research to test its premise and has not prompted questionnaire construction as the health belief model has.

### *Lay Concepts of Illness*

Lay concepts of illness, as compared to the common-sense model of illness, is based on the premise that the cultural influence of the group to which the individual belongs impacts on that individual's understanding of her illness. Fitzpatrick (in Fitzpatrick, Hinton, Newman, Scambler & Thompson eds., 1994) has emphasised the anthropological contribution to the understanding of the lay concept of illness, particularly as a cross-cultural phenomenon. Different societies have provided varied explanations of illness. A widely quoted study mentioned by Fitzpatrick (1984), is that of Evans-Pritchard (1937) who examined the beliefs about misfortune held by the Azande of Sudan. Witchcraft was a widely held belief for any negative life experience that the Azande had to face, including illness. Snow (1974) found that working-class blacks who were raised in the rural southern regions of the United-

States provided explanations for illness which fell into one of the following three categories:

- (1) natural and environmental hazards ,
- (2) punishments from God , and
- (3) spirits and witchcraft .

A few studies have investigated the content of western lay beliefs. Blaxter (1983), for example, using a sample of working-class, middle-aged women in Scotland, found that infection was quoted as the most commonest reason for ill-health, followed by heredity, environmental hazards, secondary effects of other diseases, stress, child-bearing and menopause, and finally, trauma and surgery. Similar findings were observed by Pill and Stott (1982) who conducted a study in South Wales among women aged 30 to 35 years. Infection or germs were cited as the most common cause of illness, followed by life-style, heredity and stress.

### **3.6.3.3 Illness Meaning**

McHugh and Vallis (1986) state that the concepts of illness meaning and distress help to bridge the gap between the hypothetical constructs of the illness behaviour model and the behaviour of an individual during an illness experience. The sociocultural context of the illness experience must be understood both from an individual perspective as well as from the cultural group that has had a bearing on the belief system of the person concerned. Kleinman's (1980) *explanatory model* requests that the individual's view of what caused the illness, its pathophysiology, the illness course and treatment expectations are obtained (McHugh & Vallis, 1986). Applying the explanatory model to the health practitioner is equally important as discrepancies between the patient and practitioner can be identified and addressed.

Kleinman (1986) proposes the following illness meanings:

- (1) The more obvious meaning of a symptom which is "shared meanings" that most people understand such as pain and disability.

- (2) “Deeper” meaning involving personal and cultural/religious significance, a constellation of symptoms referred to as *suffering*.
- (3) The significance of certain symptoms in certain societies, e.g. Aids in Africa.
- (4) Illness meaning may have negative connotations where certain chronic conditions becomes associated with a destructive trend in an individuals life.
- (5) The way that the observer (clinician or researcher) interprets the illness behaviour of the individual in a given context.
- (6) “Retrospective narrative” which involves telling life stories to make sense of illness.
- (7) The illness meaning for the clinician depending on their interest (scientific, professional, financial) or on the setting (therapeutic, clinician).

These illness meanings, therefore, is interactive for both the individual and the practitioner.

The concept of distress provides one other way to understand illness behaviour, particularly the action taken by the individual. Mechanic (1986) states that social stress and introspectiveness are the two factors that determine the level of distress. On recognising bodily dysfunction, an individual attaches meaning which results in perceived distress which further causes the individual to act to alleviate the distress by engaging in help-seeking and other coping behaviours.

To further illustrate illness meaning with specific reference to chronic illness conditions, Kleinman’s ( in Toombs , Barnard, & Carson eds., 1995) work on the social course of chronic illness in American and Chinese societies will be considered. An ethnographic theory forms the basis for understanding how social process is befitting as a mediator. Kleinman and Kleinman’s (1991) conceptualisation of experience is important in this regard. Experience “as an intersubjective matrix of



social transactions in local settings” draws from phenomenologist’s, ethnographer’s and social theorist’s. Social experience in turn “connects institutional structures (kinship networks, class, and jural and political institutions) and systems of collective meaning that together constitute the moral order with body self-processes” Kleinman (in Toombs , Barnard, & Carson, 1995, p. 180). The social and biological worlds become interactive, resulting in a patterned response that is projected into social space “bringing affect and embodied meaning to bear upon social life”. Kleinman (ibid.) uses this theoretical framework to present the sociosomatic processes as mediators and “transformers of chronic illness and disability”.

Based on an analysis of both chronic pain patients and patients with chronic fatigue syndrome in American and Chinese societies, Kleinman (ibid.) discovered the process of *delegitimation*, *resistance* and *transformation* in the social experience of illness. Patients with these chronic conditions are made to feel that they are exaggerating their symptoms if they do not respond to biomedical treatment and are left to feel completely demoralised when their illness experience is delegitimated. The process of social transformation often occurs when patients are provided with a legitimate medical reason to do so. They often resort to changing their life-style and settle for “low-status” occupations which often impact both directly and indirectly on the social worlds of which they are part. A third process that mediates illness is resistance. Chronically ill patients do not take well to being instructed on the “rights” and “wrongs” of their illness behaviour, resulting in non-compliant behaviour as a means of expressing resistance to “biomedical authoritarianism”.

Kleinman’s model (ibid.) might be viewed as offering a more comprehensive understanding of the biopsychosocial model as it defines far more extensively and with greater depth the interaction between the psychological and social components of the model. Further, the term social should be extended to sociocultural to embody the mediating roles of social, cultural and political factors in illness experience. This approach affords anthropology, social history and other social sciences a place in health psychology.

### **3.7 A RA Outcome Model Proposed for this Study**

Based on the biopsychosocial model of health and illness (including chronic illness), a model for the outcome of RA is proposed for this study. In this study RA outcome is seen as a multidimensional measure of quality of life. The model proposes that biological (disease factors), psychological, and social factors will interact to impact on the quality of life of RA patients.

More specifically, it is proposed that socio-demographic, disease, and psychosocial factors will predict quality of life in RA. Further, psychosocial factors will moderate the relationship between socio-demographic factors and disease factors, and factors representing quality of life.

### **3.8 Conclusion**

The health psychology literature has clearly shown increasing sophistication in developing and building on existing theories in this field of psychology. This is a complex area in which multifactorial causal pathways need to be considered. The role of psychosocial factors in chronic illness outcome has been acknowledged. The exact nature of its' link to biological pathways requires further investigation. In addition, the relative strength of each of these psychosocial factors on chronic illness outcome (quality of life) is not fully known or understood. The goal of this study is to address this gap by examining the role of psychosocial factors as both predictors and moderators of quality of life in RA.

# CHAPTER FOUR

## REVIEW OF LITERATURE

### 4.1 Introduction

RA does not only have physiological and clinical effects, but psychosocial, behavioural and economic consequences for many patients (Anderson *et al.*, 1985; Young, 1992). Although the clinical presentation of the disease varies among individuals, with some people experiencing a more severe form of RA as compared to others, in general, however, they do not escape the psychological, behavioural, social and economic changes. The clinical effects of RA, including disease course and clinical features, and the economic effects of RA were presented in Chapter Two. A general discussion on the quality of life of individuals with RA was also discussed in Chapter Two. In this chapter a review of the literature is presented on the affective, behavioural and social effects of RA as expressions of quality of life, as well as the way affective, behavioural, and social factors impact on the quality of life (health outcome) of individuals with RA.

Affective changes such as the presence of high levels of anxiety (Pincus, Griffith, Pearce, & Isenberg, 1996) and depression (DeVellis, 1993; Mcfarlane & Brooks, 1988) is well recognised in RA patients as compared to a normal population or a control group of general medical patients. Individuals with RA often experience increased levels of pain and functional incapacity, which often increase the risk of depression and other negative mood states. RA patients also experience a change in the quality of their social interactions with friends, family members and significant others (Manne & Zautra, 1989; Ward & Leigh, 1993). Social difficulties may, therefore, present as another major stressor for individuals with RA, following pain and disability.

The review of literature focuses on the role that psychosocial factors play in disease outcome or the quality of life of individuals with RA. Previous studies that were conducted to examine the relationships between factors such as socio-demographic ones, coping, perceived social support, causal attribution and cognitive illness representation, and factors representing

disease outcome (quality of life) such as pain and functional status, joint status, helplessness and depression are highlighted.

## **4.2 Quality of Life: Psychological and Behavioural Effects of RA**

### **4.2.1 Affective Changes**

The psychological state of depression has been strongly associated with medical illness (McEvoy DeVellis, 1993). More than any other mood state, including anxiety, depression has been found to be present in patients with illness of acute onset as well as those with chronic illness conditions. Depression often goes undetected in the medically ill (Rodin, Craven & Littlefield, 1991). Long-term depression may lead to the progressive worsening of the disability associated with certain illnesses, hampering effective treatment of the condition (Attkisson & Zich, 1990).

A wide range of figures pertaining to the prevalence of depression in RA have been reported. As early as 1969, Rimon reported a depressive reaction in 29% of female outpatients. Subsequent studies have reported a range of prevalence figures between 14% to 46% for depression in RA patients (Katz & Yelin, 1993). McEvoy and DeVellis (in Newman & Shipley, 1993) comment on the difficulty in ascertaining reliable figures on the prevalence of depression in rheumatological diseases, given conceptual, definitional, measurement and methodological difficulties around RA.

Most studies on depression in RA patients focus on depressive symptomatology and not on depression as a diagnostic category (Abdel-Nasser, 1996). Depression scales are often used to establish the degree of distress among RA patients because it is less time consuming than conducting clinical interviews to diagnose a depressive disorder using an accepted set of criteria. It has also been found that depressive and rheumatological symptoms are often confounded. Somatic manifestations such as sleep disturbances and pain experience are common to both depression and RA. Self-administering depression scales require the patient to endorse items pertaining to their current mental status, without taking into consideration a prior time frame which, if considered, may meet the requirements for the diagnosis of a Major Depressive Disorder, according to DSM-IV (1994) criteria or another accepted

diagnostic and classification system. The prevalence figures for depression in individuals with RA is probably lower and not indicative of actual figures as most studies are clinic- and not community-based. It is, therefore, difficult to ascertain reliable prevalence figures for depression in individuals with RA, in the general population.

In RA patients when the interview method for assessing the presence and severity of depression was used, prevalence figures were lower than if questionnaires and inventories were used (Abdel-Nasser, 1996). In a study comparing the prevalence of depression in a clinic sample of RA and osteoarthritis patients in Egypt, Abdel-Nasser (1996) used the interview method of assessment and found a 23% prevalence figure. Osteoarthritis patients were found to have a lower prevalence of depressive symptoms as compared to RA patients. This finding on the prevalence of depression is similar to findings in other studies using a diagnostic approach (Abdel-Nasser, 1996).

It is fairly widely accepted that a high degree of psychological disturbance is not directly related to disease severity or disease status among those with rheumatological conditions (Newman & Mulligan, 2000). The degree of depression that RA patients experience is often associated with socio-economic factors, pain, disability and other social and psychological factors such as coping and social support. Hawley and Wolfe (1988) in a prospective study of 400 RA patients found support for the theory that the development of depression was associated with socio-economic and not clinical factors. The presence of depression was higher in individuals with fewer socio-economic resources.

In a cross-sectional study of 238 RA patients, Smedstad, Vaglum, Kvien and Moum (1995) found that self-reported pain was highly correlated with mental distress, even when disease activity was controlled for. Beckham, D'Amico, Rice, Jordan, Divine and Brook (1992) found in a study with a sample of 34 patients with definite or classic RA, that depression was an important predictor of total, physical and psychosocial illness-related behavioural dysfunction. Downe-Wamboldt (1995) investigated emotions, coping and psychological well-being in elderly people with RA. They found that stress emotions of challenge, harm and threat, the severity of impairment; and the use of emotive and optimistic coping strategies, were statistically significant predictors of psychological well-being. Smith, Christensen, Peck and Ward (1994) in a 4-year follow-up study of 92 RA patients with a median duration of 15 years, found that cognitive distortion and perceived helplessness were related to increased

levels of depression over this period, while factors such as age, sex, disease duration or disability were not. Similar findings have been reported by Smith and Wallston (1992) in RA patients with shorter disease duration.

In an attempt to infer causality between disease factors and psychological well-being, a longitudinal study was conducted by Ward (1994) among 24 RA patients. Ward (1994) found that between 6% and 8% of change in a patient's rating of pain or general arthritis status was due to a change in their level of depression and not a change in arthritis activity. Functional ability, however, was less susceptible to confounding by depression. In a review article on depression, pain, and disability in RA, Parker and Wright (1995) present a different argument. They state that there is strong evidence that depression is a major contributor to RA disability. Based on the results of the various studies it does appear that a bidirectional relationship exists between depression and quality of life measures such as pain and disability.

Relatively few studies have considered gender differences and psychological well-being among RA patients despite the fact that women in general report higher rates of illness and greater health care use than men (Verbrugge, 1989). The prevalence rates for depression in women in the general population is twice that of men (Nolen-Hoeksema, 1990), and a similar pattern has been found for self-reported depressive symptoms in persons with RA, with women having higher rates than men (Fifield, Reisine, & Sheehan, 1996). The observed gender differences could be due to clinical differences in morbidity or to differences in illness behaviour, symptom perception, or symptom reporting (Katz & Criswell, 1996). In a study investigating psychological well-being in RA patients, Dowdy *et al.* (1996) observed that women reported more depressive symptoms than men, and the main gender difference in psychological well-being was found for the negative affect component of depressive symptoms. Several factors might affect gender differences in psychological well-being. Some possible factors are that women report higher levels of physical functional impairment, use passive pain coping more than men do and have lower quality social support than men. In a sample of RA women patients, Reisine and Fifield (1995) found that when both family and paid work demands were considered together, family demands appeared to have a greater effect on depressive symptoms than paid work demands. To examine the development of depressive symptoms among women with rheumatoid arthritis, Katz and Yelin (1995)

conducted a longitudinal study and found that the loss of valued activities led to the development of functional decline and not just general functional impairment.

Although more females with RA report depressive symptoms, a significant relationship was also noted between depression and disease severity in males with RA (Parker, Smarr, Angelone, Mothersead, Lee, Walker, Bridges & Caldwell, 1992). Furthermore, because immunological factors were found to be related to disease activity in this study, affective change and disease activity were seen to be moderated by immunologic processes.

Since it is widely accepted that depression is common in chronically ill individuals, the factors that mediate depression, such as learned helplessness, need to be explored further (Smith, Peck & Ward, 1990). Due to the unpredictability of RA disease course, the inability to control the disease may lead to depression that is mediated by feelings of helplessness. Smith *et al.* (1990) found that both helplessness and cognitive distortion were important in the development of depression in RA patients. Moreover, helplessness mediated the relationship between severe disability and depression.

### *Concluding Comments on Affective Changes*

It is clear from the review on depression in RA, that research in the area of depression and ill-health has progressed beyond a mere acknowledgement of the high prevalence of depression in individuals with poor health status or decreased quality of life. The complexities around depression in RA, such as the factors that mediate depression, gender differences in prevalence rates for depression as well as the different components of depression, are already being investigated. With respect to RA in particular, understanding gender differences in the factors that contribute to the presence and the intensity of depression, may help to facilitate the psychological management of these patients.

From the review it is also apparent that a bidirectional relationship exists between depression and socio-demographic factors, disease factors, and other psychosocial factors. Depression may, therefore, act both as an independent variable as well as a dependent variable, depending on the hypothesis being tested and the presumed direction of the relationship. This appears to hold true for both correlational and longitudinal studies.

While the correlational studies confirm the relationship between socio-demographic factors, disease factors, and other psychosocial factors and RA, the number of longitudinal studies are too few to enable one to draw conclusions about the these variables causal relationship with depression. More multifactorial, longitudinal research designs are needed to address the inadequacies of the studies reviewed.

#### **4.2.2 Pain**

Pain in RA is often a consequence of other aspects of the disease such as disease severity, disability, coping, psychological well-being and other psychosocial factors. Pain, similar to depression, has been investigated both as an antecedent variable and as an outcome measure with very little focus on demonstrating linear relationships between pain and other significant variables. Individuals who experience pain as a result of organic pathology, such as a disease like RA, would have great difficulty managing their pain, as the pain experience would at times be a direct result of the illness condition, at other times as a result of emotional conflict, and finally as a result of the combination of physical and mental health factors.

Pain is one of the most significant symptoms for most RA patients (Parker *et al.*, 1988) and medical help is often sought to reduce its intensity (Kazis, Meenan & Anderson, 1983). Pain in RA fluctuates from mild to severe, depending on the phase of the disease as well as the patient's overall sense of well-being. RA patients are often overwhelmed by the pain they experience, and tend to sometimes spend years learning to accept that pain is an integral part of the disease with which they have to live. In the Kazis *et al.* (1983) study, pain was found to be more important than physical or psychological disability in explaining the use of medication. Further, it was found that reports of pain severity provided an important clue for both the rheumatologists, as well as the patient's measure of general health status and subsequent pain and physical disability. These results confirm the predictive power of pain.

Quantitative measures of pain have been included in many health status measures such as the Health Assessment Questionnaire (HAQ; Fries, Spitz & Young, 1982) and the Arthritis Impact Measurement Scale (AIMS, AIMS2; Meenan, Gertman & Mason, 1980; Meenan, Mason, Anderson, Guccione & Kazis, 1992). Specific pain measures such as the McGill Pain



Questionnaire (Melzack, 1975) and the Visual Analogue Scale (VAS) are also commonly used in RA patients.

Generally, a positive correlation has been found between pain and anxiety, and pain and depression (Hawley & Wolfe, 1988; Smedstad *et al.*, 1995). It is important, however, to take cognisance of the period in which measures of depression are taken. In a longitudinal study of RA patients by Ferguson and Cotton (1996) it was found that pain was significantly related to depression when initial measures were taken, and that disability was the only significant predictor of depression when measures were taken over multiple time intervals. Using a sample of 287 RA patients with definite or classic RA, Brown *et al.* (1989) investigated pain coping strategies and depression. Their findings suggest that frequent use of passive pain coping strategies during episodes of increased levels of pain, contributed to the most severe level of depression over time. In a study by Brown, Nicassio and Wallston (1989) pain was found to make an independent contribution to predicting depression when both were assessed concurrently.

Significant associations have also been found between increased levels of pain and certain psychological variables, such as denial and hypochondriasis on the Illness Behaviour Questionnaire (IBQ: McFarlane & Brooks, 1988); arthritis helplessness and lower internality on the Arthritis Helplessness Index (AHI; Stein, Wallston & Nicassio, 1988); and lower self-ratings for function, managing pain and managing other symptoms (Loring, Chastian, Ung, Shoor & Holman, 1989). These findings further confirm that it is necessary to consider the experience of pain and the psychological aspects of an individual together.

In a recent study, Kelleher, Rennell and Kidd (1998) investigated the effect of social context on pain measurement. The differences in pain scores in different social contexts suggest that pain scores may be socially influenced. It is suggested, for example, that individuals with emotionally supportive partners will report higher levels of pain as compared to patients with instrumentally supportive partners (Kelleher *et al.*, 1998). This finding highlights the fact that pain experience is influenced not only by disease activity but also by the psychosocial context which includes the perception of the quality of social support received.

Managing pain is considered to be one of the most arduous tasks for the RA sufferer. In a study, conducted by Kazis, Meenan and Anderson (1983), assessing physical disability,

psychological status and pain among 729 RA patients, the significance of the pain experience was demonstrated. The results of their study showed that pain was a significant indicator of health status, medication usage and predictor of future pain level and disability.

### *Concluding Comment on Pain*

The complexity of pain is perhaps best demonstrated within the context of RA, a condition in which psychosocial factors are known to be stronger predictors of disease outcome than disease factors (Newman & Mulligan, 2000). The psychological and biomedical aspects of pain in RA, combined with other psychosocial factors, sets the stage for a multitude of interrelationships that contribute to the pain experience. The exact mechanism of the pathways are ill-understood though, making it necessary to continue researching pain using increasingly sophisticated longitudinal, multivariate designs.

It is also apparent from the review that pain, like depression, can act as an independent variable and as a dependent variable, demonstrating its capacity for bidirectional relationships with socio-demographic factors, disease factors and psychosocial factors. This holds true for both correlational as well as longitudinal studies conducted previously.

While it is accepted that there is evidence for a bidirectional relationship between pain and other variables relevant in a biopsychosocial context, there is also strong evidence, as demonstrated in the review, that pain is a quality of life measure in chronic illness conditions. The impact of socio-demographic factors, and psychosocial factors such as coping, social support, cognitive illness representations, and causal attribution, on pain (viewed as a quality of life measure), is investigated in this study.

### **4.2.3 Disability and RA**

It has been established that disease factors are not as good predictors of future disability in early and established disease RA patients, as psychosocial factors are (e.g. Brown & Nicassio, 1987). Factors such as coping, social support and cognitive illness representations affect the functional status of individuals with RA. Brown and Nicassio (1987) observed that an increased use of passive pain coping strategies by RA patients, predicted less physical

activities six months later, while a more active pain coping strategy predicted higher physical activity six months later. Keefe, Brown, Wallston and Caldwell (1989) found that the cognitive coping strategy of catastrophising predicted worse functional disability six months later.

Functional impairment is associated with increased levels of psychological distress in individuals with RA. Newman, Fitzpatrick, Lamb and Shipley (1989) found disability to be the most important predictor of RA patient's depression. Other factors of significance included gender, disease duration, social isolation and economic deprivation. Although both physical functioning and psychological variables make significant contributions to disability in RA patients, Young (1992) points out that the relationship is not as uncomplicated as it seems. In a study by McFarlane and Brooks (1988) it was found that disease activity decreased over a three-year period while disability increased. The relationship among functional impairment, pain, and psychological measures was different at the end of the study as compared to the beginning.

An association has also been found between social influences and functional status. Married RA patients were found to have less functional disability (Verbrugge, Gates & Ike, 1991), and suffered less deterioration of their condition over time than never married, divorced or widowed patients (Leigh & Fries, 1992; Ward & Leigh, 1993). The quality of social support, and not the size of the social network, has been found to be related to positive functional outcome in rheumatology patients (Cohen & Wills, 1985). Evers, Kraaimaat, Geenen and Bijlsma (1998), however, found in their investigation that recently diagnosed RA patients who use passive pain-coping strategies more often, and have a limited social network, were at risk from a decline in functional status within a year .

### *Concluding Comments on Disability*

Disability has a negative impact on the quality of life of individuals with RA. It is probably the most devastating effect, as it often renders the person disabled and dependent on others. It also restricts mobility, and accompanying physical deformities afflict only certain people with the disease. It is for this reason that understanding the complexities between disability and RA facilitates the management of RA patients both at a medical and psychosocial level.

It can be concluded from the review of the studies conducted on disability in RA that disability has been used both as an independent variable (assessing its impact on other relevant variables), and as a dependent variable (assessing other relevant variables impact on disability). There is convincing evidence, however from the correlational studies reviewed, that psychosocial factors, such as coping and quality of social support, influence the extent of disability (a quality of life measure) in individuals with RA. While this correlational relationship was also explored in this study, the moderating role of psychosocial factors on disability was investigated as a way of addressing the gap in research in this area. One of the aims of this study was to examine the moderating effects of psychosocial factors, such as coping and network support in the subjective and objective experience of RA.

### **4.3 Psychosocial factors impacting on Quality of Life**

RA is but one of the many chronic diseases in which psychosocial factors impact on the quality of life of individuals afflicted with the disease. Quality of life has become a key area of focus in health psychology, particularly in individuals with terminal and chronic diseases. Of concern are chronic conditions which include those that are manageable by treatment such as diabetes; those that are life threatening such as cancer; those that are understood but get progressively disabling such as vision loss related to aging; and those that are not well understood have unpredictable flare-ups of symptoms such as psoriatic arthritis and multiple sclerosis. The effects of these chronic diseases on an individual are not only clinical, but psychological, behavioural, social and economic as was discussed with specific reference to RA in Chapters One, Two and Four. It is beyond the scope of this study to detail the impact of all the chronic diseases. Of primary concern in this study are the psychosocial aspects of RA. This investigation is concerned with the impact of psychological and social factors on disease outcome or health-related quality of life.

Understanding the psychosocial effects of chronic illness in general is a precursor to studying the impact of RA. In this way it can be examined whether RA, compared to other chronic diseases, has a unique clinical presentation and far worse effects. Individuals with RA often have to endure intense pain, a decline in functional status and decreased psychological well-being.

A review of the literature on the impact of psychosocial factors on chronic diseases, the interrelationships between socio-demographic factors, disease factors, psychosocial and cultural factors are presented. The studies cited (e.g. Cohen & Wills, 1985; Newman *et al.*, 1990; Yelin, 1993) report the contribution of socio-demographic and psychosocial factors to disease outcome. In this literature review an attempt is made to assess the impact of socio-economic status, race, coping, social support, cognitive illness representation and causal attribution on disease outcome (quality of life) including pain, functional status and psychological well-being.

It is apparent from reviewing the research conducted in this area that while there has been a proliferation of research in the field of psychology and disease, many studies are correlational in nature (see Newman & Mulligan, 2000). Expressing an association between two relevant variables such as pain and depression does not address the question of cause and effect (e.g. does pain cause depression), nor does it adequately deal with the interrelationships between variables (e.g. between disease measures, coping style, pain, depression, and other possible extraneous variables such as demographics, cultural factors and the meaning that individuals assign to their illness status). In an attempt to investigate cause-effect relationships, a limited number of longitudinal studies have been published (e.g. Crotty, McFarlane, Brooks, Hopper, Bieri & Taylor, 1994). Based on decades of research and theoretical advancement, dual pathways analysis (evaluating the simultaneous interrelationships among selected biological, social and psychological variables), has been increasingly used to demonstrate the links between biological, psychological, social and more recently cultural aspects of disease.

A series of studies examining associations between chronic disease, psychosocial, behavioural and cultural factors will be presented, followed by those investigations that demonstrate multiple relationships between these factors and disease outcome, using more sophisticated research designs. In keeping with the aim of this investigation, RA will be highlighted.

### 4.3.2 Coping and RA

It has been widely accepted that there is often a poor correlation between disease state and disability in RA patients (Anderson *et al.*, 1985). Frequently, patients with severe RA as measured by clinical assessments including X-rays and other radiographic measures, experience mild disability, whereas patients with mild disease present with severe disability (Newman & Revenson, 1993). It is important, therefore, to identify other variables responsible for affecting the variability in the outcome measures of these patients. The psychological concept of coping has been used not only to help in understanding the relationship between RA and disability, but RA and pain as well as RA and psychological well-being. Coping is also seen to mediate between RA and other stressors associated with RA. These include, fatigue, changes in physical appearance, unpredictability of symptoms, the burden of taking care of the disease, and medication side-effects (Katz, 1998).

Coping is a dynamic and changing process evidenced by the way in which patients with a chronic illness like RA adjust to new stressors of the illness or attempt to modify existing or previous coping behaviour (Newman & Revenson, 1993). Personality characteristics, socio-demographic factors, and social resources also play a role in shaping the process of coping. Coping may be problem-focussed when, for example, individuals utilize certain coping strategies to overcome certain behavioural limitations imposed by RA due to joint stiffness, or emotion-focussed when individuals are concerned about managing the emotional distress caused by RA (Newman & Revenson, 1993). Research in the area of coping and RA has had to also take cognizance of the differences in coping efforts of patients soon after diagnosis, as opposed to established disease patients.

Numerous studies have explored how RA patients with established disease cope with the many stressors they face because of their chronic illness status (Felton *et al.* 1984; Parker *et al.* 1988; Manne & Zautra, 1989). Pain and disability, the two main stressors of RA, worsen over time and impact significantly on the social and occupational functioning of the RA patient. Findings have largely confirmed that better adjustment to the disease as well as positive affect were related to problem-solving strategies like information-seeking, whereas poorer adjustment and negative affect were related to emotion-focussed strategies like wish-fulfilling strategies. Felton and Revenson (1984) studied the influence of coping strategies on

psychological adjustment in chronic illness patients including RA patients. The findings indicate that those patients who actively confronted the illness by utilizing strategies like information-seeking had an increased sense of psychological well-being as opposed to those patients who utilized strategies such as wish-fulfillment as a way of diverting attention away from the stressors of the illness. The latter were found to adjust less well to the illness.

Van Lankveld, Van 'T Pad Bosch, Van De Putte, Naring and Van Der Staak (1994) investigated coping and well-being in relation to disease-specific stressors in a sample of RA patients with a mean age of 57 years and a mean duration of 13 years of RA complaints. They found in general that patients with an active disease did not differ in the use of coping strategies from patients who were in remission. Further, styles of coping with disease-specific stressors proved to be related to the patients' well-being. Another study by Blalock, McEvoy De Vellis, Holt and Hahn (1993) examined how individuals with RA coped with different aspects of the illness experience. They focussed on daily activities, leisure activities, work and social relationships as opposed to most other studies that have investigated how RA patients cope with one particular aspect of the illness (e.g. pain), or how RA patients cope with the illness in general. The three major findings that emerged from this study are presented below:

- individuals with RA relied on behavioural coping strategies when dealing with problems involving daily activities, leisure activities, or work than those problems involving social relationships;
- there was little consistency in the use of either cognitive or behavioural strategies across different illness stressors; and
- individuals who were more flexible "copers" functioned better psychologically than patients who had limited flexibility in their coping responses.

A study conducted by Melanson and Downe-Wamboldt (1995) among older adult RA patients with a mean age of 75 years, found that the majority of individuals in this group reported physical limitations as an illness-related stress. Further, the majority of this group of patients used confrontative strategies to cope with the stressors of the illness, followed by palliative coping, and finally "self-reliant" coping.

Driven theoretically by the stress-coping paradigm of Folkman and Lazarus (1980), Newman, Fitzpatrick, Lamb and Shipley (1990) further explored the concept of coping in a health context and devised a disease-specific questionnaire to assess the way RA patients coped with their illness. Newman *et al.* (1990) were specifically interested in discovering the patterns of coping used by RA patients as opposed to investigating only dominant coping strategies used in response to a specific stressor. Cluster analysis was used to group established disease RA patients on the basis of the overall pattern of coping strategies used. A large number of individuals in the study did not show a distinctive coping strategy but tended to use a large range of coping strategies to a moderate degree. It was found that each of the four groups coped differently with the illness. Group two (the largest group) did not utilise or reject any of the coping strategies, and were considered to be “passive copers”. Group four frequently used rest, diet, religion, and prayer to cope with their arthritis. Group one used denial and avoided others when in pain, re-organised their routine turned to friends for social support. The last group (three) was more active in the way they dealt with the stressors of arthritis. Subjects in this group confronted their disease, did not re-organise their routines, engaged in physical activity and expressed their feelings. The four groups could be distinguished on how they coped with their arthritis and not on demographic, clinical and laboratory measures. Newman *et al.* (1990) make the point that other factors like social support may account for the differences in the groups, although this was not conclusive. These researchers note that the different ways of coping may have an impact on other illness behaviours such as symptom reporting, disability and mood.

A few studies have attempted to investigate the mediating role of psychological factors, such as coping, in low-income non-Caucasian RA patients. Parker, McRae, Smarr, Beck, Frank, Anderson and Walker (1988) studied the relationships between the coping process and psychological adjustment, functional status, pain and disease activity in RA patients with limited socioeconomic resources. They found that coping was significantly related to psychological status and functional status but not to pain or disease activity. Patients who engaged in constructive coping strategies were found to have better psychological adjustment and functional status than those who hoped for unrealistic solutions or engaged in self-blame. A study conducted by Downe-Wamboldt and Melanson (1995) among elderly RA patients found that patients who had higher social economic status, used confrontative problem-solving types of coping strategies more frequently than those with lower social economic status.



In investigating the relationships of cognitive coping and pain control beliefs to pain and adjustment among African-American and Caucasian women with RA, Jordan, Lumley and Leisen (1998) found both similarities and differences between the two ethnic groups. There were no differences between the groups on most measures related to their RA status but there were differences on pain control beliefs and coping strategies. African-Americans were more likely to engage in the strategies of praying and hoping and diverting attention, whereas Caucasians were more likely to ignore the pain and tended to use coping statements.

### *Concluding Comments on Coping*

There is considerable evidence that coping mediates between disease (RA) and outcome measures such as pain, disability and psychological well-being. Longitudinal designs make it possible to assess whether both patterns of coping and coping strategies are consistent over time.

The vast majority of studies have used middle-class samples, particularly those conducted in developed countries. Research conducted on RA outside developed countries has tended to focus on biomedical aspects of the disease, and not psychological aspects. This study addresses this gap in research by exploring the interrelationships between demographic factors, disease factors, psychosocial factors, and psychosocial and “medical” health outcome in RA. It also examines the moderating effect of coping on objective and subjective quality of life factors. In the health psychology context, there appears to be a paucity of research examining the moderating effect of psychosocial factors on quality of life.

### **4.3.3 Social Support and RA**

The social effects of RA include the impact of the disease on the patient’s family and general social network. Due to the chronic nature of the disease a change in the quality of social interactions becomes inevitable. Patients do not have the same social life that existed prior to the onset of the disease. Individuals with RA report that the negative effect of the disease on their social relationships is one of the main problems (Revenson & Felton, 1985; Affleck, Pfeiffer, Fifield & Rowe, 1988). The unpredictability of symptom flare-ups followed by

periods of remission, directly impacts on the quality of social support given to the patients by family members. Family members have to adjust the type of support given to the individual with RA according to the stage of the disease. Inappropriate timing of support and the unsuitable amount of support given by family members may produce negative outcomes if the support does not meet the patient's needs. Consequently, patients perceive the support to be unsupportive (Revenson, 1990).

A significant relationship exists between social factors and RA patient's psychological adjustment to the disease. Affleck, Pfeiffer, Tennen and Fifield (1988) found that patient's satisfaction with the level of social support was associated with the physician's assessment of their psychological adjustment. In a study investigating RA patient's relationship with their spouse, Manne and Zautra (1989) found that patients who perceived their spouse as supportive reported engaging in more adaptive coping as compared to patients with critical spouses who reported more maladaptive coping and poorer psychological adjustment. Spouse support may however have unexpected effects. Over-involvement of the spouse for e.g. has been associated with increased pain behaviour, helplessness and a greater negative impact of pain (Flor, Kerns, & Turk; Flor, Turk & Rudy, 1989; Romano, Turner, Friedman, Bulcroft, Jensen, Hops & Wright, 1992).

To further illustrate the importance of social context, Schiaffino and Revenson (1995) found that in a sample of predominantly white female RA patients, there was an increase in depression as challenge appraisals increased with accompanied positive support. This contrasts with individuals who did not view their illness as a challenge and received higher support from their spouses. The latter group of patients had lower levels of depression.

Standardised assessment techniques have been used to measure psychosocial change in RA patients. In a scale measuring attitude, Earle, Perricone, Maultsby, Perricone, Turner and Davis (1979) found that patients with RA expressed lower self-esteem, decreased work satisfaction, and a greater sense of meaninglessness than did healthy controls. Using the SIP to assess psychosocial change, Deyo, Inui, Leininger and Overman (1982) found that between 43% and 52% reported dysfunction in the psychosocial subcategories of social interaction, communication or emotion behaviour. In addition the positive correlation between the physical dimension and the psychosocial dimension indicated that physical disability is accompanied by psychosocial disability.

Research investigating the role of social support in RA patients has progressed beyond the finding that social support is a buffer against the negative effects of the disease and enhances adaptation to the presence of chronic illness. The findings that not all social support is “supportive” have been increasingly placed under scrutiny. Negative support interactions that do not meet the patients’ needs, or are perceived as non-supportive by the patient may increase the probability of negative mental and physical health outcomes (Revenson *et al.*, 1988). Since this project focuses specifically on the predictive power of social support and the moderating role of social support in RA, a chronic, disabling illness, research conducted in this area will be presented to demonstrate the complexity of social support in illness conditions. A leading project was conducted by Revenson, Majerovitz and Schiaffino (1988) who investigated both positive social support and negative support interactions in an adult sample of RA patients. The study also assessed different functions of support through the use of four scales:

- emotional support
- tangible assistance
- informational support
- negative support

An unexpected finding in this study was that positive support was found to be unsupportive whether it was provided by the spouse, close family member or friend. A possible explanation, according to Revenson *et al.* (1988) is that, in keeping with Fiore’s study of Alzheimer’s caregivers, people focus on the negatives in close-knit relationships and take positives for granted.

Further, it was found that emotional and informational support were related to lower levels of depression in the short-term, although in the long-term these two types of support produced a “paradoxical response” and were found to be related to greater levels of depression. Explanations offered by Revenson *et al.* (1988) for this finding are as follows:

- In times of crisis support may be more powerful.
- Depressed patients may not be amenable to support when it is offered.

- The inability to reciprocate support to the giver or the timing of the reciprocation (how soon after it is given) plays an important role.
- The recipient may not perceive the help given as helpful.

The results of the study have lent support to the fact that the relationship between the provider of support and the recipient is vital. This study finding found that support provided by the spouse was the most beneficial.

Revenson (in Giles, Coupland & Wiemann eds., 1990) uses the term “negative social support” to indicate support that is positive in its giving but negatively received. She goes on to cite some of the reasons why negative support effects occur. In chronic illness conditions such as RA, patients are reluctant to discuss their pain experience or other related difficulties for fear of burdening other individuals who constitute their social network. This leads to inappropriate communication by the patient with her support system in her need to appear less compromised, physically. This in turn leads to the patient perceiving the support given as “unsupportive”, since it does not actually match the intensity of the difficulties she is experiencing. Other reasons why negative support effects occur include timing of support, reciprocity, misfit between support needs and provision of support and who provides the support.

Social support perceived as unsupportive and having negative consequences has also been found among cancer sufferers (Dunkel-Schetter & Wortman , 1982) , widows (Rook, 1984) and other situations in which individuals are psychologically or physically compromised. Reciprocity is one aspect of social support that contributes to understanding why certain social interactions are perceived as unsupportive. The beneficial effects of social support for the individual receiving it will only be realised if he or she has the opportunity to provide support as well. Providing social support must be especially difficult for those individuals who have a chronic or debilitating illness, like RA. In a group of middle-aged and elderly individuals coping with a chronic illness, reciprocity was found to be important to their well-being. In this group immediate reciprocation, and in kind, is difficult, and in certain cases impossible (Weiner, 1977). Goodenow, Reisine and Grady (1990) who studied a group of 194 women with RA, found that by receiving continued emotional and social support from others the women were able to continue their nurturing roles by taking care of others. There

was a stronger association between support to the nurturant rather than to the instrumental aspects of home functioning.

The relationship of the person providing social support to the individual receiving support has been found to be important as it influences the positive and negative effects of support on well-being. Rook and Pietromonaco (1987) found that familial relationships differ from friendships in that they are were not voluntary and were characterised by greater feelings of obligation. Revenson (1990) reported from her investigations of social support in RA patients that spouses provided more emotional, tangible and informational support than either close friends or family. Ironically, patients also reported receiving more negative support from their spouses than from family or friends, perhaps because they spent a greater amount of time interacting with their spouse. In a study of recently diagnosed RA patients, Revenson, Schiaffino, Majerovitz and Gibofsky (1991) found that negative social support from friends and family was related to increased levels of depression, despite the fact that that these patients may have been simultaneously receiving positive social support from the same network members.

### *Concluding Comments on Social Support*

Research evidence supports the view that the quality of social support is beneficial to groups of individuals who are compromised by virtue of their mental or physical ill-health. RA patients are particularly challenged given the functional limitations they experience as a consequence of the disabling nature of the disease. At some point in the course of their illness, therefore, RA patients require an adequate social network to be able to enjoy a reasonable quality of life.

In-depth analysis of social support and the impact it has on people who are chronically ill has shown clearly that it is important to distinguish between positive social interactions and negative social interactions. Although the provision of social support is often positively intended, it is not always positively received: as noted, the support given and the support received are not always matched. In the present study both positive social network support and problematic social network support are examined as moderators of psychological and medical outcome (quality of life). In most of the previous studies examining the factors

impacting on RA outcome, psychosocial factors such as coping and social support were investigated separately. This study addresses this gap by attempting to examine simultaneously, the moderating effects of certain psychosocial variables, such as coping and network support.

#### **4.3.4 Illness Cognition**

Primary and secondary illness appraisals are important concepts in attempting to understand the way in which RA patients construct illness meanings for themselves. Primary appraisal has generally been measured in terms of psychological control, which is a belief that one is able to influence one's illness to bring about desired outcomes. Affleck, Tennen and Fifield (1987) found in a study of adult RA patients' that the patient's belief in their ability to control daily symptoms was associated with less mood disturbance, although this did not hold true for personal control beliefs over the course of the illness.

Secondary appraisal, refers to an individual's evaluation of his or her coping resources which provides the individual the increased ability to reach the desired outcome (self-efficacy). Schiaffino *et al.* (1991) found that greater self-efficacy beliefs were related to better problem-focussed coping one year later among recently diagnosed RA patients. A correlational study of 40 osteoarthritis patients conducted by Keefe, Levebre, Maixner, Salley, Jr. and Caldwell (1995) revealed that high self-efficacy reporters for arthritis pain rated thermal pain stimuli as less unpleasant than those reporting low self-efficacy. In addition high self-efficacy reporters had higher pain thresholds than low self-efficacy reporters.

In a study of 235 recently diagnosed RA patients, Giorgino, Blalock, De Vellis, Keefe and Jordan (1994) found that both appraisal and coping differed across problems. Patients in the study reported least control over problems with pain, while attaching the most importance to being able to control their pain. The problems associated with pain, therefore, were appraised as having greater significance for well-being.

Individuals are known to search for causes for a particular event, particularly a negative one. Social and anthropological research has shown that early societies also had a strong tendency

to attribute causes, either internally or externally, for their negative life experiences, as does contemporary society (Auge & Herzlich, 1995). Auge and Herzlich (1995) disagree with anthropological writers, particularly American ones, for the use of the term “magical” to describe African attributional thinking about negative life events, including illness conditions. These writers argue that each society has their own set of juridical rules, cognitive principles, and models of interaction. Over time, with social, cultural and technological evolution, societies have evidenced a change in their mind-set. Certain occurrences were given reasonable and logical explanations in the light of scientific advancement.

When an individual is faced with physical ill-health, there is an association (either consciously or unconsciously) with death and dying. While individuals still attempt to find reasons for their illness, people’s attributions tend to be based on a fair degree of knowledge about the illness that they are facing. The challenge, therefore, is to increasingly research those populations in which there is limited exposure to knowledge on illness conditions.

In a much earlier study using a sample of 160 middle-aged Americans from five different social strata, Elder (1973) investigated the relationship between social class and lay explanations of the etiology of arthritis. She found that those individuals in “higher classes” were more likely to attribute symptoms to aging, heredity, or to state that the cause of the disease was unknown. Attribution for those in “lower classes” were related to environmental circumstances such as exposure to cold, water, dampness or working conditions. Elder (1973) concludes that attributions reflect the subjects life circumstances and the hardships experienced by those in the “lower classes” are highlighted.

### *Concluding Comments on Illness Cognition*

Individuals with chronic illness such as RA have greater difficulty coping with the life-long nature of their illness. These individuals shift their focus from trying to find reasons for the disease to looking for ways to improve their quality of life. Continuing to investigate the attributional style of both recent onset as well as established disease RA populations will help in the psychological management of these individuals. Such efforts will introduce new and constructive ways of thinking about their illness so that the course of action they take to alleviate suffering will be based on informed choice.

A review of the previous studies on attribution and cognitive illness representation show that these cognitive variables were investigated in isolation from other psychosocial variables in the health psychology context. This study addresses this gap by including factors representing illness cognition with other psychosocial factors such as coping and social support when the simultaneous interrelationships between these factors, socio-demographic factors, disease factors, and factors representing quality of life were examined. The moderating effect of the factors representing illness cognition in RA, were also examined, in relation to quality of life.

#### **4.4 Interrelationships between Biological, Psychological and Social Factors**

Recently, there have been research attempts to examine the complex interrelationships between the biological, psychological and social factors in RA onset and disease course. Lazarus (2000), for example, comments on the high quality of research being conducted in the area of stress and coping in health and other contexts in which individuals are faced with a stressful life event. Investigators in health psychology are looking increasingly at cause-effect relationships between biopsychosocial factors by engaging in longitudinal, multivariate designs (e.g. Tennen, Affleck, Armeli, & Carney, 2000). The literature reviewed demonstrates that psychological and social factors have been inextricably linked to health related quality of life outcome variables such as pain, disability and psychological well-being in RA. Coping mechanisms, for example, are known to impact on health outcome measures in chronic illness conditions. (e.g. Newman *et al.*, 1990). Social support (e.g. Revenson *et al.*, 1988) and cognitive illness representations (e.g. Lowery *et al.*, 1988) are also known to impact on illness outcome. Other factors such as socio-demographic variables are known to be important predictors of outcome measures in chronic illness conditions, such as RA (Marks *et al.*, 2000).

There are numerous studies that have investigated these interrelationships. A lack of social support, for instance, was found to be related to maladaptive coping behaviours and poor psychological adjustment. Smith and Wallston (1992) conducted a longitudinal study on health, social support and coping, and found that a lack of emotional support led to poorer psychological adjustment. In a detailed longitudinal analysis of marital quality and RA pain, Waltz, Kriegel and van't Pad Bosch (1998) found that there was a direct relationship between



stressful spouse behaviour and pain outcome. In addition their results suggest that the presence of depressive symptoms (possibly due to a lack of social support) exacerbate pain symptoms.

Brown, Nicassio and Wallston (1989) found a positive association between RA pain and depression in the cross-sectional part of their study, but this relationship failed to materialise when the factors were examined over a sixth-month period. The outcome of the investigation conducted by Schoenfeld-Smith, Petroski, Hewett, Johnson, Wright, Smarr, Walker and Parker (1996), showed that pain and helplessness were significant mediators of the relationship between disease activity and future disability in RA patients.

Although the studies reviewed in this chapter provide evidence of the interrelationships between biological and psychosocial variables that determine health outcome or quality of life in RA, multivariate studies are lacking. Multivariate studies based on multidimensional models that assess the relative impact of the various psychosocial variables on RA health outcome will address the gap in this area of research.

In managing this chronic, debilitating disease, therefore, there has to be a collaborative effort by a multidisciplinary team of health professionals in order to provide holistic health care to individuals with RA. Physiological and clinical effects of RA have to be considered, as well as psychosocial, behavioural, and economic consequences. The effects of RA influence the quality of life of individuals with this chronic illness condition.

The aim of this study is to develop a psychosocial model of variables associated with disease outcome (or quality of life) in a group of low socio-economic status South African RA patients, in order to improve the quality of life of these individuals who have limited social and economic resources. As stated in Chapter Three, this study is concerned with both the direct effect and the moderating effect of psychosocial variables on the quality of life of individuals with RA. Based on the theoretical underpinnings and the literature review, three models are proposed for this study. In the first model (see Figure 4.1), the predictive power of socio-demographic and psychosocial variables on the quality of life variables represented by pain and functional status, swollen and tender joint status, helplessness and depression is tested. In the second model (see Figure 4.2) the predictive power of the variables in model one are tested, in addition to each of the variables representing quality of life measures. Pain

and functional status, swollen and tender joint status, helplessness and depression were treated as dependent variables in the first model, and as independent variables in the second model, although separately in each instance, keeping all other variables as dependent. The third and final model (see Figure 4.3) illustrates the moderating effect of the psychosocial variables coping, network support, helplessness and causal attribution between the objective experience of RA and the subjective experience of RA.

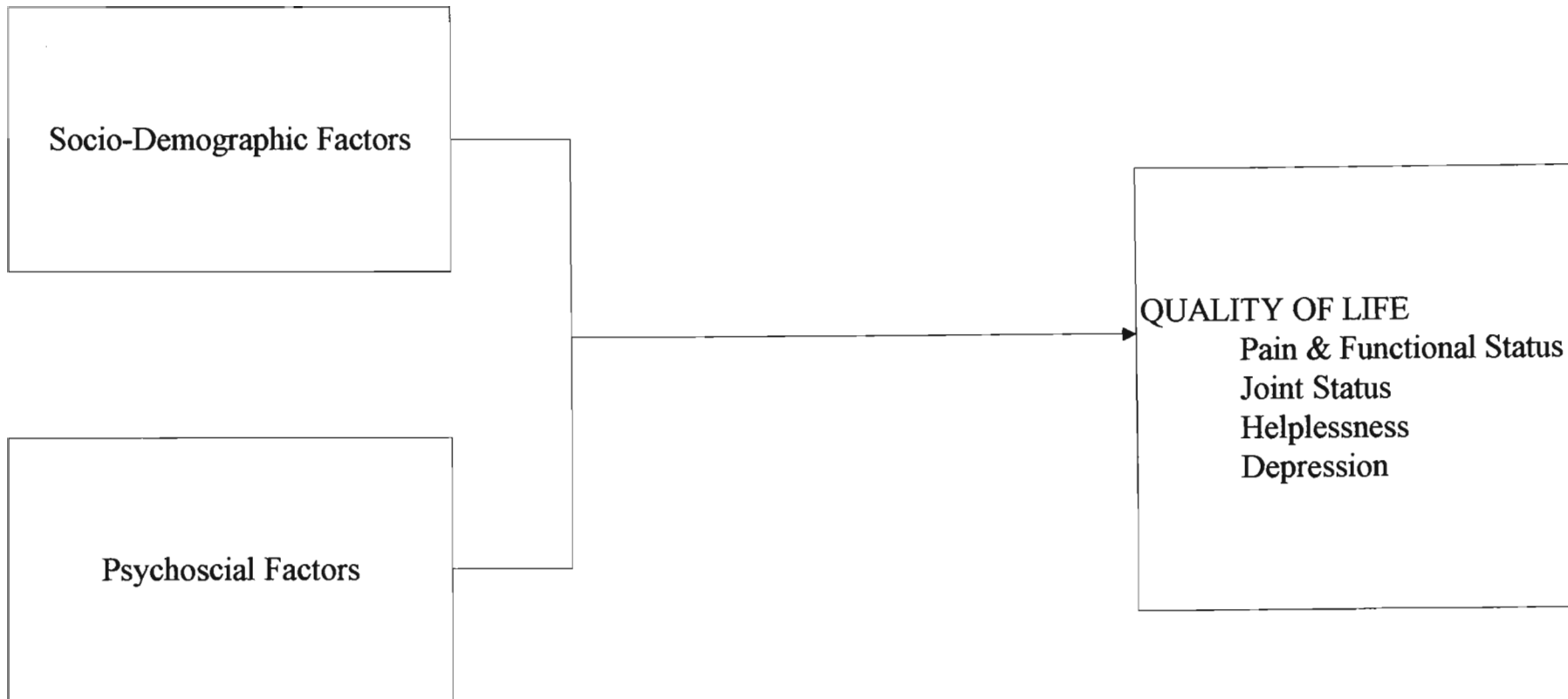


Figure 4.1: Model 1

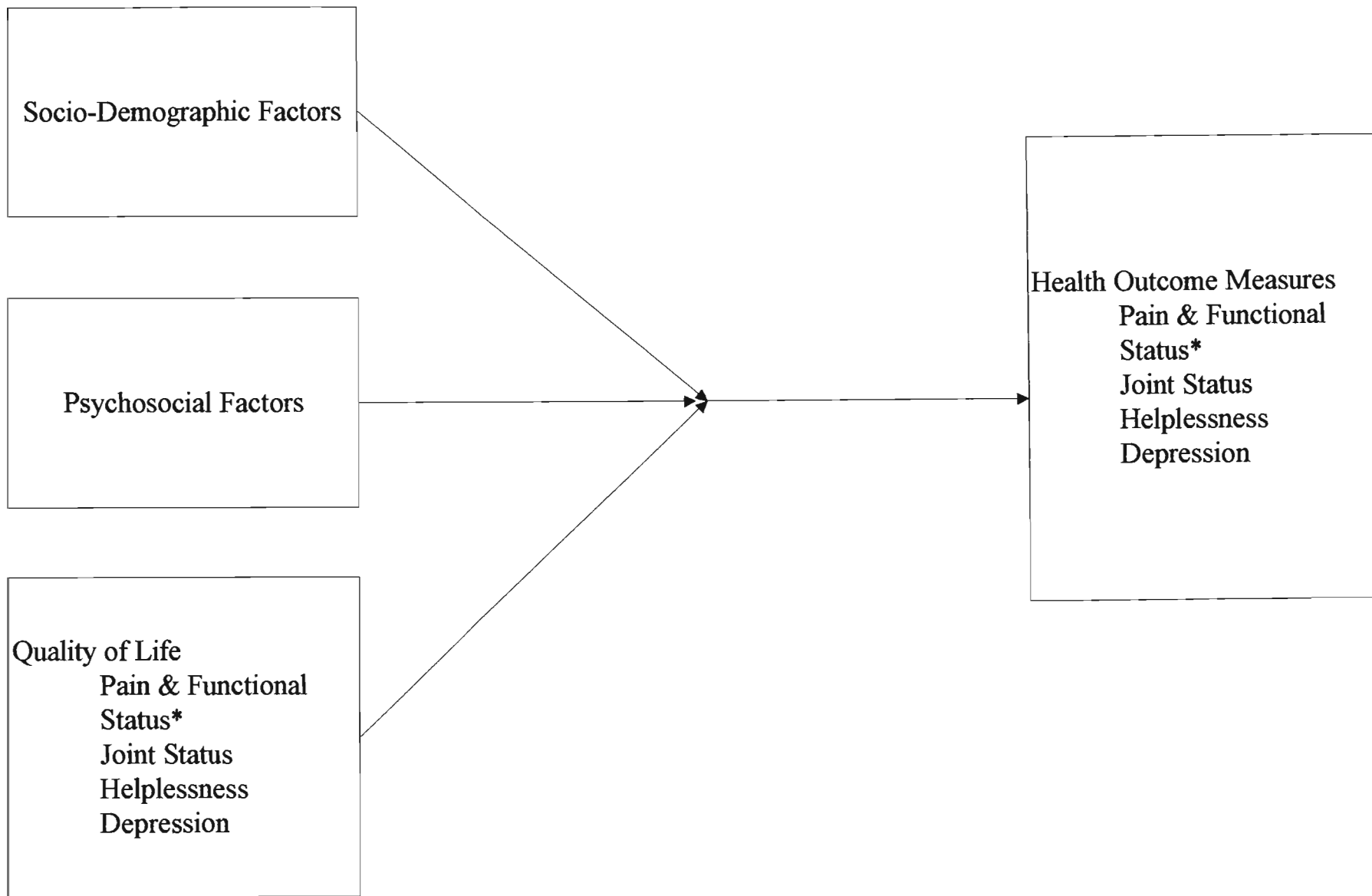


Figure 4.2: Model 2

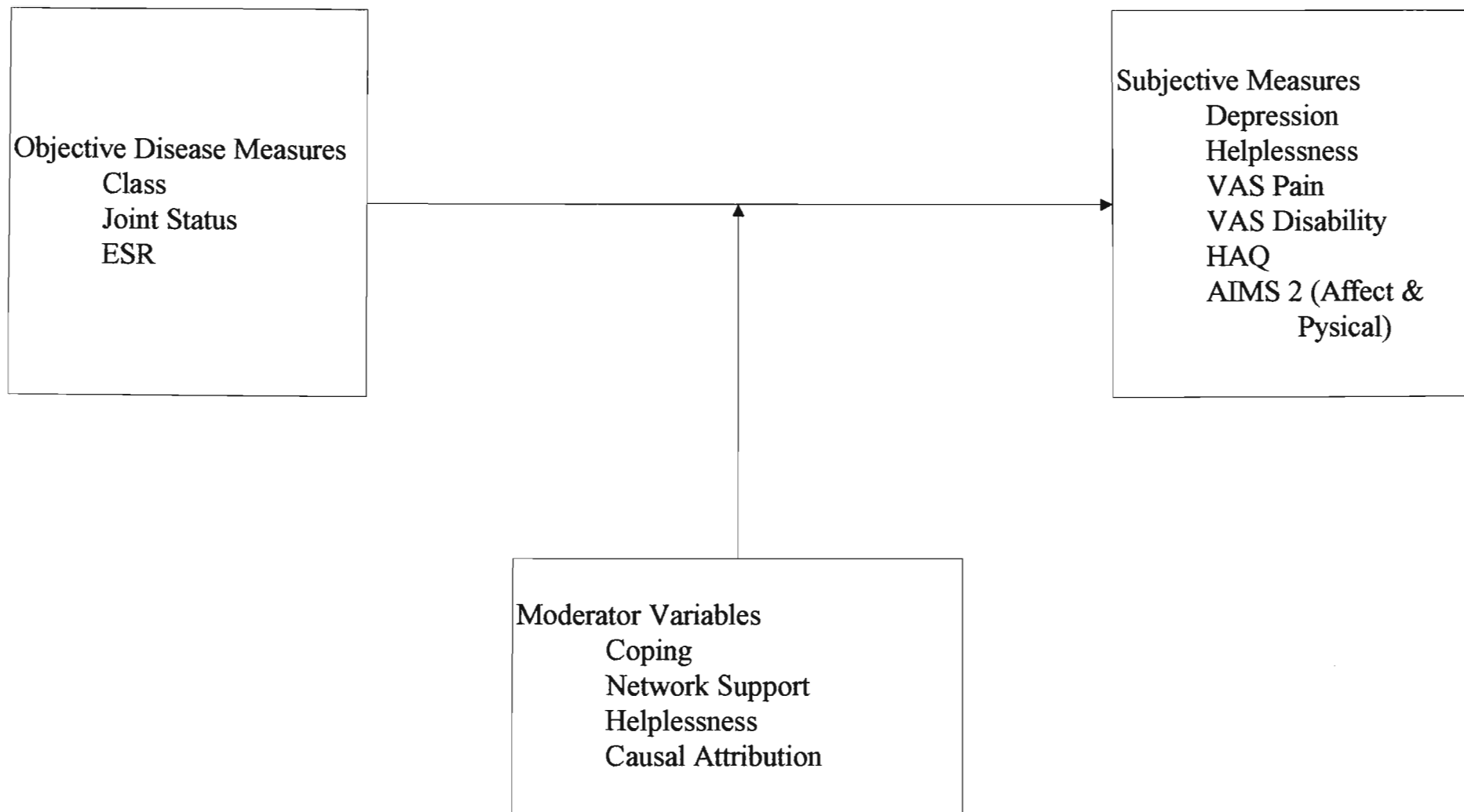


Figure 4.3: Model 3

# CHAPTER FIVE

## METHOD

### 5.1 Aims

The aims of this study were as follows:

- (1) to assess the significant relationships between socio-demographic variables, psychosocial variables (coping, social support, causal attribution and cognitive illness representation), and objective and subjective RA health outcome variables,
- (2) to develop a multivariate, predictive model for RA quality of life, and
- (3) to assess the moderating role of psychosocial factors between the objective experience of RA (measured by health personnel) and the subjective experience of RA (measured by self-administered questionnaires).

### 5.2 Hypotheses

The following hypotheses were tested in this study:

- (1) There is a significant relationship between the socio-demographic variables and the psychological variables coping, network social support, causal attribution, and cognitive illness representation, as well as both objective (medical) and subjective (psychological) health status variables. It is hypothesised, further, that socio-demographic variables are significant predictors of both objective (medical) and subjective (psychological) health status.
- (2) There is a significant relationship between the psychological variables coping, network social support, causal attribution, and cognitive illness representation, and quality of life (health status variables). It is hypothesised, further, that coping, social support, causal

attribution and cognitive illness representation are significant predictors of both objective (medical) and subjective (psychological) health status.

- (3) Psychological variables and subjective health status measures are more powerful predictors of pain and functional status, arthritis helplessness, and depression than are socio-demographic variables.
- (4) Coping moderates the relationship between the objective measures class, NTJ, TJC, NSJ, SJC and ESR, and the subjective measures depression (BDI), arthritis helplessness (AHI), VAS-Pain, VAS-Disability, HAQ, and AIMS2 (the Affect and Physical Components).
- (5) Positive and problematic network support moderates the relationship between the objective measures class, NTJ, TJC, NSJ, SJC and ESR, and the subjective measures depression (BDI), arthritis helplessness (AHI), VAS-Pain, VAS-Disability, HAQ, and AIMS2 (the Affect and Physical Components).
- (6) Arthritis helplessness moderates the relationship between the objective measures class, NTJ, TJC, NSJ, SJC and ESR, and the subjective measures depression (BDI), VAS-pain, VAS-Disability, HAQ, and AIMS2 (Affect and physical components).
- (7) Causal attribution moderates the relationship between the objective measures class, NTJ, TJC, NSJ, SJC and ESR, and the subjective measures depression (BDI), arthritis helplessness (AHI), VAS-Pain, VAS-Disability, HAQ, and AIMS2 (the Affect and Physical Components).

### 5.3 Research Design

To test the hypotheses generated in this study, a cross-sectional study was designed to explore the interrelationships between RA disease measures, socio-demographic variables, psychosocial variables and objective (medical) and subjective (psychological) health outcome measures. The first part of the study examines the role of socio-demographic factors, and psychological and social factors in predicting both psychological and disease outcome in individuals with RA. The second part of the study examines the moderating role of psychological and social factors, including coping, network social support, causal attribution and cognitive illness representation in predicting

both psychological well-being (also referred to in this dissertation as a subjective outcome), and medical outcome (also referred to in this dissertation as an objective outcome measure).

#### 5.4 Research Setting

In order to test the hypotheses in this study, a sample of individuals with RA was obtained from the out-patient Rheumatology Clinic at King Edward VIII hospital (KEH). KEH is a teaching hospital closely allied with the University of Natal's medical faculty and closely resembles that of other teaching and non-teaching historically "black hospitals" in South Africa. These hospitals are known to have inherited limited resources necessary for acceptable patient care, from the previously apartheid driven government. Despite the inadequacies in the health care system during the apartheid era, patients continued to attend these hospitals in large numbers, and braved long queues as a result of professional and non-professional staff shortages. The inequities of the past continue to be addressed by the relevant authorities, although the situation is far from ideal.

The research setting posed certain challenges. A percentage of both new and follow-up RA patients who appeared on the clinic register as pre-booked patients who were due for a consultation with the rheumatologist, did not keep their appointment. Some of the reasons for this apparent non-compliance include the fact that these patients often encounter many practical difficulties in attempting to reach the hospital. These difficulties are primarily two-fold: firstly, patients have to often contend with poor public transport facilities, and secondly, disease-related difficulties such as a flare-up of RA symptoms which often restricts the patients mobility because of its severity. If disability accompanies disease flare-ups, patients may not be able to use public transport and are often dependent on assistance from others. Many of these patients do not have the necessary social and economic resources that would allow them access to private transport.

Given the above constraints, obtaining an acceptable sample size was an initial concern in this project. Based on existing literature, a sample size of 200 was decided upon. The studies most similar to the present one are probably those by Dwyer (1997), Newman *et al.*(1990), and Revenson *et al.* (1991). The respective sample sizes of these studies were 185, 158, and 101. On this basis it was felt that a sample of 200 should be attempted. However, on completion of the data collection it was discovered that a few patients did not have complete protocols. Although an attempt was made to obtain the missing data, a final sample size of 186 was deemed to be adequate for statistical purposes.



## 5.5 Sample

A purposive or judgemental non-probability sampling method (see Bless & Higson-Smith, 1995) was used to obtain a sample of RA patients in this study. One-hundred and eighty-six (186) adult female and male RA patients were selected over an 18-month period from the out-patient Rheumatology Clinic at King Edward VIII hospital. The clinic is operational for one and a half working days a week.

## 5.6 Procedure

Permission to conduct the study was obtained from the relevant authorities at the University of Natal's medical faculty and King Edward VIII hospital. Approval from the Ethics Committee at the medical school was also obtained.

Prior to embarking on the project, and during the course of the investigation, close collaboration with the Department of Rheumatology was necessary as the professional staff that worked at the clinic were allied to this academic department. Only two rheumatologists were responsible for medically examining the subjects and confirming a diagnosis of RA. Restricting the number of rheumatologists involved in this research project ensured that there was consistency in applying the relevant medical criteria in diagnosing RA, as well as in assessing the extent to which each subject was functionally impaired (disabled as a result of RA). Although each subject was examined and assessed by only one rheumatologist, there was a high degree of collaboration between the two rheumatologists, in those cases where there was uncertainty regarding any aspect of the medical assessment.

The clinical records of the patients were reviewed before they were enrolled in the study. The rheumatologists at the clinic assessed the patients who were previously diagnosed with RA, and were able to read in English. The clinical records of the patients were examined by the rheumatologist, once again, to determine whether these patients fulfilled the American Rheumatism Association (ARA) (1987) criteria (see Table 5.1) for the diagnosis of RA. To ensure a valid and reliable sample only those patients who fulfilled the criteria were approached to participate in the study. Patients with a co-existing serious medical or psychiatric condition were

excluded. The purpose of the study and the requirements were discussed in detail with the patients and once their informed consent was obtained, they were enrolled as participants.

Information pertaining to the subject's socio-demographic status, criteria in accordance with the American College of Rheumatology (1987), disease activity measures, assessment of function, and psychological measures was obtained and recorded. The classification of the patients functional status according to the ARA revised criteria was also recorded (Class I to Class IV-see Table 5.2). The details of the various measures will be presented in section 5.8. To distinguish between recent onset RA subjects from those with established disease, duration of disease was also noted in actual number of years.

Senior nursing sisters were responsible for the collection of blood samples from each patient, which was then forwarded to the hospital laboratory for analysis. Once the results were obtained, they were interpreted and noted by the two rheumatologists involved in the study.

A series of questionnaires were administered to the subjects on the same day as the RA patients' consultation with the rheumatologists. The questionnaires were administered at the Rheumatology Clinic. The details of the questionnaires will be discussed in section 5.8. It was found that although patients reported that they could read in English, a certain number of patients still required assistance to complete the questionnaires. This led to delays as both the researcher and the trained research assistant had to maintain a constant physical presence, despite the fact that most of the questionnaires were of a self-administering nature.

A semi-structured interview also formed part of the assessment procedure. For the African patients who at times felt they could express an idea or thought more clearly in an indigenous language such as Zulu or Xhosa, a nursing sister at the rheumatology clinic acted as interpreter.

The collection of the data took longer than expected because of the difficulty some participants had with both expressive and written English. However, interactive contact with the subjects provided the opportunity to obtain certain rare insights into their physical and a psychosocial experience as RA patients.

Note: The abbreviations used in Table 5.1 are presented below the table.

**Table 5.1**

**The 1987 American Rheumatology Association (ARA) revised criteria for the classification of rheumatoid arthritis\***

<b>Criterion</b>	<b>Definition</b>
1. Morning stiffness	Morning stiffness in and around the joints, lasting at least 1 hour before maximal improvement.
2. Arthritis of 3 or more joint areas	At least 3 joint areas simultaneously have had soft tissue swelling or fluid (not bony overgrowth alone) observed by a physician. The 14 possible areas are right or left PIP, MCP, wrist, elbow, knee, ankle, and MTP joints.
3. Arthritis of hand joints	At least 1 area swollen (as defined above) in a wrist, MCP, or PIP joint.
4. Symmetric arthritis	Simultaneous involvement of the same joint areas (as defined in 2) on both sides of the body (bilateral involvement of PIPs, MCPs, or MTPs is acceptable without absolute symmetry).
5. Rheumatoid nodules	Subcutaneous nodules, over bony prominences, or extensor surfaces, or in juxtaarticular regions, observed by a physician.
6. Serum rheumatoid factor	Demonstration of abnormal amounts of serum rheumatoid factor by any method for which the result has been positive in <5% of normal control subjects.
7. Radiographic changes	Radiographic changes typical of rheumatoid arthritis on postero-anterior hand and wrist radiographs, which must include erosions or unequivocal bony decalcification localized in or most marked adjacent to the involved joints (osteoarthritis changes alone do not qualify).
*For classification purposes a patient shall be said to have rheumatoid arthritis if he/she has satisfied at least 4 of these 7 criteria. Criteria 1 through 4 must have been present for at least 6 weeks. Patients with 2 clinical diagnoses are not excluded. Designation as classic, definite, or probable rheumatoid arthritis is not to be made.	

**ABBREVIATIONS :**

- Proximal Interphalangeal - (PIP)
- Metacarpophalangeal - (MCP)
- Metatarsophalangeal - (MTP)

**Table 5.2**

**American College of Rheumatology revised criteria for classification of functional status in rheumatoid arthritis\***

Class I	Completely able to perform usual activities of daily living (self-care, vocational, and avocational).
Class II	Able to perform usual self-care and vocational activities, but limited in avocational activities.
Class III	Able to perform usual self-care activities, but limited in vocational and avocational activities.
Class IV	Limited in ability to perform usual self-care, vocational, and avocational activities.

\* Usual self-care activities include dressing, feeding, bathing, grooming, and toileting. Avocational (recreational and/or leisure) and vocational (work, school, homemaking) activities are patient-desired and age- and sex-specific.

## 5.7 Description of the sample.

### 5.7.1 Demographic Data and Duration of RA

A detailed questionnaire seeking demographic information was administered to the subjects in this study. The variables obtained included age, marital status, sex, educational level, employment status, monthly household income, religion, and racial classification.

The duration of RA (total number of years since disease onset) per subject was also obtained.

Table 5.3 shows the distribution of the demographic variables.

It is important to note the following:

- the marital status categories were modified before subjecting the data to the statistical analysis. Subjects who were separated or divorced were categorised together.
- racial classification of the subjects was considered important because of the variability of the etiological and epidemiological findings among different race groups (see Chapter 2, Sections 2.2 and 2.3). In this South African study the sample comprised only two racial groups: Africans and Indians. African subjects were primarily Zulu or Xhosa speaking and Indian subjects were of both north and south Indian origin.
- each variable with sub-categories (e.g. employment [employed/not engaged in paid work activities]) was coded for statistical purposes.

**Table 5.3****Frequencies of the Demographic Data of the Sample**

<b>Demographic Variables</b>		
<b>Age</b>	<b>Frequency</b>	<b>Percentage (%)</b>
20-29	11	5.9
30-39	21	11.3
40-49	54	29.0
50-59	69	37.1
60 & over	31	16.7
<b>Marital Status</b>		
Married	45	24.2
Never married	102	54.8
Widowed	26	14.0
Separated & Divorced	13	7.0
<b>Sex</b>		
Male	24	12.9
Female	162	87.1
<b>Educational Level</b>		
No formal schooling	22	11.8
1-3 years of junior school	4	2.2
4-6 years senior primary school	26	14.0
1-3 years of high school	71	38.2
4-6 years of high school	54	29.0
Tertiary education	9	4.8
<b>Employment Status</b>		
Employed	44	23.7
Not engaged in paid work activities	142	76.3
<b>Monthly Household Income</b>		
Less than R1000	109	58.6
Between R1000 & R2000	58	31.2
Between R2000 & R6000	16	8.6
Over R6000	3	1.6
<b>Religion</b>		
Christian	86	46.2
Hindu	82	44.1
Muslim	17	9.1
<b>Racial Classification</b>		
African	64	34.4
Indian	122	65.6
Total Number	186	100

A report on the demographic variables based on the data presented in Table 5.3 follows.

The age range of the adult sample in this study is 20 to 80 years with a mean of 49.51 and standard deviation of 10.86. The highest numbers of subjects were in the 50-59 year age range (37.1%), followed by the 40-49 year age range (29%), 60 years and over (16.7%), and the 30-39 year age range (11.3%). The least number of cases (5.9%) were between the ages of 20 to 29 years and more than half the sample (53.8%) was 50 years and older.

More than half the sample (54.8%) were not married, 24.2% were married, and twice the number of subjects (14%) were widowed as compared to patients who were separated or divorced (7%). The category "Living with Partner" was dropped because it was not endorsed by any of the subjects.

The male to female ratio is 1:6.75. Female subjects made up 87.1% of the sample whilst 12.9% were male subjects.

The majority of subjects (67.2%) were found to have some level of high school education: 38.2% completed between 1 to 3 years of high school and 29% completed between 4 to 6 years of high school. 11.8% of subjects had no formal schooling and a small number (4.8%) had tertiary education.

Only 23.7% of the sample was employed whilst the majority (76.3%) of the subjects were not engaged in paid work activities. With only two categories for employment status represented (i.e. those employed and those not engaged in paid work activities), correlations become possible, coding employed as +1 and not engaged in paid work activities as +2.

Monthly household income included, where relevant, the amount received as a disability grant or other financial assistance from the state, such as a pension benefit. Although the majority of the patients in the sample were not engaged in paid work activities, their partner's earnings combined with earnings of other significant members of the household were taken into account.

It was found that more than half the sample (58.6%) had an income of less than R1000 followed by 31.2% with an income of between R1000 and R2000. Only 8.6% of the sample had an income of between R2000 and R6000 whilst 1.6% had an income of over R6000.

A further observation with respect to the economic effect of RA on subjects who participated in this study was that well over half the sample (61.5%) was not receiving a disability grant from the state, as opposed to 33.8% who were.

The three predominant religious groups that the patients making up the sample belonged to included Christianity, Hinduism, and Islam (Muslim faith). The majority of subjects (90.3%) were either Christian or Hindu (46.2% and 44.1% respectively), whilst 9.1% were Muslim.

Only two racial groups (Indians and Africans) made up the sample. The sample profile was reflective of the patient population of the hospital in which the study was conducted. Indians made up 65.6% of the sample while Africans comprised 34.4%. The ratio of African to Indian patients was, therefore, roughly 1:2. With only two races represented, correlations become possible, coding Indians as +1 and Africans as +2.

### *Duration of the disease*

The mean number of years of RA for the sample was 10.80 (SD=7.96). 60.5% of the sample were patients with established disease (ED group) who have had RA for more than 5 years and 33.3% were recent onset patients (RO group) who have had the disease for 5 years or less.

## 5.8 Measures Used

### 5.8.1 Biographical Inventory (Appendix 1)

A detailed biographical inventory was administered. Socio-demographic data essential for statistical purposes such as age, sex, marital status, employment status, monthly household income, religion and racial classification was obtained. Actual number of years (duration) of RA was also ascertained.



## 5.8.2 Psychosocial Measures

### 5.8.2.1 The London Coping with Arthritis Questionnaire (LCRAQ) (Appendix 2)

The London Coping with Arthritis Questionnaire (Newman *et al.*, 1990) is a disease-specific, 36-item questionnaire based on a Likert-type format. It was devised using existing questionnaires such as Folkman and Lazarus's (1980) Ways of Coping Questionnaire, specific strategies suggested to patients by health care personnel, and a pilot study. According to Newman *et al.* (1990) their work on coping is an extension of the Folkman and Lazarus's (1980) process approach to coping, which emphasizes temporal and contextual influences.

Newman *et al.* (1990) subjected the LCRAQ to cluster analysis, the purpose of which was to identify the unique characteristics of groups of RA patients that used particular patterns of coping as opposed to identifying dominant styles of coping as is commonly done in Western based studies. For the purposes of this study the LCRAQ was subjected to both a factor analysis and a cluster analysis. The cluster analysis did not reveal significantly different findings from the factor analysis. It was decided that the results of the factor analysis would be retained for interpretation because clear, unambiguous factors were produced. The factor structure of the LCRAQ used in this study cannot, therefore, be compared to Newman *et al.*'s (1990) use of the LCRAQ. However, the development of the LCRAQ, a disease specific scale, was based partly on previously existing scales on general coping, such as the Ways' of Coping Scale (Folkman & Lazarus, 1980) which yields coping styles defined by factor analysis.

Subjecting the items on the LCRAQ to factor analysis and considering loadings in excess of 0.40 provides a baseline for investigating the styles of coping used by the subjects in this study. Once this is established, the intricacies of the relationship between RA, coping and disease outcome should become the focus of future research endeavors.

The details of the factor analysis of the LCRAQ is presented in section 5.8.2.1.1. In this study the LCRAQ yielded a Cronbach alpha of 0.77.

### 5.8.2.1.1 Factor Analysis of the London Coping with Rheumatoid Arthritis Questionnaire (LCRAQ)

The 36 items on the LCRAQ were subjected to factor analysis (results are presented in table form in Appendix 3). Principal component analysis was performed and 11 factors with eigenvalues greater than one were extracted. The scree plot (Figure 3) indicated that three factors should be extracted, and this more parsimonious route was taken. The factors explained 12,55%, 11,44%, and 9,20% of the variance respectively. The factors were rotated by the varimax method, using Kaiser normalization (see table in Appendix 3). Although Tabachnick and Fidell (1983) state, with regard to individual factors, that as a “rule of thumb”, loadings in excess of 0,30 are eligible for interpretation, in this study 0,40 was used as the cut-off value for the size of loading to be interpreted. Comrey (1973) suggests, however, that loadings in excess of 0,45 may be considered to be fair, accounting for 20% of variance. Inspection of the items with loadings above 0,40 in this study suggested that three factors are interpretable and were named as follows:

- (1) Proactive Coping,
- (2) Negative-Internal Coping, and
- (3) Positive-Interactive Coping.

Items on factor one reflected two aspects of positive or proactive coping. The first aspect has a behavioural component (items which pertain to active coping) and the second aspect a cognitive component (items pertaining to self-education and cognitive re-structuring). It is interesting to note that strong factor loadings (0.6 and higher) were found on items 8, 15 and 31. These items pertaining to physical attempts made by RA patients to enhance active coping methods, made a significant contribution to making up factor one. Factor one was therefore given the label “Proactive Coping.

Factor two is clearly made up of items that are indicative of “negative coping”, marked with avoidance behaviour. This factor which was made up of items 7, 13, 19, 21, 23, 24, 26 and 27 was labelled “Negative-Internal Coping”. Strong factor loadings on items 13 and 27 suggest that the way in which RA patients cope with people around them is by either avoiding others or by imposing negative social advances towards others.

Finally, factor three comprises items pertaining to socially interactive and pro-active behaviour(s) marked with optimistic thinking. This factor is labelled: Positive-Interactive Coping. Item five was the only item with a strong factor loading indicating the importance of positive social interaction with friends and family members.

Weighted factor scores were computed, and used as measures of the three dimensions of coping. High scores on all three measures indicate higher levels of the particular dimension of coping. High scores on the proactive and positive-interactive measures of coping are indicative of an increased positive style of coping. High scores on the negative-internal measure indicate a negative coping style. Factors one, two and three may, therefore, be seen to broadly represent positive and negative coping styles. Factors one and three reflect a positive coping style as compared to factor two, which reflects a negative coping style.

#### 5.8.2.2 The Illness Specific Social Support Scale (IS-SSS) (Appendix 4)

Revenson and Majerovitz (1992), to assess the construct of problematic support as well as positive social support in individuals with RA, used the Illness Specific Social Support Scale (IS-SSS). Problematic support refers to negative support interactions that do not meet the recipient's needs or are seen as unsupportive (Revenson *et al.*, 1988).

Subjects may be requested to complete the support scale three times in order to ascertain the following:

- Support received from their spouse.
- Support provided to their spouse.
- Support received from their social network.

Each version of the scale is identical, the only difference being more relevant wording of the items to reflect the intention of the scale. There are two parts to each version of the scale. Part A comprises items relating to positive social support and Part B has items pertaining to "problematic" social support.

Further, theoretically driven support sub-scales including emotional support, esteem support, tangible support and informational support can be obtained for use in statistical analysis such as examining the relationship between social support and psychosocial outcome. The reliabilities of the support sub-scales, reported by Revenson and Majerovitz (1992), for the RA patients from their spouse and from their network, respectively, are as follows: (a) emotional support (0.93 and 0.91), (b) esteem support (0.81 and 0.76), (c) tangible support (0.84 and 0.87), and (d) informational support (0.64 and 0.72).

Revenson and Majerovitz (1992) report the reliabilities for the total problematic support scale for the patients from their spouse as 0.88 and for the patients from their network support as 0.87. An additional negative social interactions sub-scale can be obtained from the problematic support scale.

Due to the complexity of this study in terms of the number of psychosocial variables being examined, it was decided that only network support would be assessed. Further, the fact that a high number of RA patients who attend the Rheumatology out-patient clinic at which this study was conducted, were never married was taken into account, as well as the fact that extended families or communal living is an accepted cultural practice among Africans and Indians. Due to the social and cultural practices of Africans and Indians it is expected that network support would be an important social resource for the RA patients who participated in this study.

The IS-SSS in this study yielded a Cronbach alpha of 0.70 for positive social support and 0.68 for problematic social support.

#### 5.8.2.3 Causal Attribution and Cognitive Illness Representation (Appendix 5)

A semi-structured questionnaire was devised to assess the causes that RA patients attribute to their disease and to assess Ra patients cognitive illness representations. “Open-ended” responses were obtained to ascertain the causal attribution subjects made at the time of disease onset and at the time the study was conducted. Sensky’s (1997) suggests that spontaneous attributions are more likely to be clinically relevant than attributions elicited from a predetermined list, and should,

therefore, be used as a preferred method in research. The suggestion put forward by Sensky (1997) supports the method used in this study to assess causal attribution.

The perception of the subject's ability to control RA represented one aspect of the assessment of the subject's cognitive representation of their illness. Participants in this study were asked to report their perceived ability to control (internal control) RA at the time of onset of the disease as well as the time the study was conducted. They were also asked to report whether they perceived outside factors (factors beyond their control) to have greater control over their disease (RA) than internal factors. Finally, they were also given the opportunity to endorse both categories (internal and external control) if they perceived that both internal and external control played an equal role.

Responses to the questions pertaining to causal attribution and to perceived control were categorised and coded in order to subject the data to statistical analysis. The causes that subjects attributed for their illness at the time of onset of the disease, and at the time the study was conducted were placed in one of two categories: those subjects who reported internal factors as a cause (eg. self-blame such as poor diet, or genetic factors), and those subjects who reported external factors as a cause (e.g. cold weather, or forced to engage in physically hard work due to circumstances out of their control). Responses of the participants perceived ability to control their illness at the time of disease onset and at the time the study was conducted were also placed in two categories: those reporting internal (self) control, and those reporting that control factors lie outside the individual (e.g. only the doctor can control the disease).

#### 5.8.2.4 Arthritis Helplessness Index (AHI) (Appendix 6)

The learned helplessness theory of Abramson, Seligman and Teasdale (1978) formed the basis for the development of the AHI. The AHI (Nicassio, Wallston, Callahan, Herbert & Pincus, 1985) is a 15-item self-report inventory based on a four-point Likert-type format that assesses to what extent patients believe they are able to control and/or cope with arthritis symptoms. Although participants were asked to report their perceived ability to control their disease, as reported in section 5.8.2.3, the researcher decided to administer the AHI because it is a disease-specific measure. Nicassio *et al.* (1985) report that a measure of helplessness should be significantly correlated with associated theoretical variables such as personal control, anxiety and depression, difficulties in self-management and other health related behaviours.

Internal consistency (reliability of the original AHI) was measured using Cronbach's alpha and was found to be 0.69. Nicassio *et al.* (1985) also report good construct validity. In addition correlation of full-scale helplessness scores with depression has been found (Nicassio *et al.*, 1985). As has already been stated depression, in this study, is one of the psychological health outcome measures.

A reliability test conducted for this study yielded a Cronbach alpha of 0.67.

#### 5.8.2.5 Beck Depression Inventory (BDI) (Appendix 7)

As a measure of the relative severity of depression, the Beck Depression Inventory or BDI (Beck, 1972) appears to be one of the better self-rating scales. The BDI does not diagnose different types of depression nor does it differentiate other causes (e.g. alcoholism or schizophrenia). Twenty-one items, each weighted in severity from 0 to 3, comprise this rating scale, which includes statements about mood, affect and feelings that relate to depression in adults.

Providing a rationale for the BDI, Beck (1972) stated that that the aim was to develop an inventory that approximated clinical judgements of the intensity of depression, which would offer a number of advantages for research purposes. The inventory was designed to include all symptoms integral to the depressive constellation and at the same time to provide for grading the intensity of each.

Each symptom category was constructed to include a series of statements reflecting varying degrees of severity. The scoring system takes into account the number of symptoms reported by the patient by assigning a numerical score for each symptom. For every symptom the intensity was registered by assigning graduated numerical values to each statement within a category. The patient's total score, therefore, can be in the range of 0 to 63.

Patients are placed into a category of depression according to their total depression score. The categories are as follows:

- 0 to 9                      represents *no depression*
- 10 to 15                    represents *mild depression*
- 16 to 19                    represents *moderate depression*

- over 20 represents *severe depression*

Two methods for evaluating the internal consistency of the original instrument were used (Beck, 1972). Firstly, the Kruskal-Wallis Non Parametric ANOVA by Ranks showed a significant relationship to the total score of the inventory. Secondly, in determining the split-half reliability, the Pearson  $r$  between the odd and even categories was computed and yielded a coefficient of 0,86.

The concurrent and construct validity was also found to be high when the BDI was developed. The Pearson biserial  $r$  was computed to determine the correlation between the scores on the BDI and the clinical judgement of depression. Biserial  $r$  was found to be between 0,65 and 0,67.

Beck and Steer (1984) studied internal consistencies of the 1961 and 1978 versions of the BDI in two samples of psychiatric patients. The alpha coefficients for the 598 patients and outpatients who were administered the 1961 version and the 248 outpatients who were self-administered the 1978 version were 0,88 and 0,86 respectively. These investigators concluded that the 1961 and 1978 versions of the BDI were found to possess high levels of internal consistency despite differences in the background characteristics of the samples, modes of administration, decades in which the samples were tested and time frames that the patients were asked to describe.

Although the BDI was constructed to assess the severity of depression among psychiatric patients, it has been widely used in patients with a known medical disorder such as a life-threatening or chronic illness. The general criticism levelled against the use of this inventory in RA patients is the overlapping of the somatic symptoms of RA with the symptoms of a depressive disorder (Blalock, DeVellis, Brown & Wallston, 1989; Peck, Smith, Ward & Milano, 1989; Pincus, Callahan, Bradley, Vaughn & Wolfe, 1986). However, Frank, Chaney, Clay, *et al.* (1992), in their study of chronically ill individuals (RA and spinal cord injuries), and a group of depressed individuals, concluded that somatic items on a self-report inventory of depression were less important to the syndrome of depression in physically ill patients. A study evaluating the use of the BDI as a screening tool for depression in a clinic setting with RA patients supported these findings (Krug, Woods & Mahowald, 1997). The results of the Frank *et al.* (1992) and Krug *et al.* (1997) studies which suggest that the BDI is a good instrument to assess depression in a physically ill sample because the somatic items on the inventory do not give an inflated depression score, although these items may be conceived of as illness symptoms. This contradicts previous findings

that suggest that the somatic items on the BDI inflate the total score reflecting the severity of depression.

Another important consideration would be to assess the suitability of BDI for detecting depression in RA patients in different settings such as hospital out-patient clinic-based settings or in-patient settings. In a clinic sample of Mexican RA patients, Suarez-Mendoza, Cardiel, Caballero-Urbe, Ortego-Soto and Marques-Marin (1997) validated the use of the original inventory (sensitivity of 92%), as well as a modified version that excluded somatic items.

The somatic items in the BDI were not removed for use in this study of RA patients, based on the evidence from previous studies (e.g. Frank *et al.*, 1992; Suarez-Mendoza *et al.*, 1997) that these items do not contaminate the total score, which reflects the severity of depression.

A reliability analysis conducted for this study yielded a Cronbach alpha of 0.90.

#### 5.8.2.5.1 Factor Analysis of the BDI

The 21 items of the BDI were submitted to Principal Components Factor Analysis. There were five factors with eigen values greater than one, explaining 19,39%, 12,95%, 11,13%, 7,85% and 7,62% of the variance respectively.

The scree plot suggested that the measure was unidimensional. It was unclear whether the five factors or the single summed score should have been used in further analysis. It was decided to postpone this decision until further analysis had been conducted by subjecting the health status measures to factor analysis. The results of the factor analysis indicated that the BDI should be retained as a unidimensional measure (see chapter 6, section 6.3 for a more detailed discussion).

### 5.8.3 Measures of Disease Activity

#### 5.8.3.1 Laboratory Tests

The history and physical examination of the patient is crucial in making a diagnosis of RA, as there is no single laboratory measure that is diagnostic of the disease (Katz, 1982). Usually a small



number of tests are used to increase the precision in diagnosing RA. These tests include a complete blood count (CBC), blood chemistry studies and urinalysis, erythrocyte sedimentation rate (ESR), C-Reactive protein, rheumatoid factor (RF) and antinuclear antibody. In cases where the diagnosis of RA is more difficult to make an additional number of tests may be utilised which include a synovial fluid analysis, complement levels, human leukocyte antigen (HLA), and histologic and cytologic studies.

The basic laboratory tests used for the differential diagnosis of RA were conducted on all the patients attending the rheumatology clinic, including the sample, as is routinely done. For the purposes of this study only the ESR was used as the disease activity measure.

#### 5.8.3.2 Erythrocyte Sedimentation Rate (ESR)

The ESR is the most widely used test to detect inflammation. This test helps to differentiate inflammatory disorders, such as RA, from non-inflammatory disorders, such as osteoarthritis and soft tissue rheumatism. ESR values are found to correlate with inflammation and a normal ESR value usually excludes the presence of active inflammation.

In this study the ESR, the only laboratory measure used, combined with other diagnostic criteria and the rheumatologists' clinical judgement was seen as sufficient in confirming a diagnosis of RA. The ESR was considered to be an adequate laboratory indication of disease activity.

#### 5.8.3.3 28-Joint Count (Appendix 8)

Many quantitative measures are used to assess and monitor RA disease course. Joint counts for pain and swelling is one of these measures which is also predictive of radiographic changes as well as of long-term morbidity and mortality (Smolen, Breedveld, Eberl, Jones, Leeming, Wylie & Kirkpatrick, 1995). Traditionally a greater number of joints (66/68) were taken into consideration when ascertaining a joint count in RA patients. It has been found however that the 28-joint count is not only easier to use (Fuchs, Brooks, Callahan & Pincus, 1989) but correlates highly with the information obtained from the 66/68-joint count (Smolen *et al.*, 1995).

The 28 joint index includes the following 28 joints:

- 10 proximal interphalangeal joints of the fingers;
- 10 metacarpophalangeal joints; and
- the wrists, elbows, shoulders and knees (8 counts) (Fuchs *et al.*, 1989).

These joints are evaluated for swelling, tenderness, and limited motion. Normal or abnormal scores are noted.

Fuchs *et al.* (1989) acknowledge the omission of foot and ankle joints from the 28-joint index which they have developed, but state two reasons to justify this. Firstly, they cite practical reasons and secondly, they argue that foot abnormalities may be due to processes other than RA, such as fluid retention and venous insufficiency.

Smolen *et al.* (1995) found evidence for the validity and reliability of a reduced joint count (the 28-joint count) for the assessment of RA activity in comparison to the 66/68 joint count. The evidence included the fact that: (1) most of the swollen and tender joints were found on the 28-joint count whilst the remaining joints on the 66/68-joint count were frequently not involved in RA, (2) the number of swollen and tender joints obtained using the 28-joint count correlated well with those obtained using the 66/68 joint count, and (3) changes in joint tenderness and swelling during therapy as measured by both joint counts, correlated highly.

Finally, Fuchs and Pincus (1994) found that reduced joint count scores may be used to evaluate the results of clinical trials without decreasing the ability to detect change over time as well as facilitate assessment of responses to treatment of RA patients.

## 5.8.4 Measures of Pain and Disability

5.8.4.1 Measures of Pain-Visual Analogue Scale (VAS) and Arthritis Impact Measurement Scale<sup>2</sup> (AIMS<sup>2</sup>) pain sub-scale (see Appendices 9 and 10 respectively)

Two measures of pain were obtained. The first scale used to measure participants response to the intensity of the pain experienced as a direct result of the disease, was the VAS, and the second measure was obtained from the pain sub-scale of the AIMS 2.

### *VAS*

Huskisson (in Melzack ed., 1983) describes the VAS as “a simple, robust, sensitive and reproducible instrument that enables a patient to express the severity of his pain in such a way that it can be given a numerical value” (p. 33). The scale is independent of language. It is a 10cm horizontal line with the end points representing pain intensity from “no pain” on the left side to the “worst possible pain” on the right side. Patients are asked to indicate the intensity of their pain on the line. VAS pain scores range from 0 to 10.

Commenting on the VAS, McQuay (in Hopkins & Costain eds., 1990) contends that the instrument is more complex than the binary and categorical scales for pain which are much simpler to use. However, McQuay (in Hopkins & Costain eds., 1990) goes on to say that the only major limitations of the VAS reported in the literature are in the elderly and in patients who are sleepy.

### *AIMS<sup>2</sup> – Pain Sub-Scale*

The pain sub-scale on the AIMS<sup>2</sup> (Meenan, Mason, Anderson, Guccione & Kazis, 1992) is called “Arthritis Pain” and in the three and five component models of health status of the AIMS<sup>2</sup>, “symptom” is the equivalent of arthritis pain. Scores on the sub-scale can range from 0 to 10, with 0 representing good health status and 10 representing poor status. A more detailed discussion on the AIMS<sup>2</sup> will form part of the section on measures of disability, which follows.

#### 5.8.4.2 Measures of Disability-Visual Analogue Scale (VAS), Arthritis Impact Measurement Scale (AIMS2), and Stanford Health Assessment Questionnaire (HAQ)

##### *VAS* (Appendix 11)

Of the measures of disability, the VAS was the first to be used. The instrument was markedly similar to the VAS used to measure pain as described in section 5.8.4.2. Patients were also asked to mark on a 10cm horizontal line the extent of their disability as a result of having RA, from 0 (no disability) to 10 (completely disabled). Scoring followed the same procedure that was used for the VAS measure of pain.

##### *AIMS2* (Appendix 12)

The extent of the disability or functional status of the sample was measured by the AIMS 2 (Meenan *et al.*, 1992), a 78 item self-administering questionnaire which is an improvement on the AIMS1, originally devised to measure patient outcome in the rheumatic diseases. The AIMS has also been described as a quality of life measure (Karoly, 1985).

Twelve sub-scales are devised from the first 57 items. The sub-scales include mobility level, walking and bending, hand and finger function, arm function, self-care tasks, household tasks, social activity, support from family and friends, arthritis pain, work, level of tension, and mood.

Responses to items 58 to 78 enables the researcher to obtain information separate from issues pertaining to functional status which include patients satisfaction with their health status, the impact of arthritis on the patients life and certain demographic variables. All the scores can be expressed in the range 0 to 10, with 0 representing good health status and 10 representing poor status for all 12 sub-scales.

The five-component model of health status was developed by subjecting the original AIMS scale to a factor analysis (Meenan *et al.*, 1992). This five-component model using normalised AIMS2 scale scores was used in this study. The components and the scale scores making up each component are presented in Table 5.3.

**Table 5.4****The five-component model of the AIMS2**

<b>Components</b>	<b>Normalised AIMS2 scale scores</b>
Physical	Mobility level Walking and Bending Hand and Finger Function Arm Function Self-Care Tasks Household Tasks
Affect	Level of Tension Mood
Symptom	Pain
Social Interaction	Social Activity Support from Family
Role	Work

Acceptable levels of reliability and internal validity were found from a pilot study and a large cross-sectional performance test. These levels of reliability and validity were found to be generalizable across major disease and demographic sub-groups (Meenan *et al.*, 1992).

**HAQ (Appendix 13)**

Another measure of functional disability used was a modified version of the Stanford Health Assessment Questionnaire (HAQ), devised as a disease-specific measure. The version used in the study was modified from the original 20-item HAQ (Fries, Spitz, Kraines & Holman, 1980) to 8-items which provided a functional disability index (FDI) (Pincus, Summey, Soraci, Wallston & Hummon, 1983). RA patients are asked to rate the degree of disability on a Likert scale for 8-items, which include dressing and grooming, rising, eating, walking, hygiene, reach, grip, and activities.

The Stanford HAQ which was developed for use in RA patients has been validated and found to be useful in clinical trials (Wolfe, Kleinheksel, Cathey, Hawley, Spitz & Fries, 1988). Wolfe *et al.* (1988) found in a study of 400 cohorts that the HAQ's functional disability index (FDI) scores identified patients with increasingly severe scores for clinical, psychological, and demographic variables. The FDI scores also predicted increased in-patient and out-patient utilisation of services and mortality. Ziebland, Fitzpatrick, Jenkinson, Mowat and Mowat (1992) argue that the 8-item modified HAQ has greater sensitivity to rheumatological changes over time than the conventional HAQ.

## 5.9 Summary and Conclusion

One-hundred and eighty-six adult recent onset and established disease clinic patients who met the criteria for the ARA Classification for RA, were subjected to a series of self-administering questionnaires and a semi-structured questionnaire. The measures were used to ascertain the interrelationships between socio-demographic factors, psychosocial factors and objective and subjective RA health outcome measures.

Careful consideration was given to the theoretical formulation on which the hypotheses for this cross-sectional study was based, because of the complex nature of the interrelationships between socio-demographic factors, psychosocial factors and RA health outcome measures. This study intends to establish a baseline of information for the biopsychosocial understanding of RA patients in a "non-Western" group of patients, with an apriori assumption that this group would present with certain unique features not usually found in Western samples.

# CHAPTER SIX

## RESULTS

### 6.1 Introduction

In order to test the hypotheses presented in Chapter Five (section 5.2) the data obtained from 186 subjects with RA was statistically analysed through the SPSS statistical programme (Norusio, 1992). The results obtained from the analysis are presented in two separate sub-sections, in this chapter. In the first sub-section (Part A), the results of the preliminary analysis in which factor analysis was used to develop the health status measures for use in this study, the results of the correlational analysis used to assess the linear relationships between variables, and, finally, the results of the stepwise multiple regression analysis testing the health-sustaining function of psychosocial factors (referred to as the direct-effects hypothesis: Shumaker & Brownell, 1984) are presented. The results of the moderated regression analysis used to test the stress-reducing function of psychosocial factors (referred to as the moderating hypothesis: Shumaker & Brownell, 1984) are presented in Part B, the second sub-section. In general, multiple regression analysis is used to describe the multivariate relationships between variables, and tests the capacity of independent variables (IVs) to predict dependent variables (DVs). Discussions of these results follow in Chapter Seven.

Part A will contain details of the results of the systematic statistical analysis as specified above and will be presented as follows:

#### (1) Development of health status measures

Psychosocial (subjective, self-report measures) and medical (objective measures) health status measures were together subjected to a factor analysis in order to assess the need to keep each measure as separate measures in this study, and to examine the possibility of reducing the number of health status measures. The following four health status measures (dependent variables) emerged:

- Self-Report of Pain and Functional Status,
- Swollen and Tender Joint Status,
- Arthritis Helplessness Index (AHI), and
- Beck Depression Inventory (BDI).

The labels given to the first two measures i.e. Self-Report of Pain and Functional Status and Swollen and Tender Joint Status are indicative of exactly what is being measured. Measures that were retained in its original form were the Arthritis Helplessness Index (AHI), which is a measure of the degree of helplessness experienced by the participants in this study, and the Beck Depression Inventory (BDI), which measures the presence and severity of depression. It must be noted that subjecting both the subjective and objective health status measures to factor analysis, together, did not make a significant difference to certain psychological measures, namely, the Beck Depression Inventory (BDI) and the Arthritis Helplessness Index (AHI). The results of the factor analysis indicated that the AHI and the BDI should be retained as unidimensional measures.

It is clear that in this study both the subjective and objective measures of illness are considered to be dependent variables (representing health status). While it is conceivable that the objective measures would in some instances be predictive of some of the subjective measures (for example, the number of swollen joints could be predictive of helplessness and/or depression), the focus of the current study is the role that coping and other psychosocial variables such as network social support, causal attribution, and cognitive illness representation play in the experience of RA. As such coping and the other specified psychosocial variables were used as independent variables while both subjective and objective measures of illness were used as dependent variables. This represents an examination of the direct effects of coping, network social support, causal attribution, and cognitive illness representation on the condition of RA.



## (2) Bivariate analysis

Bivariate analysis was conducted between the socio-demographic variables, psychosocial variables and dependent variables (subjective and objective health status measures), as well as illness duration.

## (3) Multivariate analysis

Multivariate analysis, including stepwise multiple regression, and analysis of variance (ANOVA) were performed as the final step in the analysis to determine the relationship between the predictor variables and the dependent variables self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index (AHI), and the Beck Depression Inventory (BDI). A second set of stepwise multiple regressions were conducted to determine the relationship between predictor variables, which included the variables used as dependent variables in the first set of multiple regression analysis, as well as the dependent variables self-report of pain and functional status, swollen and tender joint count, Arthritis Helplessness Index (AHI) and Beck Depression Inventory (BDI). In other words, those variables used as dependent variables in the first set of multiple regression analysis were used as independent variables in the second set of multiple regressions. Recognising the dependent variables as independent variables in the second set of multiple regressions is based on empirical and theoretical evidence that certain quality of life components may predict other quality of life components in chronic illness. In this study, therefore, pain and functional status was considered in the first instance to be a quality of life component, and in the second instance pain and functional status was considered with other independent variables, such as socio-economic status, as a predictor of quality of life (health status). Each of the quality of life components were treated in this manner.

## 6.2 Means and standard deviations of measures obtained

The means and standard deviations of the measures obtained are presented in Table 6.1. Coping and perceived network support were measured using disease-specific questionnaires. The London Coping with Arthritis Questionnaire (LCRAQ) was used to measure the psychological concept of coping among the RA patients in this study, and the positive and problematic support scales of the Illness Specific Social Support Scale (I-SSSS) were used to measure perceived network support. The other psychological variables CA\_O (causal attributions made at the time of onset of RA by participants in the study), CA\_R (causal attributions made by participants at the time the study was conducted), Control\_I (the patient's perception that they are able to control their RA illness condition), and Control\_E (the patient's perception that RA can only be controlled by external factors), produced data that are categorical in nature. A frequency and percentages analysis was, therefore, performed and the data is presented in section 6.2.1.

Numerous health status measures were obtained using the relevant instruments. The properties of these instruments are discussed in Chapter Five (section 5.8). The health status measures include the following:

- Class (ARA Functional Status)
- Swollen and Tender Joint Status:
  - Number of tender joints (NTJ)
  - Tender joint count (TJC)
  - Number of swollen joints (NSJ)
  - Swollen joint count (SJC)
- Arthritis Impact Measurement Scale (AIMS2) - Physical Component
- Erythrocyte Sedimentation Rate (ESR)
- Health Assessment Questionnaire (HAQ)
- Beck Depression Inventory (BDI)
- Arthritis Helplessness Index (AHI)
- Visual Analogue Scale (VAS) for Pain
- Visual Analogue Scale (VAS) for Disability

- Arthritis Impact Measurement Scale (AIMS2) – Affect Component
- Arthritis Impact Measurement Scale (AIMS2) – Pain Component

**Table 6.1****Means and Standard Deviations (SDs) of the measures used**

<b>PSYCHOSOCIAL MEASURES</b>	<b>Means</b>	<b>SDs</b>
Total Coping	146.42	24.70
NSA* Emotional	31.84	4.23
NSA Esteem	13.48	4.25
NSA Tangible	17.68	2.98
NSA Informational	20.56	4.27
NSB** Emotional	17.39	5.10
NSB Esteem	12.13	3.08
NSB Tangible	12.14	2.85
NSB Informational	16.57	3.63
NSB Negative Interactions	17.43	3.03
<b>HEALTH STATUS MEASURES</b>		
CLASS	2.33	0.85
NTJ	6.58	5.96
TJC	7.93	7.63
NSJ	5.32	4.85
SJC	6.35	6.19
AIMS Physical	4.99	1.61
ESR	39.82	27.77
HAQ	1.55	1.04
BDI	16.22	10.61
AHI	35.56	4.99
VAS Pain	5.79	2.63
VAS Disability	4.81	2.77
AIMS2 Affect	4.57	1.37
AIMS2 Pain	6.49	2.33

\* NSA represents perceived positive network support received, as measured by the I-SSS.

\*\* NSB represents perceived problematic network support received as measured by the I-SSS

The means and standard deviations presented in Table 6.1 represent overall values obtained for the sample on each of the various measures. Only those measures with an established set of norms will be commented on.

High mean scores on the sub-scales for NSA are indicative of a high level of positive social support received from a network of individuals as specified by the participants in the study. Subjects simultaneously endorsed high values for perceived problematic support (NSB), on each sub-scale, from individuals making up their support network.

The RA health status measures (dependent variables) presented in Table 6.1 broadly represent both objective (medical) and subjective (psychological) measures.

According to the ARA classification system (see Table 5.2), the majority of subjects belonged in Class II. These RA patients, categorised in Class II, are able to perform usual self-care and vocational activities but are limited in recreational or leisure activities. The low mean scores on swollen and tender joint status (NTJ, TJC, NSJ and SJC) indicate that the sample did not have severe difficulties with their joint functioning. A mean score of 4,99 on AIMS2 - Physical component indicates that subjects experienced moderate difficulty with respect to their physical health status. A score of 4.99 on the AIMS2 – Physical component is interpreted as moderate considering that on each of the sub-scales on the AIMS2 a range of scores between 0 and 10 may be obtained, with 0 representing good health status and 10 representing poor health status. Rheumatologists involved in this study used the ESR values in combination with other relevant diagnostic criteria to confirm a diagnosis of RA. The mean ESR value of 39,82 clearly confirmed that subjects had joint inflammation. An ESR value of between 22 and 25 and above is considered to be diagnostically significant. A mean score of 1,55 on the HAQ was indicative of moderate functional impairment as a maximum score of 3 can be obtained. A final measure of functional impairment or disability was a self-rated one using the VAS. The VAS - Disability measure yielded a mean score of 4.81 (within a possible range of scores between 0 and 10), which is indicative of a moderate degree of disability.

The mean BDI score (16.22) indicates that the sample was found to be moderately depressed. As was discussed in section 5.8.2.5 a score falling in the range of 16 to 19

on the BDI is indicative of moderate levels of depression. A mean score of 35,56 on the AHI indicates that the sample experienced moderate levels of helplessness (a maximum score of 60 is possible). Mean scores on VAS – Pain and AIMS – pain component, are indicative of high levels of pain experienced by the sample. On the VAS – Pain scale the range of scores are from 0 to 10 with 5 indicating a moderate degree of pain (see Chapter Five, section 5.8.4.1), and on the AIMS – pain component scale the range of scores are from 0 to 10 with 0 representing good health status and 10 representing poor health status (see Chapter Five, section 5.8.4.2). Finally, the mean score on AIMS2 – Affect component indicated that subjects in the study experienced moderate levels of depressed mood and “tension” or anxiety.

In summary, the mean scores obtained from the various measures indicate that the participants in the study experienced a moderate degree of functional impairment, accompanied, however, by less severe joint involvement. Overall, the sample was found to be moderately depressed and experienced helplessness with respect to the condition of RA. Finally, the severity of pain experienced by the RA patients in the study was found to be higher than the degree of disability that was reported.

### **6.2.1 Frequency and Percentages Analysis of Causal Attribution and Internal and External Control**

A frequency and percentages analysis of causal attributions made at the time of onset of RA (CA\_O), causal attributions made at the time the study was conducted (CA\_R), and both internal and external control (Control\_I and Control\_E respectively) was conducted (see Table 6.2).

**Table 6.2**

**Frequency and Percentages Analysis of causal attributions made at the time of onset of RA (CA\_O), causal attributions made at the time the study was conducted (CA\_R), and internal and external control (Control\_I and Control\_E)**

<b>Psychological Variables</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>
<b>CA_O</b>		
Internal	37	19.9
External	39	21.0
Cause not considered	110	59.1
<b>CA_R</b>		
Internal	36	19.4
External	38	20.4
Cause not considered	112	60.2
<b>CONTROL Internal</b>		
Yes	78	41.9
No	108	58.1
<b>CONTROL External</b>		
Yes	151	81.2
No	35	18.8

It can be deduced from Table 6.2, that the majority of subjects in this study reported that they did not consider what caused their illness condition at the time of onset of RA (59.1%), nor at the time the study was conducted (60.2%). An almost equal number of subjects attributed causes for RA, for both CA\_O and CA\_R, as existing within the individual and an almost equal number of subjects attributed causes for RA as external to the individual.

A greater percentage of subjects (58.1%) expressed that they did not have control over the condition of RA as compared to 41.9% of subjects who expressed that they could personally control the disease. 81.2% of subjects perceived that external factors such as medical intervention and weather conditions had greater control of their illness condition as opposed to 18.8% who did not perceive external factors to have control over the disease.

## **PART A: DEVELOPMENT OF MULTIVARIATE, PREDICTIVE MODELS FOR RA OUTCOME**

### **6.3 Development of health status measures using factor analysis**

To explore the possibility of redundancy of measures, and to make the analysis more parsimonious, a factor analytic study was conducted using all the subjective and objective health status measures. These measures included the following:

- (1) Class (according to the ARA system of classification)
- (2) 28 Joint-Count which includes:
  - NTJ (Number of tender joints)
  - TJC (Tender joint count)
  - NSJ (Number of swollen joints)
  - SJC (Swollen joint count)
- (3) AIMS2\_P (Physical component of the AIMS scale)
- (4) ESR (Erythrocyte Sedimentation Rate)
- (5) HAQ (Functional status measure)
- (7) BDI (Total depression score)
- (8) BDI (Five factors that emerged from factor analysis)
- (9) AHI (Total score for helplessness)
- (10) VAS\_P (Pain score)
- (11) VAS\_D (Disability Score)



(12) AIMS\_A (Affect component of the AIMS scale)

(13) AIMS\_S (Symptom [pain] component of the AIMS scale)

Principal component analysis was used to extract factors. On the basis of the scree plot (see Appendix 14), three factors were extracted explaining 16.45%, 15.96% and 12.92% of the variance respectively. These factors were rotated by the varimax method, and the final factor structure is reported in Appendix 14.

On the basis of this clear factor structure it was decided to create multi-measure summed indices of the main health status variables. First, once the factor analysis had been used to identify different dimensions of reaction or outcome of RA, all indices that loaded greater than 0.40 on each factor were submitted to item analysis. By means of an iterative procedure in which indices with low item-total correlations were excluded, it was possible to construct unidimensional measures of outcome for factor one and factor two.

Factor one was made up of indices for Class, AIMS2 – physical component, HAQ, VAS - Pain, VAS - Disability and AIMS2 – pain (S). The Cronbach alpha for this measure was 0.78. The above measures represent pain and functional status measures. Interestingly, all these measures are dependent on the subjects self-report. Class is the only measure that is decided by the rheumatologist, although based entirely on the subject's report. This factor was, therefore, given the following label: Self-report of Pain and Functional Status. Class and AIMS2\_P had strong factor loadings on factor one, indicating the importance of RA patient's functional status and overall physical status in making up this factor.

Similar item analysis was conducted for indices that loaded on factor two. This factor was made up of the NTJ, TJC, NSJ, and SJC. These indices are entirely rheumatologist dependent and are scored on the basis of the findings of the physical or medical examination conducted by the medical practitioner. A label of Swollen and Tender Joint Status was given to this factor. The unweighted sum of the four indices (NTJ, TJC, NSJ, and SJC) was computed and produced a Cronbach Alpha of 0.90. It is important to note that despite the fact that the items which loaded on this factor

were exactly the same as the original instrument, it was decided that the label Swollen and Tender Joint Status will be given to this factor because this label clearly conveys to non-medical readers, exactly what the instrument measures. The equivalent original instrument is called the 28-Joint Count widely used by rheumatologists.

The results of the factor analysis suggested that affective indices including the BDI, AHI and AIMS2\_A (AIMS2\_Affect) made up a distinct factor. Unfortunately, item analysis indicated that the indices with loadings greater than 0.40 did not form an internally consistent measure (Cronbach Alpha = 0.46).

Two single unidimensional scores, the Beck Depression Inventory and the Arthritis Helplessness Index, were thus used as further dependent variables along with the dependent variables self-report of pain and functional status, and swollen and tender joint count. The BDI is an inventory that measures severity of depression (see section 5.8.2.5 for discussion on the properties of this inventory). The AHI is an index that measures the level of helplessness experienced by individuals with RA, with low scores indicating lower degrees of helplessness and high scores indicating a greater degree of helplessness (see section 5.8.2.4 for a discussion on the properties of this index).

The final health status measures (dependent variables) were as follows:

- (1) Dependent measure One : Self-report of Pain and Functional Status,
- (2) Dependent measure Two : Swollen and Tender Joint Status,
- (3) Dependent measure Three : Arthritis Helplessness Index (AHI), and
- (4) Dependent measure Four : Beck Depression Inventory (BDI).

### **6.3.1 Descriptive Statistics of the health status measures**

The minimum and maximum values, means and standard deviations of each of the health status measures (self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index (AHI), and Beck Depression Inventory (BDI) are presented in Table 6.3.

**Table 6.3**

**Descriptive statistics of the health status measures Self-report of Pain and Functional Status, Swollen and Tender Joint Status, Arthritis Helplessness Index, and Beck Depression Inventory**

	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Cronbach Alpha</b>
DV1 (Self-report of Pain & Functional Status)	5.23	48.49	29.42	9.65	0.78
DV2 (Swollen & Tender Joint Count)	0	92.00	25.74	21.77	0.90
DV3 (BDI-Total)	0	48.00	15.83	10.72	0.90
DV4 (AHI-Total)	19.00	54.00	35.52	4.95	0.67
N	186				

The sample had high mean score values on all four health status measures. Subjects, therefore, had high levels of pain and poor functional status, a higher number of swollen and tender joints, were moderately depressed and experienced increased levels of helplessness.

## **6.4 Bivariate and Multivariate Analyses**

### **6.4.1 Introduction**

Hierarchical multiple regression analysis was used to identify predictors of the four dependent variables, namely self-report of pain and functional status, swollen and tender joint status, AHI, and BDI, in the first set of regressions (see Cohen & Cohen, 1975). Variables used as dependent variables in the first set of regressions were used as independent variables in the second set of hierarchical multiple regressions, which was used to identify predictors of each of the four dependent variables, namely self-

report of pain and functional status, swollen and tender joint status, AHI and BDI. In the first set of hierarchical multiple regression analysis the following procedure was followed for each of the dependent variables:

- (1) Bivariate analysis was conducted,
- (2) Entered independent variables as a set with stepwise predictors, and
- (3) Entered psychological variables as a set with stepwise predictors.

The following independent variables were entered as a set with stepwise predictors: age, sex, educational level, employment status, monthly household income, and racial classification. The independent variables marital status and religion were subjected to ANOVA because of the categorical nature of these variables data.

The following psychological variables were entered as a set with stepwise predictors: total coping, proactive coping, negative-internal coping, positive-interactive coping, control (internal) and control (external). The psychological variables causal attribution (CA\_O and CA\_R) were also subjected to ANOVA because its' data is categorical in nature.

Eight separate stepwise multiple regression analyses were, therefore, conducted.

#### **6.4.2 Bivariate Analysis**

Correlations between the variables that were used in the first set of multiple regression analysis are presented. Initially, the strength of the relationships among the independent variables and among the dependent variables was calculated and is presented in Table 6.4.

**Table 6.4**

**Table of Pearson Product-Moment Correlation Coefficients (Zero-order-r) among the dependent variables (DVs) (Self-report of Pain and Functional Status, Swollen and Tender Joint Status, Arthritis Helplessness Index and Beck Depression Inventory)**

DVs	Self-Report of Pain & Functional Status	Swollen & Tender Joint Status	AHI	BDI
	Zero-order (r)	Zero-order (r)	Zero-order (r)	Zero-order (r)
Self-report of Pain & Functional Status		0.42**	0.42**	0.45**
Swollen & Tender Joint Status	0.42**		0.23**	0.20**
AHI	0.42**	0.23**		0.41**
BDI	0.45**	0.20**	0.41**	

\*\*p<0.01

**Table 6.5**

**Table of Pearson Product-Moment Correlation Coefficients (Zero-order-r) among the independent variables (IVs) (Age, Sex, Educational Level, Employment Status, Income, Duration and Race)**

Ivs	Age	Sex	Educational Level	Employment Status	Income	Duration	Race
Age	1.00	0.12	-0.25**	0.17*	-0.07	0.35**	-0.08
Sex		1.00	-0.14	0.01	0.04	-0.03	-0.08
Educational Level		-0.14	1.00	-0.25**	0.22*	0.00	-0.11
Employment Status		0.01	-0.25**	1.00	-0.16*	0.15	0.05
Income		0.39	0.22**	-0.16*	1.00	-0.07	0.13
Duration		-0.03	0.00	0.15	-0.07	1.00	-0.01
Race		-0.08	-0.11	0.05	0.13	-0.01	1.00

\*\*p<0.01

\*p<0.05

### *Significant correlations among the independent variables*

It was hypothesized (see Chapter 5, section 5.2) that there will be significant correlations between the socio-demographic variables. This hypothesis was partially supported. Marital status, religion and racial category were not significantly correlated with any of the socio-demographic variables.

Significant positive correlations were found between income and educational level ( $r=0.22$ ), age and employment status ( $r=0.17$ ), and age and duration ( $r= 0.35$ ). Subjects with higher monthly household incomes, therefore, were more educated, older subjects were not engaged in paid work activities and had RA for a greater number of years.

Significant negative correlations were found between age and educational level ( $r= -0.25$ ), educational level and employment status ( $r= - 0.25$ ), and employment status and income ( $r= - 0.16$ ). These associations indicate that older subjects had less education, subjects with higher levels of education were employed and those who were not employed had lower monthly household incomes.

### *Significant correlations among the dependent variables*

It was hypothesized (see Chapter 5, section 5.2) that there will be significant correlations among the dependent variables (subjective and objective health status measures). Results of the bivariate correlations supported this hypothesis.

Significant positive correlations ( $r$ ) were found between self-report of pain and functional status and swollen and tender joint status ( $r=0.42$ ), self-report of pain and functional status and Arthritis Helplessness Index ( $r=0.42$ ), self-report of pain and functional status and BDI ( $r=0.45$ ), swollen and tender joint status and Arthritis Helplessness Index ( $r=0.23$ ), swollen and tender joint status and Beck Depression Inventory ( $r=0.20$ ), and finally Arthritis Helplessness Index and Beck Depression Inventory ( $r=0.41$ ).

The higher the self-report of pain and functional status, therefore, the worse the swollen and tender joint status, and the greater the degree of helplessness and depression. Poor swollen and tender joint status was related to higher degrees of helplessness and depression. Finally, the greater the helplessness, the more severe the depression.

### *Interrelationships between the psychological variables and independent variables*

The strength of the relationships between the psychological variables and the independent variables are presented in Table 6.6. The results of the cross tabulations carried out between the psychological variables CA\_O (causal attributions made at the time of onset of RA), CA\_R (causal attributions made at the time the study was conducted), perceived internal control and perceived external control, and the independent variables are discussed at the end of this section.

**Table 6.6**

**Table of Pearson-Product Moment Correlation Coefficients (Zero-order-r) between the psychological variables Total Coping, Network Support\_A (Positive Support), Network Support\_B (Negative Social Interaction) and independent variables (IVs) (Age, Sex, Educational Level, Employment Status, Income, Duration and Race)**

	IVs	Age	Sex	Reli- gion	Educatio- nal Level	Employ- ment Status	Income	Duration	Race
<b>Psycholo- gical Variables</b>		Zero- order (r)	Zero- order (r)	Zero- order (r)	Zero- order (r)	Zero- order (r)	Zero- order (r)	Zero- order (r)	Zero- order (r)
Total Coping		-0.11	0.00	-0.12	0.09	-0.09	0.07	-0.01	0.07
NSA_E		0.13	-0.11	-0.06	-0.08	-0.13	0.16*	-0.06	0.10
NSA_Est		0.09	-0.04	-0.01	-0.13	-0.04	0.10	-0.08	0.04
NSA_Tan		0.16*	- 0.17*	0.02	-0.13	-0.07	0.11	-0.06	0.10
NSA_Info		0.02	0.02	-0.03	-0.05	-0.10	0.14	-0.12	0.03
NSB_E		0.11	- 0.17*	0.16*	-0.21**	0.08	-0.05	-0.03	-0.03
NSB_Est		0.26	-0.15	0.10	-0.13	0.10	0.02	0.13	-0.05
NSB_Tan		0.23**	- 0.16*	0.12	-0.18*	0.06	0.02	0.09	-0.08
NSB_Info		0.27	- 0.16*	0.08	-0.18*	0.13	0.01	0.05	-0.02
NSB_Neg		0.17*	- 0.18*	0.06	-0.10	-0.07	0.05	-0.03	-0.01

\*\*p<0.01

\*p<0.05



It was hypothesized that there will significant correlations between the demographic and socioeconomic variables, and the psychosocial variables total coping, network support\_A (Positive Support), network support\_B (Problematic Support), causal attribution at the time of onset of RA and at the time the study was conducted, and perceived internal and perceived external control. This hypothesis was partially supported. There were no significant correlations found between socio-demographic variables, and the psychosocial variables causal attribution at the time of onset of the disease, causal attribution at the time the study was conducted, and perceived external control.

Significant positive correlations existed between monthly household income and positive network support (emotional sub-scale), and age and positive network support (tangible sub-scale). These results indicate that the higher the monthly household income, the greater the perceived emotional support received, and the older the subject, the greater the perceived tangible support received. A significant negative correlation exists between sex and tangible support received which indicates that female subjects perceived that they received decreased levels of tangible support.

A significant positive correlation was found between age and problematic network support (tangible and negative interaction sub-scales) which indicated that the older the subject the greater the perception that individuals making up the network support projected negative social interactions and provided greater problematic tangible support. Significant negative correlations were found between sex and educational level, and problematic network support (emotional sub-scale). Female subjects and subjects with a higher educational level perceived that they received less problematic emotional support. A significant negative correlation exists between sex and perceived problematic network support (esteem sub-scale). Female subjects perceived that they received less problematic esteem support. Significant negative correlations were also found between sex and educational level, and problematic network support (tangible sub-scale). This finding indicates that the female subjects and subjects with a higher educational level perceived that they received less problematic tangible support. Significant negative correlations were found between sex and educational level, and problematic network support (information sub-scale) which indicated that

those female subjects and subjects with a higher educational level perceived that they received less problematic informational support. Finally, a significant negative correlation was found between sex and problematic network support (negative interactions sub-scale). Female subjects perceived that individuals in their social network projected less problematic negative social interactions.

Due to the categorical nature of the data obtained regarding the subjects attributions about the cause of RA at the time of disease onset and at the time the study was conducted, cross-tabulations were performed between CA\_O, CA\_R and the independent variables. Cross-tabulations were also conducted for perceived internal and perceived external control and the independent variables. There was only one significant finding from the computations carried out in this regard. A significant positive association (Chi-square)\*\* (11.33;  $p=0,05$ ) was found between educational level and perceived internal control. This finding indicates that the higher the level of education of the subjects, the greater the perception that they are able to control the condition of RA.

### *Interrelationships between the independent variables and dependent variables*

It was hypothesized that there will be significant correlations between socio-demographic variables and each of the health status variables (self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index and Beck Depression Inventory). Results of the bivariate analysis supported this hypothesis.

The strength of the relationships between the independent variables and the dependent variables is presented in Table 6.7.

**Table 6.7**

**Table of Pearson-Product Moment Correlation Coefficients (Zero-order-r) between independent variables (IVs - Age, Sex, Educational Level, Employment Status, Income, Duration and Race) and the dependent variables (DVs - Self-Report of Pain and Functional Status, Swollen & Tender Joint Status, AHI and BDI), and Marital Status and Religion with four and three categories respectively, are represented by F-values from ANOVAs**

IVs	Self-report of Pain & Functional Status	Swollen & Tender Joint Status	AHI	BDI
	Zero-order (r)	Zero-order (r)	Zero-order (r)	Zero-order (r)
Age	0.10	0.22*	0.09	0.06
Sex	0.06	0.09	0.08	0.20**
Education Level	- 0.12	- 0.08	- 0.15*	0.23**
Employment Status	0.25**	0.17*	0.15*	0.06
Income	- 0.27**	- 0.05	- 0.22**	- 0.22**
Duration	0.02	- 0.06	0.14	- 0.02
Race	- 0.16*	- 0.12	- 0.02	- 0.03
Marital Status	F(3,186)=2.86*	F(3,186)=0.003	F(3,186)=1.18	F(3,186)=0.85
Religion	F(2,186)=3.39*	F(2,186)=2.66	F(2,186)=1.33	F(2,186)= 2.66

\*\*p<0.01

\*p<0.05

Note: F values from the ANOVAS for marital status and religion are presented.

The significant interrelationships between the independent variables and each dependent variable (Self-Report of Pain and Functional Status, Swollen and Tender Joint Status, AHI and BDI) will be discussed as reflected in Table 6.7.

*Interrelationship between Age, Sex, Educational Level, Employment Status, Monthly Household Income, Duration and Race, and Self-Report of Pain and Functional Status (DV1)*

A significant positive relationship was found between employment status and self-report of pain and functional status ( $r=0.25$ ). RA patients in this study who were not engaged in paid work activities experienced higher levels of pain and poorer functional status.

Significant negative relationships were found between monthly household income and self-report of pain and functional status ( $r= -0.27$ ); and race and self-report of pain and functional status ( $r= -0.16$ ). The first reported significant negative correlation indicates that subjects who earned more had less pain and better functional status, and the second significant negative correlation indicates that subjects of Indian origin experienced less pain and better functional status.

*Interrelationship between Age, Sex, Educational Level, Employment Status, Monthly Household Income, Duration and Race, and Swollen and Tender Joint Status (DV2)*

Significant positive relationships were found between employment status and swollen and tender joint status ( $r= 0.17$ ), and age and swollen and tender joint status ( $r=0.22$ ) indicating that those subjects not engaged in paid work activities, as well the older RA subjects had poor joint status (i.e. higher scores on the measure for swollen and tender joint status).

*Interrelationship between Age, Sex, Educational Level, Employment Status, Monthly Household Income, Duration and Race, and Arthritis Helplessness Index (DV3)*

A significant positive relationship was found between employment status and helplessness ( $r=0.15$ ). Subjects not engaged in paid work activities, therefore, had a greater sense of helplessness.

Significant negative correlations were found between level of education and helplessness ( $r= -0.15$ ) and between monthly household income and helplessness ( $r= -0.22$ ). These significant negative correlations indicate that subjects with a higher level of education had a decreased sense of helplessness and those who had a higher household income also experienced lower levels of helplessness.

*Interrelationship between Age, Sex, Educational Level, Employment Status, Monthly Household Income, Duration and Race, and Beck Depression Inventory (DV4)*

A significant positive correlation was found between sex and depression ( $r=0.20$ ).

This result is consistent with other research findings, which show that female RA patients are often found to have higher levels of depression as compared to male RA patients.

Significant negative correlations were found between educational level and depression ( $r= -0.23$ ), and income and depression ( $r= -0.22$ ). These results indicate that subjects with a higher level of education and greater monthly household income were found to have decreased levels of depression.

*Interrelationships between the psychological variables and dependent variables (Self-Report of Pain and Functional Status, Swollen and Tender Joint Status, Arthritis Helplessness Index and Beck Depression Inventory)*

It was hypothesized that there will be significant correlations between the psychosocial variables and each health status variable (self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index and Beck Depression Inventory). This hypothesis was only partially supported. Network support (both positive and problematic) was not found to be significantly associated with any one of the health status variables. The strength of the relationships between the psychosocial variables and dependent variables are presented in Table 6.8.

**Table 6.8**

**Pearson Product-Moment Correlation Coefficients (r) between Total Coping, Proactive Coping, Negative-Internal Coping, Positive-Interactive Coping, Network Support\_A (Positive Support), Network Support\_B (Problematic Support) and Self-Report of Pain and Functional Status, Swollen and Tender Joint Status, Arthritis Helplessness Index and Beck Depression Inventory, and Causal Attribution at the time of onset of RA (CA\_O) and Causal Attribution at the time the study was conducted (CA\_R) are represented by F-values from ANOVAs**

Psychosocial Variables	Self-report of Pain & Functional Status	Swollen & Tender Joint Status	AHI	BDI
	Zero-order (r)	Zero-order(r)	Zero-order(r)	Zero-order(r)
Total Coping	- 0.30**	- 0.12	- 0.26**	- 0.20**
Proactive Coping	- 0.21**	- 0.12	- 0.23**	- 0.24**
Negative-Internal Coping	- 0.39**	- 0.27**	- 0.18*	- 0.43**
Positive-Interactive Coping	- 0.20**	- 0.03	- 0.25**	- 0.09
Network Support_A	-0.09	0.001	-0.07	-0.08
Network Support_B	-0.06	0.05	-0.06	0.04
Control Internal	0.22**	0.16*	0.21**	0.17*
Control External	0.16*	0.15*	0.09	0.13
Causal Attribution_O	F(2,186)=0.10	F(2,186)=0.55	F(2,186)=0.53	F(2,186)=0.57
Causal Attribution_R	F(2,186)=0.21	F(2,186)=0.67	F(2,186)=0.49	F(2,186)=0.67

\*\*p<0.01

\*p<0.05

Note: F values for causal attribution at the time of onset of RA (CA\_O) and causal attribution at the time the study was conducted (CA\_R) are presented.

The values presented in Table 6.8 show that there are no associations between both positive social support and problematic support and each of the dependent variables. This unusual finding is contrary to what has been reported in the literature about the direct effect of social support on health status. Social support has been associated with increased psychological well-being and better functional status in chronically ill individuals. A more detailed discussion regarding the findings with respect to the

relationship between social support and RA outcome will be presented in the Chapter Seven (Discussion of Results).

### *Interrelationships between the psychological variables and Self-Report of Pain and Functional Status (DV1)*

There were significant positive correlations between internal control ( $r=0.22$ ), external control ( $r=0.16$ ) and self-report of pain and functional status. This result indicates that subjects who believed that they had the ability to control the disease (RA) as well as those who believed that RA can only be controlled by factors outside the individual had increased levels of pain and poorer functional status.

Significant negative correlations were found between total coping and self-report of pain and functional status ( $r= -0,30$ ); proactive coping and self-report of pain and functional status ( $r= -0.21$ ); negative-internal coping and self-report of pain and functional status ( $r= -0.39$ ); and positive-interactive coping and self-report of pain and functional status ( $r= - 0.20$ ). These associations indicate that increased ability to cope with RA is related to lower scores on pain and functional status. In addition, proactive and positive-interactive coping styles of the subjects were related to decreased levels of pain and better functional status. Finally, a somewhat contradictory finding indicates that a negative-internal coping style is associated with lower pain scores and better functional status. Possible reasons for the finding that the negative-internal coping style has the same relationship with self-report of pain and functional status as the positive coping style does, is presented in Chapter Seven.

### *Interrelationships between the psychological variables and Swollen and Tender Joint Status (DV2)*

As shown in Table 6.8 significant positive relationships were found between internal control and swollen and tender joint status ( $r=0.16$ ) and external control and swollen and tender joint status ( $r=0.15$ ). These findings indicate that despite the subject's belief that they are able to control the disease they still have increased joint involvement. In addition, those subjects who believed factors outside the individual



played a greater role in controlling the disease also had increased joint involvement. Psychological control, therefore, may not be as significant as biological factors during symptom flare-ups or it is possible that psychological factors are playing a role in an unexpected direction. Whether there is a perception of greater internal or external control in this sample did not make a difference to joint involvement.

The only significant correlation with coping variables was found between negative-internal coping and joint status ( $r = -0.27$ ) indicating that an increased negative style of coping is associated with poor joint status.

#### *Interrelationships between the psychological variables and Arthritis Helplessness Index (AHI) (DV3)*

A significant positive correlation was found between internal control and Arthritis Helplessness Index ( $r = 0.21$ ). This indicates that the subject's belief that they are able to control the disease was associated with a greater sense of helplessness.

Significant negative correlations were found between total coping and Arthritis Helplessness Index ( $r = -0.26$ ), proactive coping and Arthritis Helplessness Index ( $r = -0.23$ ), and positive-interactive coping and Arthritis Index ( $r = -0.25$ ). This indicates that the greater the subjects ability to cope with the disease, the less the helplessness experienced. In addition, increased proactive and positive-interactive coping styles were associated with decreased helplessness.

#### *Interrelationships between the psychological variables and Beck Depression Inventory (BDI) (DV4)*

Only one significant positive relationship was found between the psychological variable internal control and the Beck Depression Inventory ( $r = 0.17$ ). Subjects who believed that they have the ability to control the disease experienced greater severity of depression.

Significant negative correlations were found between total coping and depression ( $r = -0.20$ ), proactive coping and depression ( $r = -0.24$ ), and negative-internal coping and depression ( $r = -0.43$ ). Subject's who were better able to cope, therefore, had less severe depression. In addition both proactive and negative-internal coping styles were associated with less severe depression.

### **6.4.3 Multivariate Analysis**

Multivariate analysis was conducted, in the first instance, to construct predictive models of the factors that contribute to each of the dependent variables associated with RA, namely, self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index, and Beck Depression Inventory. In the second instance, predictive models were constructed of the factors that contribute to each health outcome measure (while treating the other health outcome measures as independent variables), namely, pain and functional status, swollen and tender joint status, helplessness and depression. A hierarchical method of analysis was employed whereby the variance associated with factors which were deemed 'causally prior', which have been termed independent variables (IVs), was partialled out before the effect of other psychological variables were examined. A mixture of analysis of variance and hierarchical multiple regression analysis (see Cohen & Cohen, 1983) was used to isolate the predictors of each of the four dependent variables in the first and second instances. The following procedure was used to develop a model for each dependent variable:

#### Step One:

All the independent variables that had been found to be significantly related to the dependent variable in the bivariate analysis were entered into the regression analysis, and a stepwise procedure was employed to determine which variable remained in the final model.

## Step Two:

All the psychological variables that were found to be significantly related to the dependent variable in the bivariate analysis were entered into the regression analysis next, as a set, after the independent variable. A stepwise procedure was employed once again to determine which variable remained in the final model.

By means of this two-stage process it was possible to develop predictive models for each dependent variable (DV), where the psychological variables (in the first instance) and the medical (objective measures) and psychological predictors (in the second instance) were only entered once the variance for the socio- demographic variables had already been partialled out.

There was one minor difficulty in developing the models. There were two sets of categorical variables among both the independent variables (Marital Status and Religion) and the psychological variables (CA\_O and CA\_R – causal attributions made by the subject's at the time of onset of the disease and causal attributions made at the time the study was conducted, respectively) which could not simply be entered into the regression analysis. At the completion of step one, regression residuals were computed, and these were used as dependent variables in two one way ANOVAS, to determine whether marital status and religion were also significant predictors. If the categorical independent variables were significant, their variance was partialled out, and the residuals were thus used as dependent variables in step two of the analysis. On the other hand, if they were not significant, step two was conducted after step one, without partialling out variance attributable to these variables. A similar procedure was employed at the end of step two. Once all the variance for both the independent variables (in step one) and the psychological variables (in step two) had been partialled out, residuals were saved and used as dependent variables in two, one way ANOVAS, for CA\_O and CA\_R. In no instances were these found to be significant.

The results of the first set of analysis are reported in Table 6.9. The independent variables (i.e. marital status and religion) and the dependent variables (CA\_O and CA\_R) produced categorical data and were, therefore, subjected to ANOVAS that were not found to be significant.

Results of the second set of regression equations for the dependent variables pain and functional status, swollen and tender joint status, AHI and BDI are reported in Table 6.10. In this set of multiple regressions, the variables pain and functional status, swollen and tender joint status, helplessness and depression that were used as dependent variables in the first set of regressions were entered in step two (as specified above). Finally, a stepwise procedure was again employed to determine which variable remained in the final model. The non-significant variables of the multiple regressions are reported in Appendix 15.

**Table 6.9**

**Set One: Regression Equations for Self-report of Pain and Functional Status, Swollen & Tender Joint Status, Arthritis Helplessness Index and Beck Depression Inventory**

DV: Self-report of pain and functional status ( $R^2=0.30$ $F(5.179)=15.55$ )			
Significant Predictors	$\beta$	t	Partial R
Income	-0.16*	-2.49	-0.18
Employment Status	0.14*	2.20	0.16
Negative-internal Coping	-0.33**	-5.20	-0.36
Total Coping	-0.26**	-4.20	-0.30
DV: Swollen and Tender Joint Status ( $R^2=0.90$ $F(2.183)=9.05$ )			
Significant Predictors	$\beta$	t	Partial R
Employment Status	0.13*	1.86	0.14
Negative-internal Coping	-0.25**	-3.47	-0.25
DV: AHI ( $R^2=0.11$ $F(2.183)=11.23$ )			
Significant Predictors	$\beta$	t	Partial R
Income	-0.20**	-2.91	-0.21
Total Coping	-0.25**	-3.53	-0.25
DV: BDI ( $R^2=0.30$ $F(5.179)=15.50$ )			
Significant Predictors	$\beta$	t	Partial R
Educational Level	-0.11*	-1.67	-0.12
Income	-0.12*	-1.81	-0.13
Sex	0.16*	-2.50	0.18
Negative-internal Coping	-0.38**	-6.0	-0.41
Positive-interactive Coping	-0.23**	-3.59	-0.26

\*\*  $p < 0.01$

\*  $p < 0.05$

**Table 6.10****Set Two: Regression Equations for Self-report of Pain and Functional Status Joint Status, Arthritis Helplessness Index and Beck Depression Inventory**

DV: BDI (R <sup>2</sup> =0.35 F(6.178)=16.14)			
Significant Predictors	$\beta$	t	Partial R
Educational Level	-0.11*	-1.69	-0.13
Sex	0.15*	-2.46	0.18
Negative-internal Coping	-0.29**	-4.43	-0.32
Positive-interactive Coping	-0.18**	-2.82	-0.21
Pain and Functional Status	0.26**	3.72	0.27
DV: AHI (R <sup>2</sup> =0.21 F(3.182)=15.93)			
Significant Predictors	$\beta$	t	Partial R
Income	-0.12*	-1.72	-0.13
Total Coping	-0.15*	-2.22	-0.16
Pain and Functional Status	0.34**	4.76	0.33
DV: Swollen and Tender Joint Status (R <sup>2</sup> =0.12 F(3.182)=8.22)			
Significant Predictors	$\beta$	t	Partial R
Negative-internal Coping	-0.22**	-3.07	-0.22
AHI	0.18*	2.46	0.17
DV: Pain and Functional Status (R <sup>2</sup> =0.38 F(6.179)=18.12)			
Significant Predictors	$\beta$	t	Partial R
Income	-0.11*	-1.71	-0.13
Employment Status	0.13*	2.15	0.16
Negative-internal Coping	-0.23**	-3.46	-0.25
Total Coping	-0.19**	-2.98	-0.22
AHI	0.20**	3.04	0.22
BDI	0.20**	2.76	0.20

\*\* p&lt;0.01

\* p&lt;0.05

It was hypothesized that the socio-demographic variables and the psychological variables would be significant predictors of the RA health status variables (self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index and Beck Depression Inventory). Further, it was hypothesized that certain socio-demographic factors and psychological or subjective variables, including those psychological variables considered as health status variables in the previous hypothesis, would be significant predictors of the health status variables self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index and Beck Depression Inventory.

These hypotheses were supported by the findings. The results of the multiple regression analyses for each of the dependent variables are presented below.

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#### Regression Models: Set One

##### *Predictive Model One: Self-Report of Pain and Functional Status*

The partial correlations (partial  $r$ ) presented in Table 6.9 indicate which socio-demographic and psychological variables are significant predictors of the dependent variable self-report of pain and functional status.

The demographic variables that were found to be significant predictors of the dependent variable self-report of pain and functional status were employment status and monthly household income.

As already explained marital status and religion could not be entered into the regression equation because its data is classified in statistical terms as categorical data. The results of the one-way ANOVAS indicated that there was a significant difference between the never married, married, widowed and divorced groups on self-report of pain and functional status ( $F=2.86$ ,  $p<0.05$ ). Further analysis using the Schéffe test revealed that there is a significant difference between the married and widowed groups on self-report of pain and functional status with the married group

reporting lower levels of pain and better functional status (5% level of significance) than the widowed group.

A significant difference was also found between the different religious groups i.e. Christians, Hindus and Muslims on self-report of pain and functional status ( $F=3.39$ ,  $p<0.05$ ). Use of the Schéffe test revealed that Muslims and Christians were significantly different on self-report of pain and functional status (5% level of significance). Muslims reported lower levels of pain and better functional status.

The two psychological variables, negative-internal coping and total coping were found to be significant predictors of self-report of pain and functional status.

The psychological variables that could not be entered into the regression equation were causal attribution at the time of onset (CA\_O) of the illness and causal attribution at the time the study was conducted (CA\_R). The results of the ANOVAS with CA\_O and CA\_R on self-report of pain and functional status were not significant.

Monthly household income, employment status, racial classification, negative-internal coping and total coping were entered into a stepwise multiple regression. The residuals (residual one: income, employment status and racial classification) were then saved as dependent variables. ANOVAs were then computed between residual one (treated as a dependent variable) and marital status and religion. As already stated marital status and religion had significant F values with the dependent variable self-report of pain and functional status. A significant difference was found between the married and widowed group ( $F=3.26$ ,  $p<0.05$ ) and residual one, which was in turn saved as residual two. The effect for religion was not significant.

Once residual two was ascertained the psychological variables total coping, proactive coping, negative-internal coping, positive-interactive coping, internal control and external control were entered into a stepwise regression on residual two as the dependent variable. In the final analysis employment status, monthly household income, negative-interactive coping and total coping were found to be significant predictors of self-report of pain and functional status. A beta coefficient of  $-0.16$

indicates that higher monthly household income is predictive of less severe pain and better functional status. Unemployed status (not being engaged in paid work activity) is predictive of increased levels of pain and poor functional status (beta coefficient of 0.14). The beta coefficient of  $-0.42$  indicates that increased negative-internal coping is predictive of lower degrees of self-report of pain and better functional status. A beta coefficient of  $-0.26$  indicates that better overall coping is predictive of lower levels of reported pain and better functional status.

### *Predictive Model Two: Swollen and Tender Joint Status*

The only demographic variable that was found to be a significant predictor of swollen and tender joint status was employment status. ANOVA computed for marital status and racial classification; and joint status did not yield significant results. ANOVAs computed for CA\_O and CA\_R, and swollen and tender joint status, were also not significant.

Employment and negative-internal coping were entered into a stepwise multiple regression analysis to assess the variables' power to predict swollen and tender joint status. Both variables were found to be significant predictors of swollen and tender joint status, although negative-internal coping was found to be a more significant predictor of swollen and tender joint status (beta coefficient of  $-0.25$ ). Increased negative-internal coping style, therefore, is predictive of lower levels of swollen and tender joint status. Unemployed or not being engaged in paid work activities is predictive of poor joint status (beta coefficient of 0.13).

### *Predictive Model Three: Arthritis Helplessness Index*

Monthly household income and total coping were entered into stepwise regression to determine these variables predictive power in relation to helplessness. ANOVA computed for the independent variables marital status and religion; and psychological variables CA\_O and CA\_R did not yield significant findings. Income and total coping were found to be significant predictors of helplessness. Higher income (beta coefficient of  $-0.20$ ) and better overall coping (beta coefficient of  $-0.25$ ) were both



predictors of decreased levels of helplessness with overall coping being the more significant predictor.

#### *Predictive Model Four: Beck Depression Inventory*

Educational level, monthly household income, sex, negative-internal coping and positive-interactive coping were entered into a stepwise multiple regression analysis to assess these variables ability to predict depression. ANOVA computed for the demographic variables marital status and religion; and psychological variables CA\_O and CA\_R did not yield significant findings. Of these variables educational level, monthly household income, sex, negative-internal coping and proactive coping were found to significantly predict depression. Better educational level (beta coefficient of  $-0.11$ ), higher levels of monthly household income (beta coefficient of  $-0.12$ ), increased negative-internal coping (beta coefficient of  $-0.38$ ) and proactive coping (beta coefficient of  $-0.23$ ) is predictive of lower levels of depression. Women had a greater chance of becoming depressed (beta coefficient of  $0.16$ ).

#### Regression Models: Set Two

#### *Predictive Model Five: Beck Depression Inventory (BDI)*

In this set of regressions the health status variable self-report of pain and functional status was entered following proactive coping, negative-internal coping, sex, monthly household income and educational level, to assess the variables power to predict depression. In the final analysis only the psychological or subjective variables were found to be significant predictors of depression. Increased negative-internal coping is predictive of decreased levels of depression (beta coefficient of  $-0.30$ ). Self-report of increased pain and poor functional status is predictive of higher levels of depression (beta coefficient of  $0.26$ ). Finally, increased proactive coping is predictive of lower levels of depression (beta coefficient of  $-0.18$ ).

### *Predictive Model Six: Arthritis Helplessness Index (AHI)*

In this set of regressions the health status variable self-report of pain and functional status was entered following total coping and monthly household income to assess the variables power to predict helplessness. Only self-report of pain and functional status was found to be a significant predictor of helplessness. Increased pain and poor functional status is predictive of higher degrees of helplessness (beta coefficient of 0.34).

It was found that when the health status variable self-report of pain and functional status was added into the regression equation (the first set), then  $R^2$  doubles, which is indicative of the variables power to predict helplessness.

### *Predictive Model Seven: Swollen and Tender Joint Status*

In this set of regressions the variables negative-internal coping and monthly household income were first entered followed by helplessness to assess the variables power to predict swollen and tender joint status. In the final analysis only negative-internal coping and helplessness (AHI) were found to be significant predictors of swollen and tender joint status. Increased negative-internal coping (the more powerful predictor) is predictive of better swollen and tender joint status (beta coefficient of -0.22). Higher levels of helplessness is predictive of poor swollen and tender joint status (beta coefficient of 0.18).

### *Predictive Model Eight: Self-report of pain and functional status*

In this set of regressions the variables total coping, negative-internal coping, employment, and monthly household income were first entered followed by helplessness (AHI), and finally depression (BDI) to assess the variables power to predict self-report of pain and functional status. In the final analysis only the psychological factors negative-internal coping, total coping, helplessness and depression were found to be predictive of self-report of pain and functional status. Increased negative-internal coping is predictive of lower levels of pain and better

functional status (beta coefficient of  $-0.23$ ). Increased total coping is predictive of lower levels of pain and better functional status (beta coefficient of  $-0.19$ ). Greater levels of helplessness (beta coefficient of  $0.20$ ) and increased levels of depression (beta coefficient of  $0.20$ ) are predictive of increased levels of pain and poor functional status.

Psychological factors were found, therefore, to be more important predictors of self-report of pain and functional status than socioeconomic factors.

## **6.5 Summary of Results: Part A**

Data obtained from 186 subjects with RA was subjected to a statistical analysis in accordance with the hypotheses specified in Chapter Five. The mean age of the sample was 49.51 years, with a mean duration of RA of 10.80 years.

Mean scores obtained from the subjective measures provided an indication of the overall psychosocial functioning of the subjects in this study. The sample as a whole was found to be coping well with RA. High levels of both positive network support and problematic network support were reported. An almost equal percentage of subjects (60%) did not make causal attributions for their RA at the time of disease onset and at the time the study was conducted. Further, a large percentage of subjects reported that they did not have control over RA, whilst the majority reported that control of the disease lies outside individual control. Subjects were found to have moderate levels of depression and helplessness. Finally, the subjects had a moderate degree of functional impairment and reported greater pain severity than degree of disability.

RA subjective and objective health status measures were developed for use in this study. The original measures of health status were subjected to factor analysis. Principal component analysis with varimax rotation was performed. In the final analysis, the Beck Depression Inventory (BDI) and Arthritis Helplessness Index (AHI) were retained as unidimensional measures. The final dependent variables or health status measures were the following:

- Dependent measure One : Self-Report of Pain and Functional Status
- Dependent measure Two : Swollen and Tender Joint Status
- Dependent measure Three : Arthritis Helplessness Index measuring helplessness
- Dependent measure Four : Beck Depression Index measuring depression

Bivariate analysis was conducted to examine the significant relationships between the independent variables, psychosocial variables and dependent variables. In summary, the major findings revealed that socio-economic factors such as employment status and income were significantly associated with all four health status measures, namely, self-report of pain and functional status, swollen and tender joint status, Arthritis Helplessness Index (AHI) and Beck Depression Inventory (BDI).

The psychosocial variables coping and internal and external control were found to be significantly associated with the RA health status measures. Network support and causal attributions were not found to be associated with any of the health outcome measures. The socio-demographic variables monthly household income, age, and sex were found to be significantly associated with certain dimensions of network support received. Educational level was the only socio-demographic variable found to be associated with perceived internal control. The significant associations between the variables and the direction of the relationships were taken into consideration for the multiple regression analysis.

Multivariate analysis was conducted to construct predictive models of the factors that contribute to each of the health status variables (dependent variables) associated with RA. A mixture of ANOVAs and multiple regression analysis was used to identify the predictors of each of the four dependent variables. A model for each dependent variable was developed through a two-step process. Firstly, only the socio-demographic variable(s) that were found to be significantly related to the dependent variable in the bivariate analysis were entered into the regression analysis. Secondly, only the psychosocial variables, that were found to be significantly related to the dependent variable in the bivariate analysis, were entered into the regression analysis,

after the independent variables. In both instances a stepwise procedure was used to determine which variables remained in the final model.

Two sets of multiple regression analyses were conducted to develop predictive models for each of the four dependent variables (self-report of pain and functional status, swollen and tender joint count, AHI and BDI) in the first instance, and the same four dependent variables (self-report of pain and functional status, swollen and tender joint status, AHI and BDI) in the second instance. In the second set of multiple regressions however, the dependent variables (health status measures) were entered as independent variables to test their predictive power. A summary of the results of the regression analyses used to develop predictive models for each of the dependent or health status variables is presented below.

#### Multiple regressions: Set One

##### *Predictive Model One: Self-report of Pain and Functional Status (DVI)*

Increased negative-internal coping and overall coping are predictive of lower degrees of self-report of pain and better functional status.

##### *Predictive Model Two: Swollen and Tender Joint Status*

Employment and increased negative-internal coping is predictive of poor swollen and tender joint status (i.e. subjects had high scores on the measure for joint status). Those subjects not engaged in paid work activities had poor joint status. Negative-internal coping style was predictive of better levels of swollen and tender joint status.

##### *Predictive Model Three: Arthritis Helplessness Index*

Higher monthly household income and better overall coping are predictors of decreased levels of helplessness.

##### *Predictive Model Four: Beck Depression Inventory*

Better educational level, higher levels of monthly household income, increased negative-internal coping and positive-interactive coping predicted lower levels of depression. In addition, women had a greater chance of becoming depressed.

## Multiple regressions: Set Two

### *Predictive Model Five: BDI*

Psychological or subjective variables were found to be significant predictors of depression. Increased negative-internal coping is predictive of decreased levels of depression. Self-report of increased pain and poor functional status is predictive of higher levels of depression. Finally, increased positive-interactive coping is predictive of lower levels of depression.

### *Predictive Model Six: AHI*

Self-report of pain and functional status was found to be a significant predictor of helplessness. Increased pain and poor functional status is predictive of greater helplessness.

### *Predictive Model Seven: Swollen and Tender Joint Status*

Negative-internal coping and helplessness were found to be significant predictors of swollen and tender joint status. Increased negative-internal coping is predictive of better swollen and tender joint status and greater helplessness is predictive of poor swollen and tender joint status.

### *Predictive Model Eight: Self-report of pain and functional status*

In the final analysis only the psychological factors negative-internal coping, total coping, helplessness and depression were found to be predictive of self-report of pain and functional status. Increased negative-internal coping is predictive of lower levels of pain and better functional status. Increased total coping is predictive of lower levels of pain and better functional status. Greater levels of helplessness and increased levels of depression are predictive of increased levels of pain and poor functional status.

## *Concluding Comments*

In the final analysis socio-demographic status and coping were found to play a significant role in predicting both objective and subjective health status measures self-report of pain and functional status, swollen and tender joint status, helplessness and depression. The health status measure self-report of pain and functional status proved to be an exception, however. Socio-demographic factors were not predictive of the pain and functional status measure, but coping was. When factors predicting only subjective or psychosocial health status were considered, psychosocial factors were found to be the more significant predictors.

It was important, therefore, in this study that the quality of life components (DVs) were also conceptualized as IVs. The second set of multiple regressions were used to test the power of each quality of life component's ability to predict RA health status.

## **PART B : THE MODERATING ROLE OF PSYCHOSOCIAL FACTORS**

### **6.6 Introduction**

The role of psychosocial factors that contribute to the maintenance of health have been conceptualised in terms of a health-sustaining function (or direct-effects hypothesis) as well as a stress-reducing function (or moderating hypothesis: Shumaker & Brownell, 1984). The health-sustaining hypothesis postulates that these variables influence adjustment directly, irrespective of the level of adverse conditions that are presumed to influence psychological adjustment. For example in the case of depression resulting from the experience of arthritic pain the health sustaining hypothesis would imply that a moderating variable such as social support would impact directly on the experience of depression, irrespective of the level of arthritic pain. This health-sustaining is normally investigated using a stepwise regression model where the psychosocial factors are used as predictors. This was reported in Part A of the results section.

The stress-reducing hypothesis suggests that the psychosocial factors interact with the adverse conditions in effecting psychological adjustment. For example, this hypothesis would predict that at low levels of social support the relationship between arthritic pain and depression would be strong and direct (that is, high levels of pain associated with high levels of depression), and as social support increases the relationship should weaken. Under conditions of maximal support the relationship between pain and depression should be non-existent.

To investigate the moderating (or stress-reducing) function of a psychosocial variable moderated multiple regression should be used (Arnold, 1972; Cohen & Cohen, 1975). In moderated multiple regression the adverse condition that is presumed to influence psychological adjustments (for example, pain) and the psychosocial variable (for example, social support) are forced into the regression equation in Step 1, while an interactive term (the product of the adverse condition and the psychosocial variable) is entered in Step 2. A significant interaction term (usually a significant change in  $R^2$ ) is taken as indicative of a stress-reducing effect.



In applying moderated multiple regression the objective measures of arthritis (those assessments undertaken by health personnel, namely: Class, NTJ, TJC, NSJ, SJC and ESR) was regarded as the adverse conditions while the subjective experience of arthritis (previously referred to as subjective measures, namely: Depression (BDI), helplessness (AHI), VAS-pain, Vas-Disability, HAQ and AIMS2 - Affect and Physical components) were used as the health status variables.

In the previous section these objective and subjective measures were subjected to a factor analytic procedure to enable a more parsimonious analysis. Since moderating effects are more difficult to determine and often masked when multiple measures are grouped together, it was decided that for the moderated regression analysis the original measures will be used. The redundancy issue was statistically tested using collinearity statistics to ensure that the original measures are in fact independent. The specific collinearity measure used was the Tolerance index. The tolerance of a variable is simply defined as  $1 - R^2$ , where  $R^2$  refers to the multiple correlation when the variable is being predicted from all other independent variables. If the tolerance of a variable is very small it is considered to be a linear combination of the other independent variables.

The tolerance values of the subjective measures (using Depression as dependent) is shown in Table 6.11

**Table 6.11**

**Tolerance of subjective measures using depression as criterion**

<b>Scale</b>	<b>Tolerance</b>
VAS_P	0.57
VAS_D	0.55
AIMS_P	0.71
AIMS_A	0.72
HAQ	0.75

Given that the tolerance of a variable is expressed as a coefficient, one can see that these tolerances are very high, ranging from 0.55 to 0.75.

For the objective measures the tolerance values are reported below.

**Table 6.12**

**Tolerance of objective measures using ESR as criterion**

<b>Scale</b>	<b>Tolerance</b>
NTJ	0.13
TJC	0.16
NSJ	0.12
SJC	0.15
Classification	0.74

It would appear that, with the exception of classification, that the tolerance of the other objective measures are very low. This, however, is to be expected since all of the four variables are measures of Joint Counts (swelling and tenderness).

In general one could therefore be reasonably satisfied that redundancy and multicollinearity would

not pose an obstacle to using these original measures, rather than the factor derived scales.

## 6.7 The Role of Coping

### 6.7.1 Depression as health status variable

Table 6.13

Moderated Multiple regression using Depression as Health Outcome and Coping as moderator

Predictor <sup>a</sup>	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change <sup>b</sup>	Beta
<b>1. Proactive Coping</b>					
ESR	1/183	0.37			0.03
Proactive coping	1/183	-3.30	0.06		-0.24
A X B <sup>c</sup>	1/182	1.02	0.06	0.01	0.13
Number Tender Joint	1/183	3.27			0.23
Proactive coping	1/183	-2.76	0.11		-0.20
A X B	1/182	-1.72	0.12	0.01	-0.19
Tender Joint Counts	1/183	3.70			0.26
Proactive Coping	1/183	-2.75	0.12		-0.19
A X B	1/182	-1.64	0.14	0.02	-0.17
Number of Swollen Joint	1/183	1.05			0.08
Proactive Coping	1/183	-3.27	0.06		-0.23
A X B	1/182	-0.74	0.07	0.01	-0.08
Swollen Joint Count	1/183	0.11			0.11
Proactive coping	1/183	-3.32	0.06		-0.24
A X B	1/182	-0.67	0.06	0.00	-0.07
Class	1/183	4.12			4.12
Proactive coping	1/183	-2.90	0.14		-0.20

A X B	1/182	-0.71	0.14	0.00	-0.71
<b>2. Negative-Internal Coping</b>					
ESR	1/183	0.24			0.02
<del>Negative-Internal Coping</del>	1/183	-6.33	0.18		-0.42
A X B	1/182	1.47	0.19	0.01	0.17
Number Tender Joint	1/183	2.20			0.15
<del>Negative-internal Coping</del>	1/183	-5.46	0.20		-0.38
A X B	1/182	2.19	0.22	0.02**	0.22
Tender Joint Counts	1/183	2.57			0.18
<del>Negative-internal Coping</del>	1/183	-5.34	0.21		-0.37
A X B	1/182	2.30	0.23	0.02**	0.22
Number of Swollen Joint	1/183	0.11			0.01
<del>Negative-internal Coping</del>	1/183	-6.22	0.18		-0.42
A X B	1/182	1.42	0.19	0.01	0.14
Swollen Joint Count	1/183	-0.72			-0.05
<del>Negative-internal Coping</del>	1/183	-6.40	0.18		-0.43
A X B	1/182	0.96	0.19	0.01	0.09
Class	1/183	3.27			0.22
<del>Negative-internal Coping</del>	1/183	-5.52	0.23		-0.37
A X B	1/182	0.12	0.23	0.00	0.02
<b>3. Positive-Interactive Coping</b>					
ESR	1/183	0.41			0.03
<del>Positive-Interactive Coping</del>	1/183	-1.23	0.01		-0.09
A X B	1/182	0.02	0.01	0.00	0.01
Number Tender Joint	1/183	3.68			0.26
<del>Positive-Interactive Coping</del>	1/183	-0.99	0.08		-0.07

A X B	1/182	0.49	0.08	0.00	0.05
Tender Joint Counts	1/183	4.07			0.29
<u>Positive-Interactive Coping</u> — — —	1/183	-0.99	0.09		-0.77
A X B	1/182	0.57	0.09	0.00	0.06
Number of Swollen Joint	1/183	1.21			0.09
<u>Positive-Interactive Coping</u> — — —	1/183	-1.29	0.02		-0.10
A X B	1/182	0.44	0.02	0.00	0.05
Swollen Joint Count	1/183	0.15			0.01
<u>Positive-Interactive Coping</u> — — —	1/183	-1.27	0.01		-0.09
A X B	1/182	0.63	0.01	0.00	0.07
Class	1/183	4.29			0.31
<u>Positive-Interactive Coping</u> — — —	1/183	-0.63	0.10		-0.05
A X B	1/182	0.38	0.10	0.00	0.08

<sup>a</sup> A dashed line represents different steps in the regression model.

<sup>b</sup> Since the focus is on the interaction term significance is only indicated (where applicable) in the case of step 2 (the interaction term).

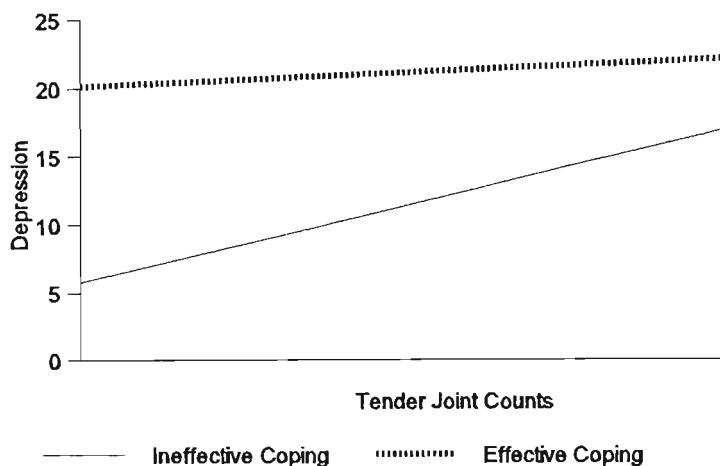
<sup>c</sup> A X B represents the product (interaction term) of the two predictors entered in the regression equation in the first step of the regression model.

\*\* p < 0.05

The only significant interaction effects in the above table was in the case of Negative-internal coping interacting with Tender Joint Count and Number of Tender Joints in affecting depression. This result suggests a stress-reducing role for Negative-Internal Coping. The exact nature of this effect is shown in Figures 6.1 and 6.2. Cohen and Cohen (1975) suggests that the nature of the interaction effect can be established by comparing the regression lines of those high on the moderator variable with those low on the moderator variable.

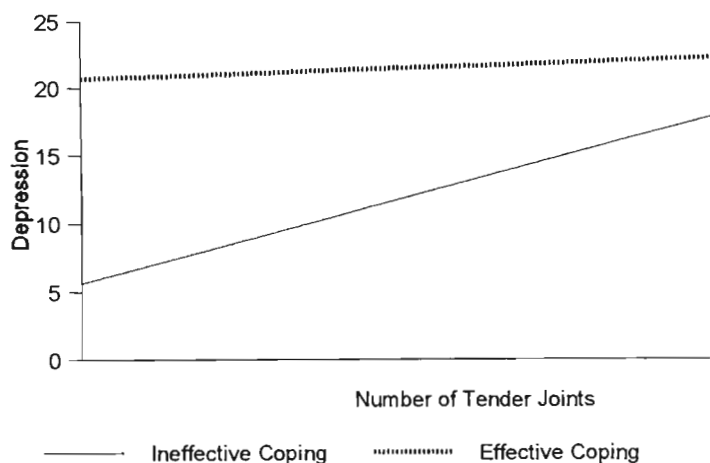
Following the procedure suggested by Cohen and Cohen (1975) two different regression lines were calculated - one for those high in negative-internal coping (ineffective coping - at or above the 75<sup>th</sup> percentile, N=47) and one for those low in negative-internal coping (effective coping - at or below

the 25<sup>th</sup> percentile, N=46). The graphs for high and low negative-internal coping for the relationship between Depression and Tender Joint Counts and Number of Tender joints respectively are shown below.



**Figure 6.1: Regression of Depression on Tender Joint counts for high and low Negative-Internal Coping**

The regression line for those high on Negative-Internal Coping is much steeper (slope = 0.69) than for those low on Negative-Internal Coping (slope = 0.12) demonstrating the moderating effect of coping. In other words, as scores on the Tender Joint Counts increases the level of Depression also increases, but only for those high on Negative-Internal Coping (i.e. ineffective coping). The relationship between Tender Joint Counts and Depression was stronger for the ineffective coping group ( $r = 0.46$ ) than for the effective coping group ( $r = 0.10$ ).



**Figure 6.2: Regression of Depression on Number of Tender Joints for High and Low Negative-Internal Coping**

In terms of the relationship between Number of Tender Joints and Depression the steepness of the regression line for those high on Negative Internal Coping (i.e ineffective coping - slope = 0.76) as opposed to those low on Negative Internal Coping (i.e. effective coping - slope = 0.09) suggests a moderating effect for Negative-Internal Coping. Higher scores on Number of Tender Joints are associated with higher levels of Depression but only for ineffective copers. The relationship between Depression and Number of Tender Joints was stronger for the ineffective coping group ( $r = 0.47$ ) than for the effective coping group ( $r = 0.06$ ).

### 6.7.2 Visual Analogue Scale (VAS) for pain as health status variable

**Table 6.14**

**Moderated Multiple regression using VAS-Pain as Health Outcome and Coping as moderator**

Predictor <sup>a</sup>	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change <sup>b</sup>	Beta
<b>1. Proactive Coping</b>					
ESR	1/183	0.73			0.05
Proactive coping	1/183	-0.64	0.01		-0.05

A X B <sup>c</sup>	1/182	1.22	0.01	0.00	0.16
Number Tender Joint	1/183	4.77			0.34
Proactive coping	1/183	0.17	0.11		0.01
A X B	1/182	-0.83	0.12	0.01	-0.09
Tender Joint Counts	1/183	5.42			0.38
Proactive Coping	1/183	0.22	0.14		0.02
A X B	1/182	0.11	0.14	0.00	0.01
Number of Swollen Joint	1/183	2.31			0.17
Proactive Coping	1/183	-0.57	0.03		-0.04
A X B	1/182	-0.58	0.03	0.00	-0.06
Swollen Joint Count	1/183	2.15			0.16
Proactive coping	1/183	-0.70	0.03		-0.05
A X B	1/182	-1.68	0.04	0.01	-0.18
Class	1/183	5.69			0.39
Proactive coping	1/183	0.02	0.15		0.01
A X B	1/182	-1.44	0.16	0.01	-0.28

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## **2. Negative-Internal Coping**

ESR	1/183	0.63			0.05
Negative-Internal Coping	1/183	-2.81	0.04		-0.20
A X B	1/182	0.79	0.05	0.01	0.10
Number Tender Joint	1/183	4.14			0.30
Negative-internal Coping	1/183	-1.57	0.13		-0.11
A X B	1/182	1.68	0.14	0.01	0.17
Tender Joint Counts	1/183	4.79			0.34
Negative-internal Coping	1/183	-1.37	0.15		-0.10

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A X B	1/182	1.12	0.16	0.01	0.11
Number of Swollen Joint	1/183	1.88			0.04
<del>Negative-internal Coping</del> — — —	1/183	-2.47	0.06		-0.18
A X B	1/182	1.59	0.07	0.01	0.17
Swollen Joint Count	1/183	1.84			0.13
<del>Negative-internal Coping</del> — — —	1/183	-2.62	0.06		-0.19
A X B	1/182	0.53	0.06	0.00	0.06
Class	1/183	5.19			0.36
<del>Negative-internal Coping</del> — — —	1/183	-1.66	0.17		-0.12
A X B	1/182	-0.09	0.17	0.00	-0.02
<hr/>					
<b>3. Positive-Interactive Coping</b>					
ESR	1/183	0.59			0.04
<del>Positive-Interactive Coping</del> — — —	1/183	-2.15	0.03		-0.16
A X B	1/182	-0.12	0.03	0.00	-0.02
Number Tender Joint	1/183	4.69			0.32
<del>Positive-Interactive Coping</del> — — —	1/183	-1.93	0.13		-0.13
A X B	1/182	2.00	0.15	0.02**	0.20
Tender Joint Counts	1/183	5.35			0.36
<del>Positive-Interactive Coping</del> — — —	1/183	-1.94	0.16		-0.13
A X B	1/182	2.58	0.19	0.03**	0.25
Number of Swollen Joint	1/183	2.42			0.17
<del>Positive-Interactive Coping</del> — — —	1/183	-2.28	0.06		-0.16
A X B	1/182	1.21	0.06	0.00	0.13
Swollen Joint Count	1/183	2.31			0.17
<del>Positive-Interactive Coping</del> — — —	1/183	-2.37	0.05		-0.17
A X B	1/182	1.03	0.06	0.00	0.11

Class	1/183	5.47			0.37
<u>Positive-Interactive Coping</u>	<u>1/183</u>	<u>-1.48</u>	<u>0.16</u>		<u>-0.10</u>
<u>A X B</u>	<u>1/182</u>	<u>0.78</u>	<u>0.17</u>	<u>0.01</u>	<u>0.15</u>

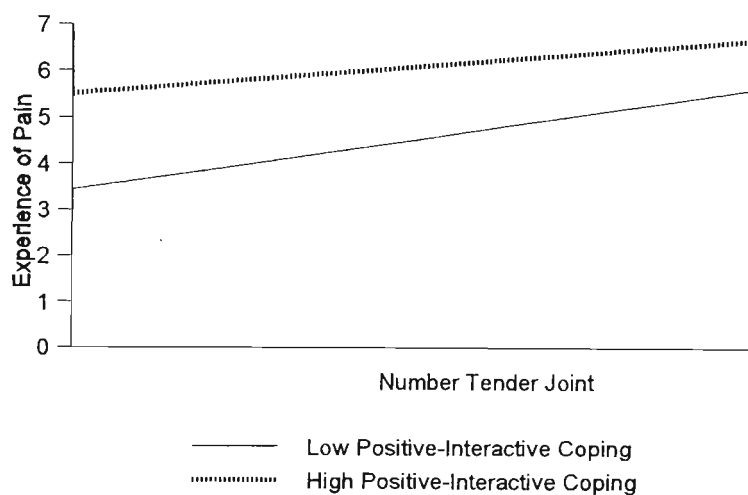
<sup>a</sup> A dashed line represents different steps in the regression model.

<sup>b</sup> Since the focus is on the interaction term significance is only indicated (where applicable) in the case of step 2 (the interaction term).

<sup>c</sup> A X B represents the product (interaction term) of the two predictors entered in the regression equation in the first step of the regression model.

\*\* p < 0.05

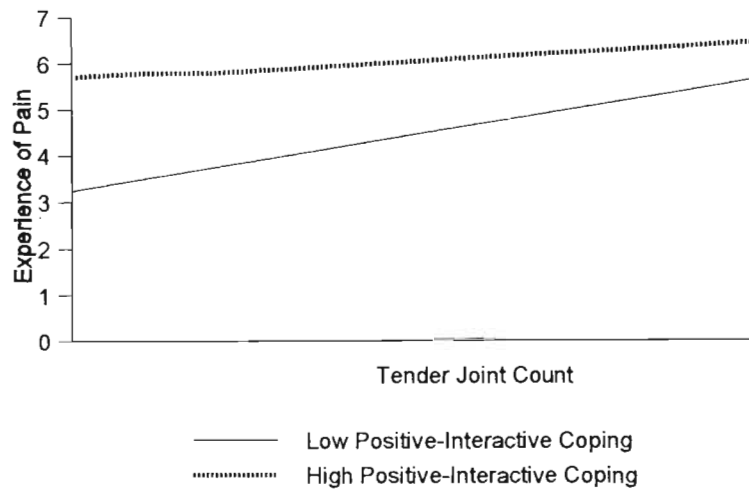
When considering the relationship between objective measures of arthritis and the subjective experience of pain there was no significant interaction effects for proactive coping and Negative-Internal Coping, indicating no stress-reducing effects in this instance. For Positive-Interactive Coping there was significant interaction effects in the case of the relationship between the subjective experience of pain (VAS-Pain) on the one hand and Number of Tender Joints as well as Tender Joint Counts respectively. The nature of these relationships for high and low Positive-Interactive Coping groups are plotted below.



**Figure 6.3: Regression of VAS-Pain on Number of Tender Joints for high and low Positive-Interactive Coping**

A significant stress-reducing effect for Positive-Interactive Coping is indicated by the regression line for the low Positive-Interactive Coping group (N=47) which is much steeper (slope = 0.27) than that

of the high Positive-Interactive Coping group (N=46, slope = 0.14). The relationship between Number of Tender Joints and the subjective experience of pain (VAS-Pain) weakens as positive-interactive coping increases. This is indicated by the correlation coefficients which was greater for low positive-interactive coping (  $r = 0.52$ ) than for high positive-interactive coping (  $r = 0.31$ ).



**Figure 6.4: Regression of VAS-Pain on Tender Joint Count for high and low Positive-Interactive Coping**

The regression line for the low Positive-Interactive Coping group (N = 47) was much steeper (slope = 0.24) than that of the high Positive-Interactive Coping group (N = 46; slope = 0.08) which is indicative of a moderating effect for Positive-Interactive Coping. Similarly the relationship between Tender Joint Count and VAS-Pain was stronger for the low coping group (  $r = 0.59$ ) than for the high coping group (  $r = 0.29$ ).

### 6.7.3 Visual Analogue Scale-Disability as health status variable

Since the method of presentation of the results of moderated regression analysis have been illustrated in the previous tables only the interaction terms will henceforth be reported for reasons of economy of space.

**Table 6.15**

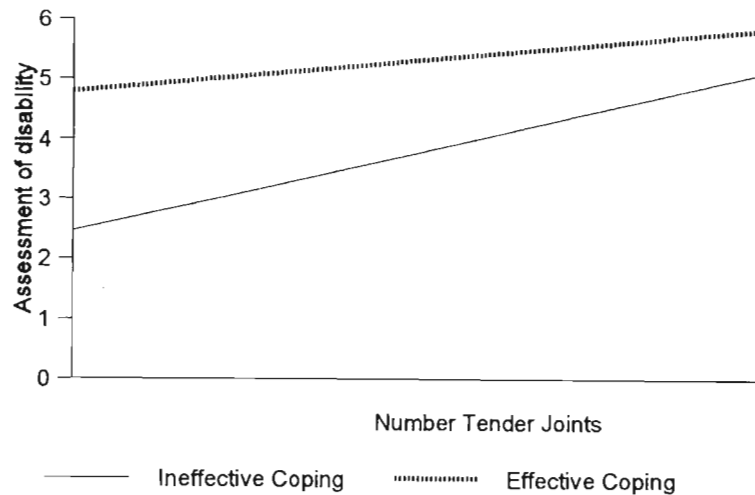
**Moderated Multiple regression using Vas-Disability as Health Outcome and Coping as moderator**

<b>Predictor</b>	<b>df</b>	<b>t-value</b>	<b>Cum R<sup>2</sup></b>	<b>R<sup>2</sup> Change</b>	<b>Beta</b>
<b>1. Proactive Coping</b>					
ESR X Proactive Coping	1/182	0.14	0.04	0.00	0.02
Number Tender Joint X Proactive Coping	1/182	0.01	0.13	0.00	0.00
Tender Joint Counts X Proactive Coping	1/182	0.58	0.17	0.00	0.06
Number Swollen Joints X Proactive Coping	1/182	-0.24	0.04	0.00	-0.03
Swollen Joint Count X Proactive Coping	1/182	-1.39	0.04	0.01	-0.15
<u>Class X Proactive Coping</u>	<u>1/182</u>	<u>-0.19</u>	<u>0.22</u>	<u>0.00</u>	<u>-0.04</u>
<b>2. Negative-Internal Coping</b>					
ESR X Negative Internal Coping	1/182	0.91	0.09	0.00	0.11
Number Tender Joint X Negative Internal Coping	1/182	1.96	0.17	0.02**	0.20
Tender Joint Counts X Negative Internal Coping	1/182	1.46	0.19	0.01	0.14
Number Swollen Joints X Neg-Internal Coping	1/182	1.36	0.09	0.01	0.15
Swollen Joint Count X Negative Internal Coping	1/182	0.11	0.08	0.00	0.01
<u>Class X Neg-internal Coping</u>	<u>1/182</u>	<u>-1.29</u>	<u>0.25</u>	<u>0.01</u>	<u>-0.23</u>
<b>3. Positive-Interactive Coping</b>					
ESR X Positive-interact. Coping	1/182	-0.56	0.04	0.00	-0.07
Number Tender Joint X Positive Interactive Coping	1/182	0.87	0.13	0.00	0.09
Tender Joint Counts X Positive Interactive Coping	1/182	1.14	0.18	0.01	0.16
<u>Number Swollen Joints X Pos-</u>					

Interactive Coping	1/182	0.27	0.04	0.00	0.03
Swollen Joint Count X Pos-					
Interactive Coping	1/182	-0.06	0.03	0.00	-0.01
<u>Class X Pos-Interactive Coping</u>	<u>1/182</u>	<u>-0.49</u>	<u>0.22</u>	<u>0.00</u>	<u>-0.09</u>

\*\* p < 0.05

The only significant interaction effect was in the case of Number of Tender Joints interacting with Negative Internal Coping. This would imply that negative internal coping acts as a moderator of the impact of Number of Tender Joints on the subjective assessment of the extent of the disability as measured by VAS-Disability. To examine the nature of this moderating effect two different regression lines were computed - one for those high in negative-internal coping (ineffective coping - at or above the 75<sup>th</sup> percentile, N=47) and one for those low in negative-internal coping (effective coping - at or below the 25<sup>th</sup> percentile, N=46). The graphs for high and low negative-internal coping for the relationship between Vas-Disability and Number of Tender Joints are shown below.



**Figure 6.5: Regression of Vas-Disability on Number of Tender Joints for High and Low Negative-Internal Coping**

In terms of the relationship between Number of Tender Joints and Vas-Disability the steepness of the regression line for those high on Negative Internal Coping (i.e ineffective coping - slope = 0.26) as

opposed to those low on Negative Internal Coping (i.e. effective coping - slope = 0.10) suggests a moderating effect for Negative-Internal Coping. Higher scores on Number of Tender Joints are associated with higher assessment of the extent of disability but only for ineffective copers. The relationship between Vas-Disability and Number of Tender Joints was stronger for the ineffective coping group ( $r = 0.47$ ) than for the effective coping group ( $r = 0.26$ ).

#### 6.7.4 AIMS-Affect as health status variable

**Table 6.16**

**Moderated Multiple regression using AIMS-Affect as Health Outcome and Coping as moderator**

<b>Predictor</b>	<b>df</b>	<b>t-value</b>	<b>Cum R<sup>2</sup></b>	<b>R<sup>2</sup> Change</b>	<b>Beta</b>
<b>1. Proactive Coping</b>					
ESR X Proactive Coping	1/170	0.67	0.11	0.00	0.09
Number Tender Joint X Proactive Coping	1/170	0.53	0.18	0.00	0.06
Tender Joint Counts X Proactive Coping	1/170	1.00	0.19	0.01	0.10
Number Swollen Joints X Proactive Coping	1/170	-0.97	0.12	0.01	-0.10
Swollen Joint Count X Proactive Coping	1/170	-1.14	0.12	0.01	-0.13
<b>Class X Proactive Coping</b>	1/170	1.54	0.23	0.01	0.31
<b>2. Negative-Internal Coping</b>					
ESR X Negative Internal Coping	1/170	0.07	0.14	0.01	0.01
Number Tender Joint X Negative Internal Coping	1/170	1.68	0.20	0.01	0.17
Tender Joint Counts X Negative Internal Coping	1/170	1.59	0.20	0.01	0.16
Number Swollen Joints X Neg-Internal Coping	1/170	0.17	0.14	0.00	0.02

Swollen Joint Count X Negative					
Internal Coping	1/170	0.05	0.14	0.00	0.01
<u>Class X Neg-internal Coping</u>	<u>1/170</u>	<u>0.42</u>	<u>0.22</u>	<u>0.00</u>	<u>0.08</u>
<b>3. Positive-Interactive Coping</b>					
ESR X Positive-interact. Coping	1/170	-1.27	0.04	0.01	-0.17
Number Tender Joint X Pos-					
Interactive Coping	1/170	-0.39	0.12	0.00	-0.04
Tender Joint Counts X Pos-					
Interactive Coping	1/170	-0.20	0.13	0.00	-0.02
Number Swollen Joints X Pos-	1/170	0.85	0.05	0.00	0.10
Interactive Coping					
Swollen Joint Count X Pos-					
Interactive Coping	1/170	0.51	0.04	0.00	0.06
<u>Class X Pos-Interactive Coping</u>					

\*\* p < 0.05

There was no significant interaction effects indicating that none of the coping variables moderated the relationship between the objective assessment of Arthritis and the AIMS-Affect scale.

### 6.7.5 AIMS-Physical as health status variable

Table 6.17

**Moderated Multiple regression using AIMS-Physical as Health Outcome and Coping as moderator**

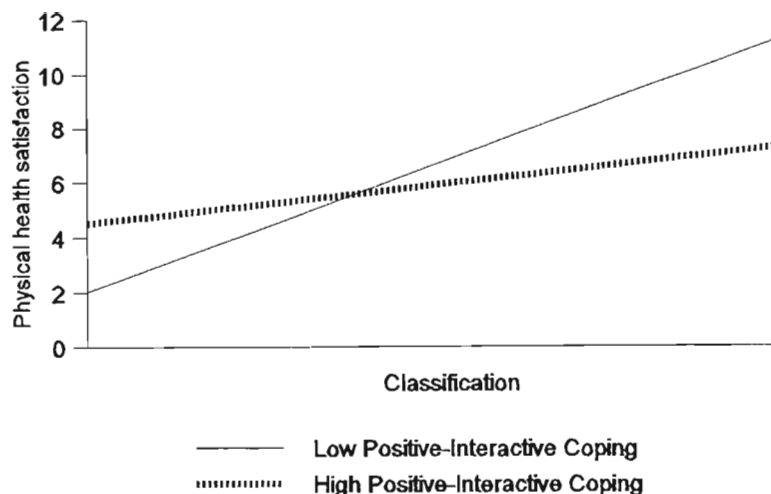
<b>Predictor</b>	<b>df</b>	<b>t-value</b>	<b>Cum R<sup>2</sup></b>	<b>R<sup>2</sup> Change</b>	<b>Beta</b>
<b>1. Proactive Coping</b>					
ESR X Proactive Coping	1/168	1.47	0.09	0.01	0.19
Number Tender Joint X Proactive Coping	1/168	0.67	0.16	0.00	0.08
Tender Joint Counts X Proactive Coping	1/168	0.96	0.14	0.01	0.10
<u>Number Swollen Joints X Pro-</u>					

active Coping	1/168	-0.60	0.08	0.00	-0.07
Swollen Joint Count X Proactive Coping	1/168	-0.87	0.06	0.00	-0.10
<u>Class X Proactive Coping</u>	<u>1/168</u>	<u>0.49</u>	<u>0.21</u>	<u>0.00</u>	<u>0.10</u>
<b>2. Negative-Internal Coping</b>					
ESR X Negative Internal Coping	1/168	-0.42	0.14	0.00	-0.05
Number Tender Joint X Negative Internal Coping	1/168	1.06	0.20	0.01	0.11
Tender Joint Counts X Negative Internal Coping	1/168	1.31	0.18	0.01	0.14
Number Swollen Joints X Neg-Internal Coping	1/168	-0.37	0.13	0.00	-0.04
Swollen Joint Count X Negative Internal Coping	1/168	-0.73	0.12	0.00	-0.08
<u>Class X Neg-internal Coping</u>	<u>1/168</u>	<u>1.90</u>	<u>0.25</u>	<u>0.02</u>	<u>0.37</u>
<b>3. Positive-Interactive Coping</b>					
ESR X Positive-interact. Coping	1/168	-0.15	0.07	0.00	-0.02
Number Tender Joint X Pos-Interactive Coping	1/168	-0.30	0.16	0.00	-0.03
Tender Joint Counts X Pos-Interactive Coping	1/168	0.29	0.14	0.00	0.03
Number Swollen Joints X Pos-Interactive Coping	1/168	-0.53	0.28	0.00	-0.06
Swollen Joint Count X Pos-Interactive Coping	1/168	-0.87	0.05	0.00	-0.10
<u>Class X Pos-Interactive Coping</u>	<u>1/168</u>	<u>2.19</u>	<u>0.47</u>	<u>0.02**</u>	<u>0.42</u>

\*\* p < 0.05

The only significant interaction effect was for classification interacting significantly with positive interactive coping. This would indicate that positive interactive coping significantly moderates the relationship between classification (of disability) and patient's satisfaction with their physical health status as measured by AIMS-Physical. The nature of these relationships for high and low Positive-Interactive Coping groups are plotted below.





**Figure 6.6: Regression of Physical health satisfaction on Classification for high and low Positive-Interactive Coping**

A significant stress-reducing effect for Positive-Interactive Coping is indicated by the regression line for the low Positive-Interactive Coping group (N=47) which is much steeper (slope = 1.13) than that of the high Positive-Interactive Coping group (N=46, slope = 0.33). The relationship between classification of extent of disability and the satisfaction with physical health (AIMS-Physical) weakens as positive-interactive coping increases. This is indicated by the correlation coefficients which was greater for low positive-interactive coping (  $r = 0.67$ ) than for high positive-interactive coping (  $r = 0.14$ ). The dissatisfaction with physical health status for the low positive-interactive coping group was significantly greater, the higher the classification of extent of disability.

### 6.7.6 Health Assessment Questionnaire (HAQ) as health status variable

Table 6.18

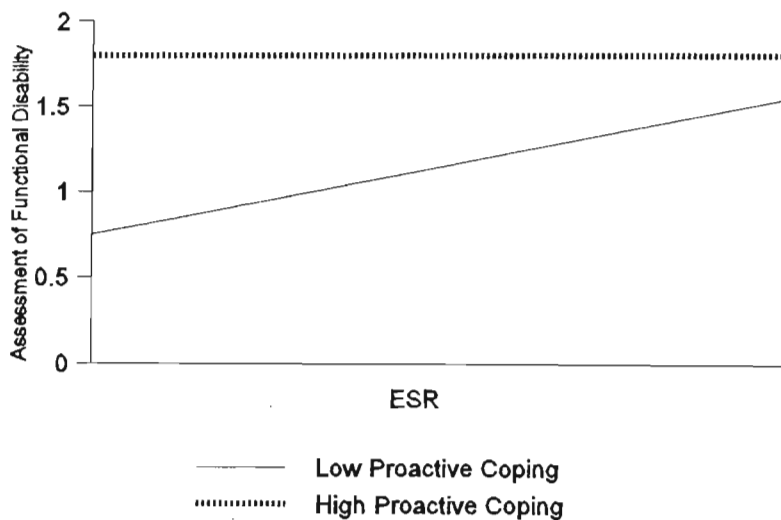
Moderated Multiple regression using Health Assessment (HAQ) as Health Outcome and Coping as moderator

Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b>1. Proactive Coping</b>					
ESR X Proactive Coping	1/182	2.05	0.09	0.02**	0.26
Number Tender Joint X Proactive Coping	1/182	0.82	0.10	0.00	0.09
Tender Joint Counts X Proactive Coping	1/182	1.15	0.11	0.01	0.12
Number Swollen Joints X Proactive Coping	1/182	0.09	0.06	0.00	0.01
Swollen Joint Count X Proactive Coping	1/182	0.02	0.06	0.00	0.00
Class X Proactive Coping	1/182	0.27	0.13	0.00	0.05
<b>2. Negative-Internal Coping</b>					
ESR X Negative Internal Coping	1/182	0.13	0.08	0.00	0.02
Number Tender Joint X Negative Internal Coping	1/182	0.17	0.09	0.00	0.02
Tender Joint Counts X Negative Internal Coping	1/182	0.28	0.10	0.00	0.03
Number Swollen Joints X Neg-Internal Coping	1/182	0.73	0.07	0.00	0.08
Swollen Joint Count X Negative Internal Coping	1/182	0.61	0.07	0.00	0.06
Class X Neg-internal Coping	1/182	0.55	0.13	0.00	0.11
<b>3. Positive-Interactive Coping</b>					
ESR X Positive-interact. Coping	1/182	-0.92	0.03	0.00	-0.12
Number Tender Joint X Positive-Interactive Coping	1/182	-0.52	0.06	0.00	-0.06

Tender Joint Counts X Pos-						
Interactive Coping	1/182	-0.35	0.07	0.00	-0.04	
Number Swollen Joints X Pos-						
Interactive Coping	1/182	-0.18	0.02	0.00	-0.02	
Swollen Joint Count X Pos-						
Interactive Coping	1/182	-0.44	0.02	0.00	-0.05	
<u>Class X Pos-Interactive Coping</u>	<u>1/182</u>	<u>1.51</u>	<u>0.11</u>	<u>0.01</u>	<u>0.30</u>	

\*\* p < 0.05

There was a significant interaction effect for proactive coping and ESR indicating that proactive coping moderates the relationship between ESR and the subjective assessment of functional disability as measured by the HAQ. The nature of the relationship between the ESR and HAQ for high and low proactive coping is shown in the following figure.



**Figure 6.7: Regression of Assessment of functional disability on ESR for high and low Proactive Coping**

A significant stress-reducing effect for Proactive Coping is indicated by the regression line for the low Proactive Coping group (N=47) which is slightly steeper (slope = 0.10) than that of the high Proactive Coping group (N=46, slope = 0.00). The interaction effect is much more noticeable when the

relationship between ESR and HAQ is considered. The relationship between active inflammation (as measured by the ESR) and subjective assessment of functional disability (as measured by the HAQ) weakens as proactive coping increases. This is indicated by the correlation coefficients which was greater for low positive-interactive coping ( $r = 0.33$ ) than for high positive-interactive coping ( $r = 0.05$ ).

## 6.8 The role of Network Support

### 6.8.1 Depression as health status variable

**Table 6.19**

**Moderated Multiple regression using Depression as Health Outcome and Network Support as moderator**

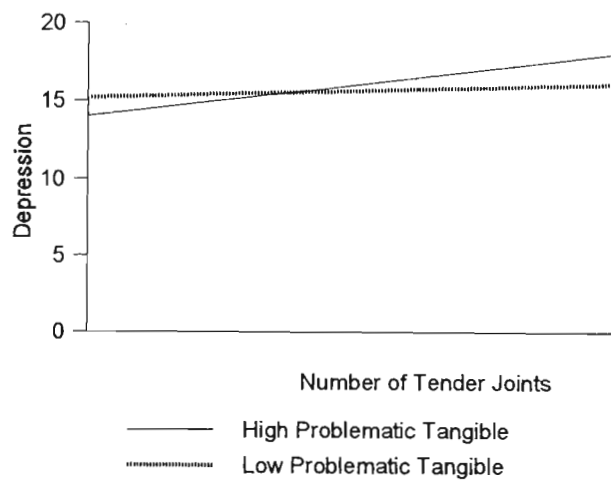
Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b><u>1. NSA-Emotional</u></b>					
ESR X NSA-Emotional	1/182	1.43	0.03	0.01	0.81
Number Tender Joint X NSA-Emotional	1/182	-0.20	0.08	0.00	-0.09
Tender Joint Counts X NSA-Emotional	1/182	-0.16	0.09	0.00	-0.08
Number Swollen Joints X NSA-Emotional	1/182	1.61	0.04	0.01	0.92
Swollen Joint Count X NSA-Emotional	1/182	1.33	0.02	0.01	0.72
Class X NSA-Emotional	1/182	0.57	0.11	0.00	0.37
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/182	1.37	0.02	0.01	0.81
Number Tender Joint X NSA- Esteem	1/182	0.06	0.08	0.00	0.02
Tender Joint Counts X NSA-Esteem	1/182	-0.16	0.10	0.00	-0.06
Number Swollen Joints X NSA-Esteem	1/182	1.33	0.03	0.01	0.64
Swollen Joint Count X NSA-Esteem	1/182	1.10	0.02	0.01	0.53
Class X NSA-Esteem	1/182	0.03	0.10	0.00	0.01
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/182	0.96	0.02	0.01	0.50
Number Tender Joint X NSA-Tangible	1/182	-0.30	0.08	0.00	-0.11

Tender Joint Counts X NSA-Tangible	1/182	0.16	0.09	0.00	0.07
Number Swollen Joints X NSA-Tangible	1/182	0.65	0.02	0.00	0.26
Swollen Joint Count X NSA-Tangible	1/182	0.49	0.01	0.00	0.19
<b>Class X NSA-Tangible</b>	<b>1/182</b>	<b>0.69</b>	<b>0.11</b>	<b>0.00</b>	<b>0.35</b>
<b><u>4. NSA-Informational</u></b>					
ESR X NSA-Informational	1/182	1.76	0.02	0.02	0.67
Number Tender Joint X NSA-Informational	1/182	0.29	0.07	0.00	0.10
Tender Joint Counts X NSA-Informational	1/182	0.17	0.09	0.00	0.06
Number Swollen Joints X NSA-Informational	1/182	1.26	0.02	0.01	0.51
Swollen Joint Count X NSA-Informational	1/182	1.07	0.01	0.01	0.40
<b>Class X NSA-Informational</b>	<b>1/182</b>	<b>1.00</b>	<b>0.10</b>	<b>0.01</b>	<b>0.41</b>
<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/182	-0.37	0.00	0.00	-0.11
Number Tender Joint X NSB-Emotional	1/182	-1.68	0.09	0.01	-0.43
Tender Joint Counts X NSB-Emotional	1/182	-0.95	0.09	0.00	-0.18
Number Swollen Joints X NSB-Emotional	1/182	-0.06	0.01	0.00	-0.02
Swollen Joint Count X NSB-Emotional	1/182	-0.07	0.00	0.00	-0.02
<b>Class X NSB-Emotional</b>	<b>1/182</b>	<b>-1.36</b>	<b>0.11</b>	<b>0.01</b>	<b>-0.41</b>
<b><u>6. NSB-Esteem</u></b>					
ESR X NSB-Esteem	1/182	-1.15	0.01	0.01	-0.45
Number Tender Joint X NSB-Esteem	1/182	-1.14	0.08	0.01	-0.34
Tender Joint Counts X NSB-Esteem	1/182	-1.17	0.10	0.01	-0.35
Number Swollen Joints X NSB-Esteem	1/182	0.60	0.01	0.00	0.21
Swollen Joint Count X NSB-Esteem	1/182	0.51	0.01	0.00	0.16
<b>Class X NSB-Esteem</b>	<b>1/182</b>	<b>-0.22</b>	<b>0.10</b>	<b>0.00</b>	<b>-0.08</b>
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/182	-0.64	0.01	0.00	-0.25
Number Tender Joint X NSB-Tangible	1/182	-2.01	0.09	0.02**	-0.71
Tender Joint Counts X NSB-Tangible	1/182	-1.57	0.10	0.01	-0.52
Number Swollen Joints X NSB-Tangible	1/182	0.52	0.01	0.00	0.19
Swollen Joint Count X NSB-Tangible	1/182	0.80	0.01	0.00	0.27
<b>Class X NSB-Tangible</b>	<b>1/182</b>	<b>-0.27</b>	<b>0.10</b>	<b>0.00</b>	<b>-0.11</b>
<b><u>8. NSB-Informational</u></b>					

ESR X NSB-Informational	1/182	-0.23	0.01	0.00	-0.11
Number Tender Joint X NSB-Informational	1/182	-1.93	0.09	0.02	-0.65
Tender Joint Counts X NSB-Informational	1/182	-1.98	0.11	0.02**	-0.69
Number Swollen Joints X NSB-Informational	1/182	0.46	0.01	0.00	0.17
Swollen Joint Count X NSB-Informational	1/182	0.92	0.01	0.01	0.35
Class X NSB-Informational	1/182	-1.17	0.11	0.11	0.01
<b>9. NSB-Negative Interactions</b>					
ESR X NSB-Neg. Interact.	1/182	1.10	0.02	0.01	0.62
Number Tender Joint X NSB-Neg. Interact.	1/182	-1.61	0.09	0.01	-0.62
Tender Joint Counts X NSB-Neg. Interact.	1/182	-1.20	0.10	0.01	-0.49
Number Swollen Joints X NSB-Neg. Interact.	1/182	0.31	0.02	0.00	0.13
Swollen Joint Count X NSB-Neg. Interact.	1/182	0.32	0.01	0.00	0.12
Class X NSB-Neg. Interact.	1/182	-0.10	0.10	0.00	-0.05

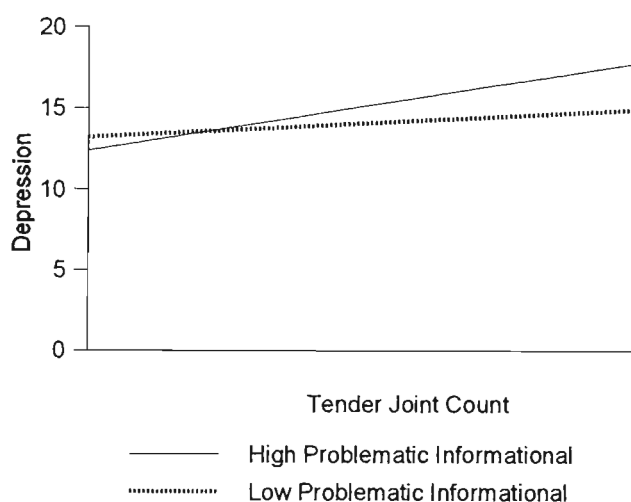
\*\* p < 0.05

The only significant interaction effects were in the case of problematic tangible support interacting with Number of Tender Joints and problematic informational support interacting with Tender Joint Count. This indicates that problematic tangible support moderates the relationship between Number of Tender Joints and Depression while problematic informational support moderates the relationship between Tender Joint Count and Depression. The exact nature of these moderating effects are illustrated in Figure 6.8 and Figure 6.9.



**Figure 6.8: Regression of Depression on NTJ for high and low Problematic Tangible Support**

The regression line for those high on Problematic Tangible Support (N=46) is much steeper (slope = 0.49) than for those low on Problematic Tangible Support (N=64, slope = 0.10) demonstrating the moderating effect. In other words, as scores on Number of Tender Joints increases the level of Depression also increases, but only for those high on problematic support. The relationship between Number of Tender Joints and Depression was stronger for the high problematic tangible support group ( $r = 0.26$ ) than for the low problematic tangible support group ( $r = 0.06$ ).



**Figure 6.9: Regression of Depression on Tender Joint Count for high and low Problematic Informational Support**

The regression line for those high on Problematic Informational Support (N=49) is much steeper (slope = 0.66) than for those low on Problematic Informational Support (N=64, slope = 0.20) demonstrating the moderating effect. The relationship between Tender Joint Count and Depression was stronger for the high problematic informational support group ( $r = 0.39$ ) than for the low problematic informational support group ( $r = 0.17$ ). This would indicate that as Tender Joint Count increases the level of Depression also increases, but more so for those with high scores on problematic informational support.

## 6.8.2 Visual Analogue Scale (VAS) for Pain as health status variable

**Table 6.20**

**Moderated Multiple regression using VAS-Pain as Health Outcome and Network Support as moderator**

Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b><u>1. NSA-Emotional</u></b>					
ESR X NSA-Emotional	1/182	1.20	0.07	0.03	0.05
Number Tender Joint X NSA-Emotional	1/182	0.68	0.31	0.01	0.37
Tender Joint Counts X NSA-Emotional	1/182	0.78	0.31	0.01	0.49
Number Swollen Joints X NSA-Emotional	1/182	-0.13	0.14	0.00	-0.12
Swollen Joint Count X NSA-Emotional	1/182	0.06	0.08	0.00	0.07
Class X NSA-Emotional	1/182	-0.97	0.12	0.02	-0.98
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/182	0.82	0.03	0.02	0.70
Number Tender Joint X NSA- Esteem	1/182	0.23	0.31	0.00	0.09
Tender Joint Counts X NSA-Esteem	1/182	0.25	0.31	0.00	0.11
Number Swollen Joints X NSA-Esteem	1/182	-0.69	0.13	0.01	-0.42
Swollen Joint Count X NSA-Esteem	1/182	-0.50	0.07	0.01	-0.38
Class X NSA-Esteem	1/182	-0.42	0.09	0.00	-0.30
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/182	1.70	0.07	0.06	0.12
Number Tender Joint X NSA-Tangible	1/182	0.36	0.30	0.00	0.17
Tender Joint Counts X NSA-Tangible	1/182	0.58	0.30	0.01	0.31
Number Swollen Joints X NSA-Tangible	1/182	0.61	0.12	0.01	0.42
Swollen Joint Count X NSA-Tangible	1/182	0.90	0.06	0.02	0.70
Class X NSA-Tangible	1/182	-0.41	0.08	0.00	-0.32
<b><u>4. NSA-Informational</u></b>					
ESR X NSA-Informational	1/182	2.07	0.10	0.09**	1.33
Number Tender Joint X NSA-Informational	1/182	0.65	0.31	0.01	0.29
Tender Joint Counts X NSA-Informational	1/182	0.75	0.30	0.01	0.37
Number Swollen Joints X NSA-Informational	1/182	0.11	0.11	0.00	0.08
Swollen Joint Count X NSA-Informational	1/182	0.29	0.04	0.00	0.20
Class X NSA-Informational	1/182	-0.06	0.07	0.00	-0.05

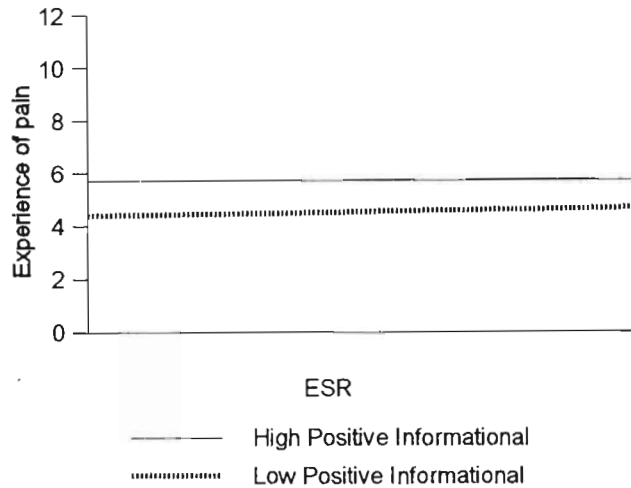


<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/182	-0.68	0.05	0.01	-0.45
Number Tender Joint X NSB-Emotional	1/182	-0.09	0.33	0.00	-0.05
Tender Joint Counts X NSB-Emotional	1/182	0.13	0.31	0.00	0.07
Number Swollen Joints X NSB-Emotional	1/182	-0.84	0.14	0.02	-0.60
Swollen Joint Count X NSB-Emotional	1/182	-0.89	0.08	0.02	-0.90
Class X NSB-Emotional	1/182	0.23	0.10	0.00	0.16
<b><u>6. NSB-Esteem</u></b>					
ESR X NSB-Esteem	1/182	0.83	0.09	0.02	0.40
Number Tender Joint X NSB-Esteem	1/182	0.54	0.33	0.01	0.23
Tender Joint Counts X NSB-Esteem	1/1820	0.16	0.31	0.00	0.07
Number Swollen Joints X NSB-Esteem	1/182	0.37	0.17	0.00	0.19
Swollen Joint Count X NSB-Esteem	1/182	-0.56	0.10	0.01	-0.43
Class X NSB-Esteem	1/182	0.59	0.13	0.01	0.34
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/182	-1.43	0.08	0.05	-1.20
Number Tender Joint X NSB-Tangible	1/182	-1.03	0.34	0.02	-0.81
Tender Joint Counts X NSB-Tangible	1/182	-0.83	0.32	0.01	-0.65
Number Swollen Joints X NSB-Tangible	1/182	0.50	0.13	0.01	0.46
Swollen Joint Count X NSB-Tangible	1/182	0.23	0.06	0.00	0.24
Class X NSB-Tangible	1/182	-0.07	0.09	0.00	-0.05
<b><u>8. NSB-Informational</u></b>					
ESR X NSB-Informational	1/182	0.88	0.06	0.02	0.46
Number Tender Joint X NSB-Informational	1/182	1.45	0.36	0.03	0.74
Tender Joint Counts X NSB-Informational	1/182	1.15	0.33	0.02	0.62
Number Swollen Joints X NSB-Informational	1/182	0.81	0.15	0.01	0.42
Swollen Joint Count X NSB-Informational	1/182	0.60	0.08	0.01	0.46
Class X NSB-Informational	1/182	1.35	0.14	0.04	0.85
<b><u>9. NSB-Negative Interactions</u></b>					
ESR X NSB-Neg. Interact.	1/182	1.45	0.06	0.05	1.04
Number Tender Joint X NSB-Neg. Interact.	1/182	0.87	0.33	0.01	0.46
Tender Joint Counts X NSB-Neg. Interact.	1/182	0.48	0.33	0.00	0.30
Number Swollen Joints X NSB-Neg. Interact.	1/182	1.38	0.15	0.04	0.95
Swollen Joint Count X NSB-Neg. Interact.	1/182	1.68	0.11	0.06	1.17

Class X NSB-Neg. Interact.	1/182	-0.60	0.10	0.01	-0.61
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\*\* p < 0.05

The only significant interaction effect was for Positive Informational Support interacting with ESR in predicting VAS-Pain. This would suggest that positive informational support moderates the relationship between active inflammation (as measured by ESR) and the subjective experience of pain (as measured by VAS-Pain). The nature of this moderating effect is illustrated in Figure 6.10.



**Figure 6.10: Regression of Vas-Pain on ESR for high and low Positive Informational Support**

The figure shows a flat regression line for those high on Positive Informational Support (N=50, slope=0.00), while the regression line is slightly steeper for those low on Positive Informational Support (N=59, slope = 0.03). The moderating effect is much more noticeable when the correlation is considered. The relationship between ESR and Vas-Pain was stronger for the low positive informational support group ( r = 0.39) than for the high positive informational support group ( r = 0.02). This would indicate that as the extent of active inflammation increases the subjective assessment of pain also increases, but more so for those with low scores on positive informational support.

### 6.8.3 Visual Analogue Scale (VAS) for Disability as health status variable

**Table 6.21**

**Moderated Multiple regression using VAS-Disability as Health Outcome and Network Support as moderator**

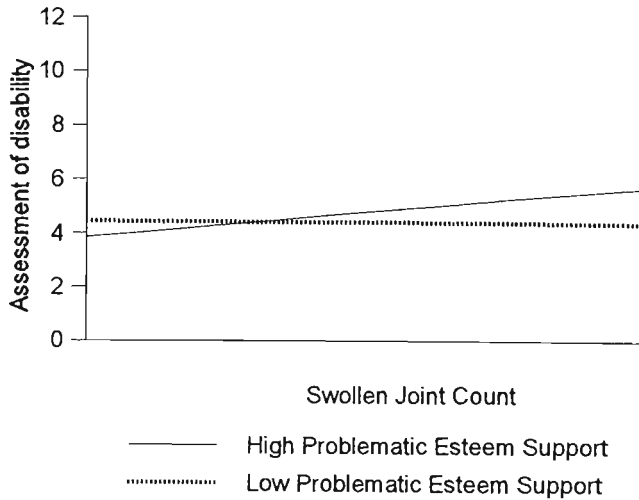
Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b><u>1. NSA-Emotional</u></b>					
ESR X NSA-Emotional	1/182	1.24	0.04	0.01	0.69
Number Tender Joint X NSA-Emotional	1/182	0.78	0.13	0.00	0.34
Tender Joint Counts X NSA-Emotional	1/182	0.41	0.17	0.00	0.19
Number Swollen Joints X NSA-Emotional	1/182	0.10	0.03	0.00	0.06
Swollen Joint Count X NSA-Emotional	1/182	0.29	0.03	0.00	0.16
Class X NSA-Emotional	1/182	0.32	0.22	0.00	0.19
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/182	0.39	0.03	0.00	0.23
Number Tender Joint X NSA- Esteem	1/182	0.43	0.12	0.00	0.15
Tender Joint Counts X NSA-Esteem	1/182	-0.02	0.16	0.00	-0.01
Number Swollen Joints X NSA-Esteem	1/182	0.25	0.02	0.00	0.12
Swollen Joint Count X NSA-Esteem	1/182	0.25	0.02	0.00	0.12
Class X NSA-Esteem	1/182	-0.42	0.22	0.00	-0.19
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/182	1.07	0.03	0.01	0.56
Number Tender Joint X NSA-Tangible	1/182	0.64	0.13	0.00	0.23
Tender Joint Counts X NSA-Tangible	1/182	0.11	0.16	0.00	0.04
Number Swollen Joints X NSA-Tangible	1/182	1.46	0.03	0.01	0.57
Swollen Joint Count X NSA-Tangible	1/182	1.50	0.03	0.01	0.59
Class X NSA-Tangible	1/182	0.12	0.22	0.00	0.06
<b><u>4. NSA-Informational</u></b>					
ESR X NSA-Informational	1/182	1.63	0.04	0.01	0.62
Number Tender Joint X NSA-Informational	1/182	1.00	0.13	0.01	0.33
Tender Joint Counts X NSA-Informational	1/182	-0.08	0.16	0.00	-0.03
Number Swollen Joints X NSA-Informational	1/182	0.83	0.02	0.00	0.33
Swollen Joint Count X NSA-Informational	1/182	0.26	0.02	0.00	0.09
Class X NSA-Informational	1/182	0.27	0.22	0.00	0.10

<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/182	-0.81	0.03	0.00	-0.24
Number Tender Joint X NSB-Emotional	1/182	-0.29	0.12	0.00	-0.07
Tender Joint Counts X NSB-Emotional	1/182	0.30	0.16	0.00	0.06
Number Swollen Joints X NSB-Emotional	1/182	1.10	0.03	0.01	0.30
Swollen Joint Count X NSB-Emotional	1/182	1.09	0.02	0.01	0.32
Class X NSB-Emotional	1/182	0.63	0.22	0.00	0.18
<b><u>6. NSB-Esteem</u></b>					
ESR X NSB-Esteem	1/182	-0.44	0.02	0.00	-0.17
Number Tender Joint X NSB-Esteem	1/182	-0.74	0.12	0.00	-0.22
Tender Joint Counts X NSB-Esteem	1/1820	-1.54	0.17	0.01	-0.44
Number Swollen Joints X NSB-Esteem	1/182	1.59	0.03	0.01	0.53
Swollen Joint Count X NSB-Esteem	1/182	2.37	0.04	0.03**	0.74
Class X NSB-Esteem	1/182	-0.69	0.22	0.00	-0.22
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/182	-0.13	0.02	0.00	-0.05
Number Tender Joint X NSB-Tangible	1/182	-0.67	0.12	0.00	-0.23
Tender Joint Counts X NSB-Tangible	1/182	-0.66	0.16	0.00	-0.21
Number Swollen Joints X NSB-Tangible	1/182	1.35	0.03	0.01	0.48
Swollen Joint Count X NSB-Tangible	1/182	2.16	0.04	0.03**	0.71
Class X NSB-Tangible	1/182	-0.16	0.22	0.01	-0.06
<b><u>8. NSB-Informational</u></b>					
ESR X NSB-Informational	1/182	-0.79	0.03	0.00	-0.35
Number Tender Joint X NSB-Informational	1/182	0.21	0.12	0.00	0.07
Tender Joint Counts X NSB-Informational	1/182	-1.28	0.17	0.01	-0.43
Number Swollen Joints X NSB-Informational	1/182	2.30	0.05	0.03**	0.82
Swollen Joint Count X NSB-Informational	1/182	2.05	0.04	0.02**	0.77
Class X NSB-Informational	1/182	0.29	0.22	0.00	0.09
<b><u>9. NSB-Negative Interactions</u></b>					
ESR X NSB-Neg. Interact.	1/182	1.18	0.03	0.01	0.66
Number Tender Joint X NSB-Neg. Interact.	1/182	0.22	0.13	0.00	0.08
Tender Joint Counts X NSB-Neg. Interact.	1/182	-0.57	0.17	0.00	-0.23
Number Swollen Joints X NSB-Neg. Interact.	1/182	1.30	0.03	0.01	0.56
Swollen Joint Count X NSB-Neg. Interact.	1/182	1.77	0.04	0.02	0.67

Class X NSB-Neg. Interact.	1/182	0.04	0.22	0.00	0.02
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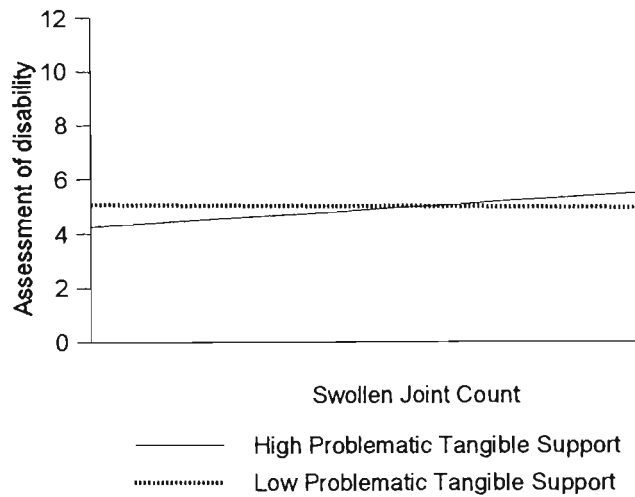
\*\* p < 0.05

There was significant effects for Swollen Joint Counts interacting with Problematic Esteem, Tangible and Informational Support respectively as well as for Number of Swollen Joints interacting with Problematic Informational Support. This would indicate that the relationship between Swollen Joint Counts and the subjective assessment of the extent of disability (as measured by VAS-Disability) is moderated by problematic esteem, tangible and informational support, while the relationship between Number of Swollen Joints and subjective assessment of disability is moderated by problematic informational support. The exact nature of these moderating effects are illustrated in Figure 6.11 to Figure 6.14.



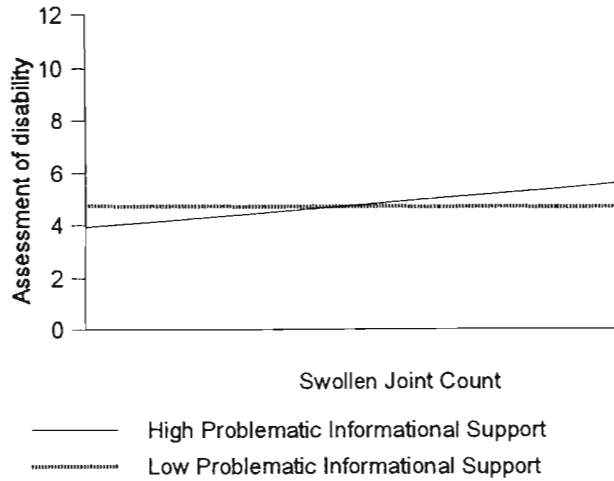
**Figure 6.11: Regression of Vas-Disability on Swollen Joint Count for high and low Problematic Esteem Support**

The regression line for the low problematic esteem group (N=50) shows a slight decline (slope = -0.01) while the regression line of the high problematic esteem support group (N = 68) is much steeper (slope = 0.20). This would indicate that for the low problematic esteem support group there is slight decrease in the assessment of disability as Swollen Joint Count increases, while for the high problematic esteem support group assessment of disability increased as Swollen Joint Count increases. This effect is supported by the correlation coefficients which were larger for the high problematic esteem group ( r = 0.45) than for the low problematic esteem group ( r = -0.01).



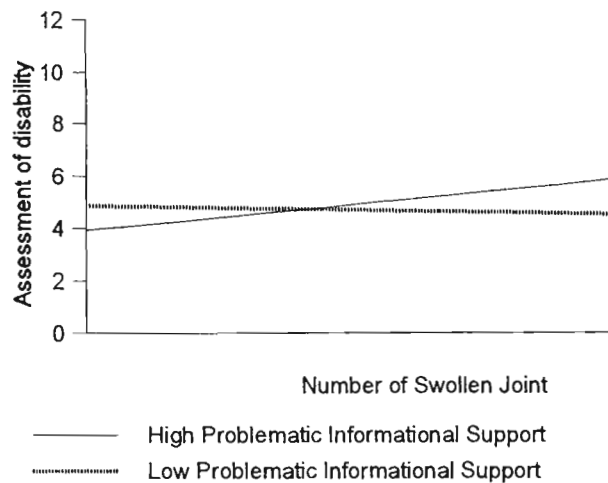
**Figure 6.12: Regression of Vas-Disability on Swollen Joint Count for high and low Problematic Tangible Support**

As in the previous instance the regression line for the high Problematic Tangible Support (N = 64) was much steeper (slope = 0.13) than that of the low Problematic Tangible Support group (N = 46). In fact the regression line for the low Problematic Tangible Support group shows a slight decline (slope = -0.02). The relationship between Swollen Joint Count and VAS-Disability was stronger for the High Problematic Tangible Support group ( $r = 0.41$ ) than for the low Problematic Tangible Support group ( $r = -0.06$ ). This indicates that an increase in Swollen Joint counts is significantly associated with an increase in VAS-Disability for the high Problematic Tangible Support group, while for the low Problematic Tangible Support group an increase in Swollen Joint Counts is associated with a slight decrease in assessment of disability.



**Figure 6.13: Regression of Vas-Disability on Swollen Joint Count for high and low Problematic Informational Support**

The regression line for the high Problematic Informational Support (N = 61) was much steeper (slope = 0.18) than that of the low Problematic Informational Support group (N = 49), with the regression line for the low Problematic Informational Support group showing a slight decline (slope = -0.01). The relationship between Swollen Joint Count and VAS-Disability was stronger for the High Problematic Informational Support group (  $r = 0.40$ ), indicating that an increase in Swollen Joint Counts is significantly associated with an increase in VAS-Disability, while for the low Problematic Informational Support group an increase in Swollen Joint Counts is associated with a slight decrease in assessment of disability (  $r = -0.02$ ).



**Figure 6.14: Regression of Vas-Disability on Number of Swollen Joints Count for high and low Problematic Informational Support**

The regression line for the high Problematic Informational Support (N = 61) was much steeper (slope = 0.21) than that of the low Problematic Informational Support group (N = 49; slope = -0.04). The relationship between Number of Swollen Joints and VAS-Disability was stronger for the High Problematic Informational Support group ( r = 0.41) than for the Low Problematic Informational Support group ( r = -0.04). An increase in Number of Swollen Joints is therefore significantly associated with an increase in VAS-Disability for the high Problematic Informational Support group while for the low Problematic Informational Support group an increase in Number of Swollen Joints is associated with a slight decrease in assessment of disability.

#### 6.8.4 AIMS-Affect as health status variable

**Table 6.22**

**Moderated Multiple regression using AIMS-Affect as Health Outcome and Network Support as moderator**

Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b>1. NSA-Emotional</b>					
ESR X NSA-Emotional	1/182	0.53	0.06	0.00	0.32



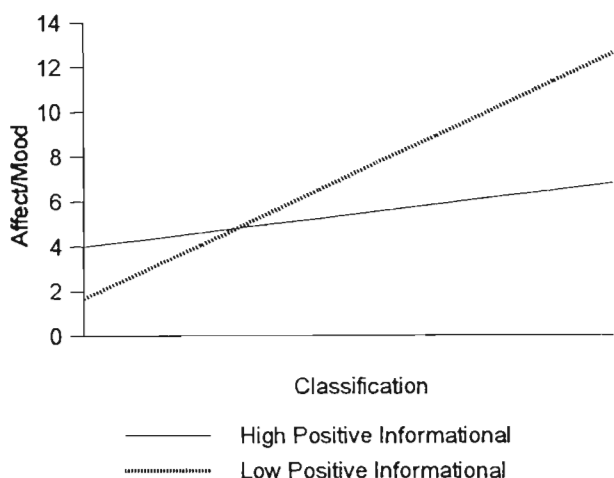
Number Tender Joint X NSA-Emotional	1/182	0.78	0.14	0.00	0.37
Tender Joint Counts X NSA-Emotional	1/182	0.89	0.15	0.00	0.45
Number Swollen Joints X NSA-Emotional	1/182	1.42	0.08	0.01	0.96
Swollen Joint Count X NSA-Emotional	1/182	1.88	0.08	0.02	1.36
Class X NSA-Emotional	1/182	1.24	0.19	0.01	0.78
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/182	0.06	0.04	0.00	0.04
Number Tender Joint X NSA- Esteem	1/182	-0.67	0.13	0.00	-0.26
Tender Joint Counts X NSA-Esteem	1/182	-0.57	0.14	0.00	-0.24
Number Swollen Joints X NSA-Esteem	1/182	0.27	0.05	0.00	0.15
Swollen Joint Count X NSA-Esteem	1/182	0.39	0.04	0.00	0.65
Class X NSA-Esteem	1/182	0.60	0.17	0.00	0.29
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/182	0.13	0.04	0.00	0.07
Number Tender Joint X NSA-Tangible	1/182	-0.95	0.14	0.01	-0.37
Tender Joint Counts X NSA-Tangible	1/182	-0.65	0.14	0.00	-0.28
Number Swollen Joints X NSA-Tangible	1/182	0.53	0.05	0.00	0.23
Swollen Joint Count X NSA-Tangible	1/182	1.30	0.05	0.01	0.62
Class X NSA-Tangible	1/182	0.80	0.17	0.00	0.39
<b><u>4. NSA-Informational</u></b>					
ESR X NSA-Informational	1/182	0.97	0.04	0.01	0.39
Number Tender Joint X NSA-Informational	1/182	-0.14	0.14	0.00	-0.05
Tender Joint Counts X NSA-Informational	1/182	0.11	0.15	0.00	0.04
Number Swollen Joints X NSA-Informational	1/182	0.63	0.05	0.00	0.29
Swollen Joint Count X NSA-Informational	1/182	1.26	0.05	0.01	0.55
Class X NSA-Informational	1/182	2.06	0.19	0.02**	0.85
<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/182	0.97	0.01	0.01	0.31
Number Tender Joint X NSB-Emotional	1/182	-0.79	0.11	0.00	-0.21
Tender Joint Counts X NSB-Emotional	1/182	-0.16	0.11	0.00	-0.03
Number Swollen Joints X NSB-Emotional	1/182	0.85	0.02	0.00	0.25
Swollen Joint Count X NSB-Emotional	1/182	1.13	0.02	0.01	0.34
Class X NSB-Emotional	1/182	-0.90	0.15	0.00	-0.29
<b><u>6. NSB-Esteem</u></b>					

ESR X NSB-Esteem	1/182	-0.13	0.04	0.00	-0.05
Number Tender Joint X NSB-Esteem	1/182	-0.31	0.12	0.00	-0.10
Tender Joint Counts X NSB-Esteem	1/1820	-0.14	0.13	0.00	-0.04
Number Swollen Joints X NSB-Esteem	1/182	0.75	0.04	0.00	0.26
Swollen Joint Count X NSB-Esteem	1/182	1.54	0.04	0.01	0.50
Class X NSB-Esteem	1/182	0.63	0.17	0.00	0.22
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/182	0.49	0.03	0.00	0.20
Number Tender Joint X NSB-Tangible	1/182	-0.85	0.13	0.00	-0.31
Tender Joint Counts X NSB-Tangible	1/182	-0.59	0.13	0.00	-0.20
Number Swollen Joints X NSB-Tangible	1/182	2.15	0.06	0.03**	0.80
Swollen Joint Count X NSB-Tangible	1/182	2.12	0.05	0.03**	0.75
Class X NSB-Tangible	1/182	-0.23	0.16	0.00	-0.09
<b><u>8. NSB-Informational</u></b>					
ESR X NSB-Informational	1/182	0.15	0.03	0.00	0.07
Number Tender Joint X NSB-Informational	1/182	-0.04	0.12	0.00	-0.01
Tender Joint Counts X NSB-Informational	1/182	-0.15	0.13	0.00	-0.06
Number Swollen Joints X NSB-Informational	1/182	1.11	0.04	0.01	0.44
Swollen Joint Count X NSB-Informational	1/182	1.98	0.05	0.02**	0.80
Class X NSB-Informational	1/182	0.32	0.15	0.00	0.12
<b><u>9. NSB-Negative Interactions</u></b>					
ESR X NSB-Neg. Interact.	1/182	0.97	0.02	0.01	0.59
Number Tender Joint X NSB-Neg. Interact.	1/182	-0.60	0.11	0.00	-0.24
Tender Joint Counts X NSB-Neg. Interact.	1/182	-0.60	0.12	0.00	-0.26
Number Swollen Joints X NSB-Neg. Interact.	1/182	0.41	0.02	0.00	0.19
Swollen Joint Count X NSB-Neg. Interact.	1/182	1.12	0.02	0.01	0.47
Class X NSB-Neg. Interact.	1/182	-0.41	0.15	0.00	-0.21

\*\* p < 0.05

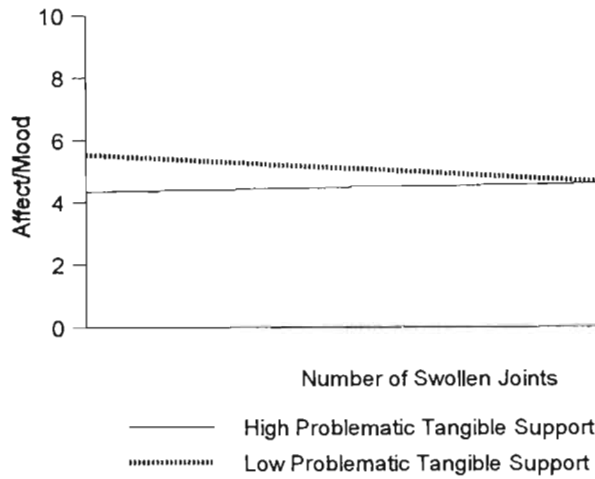
There was significant effects for Classification interacting with Positive Informational Support and Swollen Joint Counts interacting with Problematic Tangible and Informational Support respectively as well as for Number of Swollen Joints interacting with Problematic Tangible Support. This would indicate that the relationship between Classification and the subjective assessment of affect/mood (as measured by AIMS-Affect) is moderated by Positive Informational Support, that the relationship

between Swollen Joint Counts and affect/mood is moderated by problematic tangible and informational support, while the relationship between Number of Swollen Joints and subjective assessment of affect/mood is moderated by problematic tangible support. The exact nature of these moderating effects are illustrated in Figure 6.15 to Figure 6.18.



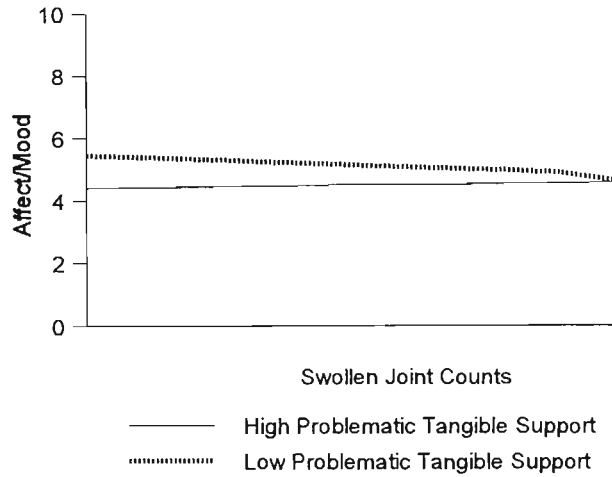
**Figure 6.15: Regression of AIMS-Affect on Classification for high and low Positive Informational Support**

The regression line for those low on Positive Informational Support (N=59) is steeper (slope = 1.21), than for those high on Positive Informational Support (N=50, slope = 0.31). The relationship between Classification (of extent of disability) and Aims-Affect was stronger for the low positive informational support group (  $r = 0.60$ ) than for the high positive informational support group (  $r = 0.19$ ). This would indicate that the higher the classification of the extent of disability the higher the assessment of negative affect/mood but especially so for those with low scores on positive informational support.



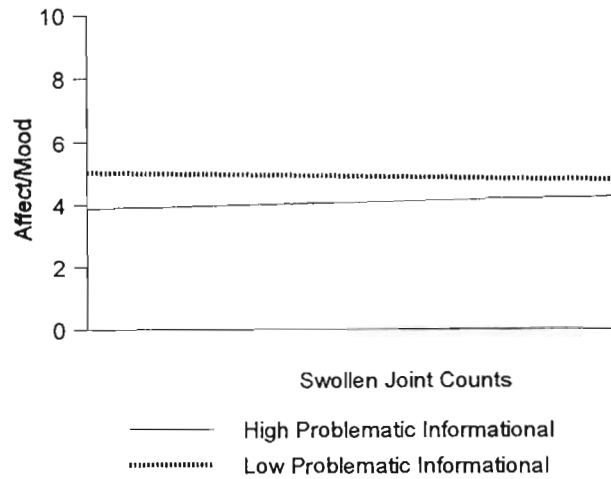
**Figure 6.16: Regression of AIMS-Affect on Number of Swollen Joints for high and low Problematic Tangible Support**

Whereas the regression line for those high on Problematic Tangible Support (N=56) is slightly steeper (slope = 0.03), the one for those low on Problematic Tangible Support (N=43) actually shows a steep decline (slope = -0.10). This is confirmed by the correlation coefficient which was negative in the case of the low Problematic Support group ( $r = -0.31$ ) and positive in the case of the high Problematic Support group ( $r = 0.12$ ). This indicates that as the Number of Swollen Joints increases, negative affect/mood for the high Problematic Tangible Support group increases, while for the low Problematic Tangible Support group negative affect/mood decreases.



**Figure 6.17: Regression of AIMS-Affect on Swollen Joint Counts for high and low Problematic Tangible Support**

In terms of the relationship between Swollen Joint Counts and Affect/mood the the regression line for those high on Problematic Tangible Support (N=56) is slightly steeper (slope = 0.02) than the one for those low on Problematic Tangible Support (N=43) which actually shows a steep decline (slope = -0.07). The correlation coefficient was also negative in the case of the low Problematic Support group (  $r = -0.31$ ) and positive in the case of the high Problematic Support group (  $r = 0.09$ ). In other words as Swollen Joint Count increases, negative affect/mood for the high Problematic Tangible Support group increases, while for the low Problematic Tangible Support group negative affect/mood decreases.



**Figure 6.18: Regression of AIMS-Affect on Swollen Joint Counts for high and low Problematic Informational Support**

The above graph shows the same tendency as the previous two, namely that the regression line for those high on Problematic Informational Support (N=56) is slightly steeper (slope = 0.04) while the one for those low on Problematic Informational Support (N=44) shows a decline (slope = -0.03). The correlation coefficient was also negative in the case of the low Problematic Support group ( $r = -0.14$ ) and positive in the case of the high Problematic Support group ( $r = 0.15$ ). In other words as Swollen Joint Count increases, negative affect/mood for the high Problematic Informational Support group increases, while for the low Problematic Informational Support group negative affect/mood decreases.

### 6.8.5 AIMS-Physical as health status variable

**Table 6.23**

**Moderated Multiple regression using AIMS-Physical as Health Outcome and Network Support as moderator**

Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b>1. NSA-Emotional</b>					
ESR X NSA-Emotional	1/168	0.59	0.04	0.00	0.36
Number Tender Joint X NSA-Emotional	1/168	1.08	0.14	0.01	0.51
Tender Joint Counts X NSA-Emotional	1/168	1.31	0.12	0.01	0.68

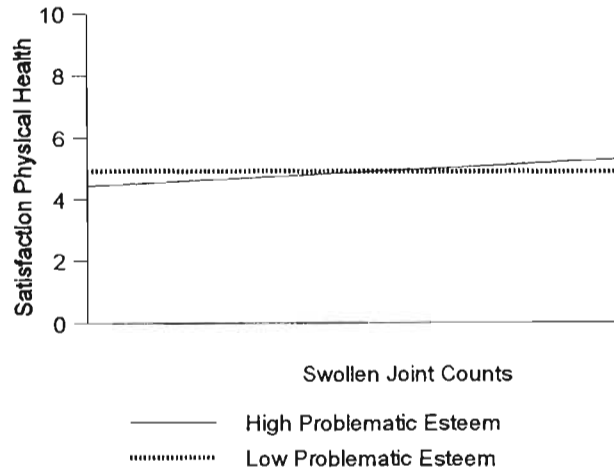
Number Swollen Joints X NSA-Emotional	1/168	0.76	0.04	0.00	0.52
Swollen Joint Count X NSA-Emotional	1/168	1.24	0.02	0.01	0.93
Class X NSA-Emotional	1/168	0.47	0.18	0.00	0.30
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/168	0.71	0.04	0.00	0.45
Number Tender Joint X NSA- Esteem	1/168	-0.39	0.93	0.00	-0.15
Tender Joint Counts X NSA-Esteem	1/168	-0.20	0.11	0.00	-0.09
Number Swollen Joints X NSA-Esteem	1/168	-0.05	0.04	0.00	-0.03
Swollen Joint Count X NSA-Esteem	1/168	0.13	0.01	0.00	0.08
Class X NSA-Esteem	1/168	-0.98	0.19	0.01	-0.46
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/168	0.91	0.04	0.01	0.53
Number Tender Joint X NSA-Tangible	1/168	0.07	0.13	0.00	0.03
Tender Joint Counts X NSA-Tangible	1/168	0.18	0.11	0.00	0.08
Number Swollen Joints X NSA-Tangible	1/168	0.75	0.04	0.00	0.33
Swollen Joint Count X NSA-Tangible	1/168	1.25	0.02	0.01	0.61
Class X NSA-Tangible	1/168	-0.08	0.18	0.00	-0.04
<b><u>4. NSA-Informational</u></b>					
ESR X NSA-Informational	1/168	0.89	0.06	0.00	0.35
Number Tender Joint X NSA-Informational	1/168	0.79	0.16	0.00	0.28
Tender Joint Counts X NSA-Informational	1/168	0.81	0.14	0.00	0.31
Number Swollen Joints X NSA-Informational	1/168	0.24	0.06	0.00	0.11
Swollen Joint Count X NSA-Informational	1/168	0.64	0.03	0.00	0.28
Class X NSA-Informational	1/168	0.54	0.19	0.00	0.22
<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/168	0.96	0.06	0.01	0.29
Number Tender Joint X NSB-Emotional	1/168	0.44	0.15	0.00	0.12
Tender Joint Counts X NSB-Emotional	1/168	0.87	0.14	0.00	0.17
Number Swollen Joints X NSB-Emotional	1/168	0.74	0.06	0.00	0.21
Swollen Joint Count X NSB-Emotional	1/168	1.34	0.04	0.01	0.40
Class X NSB-Emotional	1/168	-0.49	0.20	0.00	-0.16
<b><u>6. NSB-Esteem</u></b>					
ESR X NSB-Esteem	1/168	0.63	0.04	0.00	0.25
Number Tender Joint X NSB-Esteem	1/168	1.12	0.14	0.01	0.34

Tender Joint Counts X NSB-Esteem	1/1680	1.10	0.12	0.01	0.34
Number Swollen Joints X NSB-Esteem	1/168	1.42	0.05	0.01	0.51
Swollen Joint Count X NSB-Esteem	1/168	2.22	0.04	0.03**	0.73
Class X NSB-Esteem	1/168	1.60	0.19	0.01	0.57
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/168	0.89	0.04	0.00	0.36
Number Tender Joint X NSB-Tangible	1/168	0.57	0.14	0.00	0.21
Tender Joint Counts X NSB-Tangible	1/168	0.97	0.12	0.01	0.34
Number Swollen Joints X NSB-Tangible	1/168	0.92	0.04	0.01	0.35
Swollen Joint Count X NSB-Tangible	1/168	1.62	0.03	0.02	0.58
Class X NSB-Tangible	1/168	0.77	0.19	0.00	0.30
<b><u>8. NSB-Informational</u></b>					
ESR X NSB-Informational	1/168	0.68	0.04	0.00	0.33
Number Tender Joint X NSB-Informational	1/168	1.35	0.14	0.01	0.48
Tender Joint Counts X NSB-Informational	1/168	1.10	0.12	0.01	0.40
Number Swollen Joints X NSB-Informational	1/168	1.09	0.04	0.01	0.45
Swollen Joint Count X NSB-Informational	1/168	2.01	0.04	0.02**	0.82
Class X NSB-Informational	1/168	0.25	0.19	0.00	0.09
<b><u>9. NSB-Negative Interactions</u></b>					
ESR X NSB-Neg. Interact.	1/168	1.09	0.04	0.01	0.72
Number Tender Joint X NSB-Neg. Interact.	1/168	1.21	0.14	0.01	0.49
Tender Joint Counts X NSB-Neg. Interact.	1/168	1.12	0.12	0.01	0.50
Number Swollen Joints X NSB-Neg. Interact.	1/168	1.27	0.05	0.01	0.60
Swollen Joint Count X NSB-Neg. Interact.	1/168	1.75	0.03	0.02	0.75
Class X NSB-Neg. Interact.	1/168	0.83	0.19	0.00	0.44

\*\* p < 0.05

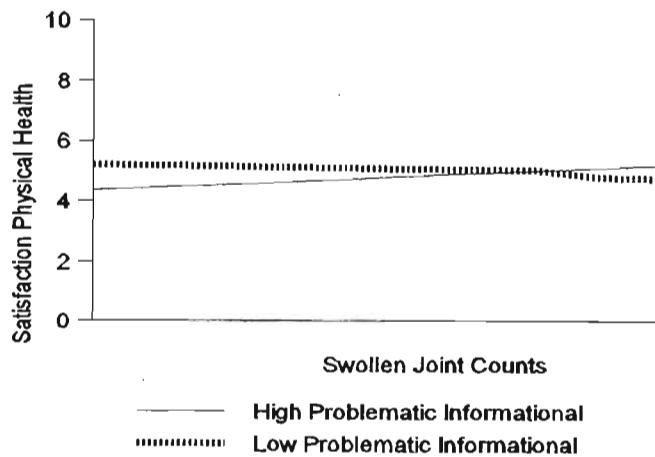
The only significant interaction effects were for Swollen Joint Counts interacting with Problematic Esteem and Informational Support. This indicates that the relationship between Swollen Joint Counts and Satisfaction with Physical Health Status is moderated by Problematic Esteem and Informational Support respectively. The nature of these effects is illustrated in Figures 6.19 and 6.20.





**Figure 6.19: Regression of AIMS-Physical on Swollen Joint Counts for high and low Problematic Esteem Support groups**

The regression line for the high Problematic Esteem group (N = 59) is slightly steeper (slope = 0.09) and the correlation coefficient is positive (-0.01) which demonstrates that as Swollen Joint Counts increases, dissatisfaction with physical health status (as measured by AIMS-Physical) also increases. On the other hand the slope of the regression line for the low Problematic Esteem group (N = 46) shows a decline (slope = -0.01) while the correlation coefficient ( $r = -0.01$ ) is very small and negative.



**Figure 6.20: Regression of AIMS-Physical on Swollen Joint Counts for high and low Problematic Informational Support groups**

For the high Problematic Informational Support group both the regression line (slope = 0.09) and the correlation coefficient (  $r = 0.30$ ) shows that the relationship between Swollen Joint Counts and dissatisfaction with physical health status (as measured by AIMS-Physical) was stronger than for the low Problematic Informational Support group (slope = -0.03;  $r = -0.14$ ).

### 6.8.6 HAQ as health status variable

**Table 6.24**

**Moderated Multiple regression using HAQ as Health Outcome and Network Support as moderator**

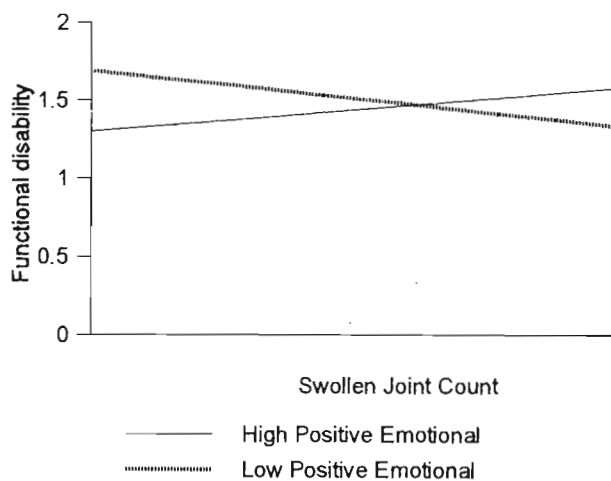
Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b><u>1. NSA-Emotional</u></b>					
ESR X NSA-Emotional	1/182	1.32	0.03	0.01	0.74
Number Tender Joint X NSA-Emotional	1/182	0.44	0.07	0.00	0.20
Tender Joint Counts X NSA-Emotional	1/182	0.15	0.07	0.00	0.07
Number Swollen Joints X NSA-Emotional	1/182	1.79	0.03	0.02	1.01
Swollen Joint Count X NSA-Emotional	1/182	2.30	0.04	0.03**	1.24
Class X NSA-Emotional	1/182	1.05	0.11	0.01	0.67
<b><u>2. NSA-Esteem</u></b>					
ESR X NSA-Esteem	1/182	1.47	0.03	0.01	0.86
Number Tender Joint X NSA- Esteem	1/182	-0.46	0.07	0.00	-0.17
Tender Joint Counts X NSA-Esteem	1/182	-0.94	0.08	0.00	-0.38
Nunber Swollen Joints X NSA-Esteem	1/182	0.65	0.02	0.00	0.31
Swollen Joint Count X NSA-Esteem	1/182	0.94	0.02	0.01	0.45
Class X NSA-Esteem	1/182	0.14	0.10	0.00	0.07
<b><u>3. NSA-Tangible</u></b>					
ESR X NSA-Tangible	1/182	1.11	0.03	0.01	0.58
Number Tender Joint X NSA-Tangible	1/182	-0.02	0.06	0.00	-0.01
Tender Joint Counts X NSA-Tangible	1/182	-0.02	0.07	0.00	-0.01
Number Swollen Joints X NSA-Tangible	1/182	0.64	0.02	0.00	0.25
Swollen Joint Count X NSA-Tangible	1/182	0.89	0.02	0.00	0.35
Class X NSA-Tangible	1/182	0.82	0.10	0.00	0.41
<b><u>4. NSA-Informational</u></b>					

ESR X NSA-Informational	1/182	1.75	0.04	0.02	0.66
Number Tender Joint X NSA-Informational	1/182	0.29	0.06	0.00	0.10
Tender Joint Counts X NSA-Informational	1/182	-0.43	0.07	0.00	-0.16
Number Swollen Joints X NSA-Informational	1/182	0.29	0.02	0.00	0.12
Swollen Joint Count X NSA-Informational	1/182	0.14	0.01	0.00	0.05
Class X NSA-Informational	1/182	1.20	0.11	0.01	0.50
<b><u>5. NSB-Emotional</u></b>					
ESR X NSB-Emotional	1/182	0.18	0.03	0.00	0.05
Number Tender Joint X NSB-Emotional	1/182	0.38	0.08	0.00	0.10
Tender Joint Counts X NSB-Emotional	1/182	0.62	0.09	0.00	0.12
Number Swollen Joints X NSB-Emotional	1/182	1.33	0.04	0.01	0.37
Swollen Joint Count X NSB-Emotional	1/182	2.12	0.05	0.02**	0.61
Class X NSB-Emotional	1/182	0.57	0.11	0.00	0.17
<b><u>6. NSB-Esteem</u></b>					
ESR X NSB-Esteem	1/182	-0.22	0.03	0.00	-0.09
Number Tender Joint X NSB-Esteem	1/182	0.11	0.08	0.00	0.03
Tender Joint Counts X NSB-Esteem	1/1820	-0.50	0.09	0.00	-0.15
Number Swollen Joints X NSB-Esteem	1/182	1.17	0.04	0.01	0.39
Swollen Joint Count X NSB-Esteem	1/182	1.61	0.04	0.01	0.50
Class X NSB-Esteem	1/182	0.40	0.11	0.00	0.13
<b><u>7. NSB-Tangible</u></b>					
ESR X NSB-Tangible	1/182	-0.89	0.04	0.00	-0.34
Number Tender Joint X NSB-Tangible	1/182	-2.50	0.11	0.03**	-0.88
Tender Joint Counts X NSB-Tangible	1/182	-1.94	0.11	0.02	-0.65
Number Swollen Joints X NSB-Tangible	1/182	-0.81	0.04	0.00	-0.29
Swollen Joint Count X NSB-Tangible	1/182	-0.12	0.03	0.00	-0.04
Class X NSB-Tangible	1/182	-0.37	0.12	0.00	-0.14
<b><u>8. NSB-Informational</u></b>					
ESR X NSB-Informational	1/182	0.40	0.03	0.00	0.18
Number Tender Joint X NSB-Informational	1/182	-0.29	0.08	0.00	-0.10
Tender Joint Counts X NSB-Informational	1/182	-0.93	0.10	0.00	-0.32
Number Swollen Joints X NSB-Informational	1/182	0.31	0.03	0.00	0.11
Swollen Joint Count X NSB-Informational	1/182	1.10	0.04	0.01	0.41
Class X NSB-Informational	1/182	-0.15	0.12	0.00	-0.05

<b>9. NSB-Negative Interactions</b>					
ESR X NSB-Neg. Interact.	1/182	0.62	0.02	0.00	0.35
Number Tender Joint X NSB-Neg. Interact.	1/182	-0.90	0.07	0.00	-0.35
Tender Joint Counts X NSB-Neg. Interact.	1/182	-0.83	0.08	0.00	-0.35
Number Swollen Joints X NSB-Neg. Interact.	1/182	0.23	0.02	0.00	0.10
Swollen Joint Count X NSB-Neg. Interact.	1/182	0.79	0.02	0.00	0.30
Class X NSB-Neg. Interact.	1/182	-0.17	0.10	0.00	-0.09

\*\* p < 0.05

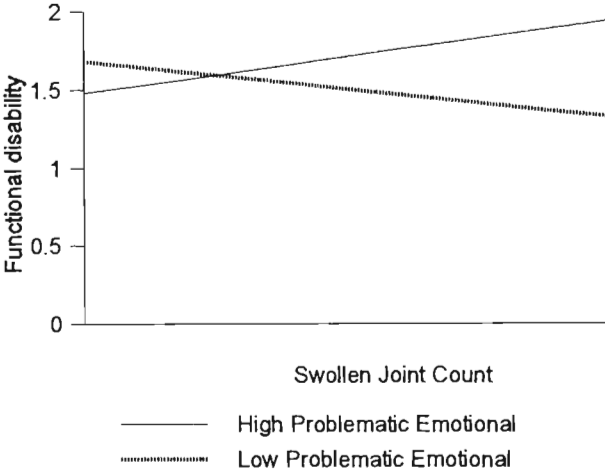
There were significant interaction effects for Swollen Joint Counts and Positive as well as Problematic Emotional Support and for Number of Tender Joints and Problematic Tangible Support. This would indicate that Positive Emotional Support and Problematic Emotional Support moderates the relationship between Swollen Joint Count and the subjective assessment of functional disability as measured by the HAQ. Also, Problematic Tangible Support moderates the relationship between Number of Tender Joints and the subjective assessment of functional disability. The exact nature of these moderating effects are illustrated in Figures 6.21 to 6.23.



**Figure 6.21: Regression of HAQ on Swollen Joint Count for high and low Positive Emotional Support groups**

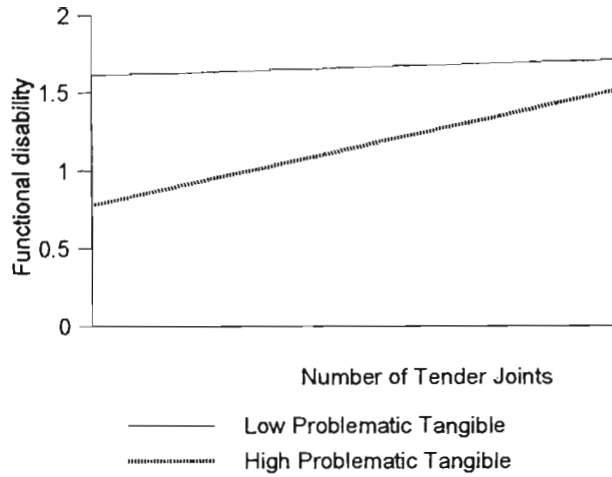
The regression line for the high Positive Emotional Support group (N = 85) is steeper (slope = 0.03) than that of the low Positive Emotional Support group (N = 50, slope = -0.04). The correlation coefficient for the high Positive Emotional group was also stronger ( r = 0.19), while for the low

Positive Emotional Support group the coefficient was negative ( $r = -0.22$ ). These results would seem to suggest a reverse moderating effect. In this regard it would suggest that too much emotional support could be detrimental in the sense that the more the emotional support the more likely it is that increased Swollen Joint Count would be associated with an increased negative assessment of functional disability.



**Figure 6.22: Regression of HAQ on Swollen Joint Count for high and low Problematic Emotional Support**

The regression line for the high Problematic Emotional Support group (slope = 0.05) and the correlation coefficient ( $r = 0.22$ ) shows that as Swollen Joint Count increases the assessment of functional disability also increases. For the low Problematic Emotional Support group the regression line (slope = -0.04) and the correlation coefficient ( $r = -0.28$ ) demonstrated the opposite, namely a decrease in the assessment of functional disability as Swollen Joint Count increases.



**Figure 6.23: Regression of HAQ on Number of Tender Joints for high and low Problematic Tangible Support**

The regression line for the high Problematic Tangible Support group was much steeper (slope = 0.08) and the correlation coefficient was bigger ( $r = 0.50$ ) than that of the low Problematic Tangible Support group (slope = 0.01,  $r = 0.10$ ). This would indicate that as Number of Tender Joints increases assessment of functional disability also increases, but more so for the high Problematic Tangible Support group.

## 6.9 The role of Arthritis Helplessness (AHI)

**Table 6.25**

**Moderated Multiple regression using Helplessness as moderator**

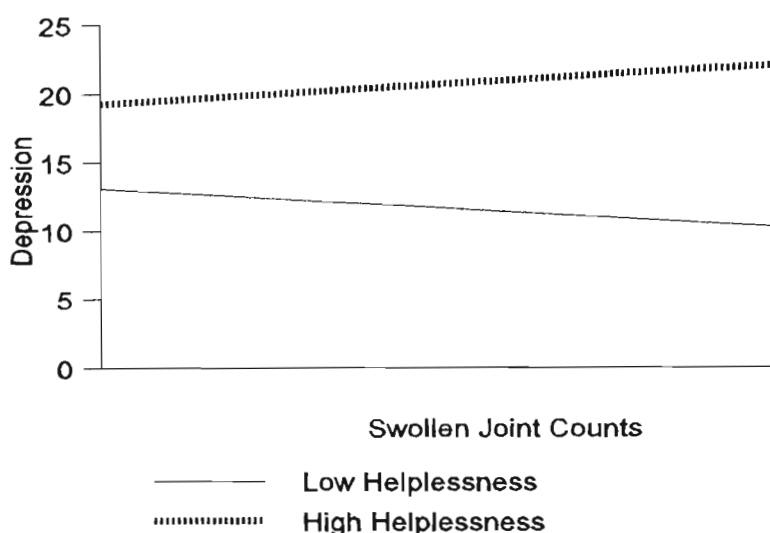
Predictor	df	t-value	Cum R <sup>2</sup>	R <sup>2</sup> Change	Beta
<b>1. Depression as outcome</b>					
ESR X Helplessness	1/182	-0.47	0.17	0.00	-0.23
Number Tender Joint X Helplessness	1/182	1.15	0.20	0.01	0.59
Tender Joint Counts X Helplessness	1/182	0.20	0.20	0.01	0.45
Number Swollen Joints X Helplessness	1/182	1.68	0.19	0.01	0.92
Swollen Joint Count X Helplessness	1/182	1.96	0.19	0.02**	0.05
Class X Helplessness	1/182	0.84	0.22	0.00	1.13

<b>2. VAS-Pain as outcome</b>					
ESR X Helplessness	1/182	-0.81	0.08	0.00	-0.42
Number Tender Joint X Helplessness	1/182	-1.56	0.16	0.01	-0.82
Tender Joint Counts X Helplessness	1/182	-2.70	0.20	0.03**	-1.19
Number Swollen Joints X Helplessness	1/182	-1.01	0.10	0.01	-0.58
Swollen Joint Count X Helplessness	1/182	-0.71	0.09	0.00	-0.43
Class X Helplessness	1/182	0.37	0.18	0.00	0.71
<b>3. VAS-Disability as outcome</b>					
ESR X Helplessness	1/182	-1.04	0.14	0.01	-0.52
Number Tender Joint X Helplessness	1/182	-1.22	0.20	0.01	-0.62
Tender Joint Counts X Helplessness	1/182	-2.32	0.24	0.02**	-0.99
Number Swollen Joints X Helplessness	1/182	-0.24	0.14	0.00	-0.14
Swollen Joint Count X Helplessness	1/182	-0.06	0.13	0.00	-0.04
Class X Helplessness	1/182	0.51	0.28	0.00	0.25
<b>4. AIMS-Affect as outcome</b>					
ESR X Helplessness	1/170	-0.83	0.15	0.00	-0.42
Number Tender Joint X Helplessness	1/170	-0.50	0.20	0.00	-0.26
Tender Joint Counts X Helplessness	1/170	-0.71	0.20	0.00	-0.32
Number Swollen Joints X Helplessness	1/170	1.10	0.16	0.01	0.62
Swollen Joint Count X Helplessness	1/170	1.33	0.16	0.01	0.79
Class X Helplessness	1/170	-1.37	0.24	0.01	-0.70
<b>5. AIMS-Physical as outcome</b>					
ESR X Helplessness	1/168	-1.17	0.10	0.01	-0.61
Number Tender Joint X Helplessness	1/168	-1.62	0.18	0.01	-0.86
Tender Joint Counts X Helplessness	1/168	-1.80	0.16	0.02	-0.84
Number Swollen Joints X Helplessness	1/168	0.26	0.10	0.00	0.15
Swollen Joint Count X Helplessness	1/168	0.86	0.08	0.00	0.54
Class X Helplessness	1/168	-0.74	0.21	0.01	-0.38
<b>6. HAQ as outcome</b>					
ESR X Helplessness	1/182	-1.61	0.15	0.01	-0.80
Number Tender Joint X Helplessness	1/182	-2.38	0.17	0.03**	-1.23
Tender Joint Counts X Helplessness	1/1820	-2.59	0.18	0.03**	-1.16
Number Swollen Joints X Helplessness	1/182	-0.78	0.13	0.00	-0.44
Swollen Joint Count X Helplessness	1/182	-0.40	0.13	0.00	-0.24

Class X Helplessness	1/182	-1.61	0.19	0.01	-0.84
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\*\* p < 0.05

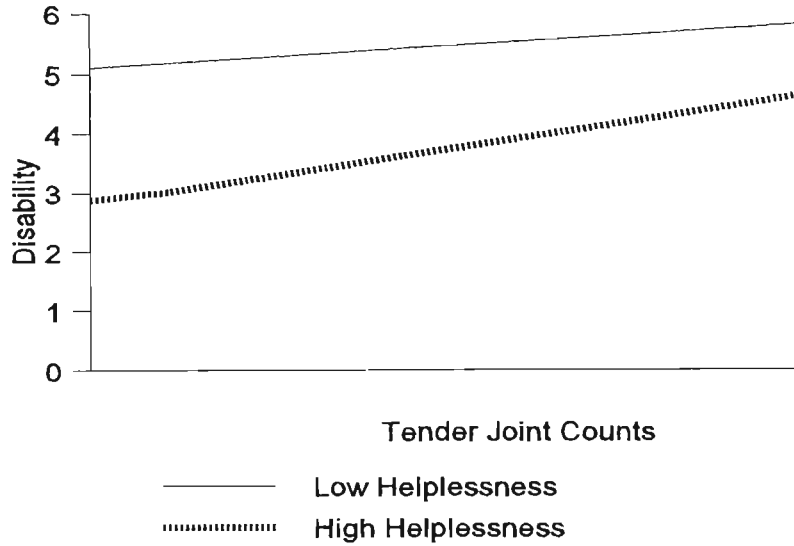
There were significant moderating effects for helplessness in terms of the following relationships: between Swollen Joint Count and Depression, Number of Tender Joints and assessment of functional disability (HAQ) and Tender Joint Count and the subjective experience of pain (VAS-P), subjective assessment of the extent of disability (VAS-D) and assessment of functional disability (HAQ) respectively. The nature of these effects are illustrated in Figures 6.24 to 6.27.



**Figure 6.24: Regression of Depression on Swollen Joints Count for high and low helplessness**

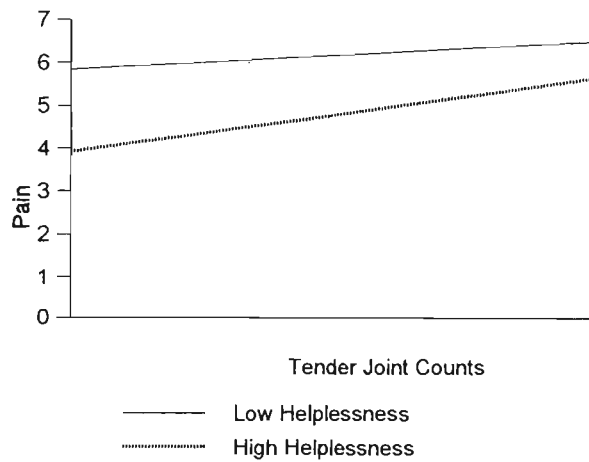
The above figure illustrates that for those who feel that they are not able to control their arthritis symptoms (high helplessness N = 50)) there is a positive relationship between Swollen Joint Counts and Depression, i.e. as Swollen Joint Counts increase, Depression also increases. On the other hand for those who report that they are able to control their symptoms (low helplessness N = 55) there is a negative relationship between Swollen Joint Counts and Depression, indicating that Depression even decreases despite an increase in Swollen Joint counts. This is confirmed by the slope of the regression line which was 0.30 for the high helplessness group and -0.30 for the low helplessness group as well as by the correlation coefficients which were 0.15 for the high helplessness group and -0.21 for the low helplessness group.





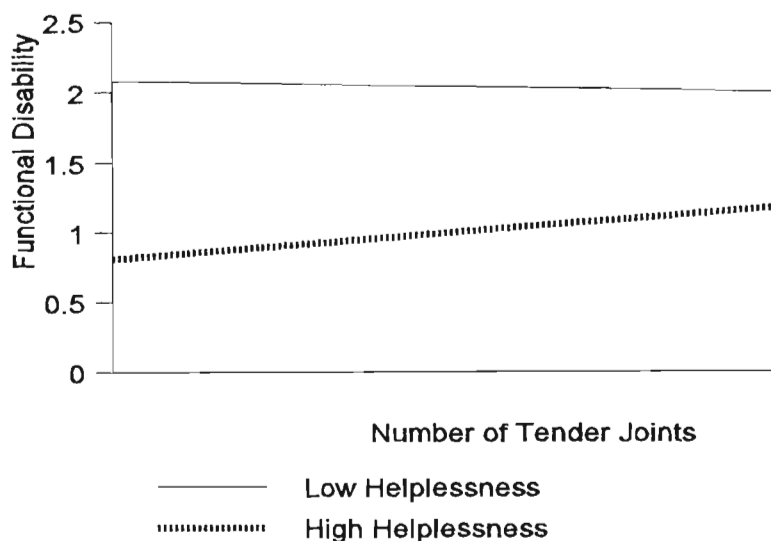
**Figure 6.25: Regression of VAS-Pain on Tender Joint Counts for high and low helplessness**

The regression line was steeper and the correlation coefficient bigger for those who reported that they are unable to control their arthritis symptoms (slope = 0.19,  $r = 0.40$ ) than for those who reported that they are able to control their symptoms (slope = 0.07,  $r = 0.26$ ). This would indicate that as Tender Joint Count increases, the subjective assessment of pain also increases, but more so for those who are unable to control their symptoms.



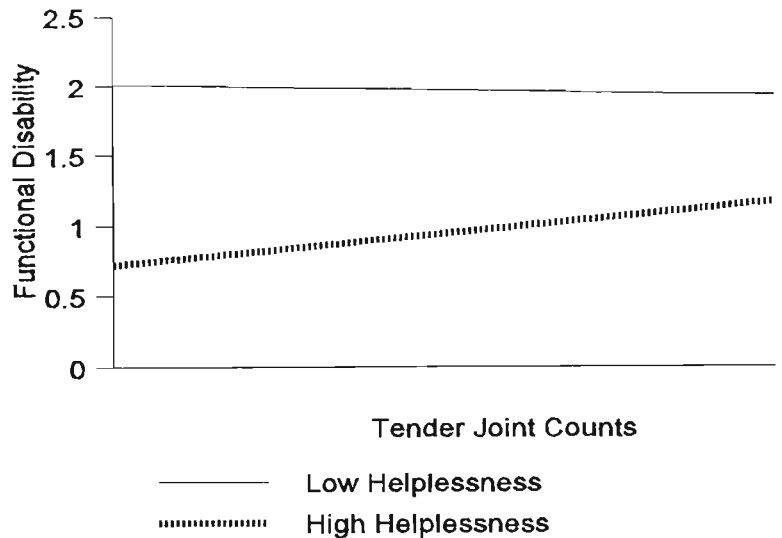
**Figure 6.26: Regression of VAS-Disability on Tender Joint Counts for high and low helplessness**

The relationship between Tender Joint Counts and assessment of the extent of disability (VAS-Disability) was stronger for those who reported that they are unable to control their symptoms (slope = 0.20,  $r = 0.39$ ), than for those who reported that they are better able to control their symptoms (slope = 0.08,  $r = 0.31$ ). This would indicate that the increase in assessment of extent of disability associated with an increase in Tender Joint Counts was greater for those patients who reported that they are not able to control their symptoms.



**Figure 6.27: Regression of HAQ on Number of Tender Joints for high and low helplessness**

For patients who reported that they are better able to control their symptoms there was a slight decline in the regression line (slope = -0.01) and a very weak relationship ( $r = -0.07$ ) between Number of Tender Joints and assessment of functional disability (HAQ). For those reporting that they are not able to control their symptoms the reverse was true (slope = 0.04,  $r = 0.23$ ). This would indicate that in the case of the high helplessness group that an increase in Number of Tender Joints is related to an increase in a negative assessment of functional disability, but not so in the case of the low helplessness group.



**Figure 6.28: Regression of HAQ on Tender Joint Count for high and low helplessness**

The slope of the regression line was steeper and the correlation coefficient larger for those that reported that they are unable to control their symptoms (slope = 0.05,  $r = 0.34$ ) than for those who reported being better able to cope (slope = -0.01,  $r = -0.03$ ). This would indicate that an increase in Tender Joint Counts is associated with an increase in negative assessment of functional disability, but only for the high helplessness group.

### 6.10 Causal attribution as moderator

Since causal attribution is in fact a categorical variable that divides subjects into discrete groups (internal and external) moderated multiple regression would not have been appropriate in this instance. Instead the correlation coefficients of the Internals and Externals were statistically compared using Fisher's Z (Howell, 1982). The significance of Fisher's Z is evaluated by means of the standard distribution of Z, namely  $Z_{crit, 0.05} = 1.96$ .

A statistically significant difference between the correlation coefficients of the two groups (internals and externals) would in fact indicate that causal attribution moderates the relationship between the two variables in question.

### 6.10.1 Causal attribution at disease onset

Table 6.26

Statistical comparison of correlation coefficients for internal and external causal attribution at time of onset of disease

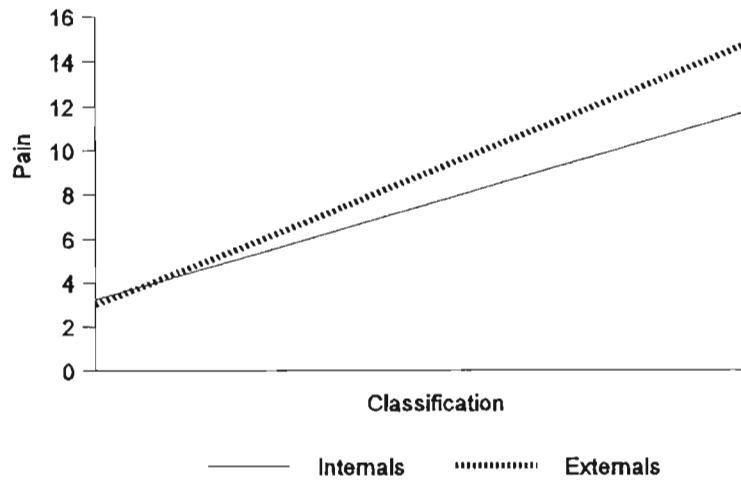
	INTERNAL			EXTERNAL			Fisher's
	N	r	b	N	r	b	Z
<b>Depression</b>							
ESR	110	0.07		39	-0.09		0.83
NTJ	110	0.28		39	0.34		-0.31
TJC	110	0.32		39	0.36		-0.26
NSJ	110	0.09		39	0.20		-0.57
SJC	110	0.00		39	0.14		-0.73
Class	110	0.35		39	0.37		-0.10
<b>VAS-P</b>							
ESR	110	.058		39	.027		0.17
NTJ	110	.288		39	.502		-1.32
TJC	110	.357		39	.508		-0.98
NSJ	110	.195		39	.240		-0.24
SJC	110	.265		39	.162		0.56
Class	110	.323	1.06	39	.659	1.47	-2.72**
<b>VAS-D</b>							
ESR	110	.137		39	.149		-0.06
NTJ	110	.341		39	.427		-0.53
TJC	110	.418		39	.434		-0.10
NSJ	110	.203		39	.111		0.49
SJC	110	.261		39	.052		1.12
Class	110	.395		39	.570		-1.19
<b>AIMS-Affect</b>							
ESR	102	-.015		35	.181		-0.97

NTJ	102	.252	0.06	35	.596	0.14	-2.11**
TJC	102	.283	0.05	35	.606	0.12	-2.02**
NSJ	102	.095		35	.164		-0.35
SJC	102	.054		35	.163		-0.55
Class	102	.343		35	.484		-0.84
<b>AIMS-Physical</b>							
ESR	102	.236		33	.151		0.42
NTJ	102	.325		33	.605		-1.75
TJC	102	.326		33	.505		-1.05
NSJ	102	.213		33	.252		-0.20
SJC	102	.148		33	.187		-0.19
Class	102	.392		33	.544		-0.94
<b>HAQ</b>							
ESR	110	.074		39	.354		-1.54
NTJ	110	.130	0.02	39	.474	0.07	-2.00**
TJC	110	.181		39	.473		-1.72
NSJ	110	.092		39	.004		0.46
SJC	110	.062		39	-.011		0.38
Class	110	.320		39	.447		-0.77

\*\* p < 0.05

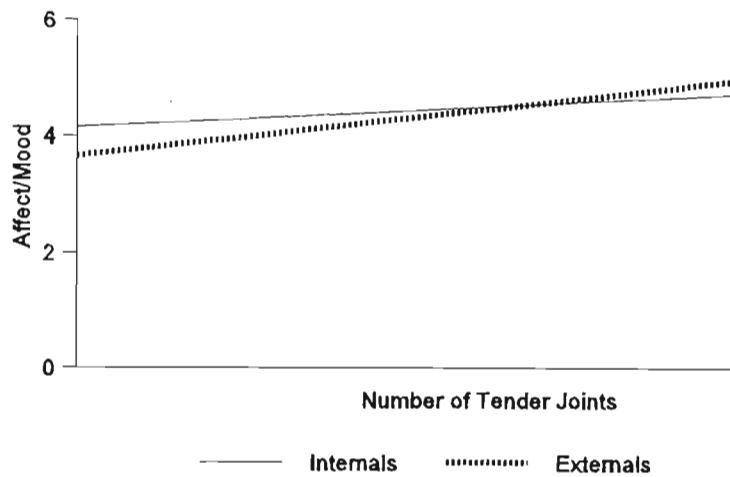
b: the slope of the regression line has only been indicated where there is a significant difference between the two correlation coefficients.

There were significant differences in the correlation coefficients of externals and internals in terms of the relationship between Classification and Vas-P, Number of Tender Joints and AIMS-Affect as well as HAQ and Tender Joint Count and AIMS-Affect. The exact nature of these differences are illustrated in the Figures below.



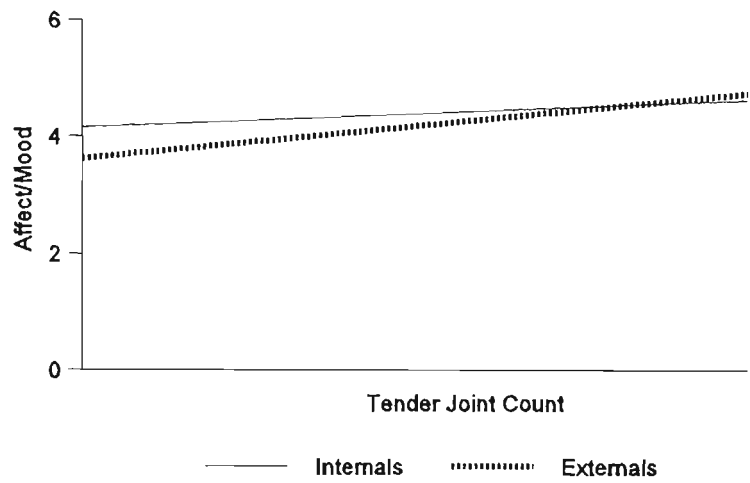
**Figure 6.29: Regression of VAS-Pain on Classification for Internal and External causal attribution**

The slope of the regression line for externals was steeper than that of internals. Thus for both those with an internal as well as those with an external causal attribution at onset of the disease the experience of pain (as measured by VAS-Pain) increases the greater the classification of extent of disability, but more so for those with an external causal attribution.



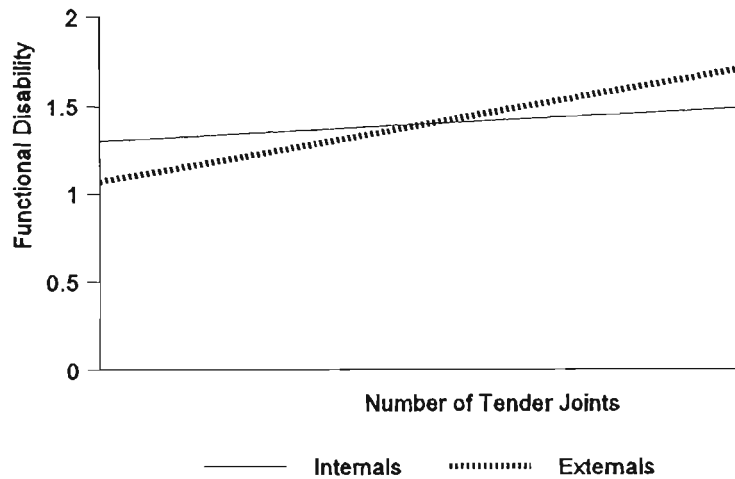
**Figure 6.30: Regression of AIMS-Affect on Number of Tender Joints for Internal and External causal attribution**

The relationship between Number of Tender Joints and negative affect/mood (as measured by AIMS-Affect) was stronger for those with an external causal attribution than for those with an internal causal attribution at time of onset of the disease. Thus an increase in Number of Tender Joints is associated with an increase in negative affect/mood, but more so for external causal attribution.



**Figure 6.31: Regression of AIMS-Affect on Tender Joint Count for Internal and External causal attribution**

The slope of the regression line was steeper for external than for internal causal attribution. This indicates that as Tender Joint Count increases, negative affect/mood as measured by (AIMS-Affect), but more so for those with an external causal attribution at the time of onset of the disease.



**Figure 6.32: Regression of HAQ on Number of Tender Joints for Internal and External causal attribution**

The relationship between Number of Tender Joints and assessment of functional disability (as measured by the HAQ) was stronger for those with an external causal attribution than for those with an internal causal attribution at the time of onset of the disease. As Number of Tender Joints increases, the negative assessment of functional disability also increases, but this was more likely in the case of those with an external causal attribution.



## 6.10.2 Most recent causal attribution

**Table 6.27**

**Statistical comparison of correlation coefficients for most recent internal and external causal attribution**

	INTERNAL			EXTERNAL			Fisher's
	N	r	b	N	r	b	Z
<b>Depression</b>							
ESR	112	.060		38	-.059		0.82
NTJ	112	.268		38	.373		-0.31
TJC	112	.300		38	.425		-0.26
NSJ	112	.088		38	.200		-0.57
SJC	112	-.004		38	.153		-0.72
Class	112	.334		38	.418		-0.10
<b>VAS-P</b>							
ESR	112	.066		38	-.022		0.16
NTJ	112	.293		38	.480		-1.31
TJC	112	.352		38	.516		-0.97
NSJ	112	.213		38	.151		-0.24
SJC	112	.277		38	.104		0.56
Class	112	.323	1.05	38	.659	1.50	-2.70**
<b>VAS-D</b>							
ESR	112	.136		38	.153		-0.06
NTJ	112	.339		38	.430		-0.53
TJC	112	.414		38	.443		-0.10
NSJ	112	.207		38	.085		0.49
SJC	112	.263		38	.033		1.11
Class	112	.420		38	.481		-1.18
<b>AIMS-Affect</b>							
ESR	104	-.001		34	.146		-0.96

NTJ	104	.261	0.06	34	.577	0.13	-2.09**
TJC	104	.287	0.05	34	.594	0.12	-2.00**
NSJ	104	.107		34	.137		-0.35
SJC	104	.063		34	.143		-0.54
Class	104	.332		34	.527		-0.83

**AIMS-Physical**

ESR	104	.213		32	.251		-0.05
NTJ	104	.307		32	.683		-1.64
TJC	104	.311		32	.577		-1.13
NSJ	104	.197		32	.302		-0.41
SJC	104	.133		32	.236		-0.41
Class	104	.370		32	.643		-1.09

**HAQ**

ESR	112	.078		38	.319		-1.52
NTJ	112	.134	0.02	38	.451	0.07	-1.98**
TJC	112	.178		38	.459		-1.71
NSJ	112	.101		38	-.040		0.45
SJC	112	.067		38	-.040		0.38
Class	112	.329		38	.400		-0.76

\*\* p < 0.05

b: the slope of the regression line has only been indicated where there is a significant difference between the two correlation coefficients.

The results for most recent causal attribution was exactly the same as that for causal attribution at time of onset of disease, namely that there were significant differences in the correlation coefficients of externals and internals in terms of the relationship between Classification and Vas-P, Number of Tender Joints and AIMS-Affect as well as HAQ and Tender Joint Count and AIMS-Affect. The slopes of the regression lines were also very similar. As such these results will not be plotted again.

## **6.11 Summary: Moderating Role of Psychosocial Variables**

### **6.11.1 Coping**

The results of the moderated regression analyses indicated that:

- Proactive coping moderates the relationship between between active inflammation (as measured by the ESR) and subjective assessment of functional disability (as measured by the HAQ).
- Negative-Internal coping moderates the relationship between:
  - a. Tender Joint Counts and Depression,
  - b. Number of Tender Joints and Depression,
  - c. Number of Tender Joints and subjective assessment of the extent of disability (Vas-D).
- Positive-interactive coping moderates the relationship between:
  - a. Number of Tender Joints and the subjective experience of pain as measured by the VAS-Pain,
  - b. Tender Joint Counts and the subjective experience of pain as measured by the VAS-Pain,
  - c. classification (of disability) and patient's satisfaction with their physical health status as measured by AIMS-Physical.

### **6.11.2 Network Support**

Moderated regression analyses indicated that:

- Positive informational support moderates the relationship between:
  - a. active inflammation (as measured by ESR) and the subjective experience of pain (as measured by VAS-Pain),

- b. Classification of the extent of the disability and the subjective assessment of affect/mood (as measured by AIMS-Affect).
- Positive Emotional Support moderates the relationship between Swollen Joint Counts and subjective assessment of functional disability as measured by the HAQ, but this moderating effect was in the reverse direction.
- Problematic Tangible Support moderates the relationship between:
  - a. Number of Tender Joints and Depression,
  - b. Swollen Joint Counts and subjective assessment of disability (as measured by VAS-Disability),
  - c. Swollen Joint Counts and subjective assessment of affect/mood (as measured by AIMS-Affect),
  - d. Number of Swollen Joints and subjective assessment of affect/mood (as measured by AIMS-Affect),
  - e. Number of Tender Joints and subjective assessment of functional disability as measured by HAQ.
- Problematic Informational Support moderates the relationship between:
  - a. Tender Joint Count and Depression,
  - b. Swollen Joint Count and subjective assessment of disability (as measured by VAS-Disability),
  - c. Number of Swollen Joints and subjective assessment of disability (as measured by VAS-Disability),
  - d. Swollen Joint Counts and subjective assessment of affect/mood (as measured by AIMS-Affect),
  - e. Swollen Joint Counts and satisfaction with physical health status (as measured by AIMS-Physical).
- Problematic Esteem Support moderates the relationship between:

- a. Swollen Joint Counts and subjective assessment of disability (as measured by VAS-Disability),
  - b. Swollen Joint Counts and satisfaction with physical health status (as measured by AIMS-Physical).
- Problematic Emotional Support moderates the relationship between Swollen Joint Counts and subjective assessment of functional disability as measured by the HAQ.

### **6.11.3 Arthritis Helplessness**

Moderated regression analyses indicated that sense of helplessness as measured by the AHI moderates the relationship between:

- a. Swollen Joint Count and Depression,
- a. Number of Tender Joints and assessment of functional disability (HAQ),
- b. Tender Joint Count and the subjective experience of pain (VAS-P),
- c. Tender Joint Count and the subjective assessment of the extent of disability (VAS-D),
- d. Tender Joint Count and assessment of functional disability (HAQ).

### **6.11.4 Causal attribution**

A statistical comparison of the correlation coefficients for internal and external casual attribution indicated that:

- causal attribution at time of onset of disease moderates the relationship between
  - a. Classification of extent of disability and the subjective experience of pain (VAS-P),
  - b. Number of Tender Joints and negative affect/mood (AIMS-Affect),
  - c. Tender Joint Count and negative affect/mood (AIMS-Affect)
  - d. Number of Tender Joints and assessment of functional disability (HAQ).

- most recent causal attribution moderates the relationship between
  - a. Classification of extent of disability and the subjective experience of pain (VAS-P),
  - b. Number of Tender Joints and negative affect/mood (AIMS-Affect),
  - c. Tender Joint Count and negative affect/mood (AIMS-Affect)
  - d. Number of Tender Joints and assessment of functional disability (HAQ).

The following chapter, Chapter Seven, considers in detail the findings of this South African study on psychosocial factors in RA. How the results compare with other studies in this area of investigation, and finally the theoretical and practical implications of the findings are also presented.

## CHAPTER SEVEN

### DISCUSSION

#### 7.1 Introduction

The overall aims of the study were, firstly, to develop a multivariate psychosocial model to predict objective (medical) and subjective (psychological) health outcomes in RA individuals of low socio-economic status in South Africa, and secondly, to assess the moderating role of psychosocial factors on RA health outcomes in these individuals. Conceptually, therefore, psychosocial factors were seen to have both a health sustaining function (based on the direct-effects hypothesis) and a stress-reducing function (based on the moderating hypothesis). Health outcomes or the quality of life of RA individuals, were of particular concern in this investigation.

While the physiological and clinical effects of RA, and the psychosocial, behavioural and economic consequences of the disease are well recognised, in middle-class, Western individuals with RA, less well known is the effect on individuals with this chronic condition in developing countries. RA individuals of low socio-economic standing in developing countries, such as South Africa, have been under-investigated, particularly with respect to the psychosocial aspects of the disease.

This study addresses the gap in the psychosocial understanding of RA individuals in a developing country and seeks to assess the quality of life of these individuals. The impact of socio-economic status on both objective (medical) and subjective (psychological) health outcome was considered. Further, the effect of social and economic factors on the psychosocial functioning of RA individuals including their coping behaviour, the social support they receive, the cognitive illness representations they make, and the causal attributions they assign to their illness condition, was also investigated. A multivariate, predictive model was developed which established the variables that are significant predictors of both objective

(medical) and subjective (psychological) RA health outcomes. In addition those psychosocial factors that played a significant moderating role between the objective experience of RA (measures undertaken by health personnel) and the subjective experience of RA, were ascertained.

The findings of this study provide a measure of the quality of life of the sample of RA patients under investigation. Demographic, social and cultural factors that influence psychological factors, which in turn are significant predictors and moderators of disease outcome are explored in order to explain the differences in the findings of this study as compared to previous studies. Contributions to an already existing theoretical position in the areas of stress and coping, cognitive illness representation, causal attribution and perceived social support are discussed. The unique characteristics of the sample with specific reference to its socio-cultural, economic and political background are seen to be the main contributors to the different and unexpected findings in this investigation.

## **7.2 Socio-demographic Profile of Sample**

### *Age, Sex and Marital Status*

The mean age of the sample in this investigation is 49.51 years, with more than half the subjects' being 50 years or more. Mody and Meyers (1989) reported a similar finding in a group of 52 clinic-based, black South Africans with a mean age of 44.60 years. Individuals around the age of 50 years appear, therefore, to be the most affected sub-group of RA patients within clinic-based populations in South Africa.

The sample comprised a significantly larger number of female RA patients, a feature of this sample, which is consistent with the general finding that more women are diagnosed with RA than are men (Anderson *et al*, 1985; Shaul, 1994). It is reported that women are three times more likely than men to be diagnosed with RA (Shaul, 1994), although Anderson *et al*. (1985) point out that older men appear to be affected as frequently as older women. Hannan (1996) suggests that researchers move beyond merely accepting that more women are afflicted with



RA and conduct investigations to understand why there is a greater number of women with the disease. In this regard Hannan (1996) suggests that the interrelationships between etiological factors, such as hormonal, genetic and autoimmunological ones, require further study.

While a preponderance of female RA patients was expected, a female to male ratio of 6.75:1 found in this study is not consistent with findings from previous studies. A ratio of 3:1 is frequently cited (e.g Linos *et al.*, 1980; Anderson *et al.*, 1985). The ratio found in this study, however, is similar to that found in an Indian study in which a female to male ratio of 9:1 was recorded (Malaviya *et al.*, 1993), compared to a South African study by Mody and Meyers (1989) in which the female to male ratio was found to be 3.7:1.

The similarity in the ratio of female to male RA patients in this study to the Indian study could be explained by the increased representation of South African Indians making up the sample in this investigation. One might assume that the biological and cultural similarities of both samples account for the high proportion of South African Indians in this study. However, within the South African context, this increased representation of Indian patients could be due to the fact that, despite their low socio-economic status, they have more social and economic resources to enable them to attend the rheumatology clinic, as compared to the black RA patients in this study. The finding that the sex ratio in this study differs from Mody and Meyers (1989) South African study could be explained by the fact that their sample was made up only of 52 black South Africans. Differences in findings across studies is a reminder that it is important to take cognisance of the epidemiological variation of RA.

Despite the fact that the mean age of the sample was 49.51 years, more than half the number of subjects had never married. In addition, not a single participant in the study was found to be living with a partner. This finding concerning the marital status and the living arrangement of a proportion of subjects' in this study is one possible indicator of the psychosocial effects of RA that warrants further investigation. It is reasonable to assume that having RA appears to decrease the chances, for the subjects in this South African study, of being in a marital relationship or in a relationship of co-habitation, both of which are social arrangements that are often associated with increased social support and better psychological well-being.

It has been established that social support enhances psychological well-being in chronically ill individuals (Fitzpatrick, Newman, Lamb & Shipley, 1988; Weinberger, Tierney, Booher, & Hiner, 1990), and further, that the relationship of the provider of the support to the recipient plays a vital role in the overall well-being of these patients (Sherbourne & Hays, 1990). Married persons with RA may have better outcomes as compared to unmarried persons (Leigh & Fries, 1991; Vliet Vlieland, Buitenhuis, van Zeben, Vandenbroucke, Breddveld & Hazes, 1994). The fact that a large percentage of the sample in this study had never married has implications for the subjects' psychological well-being. The findings suggest that these patients may be at risk for depression and other mood disorders, such as an anxiety disorder.

### *Educational level, Employment Status and Monthly Household Income*

Despite the relatively high level of education, only a small number of subjects were engaged in paid work activities. This is reflective not only of the economic effects of RA, but also of the high rate of unemployment in South Africa. Previous studies have also confirmed the economic effects of RA. Yelin, Feshbach, Meenan and Epstein (1979) found that RA is responsible for significant reductions in work status, involving both individual as well as family incomes. Meenan, Yelin, Nevitt and Epstein (1981) found that 59% of individuals with RA lose their employment after the disease occurs and earn only 50% of the income expected based on age and educational level. More recently, Yelin and Katz (1991) evaluated the trend in work disability in the United States among people with arthritis and found that the proportion of working age people with arthritis in the work force declined overall by 16% between 1970 and 1975, and again between 1982 and 1987. The steepest decline was found in the 55 to 64 year age group. RA sufferers, therefore, have less access to jobs over time. In a South African study the socio-economic profile of a randomly selected group of 135 Black and Indian RA patients showed that only 24% were employed and 35% were dependent on financial support from the state (Mody, Shaw & Ramchurren, 1988). Of the total sample, 50% had worked in the past and two-thirds had stopped working due to their poor health status that was attributed to arthritis. The finding in the current study that only a small number of RA patients were engaged in paid work activity is consistent with the findings of this earlier study.

A low monthly average household income was found to prevail in this sample. The level of income, therefore, used as one of the measures of subsistence, indicated that the subjects in this study were of low socio-economic standing. Further, most subjects reported that they were not engaged in paid work activities and only a minimum number of subjects were receiving a state disability grant.

Socio-economic status and its relationship to outcome measures in RA will be examined later in the discussion pertaining to bivariate and multivariate analyses. However, a preliminary comment will be presented here. Reports have indicated that in countries such as the United States (Mitchell, Burkhauser & Pincus, 1988) and the Netherlands (Vlieland, Buitenhuies, van-Zeben, Vandenbroucke, Breedveld & Hazes, 1994), outcome of rheumatoid disease is worse in patients' of lower socio-economic status. The 'Early Rheumatoid Arthritis Study Group' (ERAS study group), based in the United Kingdom, confirmed that the findings of their three year follow up study of 869 patients with RA were consistent with findings of previous studies (Young, Wilkinson, Talamo, Dixey, Cox, Davies, Devlin, Emery, Gough, James, Prouse, Williams, & Winfield, 2000). Socio-economic deprivation was found by the ERAS study group, to be associated with a worse clinical course of rheumatoid arthritis.

### *Religion*

Most of the subjects in this study belonged to either the Christian (46.2%) or Hindu (44.1%) religions. A minority of the subjects' (only Indian patients) were Muslim (9.1%).

It might also be of interest to know that a minority of patients (less than 5%) changed their religious affiliation in the belief that the conversion to another religion would make their condition less severe, or might serve to eradicate the condition of RA.

The relationship between religion and illness has been examined both by medical sociologists and psychologists. Williams (1993) notes that religion cannot be subjected to a single definition but may be understood as follows:

Being made up, amongst other things, of a scheme for interpreting the world, a moral vision which flows from that interpretation, a sense of individual and group identity, and a practice designed to symbolize and reaffirm all of these elements—all potential features of any culture or social movement (p. 72).

When an individual has a particular religious identity obtained at birth or later, it can be expected that this identity will transcend into other aspects of the person's functioning. Given Williams's (1993) definition of religion, one can expect that illness schemas and cognitive illness representations may be associated with religious identity. Although this study does not directly address this question, it must be remembered that the religious affiliation of the subjects might have influenced other variables in this study such as the causes they attribute for the onset of RA, as well as their perceived internal and external control over the disease. The subjects' cognitive processes associated with the condition of RA (i.e. attribution and control) should be understood within the context of an individual's developmental history within a family context and other social systems such as educational and religious institutions. Both the family and other social systems provide a constructed framework of ideas, values, attitudes and the meaning of human suffering, which in turn influences the individual's construction of the self in relation to his/her environment.

### *Duration*

Approximately one-third of the subjects had RA for five or less years (recent onset) and two-thirds had RA for more than five years (established disease). There is no absolute value that serves to distinguish between recent onset RA and established disease. In this study the five-year period was decided on following discussions with experienced rheumatologists.

### **7.3 Health Status and Psychosocial Profile of the RA group under study**

### **7.3.1 Health Status: Pain, Functional Limitation, Helplessness and Depression**

Measures of pain, functional limitation, helplessness and depression were primarily obtained through self-report instruments and, therefore, reflected the subjective experience of the subjects. These measures represent the quality of life of the RA subjects in this study. Subjects reported a moderate degree of functional impairment, high pain scores, and moderate levels of helplessness as well as depression.

These findings are consistent with findings in other studies. Experiencing functional limitations and pain have been reported to be the two challenges that an individual with RA faces (Anderson *et al.*, 1985). Both functional limitation and pain also appear to have a bidirectional relationship with depression. Katz and Yelin (1993) report a noticeable difference in functional status between depressed RA individuals and RA individuals who are not depressed. Other studies (Turner & Noh, 1988; Wolfe & Hawley, 1993) have also confirmed that changes in function are correlated with changes in depressive symptoms, although the causal direction of the relationship is unclear. Decline in functional status, therefore, may lead to an increase in the severity of depression or increasing levels of depression may exacerbate functional decline. Katz and Yelin (1995) conducted a longitudinal study to further investigate the relationship between functional status and depression. They found that for women with RA, the area of functional decline that leads to the development of depressive symptoms is the loss of valued activities, and not simply the functional impairment.

In chronic inflammatory diseases such as rheumatoid arthritis, pain is a significant symptom that is taken seriously by the patient as well as the attending physician (Schaible & Vanegas, 2000). Parker *et al.* (1988) suggest that pain is the most important symptom for the majority of RA patients. High pain scores reported in this study are consistent, therefore, with what is reported in the literature regarding pain as being a significant stressor for RA patients.

Psychological distress in the form of depression (a psychological health outcome) has been commonly found in individuals with RA (Chandrana, Earls, Srengart, Bellamy and Allen, 1987; Creed, Murphy and Jayson, 1990; Katz and Yelin, 1993). Most studies on depression in RA, however, are concerned with an individual's current psychological state, and do not take into consideration the impact of a previous history of depression. Fifield, Tennen, Reisine and McQuillan (1998) found that individuals with RA who had a prior history of major depression and a current high level of dysphoria, reported an increased level of pain, fatigue, and disability when compared with those with high dysphoria and no history of depression, as well as with those reporting a low level of dysphoria.

Another psychological effect of RA is the feeling of helplessness experienced by individuals with the disease. The unpredictability of the RA disease course, the waxing and waning of physical symptomatology, and the difficulty experienced in obtaining symptom relief may lead to feelings of helplessness with accompanying behavioural and emotional consequences (Bradley, 1985; Nicassio *et al.*, 1985). Smith *et al.*(1990) found in their study of 106 RA patients, that helplessness mediated the relationship between severe, disabling RA and depression. However, they also point out that cognitive distortion was independently associated with depression in RA.

### **7.3.2 Psychosocial Profile: Perceived Social Support, Cognitive Illness Representations and Causal Attributions**

A limited discussion of the psychosocial profile of the subjects in this study is presented here. The subjects' perception of the social support they receive from the individuals making up their network of support, the perception of control that subjects' have, and whether subjects' believe that personal factors or external factors are associated with the cause of their disease (RA), are discussed. Further discussion (later in this chapter), on the psychosocial functioning of RA patients in this study will include the coping style of these patients. The predictive power of the psychosocial factors, as well as the moderating role of psychosocial factors, between disease (RA) and RA health outcome (quality of life) are also examined later in this chapter.

Overall, the subjects' in this study perceived that the social support that they received from the individuals making up their network of support, was positive. There was also a perception, however, by these subjects that the same support network members provided problematic support and engaged in negative social interactions. This almost contradictory finding regarding social support is not uncommon. More recently, studies have shown that recipients of support often perceive significant others as providing both positive and problematic support (e.g. Revenson *et al.*, 1988).

Cognitive illness representations were assessed through the subjects' perceived control over the disease. The reasons that the subjects provided as causes for their illness (RA) were noted. The finding that more than half the subjects (58,1%) in the sample reported the perception that they did not have control over their illness and a large percentage of subjects (81,2%) believed that external factors influenced the course of their illness is a possible indication of these patient's inability to deal with the unpredictability of RA disease course, and their apparent lack of control of when and how the disease presents itself. The perception of a lack of control over RA may also be exacerbated by the subjects' low socio-economic status. It is expected that these patients' would have limited social and economic resources.

It is interesting to note that the majority of subjects' reported not making causal attributions about their illness at the time the diagnosis was made, nor at the time the study was conducted (causal attributions were assessed by the use of a semi-structured questionnaire). Further, an almost equal number of subjects in the study reported causal attribution as unknown at the time the diagnosis was made, as well as at the time the study was conducted (59.1% and 60.2% respectively). This finding differed from Lowery *et al's* study (1983) in which only 15% of 55 male RA patients did not give causes for their illness condition. The fact that many patients in this study did not ascribe causes for the onset of RA is unusual, considering the fact that 70% to 95% of patients, according to figures quoted in the literature, report causal attributions about their illness (Sensky, 1997). One possible explanation for the fact that a large number of patients did not report causes for their illness onset is that they may not want to disclose the

cause for fear of being negatively “judged” by the interviewer because their response was socially undesirable.

Landrine and Klonoff (1994) emphasise the importance of considering social desirability and suggest that in studies of causal explanations of illness, supernatural causes are often neglected because some individuals feel embarrassed to admit their belief in such causes. According to Sensky (1997) while patients with serious illnesses make frequent causal attributions, these attributions are held with less conviction (patients are not convinced about the attributions they make). In the case of RA, assigning causal attributions to disease flares is seen to provide individuals with a sense of personal control over the disease (Affleck *et al.*, 1987). Making causal attributions for patterns of disease activity provides individuals’ with a sense of being able to contend with the uncertainty of RA (Affleck *et al.*, 1987). In the present study, therefore, one may assume that a relationship exists between RA patients’ not reporting a cause for their illness and their perception that they are unable to control their illness.

The findings on attribution in this study also differ to an extent from a much earlier study investigating the relationship between social class and lay explanations of the etiology of arthritis. In Elder’s (1973) study “higher classes” (a term used by the researcher to indicate individuals of higher socio-economic status) of arthritis patients were more likely to attribute their illness symptoms to aging and heredity, or to state that the cause of their arthritis was unknown, as compared to the “lower classes” (individuals of lower socio-economic status) who were more likely to attribute symptoms to environmental circumstances including exposure to cold, water, dampness, or working conditions. In the present study of individuals of lower socio-economic status, it was found that most of the subjects stated the cause of RA to be unknown. This finding is similar to Elder’s (1973), in which this was true of individuals in “higher classes”. However, for those individuals in this study who did assign causes, the causes were similar to those causes provided by the “lower classes” in Elder’s (1973) study. The differences in the findings between the studies may in part be due to the way in which “class” and socio-economic status were measured in each investigation. In Elder’s (1973) study social class was measured by taking into account social



position on the basis of educational level and occupational standing and in the current study income was the additional factor that was considered as an indicator of socio-economic status.

In the present study, of those individuals who did make causal attributions at the time of onset of the disease as well as at the time the study was conducted, an almost equal number of subjects believed that personal factors contributed to the onset of the disease compared with those who believed that external factors contributed to the onset of the disease. A number of variables may have influenced the patients' explanations of their illness. These include the patient's level of intelligence, medical knowledge and varied exposure to illness. According to Watts (1982), explanations are also rooted in patients' cultural and social framework, as well as the way in which patients usually cope under stressful conditions or with illness in general.

Discussing causal attributions in physical illness, Sensky (1997) makes reference to factors that contribute to bias in attributions.

Among other factors, depression is quoted as one factor. Attributions, which are internal, stable and global may make people more vulnerable to becoming ill. In addition, the way in which a patient processes information about their illness and their ability to accurately recall previously acquired information is adversely affected when a patient has an affective disturbance. These factors may account for the development of a "personal" illness model.

In general the psychosocial profile of the sample in this study is consistent with the findings of previous studies investigating social support, causal attribution and cognitive illness representation. However, certain findings regarding causal attribution and cognitive illness representation are different from previous studies. The differences in findings could be explained by the low socio-economic position of the sample in this study as compared to previous studies that have used predominantly middle-income subjects.

#### **7.4 Development of a Multivariate, Predictive Model for Quality of Life in RA**

### **7.4.1 Introduction**

One of the main aims of this project was to develop a multivariate, predictive model for RA health status or quality of life in a low socio-economic group of individuals in South Africa. As a preliminary step the significant relationships between socio-demographic variables, psychosocial variables and health outcome variables were, first explored. Two predictive models were developed. In the first model, significant bivariate relationships between socio-demographic factors, such as age, sex, monthly household income and work status, and health outcome measures, and between psychosocial factors, such as social support and coping, and health outcome measures were taken into account. The significant bivariate relationships between the socio-demographic variables and the psychosocial variables were used to establish a predictive model for both objective (medical) and subjective (psychological) health outcomes in RA. In the second model the objective and subjective health outcomes including swollen and tender joint status, pain and functional status, helplessness and depression were each considered as predictors of RA health outcome.

This project is concerned with the psychological, social and economic resources that influence an individual's ability to cope with the stressors of the chronic illness condition, RA. Socio-economic status, social support, causal attribution, cognitive illness representation and coping are specifically examined in order to assess whether these factors play a role in predicting the quality of life (health outcomes) of RA individuals.

### **7.4.2 Significant relationships between socio-demographic factors, psychosocial factors and factors representing RA health outcome**

#### **7.4.2.1 Relationships between socio-demographic factors and between factors representing health outcome**

Significant relationships were expected between the socio-demographic variables age, sex, educational level, employment status and monthly household income, and between the health

outcome variables self-report of pain and functional status, swollen and tender joint count, helplessness and depression.

Significant relationships were found between the socio-economic variables monthly household income, education and employment. Those subjects with higher monthly household incomes were found to have a higher educational level. Older subjects were not engaged in paid work activities and had RA for a greater number of years. In addition older subjects had lower levels of education. Subjects with higher levels of education were more likely to be engaged in paid work activities, and those who were not engaged in paid work activities had lower household incomes.

It is clear that in this sample of RA patients, individuals with higher levels of education earn more, accounting for their greater monthly household incomes. With respect to older subjects, the fact that they are not employed could be as a result of their age or due to the disabling effects of the disease process. The educational profile of the older subjects in this study might be reflective of a lack of opportunity to engage in higher education at an earlier, educable and more productive age.

Significant relationships were also expected between objective and subjective health outcome measures. A positive relationship was found between self-report of pain and functional status, and swollen and tender joint status. This finding may be explained by the fact that the symptoms of pain and disability are most frequently related to tissue inflammation in the joints (Wilder, 1993). The positive relationships found between self-report of pain and functional status and both helplessness (AHI) and depression (BDI) in this study is consistent with the findings of other studies in which psychological factors and arthritis symptoms have been found to influence each other (Newman & Mulligan, 2000). The studies which support the findings of this study include one conducted by Smedstad *et al.* (1995) who found that self-reported pain was highly correlated with mental distress in a cross-sectional study of 238 RA patients, and another conducted by Covic *et al.* (2000) who found that for 111 RA patients, pain was found to be correlated with both helplessness and depression. As stated previously

symptoms of pain and disability are the two most trying symptoms for arthritis patients as they are constant and persistent (Anderson *et al.*, 1985).

Positive relationships were also found between swollen and tender joint status and helplessness, as well as between swollen and tender joint status and depression. A possible explanation for this finding is that joint swelling is visible and provides evidence of current disease activity to the patient, causing the patient to feel distressed. An observable in physical appearance may also lead to the development of a poor body image for the RA patient, and the fact that the structural damage to the joints is visible to others may lead to increased body consciousness which may exacerbate the severity of depression. Joint involvement, with associated pain, is a key feature in RA that accounts for the increased prevalence of depression in this group of chronically ill individuals.

Pain and depression are often seen to be the most significant difficulties that RA patients are faced with (Anderson *et al.*, 1985; Skevington, 1987). The finding, in this study, that higher levels of pain were associated with higher levels of mental distress (depression and anxiety) in RA patients replicates the findings of the study conducted by Smedstad *et al.* (1995). Hawley and Wolfe (1988) also found an association between pain and increased levels of anxiety and depression. They found that anxiety and depression were significantly associated with disability and, depression with joint count. Depression and disability were also found to be associated in a study by McFarlane and Brooks (1988). Lorish *et al.* (1991) emphasize the role of psychosocial factors in the development of physical disability among RA patients. The findings of their study revealed that only disease severity and arthritis helplessness accounted for the variance in physical functioning. In another study, Mackinnon, Avison and McCain (1994) confirmed the significant relationship between pain and depression in their study of 143 individuals with RA. Their findings indicate, however, that functional limitations were a greater source of difficulty for RA patients as compared to pain. This finding is similar to that of Hawley and Wolfe's (1991) study of RA patients. By comparison, Parker *et al.* (1988) found that reports of pain in individuals with RA are more closely associated with psychological state than with basic disease activity.

In an attempt to overcome the inadequacies of the cross-sectional design, a longitudinal study conducted by Nicassio and Wallston (1992) examined 242 RA patients over a two-year interval and found that prior pain as well as the interaction of high levels of pain and high levels of sleep problems were associated with subsequent depression. The role of sleep disturbance, therefore, was apparently an important pathway in the relationship between depression and pain.

The relationship between helplessness and depression found in this investigation is in keeping with what is expected regarding psychological distress in individuals with RA. Newman and Mulligan (2000) report that the unpredictability of RA course and the limitations in obtaining maximum symptom relief can lead to feelings of helplessness which in turn may lead to depression. These feelings of helplessness are probably best explained by Seligman's (1975) theory of learned helplessness, which is a cognitive theory of depression. A basic premise of this theory is that when individuals feel helpless in a stressful situation they develop symptoms of helplessness. Further, Abramson *et al.* (1975) refer to personal helplessness in cases where outcomes of events are uncontrollable for a proportion of individuals. Applying learned helplessness theory to illness conditions, such as RA, suggests that patients who see themselves as unable to influence control over their condition and its effects, are more susceptible to depression, via the impact of helplessness.

#### **7.4.2.2 The relationship between socio-demographic factors and psychosocial factors**

Significant associations were expected between the socio-demographic variables age, marital status, sex, educational level, employment status, monthly household income, religion and racial classification, and the psychosocial variables coping perceived positive network support, perceived problematic network support, causal attributions and cognitive illness representations. It is presumed that the psychological and social resources available to individuals are related, directly or indirectly, to their social, educational and economic background. It was expected, therefore, that the way in which an individual with RA copes, for

example, is associated with socio-demographic factors such as age, marital status, educational level, etc. This hypothesis was only partially supported.

It is important to note that when the correlational analysis was conducted between coping and other variables such as socio-demographic variables, the factors representing coping, i.e. proactive coping, negative-internal coping and positive-interactive coping that were produced by factor analysing the LCRAQ for use in this study, were used in the analysis.

There were no significant relationships found between coping and the socio-demographic variables in this study. A large number of socio-demographic variables were, however, significantly associated with social support (as measured by the network social support scale).

There were significant relationships between sex, age, monthly household income and education, and certain aspects of perceived positive social support, namely emotional and tangible support, and with aspects of perceived problematic support, namely, tangible support and negative social interactions. Explanations for these findings are presented.

In this study, there was a significant relationship between higher monthly household income and higher levels of emotional support received. A possible explanation for this finding is that the members constituting the network of support of the patients with higher monthly household incomes, probably have fewer concerns about their needs and the RA patient's basic subsistence needs, enabling them to provide the necessary emotional (and other forms of support) which was positively perceived by the recipients of the support. The relationship between economic factors and social relationships has been reported in the literature. Carlson and Vagero (1998) have shown that economic difficulties can be a source of anxiety, be associated with psychological distress and may lead to unhealthy family relations which can affect behaviour, and ultimately result in poor health.

Older RA patients in the study perceived that they received higher levels of tangible support. These older RA patients perceived that members of their network of support actively assisted them because of their illness condition. They endorsed items, such as "doing small favours"

and “helping out in a crisis” on the I-SSS. This finding is not surprising, as one would expect that a RA individual’s age and the stage of disease would necessitate that a certain type of support is provided. One may assume that older subjects experience difficulty living with a chronic illness such as RA, by virtue of their age, and would require assistance in carrying out tasks in their daily activities, which they may not be able to do as a result of their restricted mobility.

A gender difference was found with respect to the level of perceived tangible support as measured by the positive network support scale. Female RA patients perceived that they received decreased levels of tangible support (members of support actively carrying out tasks for the RA patient) . One possible explanation for this finding is that the individuals making up the network support (the RA patients’ friends and family members) would more than likely hold traditionalist views of women’s roles.

Women are possibly expected to fulfil certain tasks traditionally assigned to them, such as household chores. The providers of support, therefore, do not extend themselves by assisting in these chores. The reverse is also true, however. Female subjects were probably resistant to tangible help extended to them in the past, during the periods when they possibly enjoyed good functional status that enabled them to function more independently. These female subjects possibly carried out tasks traditionally undertaken by women, at a time when they enjoyed better RA health status. This behaviour on the part of women would reinforce the stereo-typed notion of women’s roles. This continued resistance on the part of the women RA patients in this study, probably led to the decrease in the availability of tangible support that would, otherwise, have been provided by the members of their network support.

Age and sex were found to be significantly associated with the perceived problematic aspects of network support, in this investigation. Older subjects perceived that individuals making up the network of support engaged in more negative social interactions and provided greater problematic tangible support. This apparently contradictory finding in which the recipients of support perceive certain aspects of the support provided to them to be unsupportive, is not an uncommon one. Studies have shown that social support can be both positive and problematic at

the same time (e.g. Revenson *et al.*, 1988) as was found with the older subjects in this study. An explanation is offered by Revenson *et al.* (1988) for this double-bind. Recipients of support, they state, spend a great deal of time with the providers of support, thereby allowing the recipients an opportunity to make a more detailed assessment of both the positive and “negative” efforts made by the providers of their support network.

Significant associations were also found between socio-demographic factors (gender and educational level) and the psychosocial variable problematic social network support. Female RA patients perceived that they received less problematic emotional, esteem, tangible, informational support and negative support interaction. Both male and female RA patients with higher levels of education also perceived that they had less problematic esteem, tangible, and informational support. Possible explanations for these findings are provided below.

Female RA patients, as well as male and female RA patients with a higher level of education who participated in this study (i.e. both male and female patients with a higher level of education), appear to share similar perceptions as recipients of decreased levels of certain aspects of problematic support, namely esteem, tangible and informational support. One may surmise that these two groups of patients are more self-reliant and less demanding of their support structures. However, the finding that female RA patients perceived that the members in their social network provided less problematic, negative, social interactions was not found for those patients with a higher level of education. One possible explanation for the discrepancy in this finding is that women who have traditionally been in a position of subjugation, tend to have fewer expectations in social relationships. Marks *et al.* (2000) point out that, for women, although social support from friendships, intimate relationships and marriage is significant, it appears to be of less positive value than for men. Further, women often provide more emotional support to their families than they receive. If women do not effectively express their dissatisfaction regarding traditional sex role definitions, therefore, it is likely that the practice will continue.

The finding in this study regarding the significant relationship found between the socio-demographic factors age and sex, and problematic social support differs from Revenson *et*



*al's.*(1988) study in which neither age nor sex were found to be significantly associated with social support. The difference in the finding of both these studies might be due to the fact that the two studies were conducted in dissimilar economic, social, psychological and cultural environments. This study was conducted in a developing country among RA subjects with low socioeconomic status and the Revenson *et al's.* (1988) study was conducted in a developed country, one in which individuals may have greater access to both social, economic and other resources.

The final set of findings with respect to socio-demographic factors and psychosocial variables was the significant association between educational level and perceived control. Those RA patients with a higher level of education had the perception that they are able to control the condition of RA. More informed and knowledgeable patients, therefore, seemed to have a greater degree of perceived internal (personal) control over their illness, reinforcing the notion of social positioning (by virtue of ones educational level) and health experience. Marks *et al.* (2000) point out that socio-economic status and (including social positioning) health experience has not been sufficiently explored. Causal links cannot be drawn between education and perceived control, but it is likely that education does predispose individuals to greater perceived internal control.

#### **7.4.2.3 The relationship between socio-demographic factors and RA health outcome**

It was hypothesised that there will be significant associations between the Socio-demographic variables age, marital status, sex, educational level, employment status, income, religion, racial classification and the outcome measures self-report of pain and functional status, swollen and tender joint status, helplessness and depression. This hypothesis was partially supported.

In this investigation, those RA patients who were not engaged in paid work activities reported higher levels of pain and poorer functional status. These patients also reported poor joint status as measured by the 28-joint count. A possible reason for these findings is that those patients who were not employed spent more time dwelling on their pain, limited functional ability and

degree of joint inflammation. The fact that these RA patients' had limited economic resources may have been another reason why they are at risk for poor health status.

It is widely accepted that individuals with few resources are at risk for illness onset (Berkman & Syme, 1979). In RA, socioeconomic decline is associated with a greater prevalence of the disease (Mitchell, Barkhauser & Pincus, 1988; Pincus, Callahan & Barkhauser, 1987). A study by Young *et al.* (2000) refers to the ERAS study group based in the United Kingdom that has investigated socio-economic deprivation and RA, and found that socio-economic factors were associated with a worse clinical course of rheumatoid disease. Individuals in the study who came from deprived circumstances were found to have more severe disease, as assessed by the HAQ and joint scores. Furthermore, women were reported to appear to be more at risk.

RA patients, in this study, who were not employed and had no income had a greater degree of helplessness as measured by the Arthritis Helplessness Index. The degree of helplessness experienced by these low socio-economic patients might be accounted for by many factors. Firstly, a direct causal relationship has been established between poverty and helplessness (Marks *et al.*, 2000). Secondly, helplessness may be due to the patients' realisation that their unemployed status and inability to earn an income are but some of the effects of RA as chronic illness. Moreover, if one considers the high rate of unemployment that currently exists in South Africa, the chance for individuals afflicted with a long-term disease, obtaining employment, decreases. Patients in this study, therefore, may have little optimism in obtaining employment.

Higher levels of education and higher monthly household income were found to be significantly associated with lower levels of helplessness in this study. In keeping with this finding, Nicassio *et al.* (1985) found that greater helplessness was correlated with lower educational levels. In a five-year follow-up study Callahan, Cordray, Wells and Pincus (1996) found that helplessness mediated between formal education and mortality. Callahan *et al.* (1996) argue that ascertaining the level of formal educational from patients is not only an indicator of socio-economic status but that education may be closely linked to cognitive or behavioural variables that may affect health status. Those RA patients, in this study, with lower educational levels and lower monthly household income experienced increased levels of

depression. This finding is consistent with that of Frerichs, Aneshensel and Clark (1981) who found an increased prevalence of depression in Hispanics in Los Angeles County and suggest that this increased prevalence was due to this community's lower income and lower levels of education. Their sample, however, did not specifically comprise of individuals with RA. The severity of depression in individuals with RA, therefore, may increase with limited economic and educational resources.

Hawley and Wolfe (1988) confirmed in a prospective study of 400 RA patients, that the development of depression over the course of the study was strongly related to socioeconomic factors that included family income. They concluded, however, that the premorbid conditions of RA individuals, such as a predisposition to and a prior history of depression, must be ascertained and the economic effects of the condition, such as unemployment, should be examined.

Some important questions to consider are whether individuals with RA, and other chronic illness conditions being prevented from employment opportunities, or are already employed RA individuals being found unfit for work because of their limited functional ability.

Previous research has confirmed that those individuals engaged in paid work have better health status (Nathanson, 1980; Rosenfield, 1989; Verbrugge, 1984). Being able to work despite disease helps to increase an individual's self-worth thereby buffering or reducing existing symptoms such as pain and depression. Fifield, Reisine and Grady (1991) reported an increased incidence of pain and depression among women with RA who have suffered work loss, face the threat of work loss, or are work disabled and suggest that these outcomes are related more to a loss of social role than to disease activity which has disrupted work.

#### **7.4.2.4 The relationship between psychosocial factors and RA outcome**

It was hypothesised that there would be significant associations between the psychosocial variables coping, perceived social support, causal attribution and cognitive illness representations, and both objective and subjective outcome factors (self-report of pain and

functional status, swollen and tender joint status, helplessness, and depression. This hypothesis was partially supported.

The hypothesis stating that there would be a significant association between perceived social support and RA outcome was rejected. These findings have not been replicated in other studies. Social support has generally been associated with increased psychological well-being and better functional status in chronically ill individuals (Logan and Spitze, 1994; Newman *et al.* 1989; Ward and Leigh, 1993). Social support may also be perceived as problematic with resulting negative effects (e.g. Dwyer, 1997; Revenson, 1988). It is apparent, therefore, that social support does not only have general, positive effects.

A review of the literature demonstrates a complex relationship between perceived social support and the resultant health effect. In a study of Caucasian and Black women with RA Lambert and Lambert (1985) found that the presence of social support was a significant predictor of psychological well-being in Caucasian women but not in Black women. A possible explanation for the difference in the finding between Caucasian and Black women is the fact that for Black women socioeconomic status and material conditions dominate. The concept of hardiness, a personality characteristic, is one possible explanation for reports of low social support scores. Hardiness, is defined by Kobasa, Maddi and Kahn (1982), as an inherent health promoting personality factor that assists one in coping with a stress laden human environment. Individuals possessing the personality factor hardiness may perceive that they receive less social support. Lambert, Lambert, Klipple and Mewshaw (1989) found that both social support and hardiness were significant predictors of psychological well-being despite disease severity.

In support of the hypothesis pertaining to the relationship between the psychological and RA health outcome factors, it was found that both high perceived internal and perceived external control were associated with an increased level of pain and poor functional status. The finding regarding perceived external control is somewhat surprising because it would be expected that individuals with a greater degree of perceived internal control report less severe symptoms as compared to individuals with a perceived external sense of control. A similar finding was

obtained for both perceived internal and perceived external control and swollen and tender joint status. A possible explanation for this is that during periods when symptom flare-ups are extremely severe and overwhelming, the resultant effect is the experience of severe pain, poor functional status, and poor joint status, regardless of the patients' locus of control (i.e. internal or external control).

An inverse relationship was found, in this study, between overall coping, proactive coping, negative-internal coping and positive-interactive coping, and RA patients' self-report of pain severity and functional status. These results (except the relationship between negative-internal coping and pain and functional status) are consistent with what is reported in the literature about the positive relationship between active coping strategies and psychological well-being and functional status (Newman and Mulligan, 2000). Passive or avoidant coping strategies are reported to be negatively correlated with RA outcome (Newman & Mulligan, 2000). These reports suggest that individuals who directly confront their illness have better illness outcome. The finding in this study, therefore, that negative-internal coping is significantly associated with lower pain scores and better functional status is unexpected. One possible explanation for this finding lies in intra-psychic factors. Those RA patients who use a negative-internal style of coping marked by avoidance behaviour and the need for "privacy" may have underscored (on the self-report measures of pain and functional ability) their level of pain and did not adequately reflect the difficulty they are experiencing with respect to their functional ability. The positive association found between negative-internal style of coping and poor joint status (increased count of swollen and tender joints) is consistent with findings associating poor joint status with poor functional status (e.g. Newman & Mulligan, 2000).

Total coping, proactive coping and positive-interactive coping were found to be significantly associated with a lower degree of helplessness (i.e. RA patients' did not experience a great sense of helplessness), and total coping and proactive coping were found to be significantly associated with decreased levels of depression (i.e. RA patients' were not severely depressed), in this study. The significant correlational relationship indicating that those RA patients scoring high on negative-interactive coping did not score high on depression, was an unexpected finding. A possible explanation for this finding is that those RA patients who used a negative-

internal style of coping did not accurately report their experience of depression, under-reporting its severity. It would be important, therefore, to further investigate the role that personality factors play in an individual's decision to use certain coping strategies and the relationship of these coping strategies to psychological well-being (depression). Another possible explanation for the fact that negative-internal style of coping was not significantly related to increased depression in this study may be reflective of the fact that this investigation was conducted in a developing country, South Africa, among individuals with low socio-economic status. These individuals may have come to accept their social and economic deprivation, and therefore, do not express feelings of depression due to a possible process of psychological numbing.

Depression and helplessness, the two measures of psychological well-being, were found to have significant positive associations with perceived internal control. This finding is consistent with the findings of other studies such as a study conducted by Affleck, Tennen, Pfeiffer and Fifield (1987), who found that those with severe disease (RA) who perceived a greater personal (internal) control over the course of the disease exhibited greater mood disturbance. Newman and Mulligan (2000) report that individuals with a high locus of control (personal/internal) over a challenging symptom such as pain, and not able to control the severity of the symptom as they expect to, became distressed. These results show that individuals with a high degree of perceived internal control may experience a decrease in psychological well-being if expectations of control are not met. In the current study those RA patients who had the perception of greater internal control (control factors originating within the self) over the chronic illness RA, experienced less severe helplessness and depression.

### **7.4.3 Predictive multivariate models for RA health outcome**

#### **7.4.3.1 Introduction**

One of the aims of this study was to develop a multivariate model for RA in a low socio-economic group of patients and to examine significant predictors of medical (objective) and psychological (subjective) health outcome. In the preceding section (section 7.4.2) the

significant correlations between socio-demographic factors, psychosocial factors and each of the health outcome measures, obtained through factor analysis, were discussed. These significant correlations, which were an indication of the degree of association between the variables, were utilized in the multiple regression analysis to develop predictive models for RA outcome. It was hypothesized that socio-demographic and psychosocial factors will contribute to the development of predictive models for RA outcome, namely, self-report of pain and functional status, swollen and tender joint status, helplessness and depression. It was further hypothesized that both the objective and subjective RA health outcome factors would each be significant predictors of RA health outcome factors or quality of life measures including self-report of pain and functional status, swollen and tender joint status, helplessness and depression.

The significant predictors of each of the objective and subjective health outcomes will be discussed. Eight predictive models, developed through hierarchical multiple regressions, are presented below.

#### **7.4.3.2 Model One: Predictors of Self-Report of Pain and Functional Status**

The socio-demographic factors (employment status and monthly household income) and the psychological factors (total coping and negative-internal coping) were found to be significant predictors of self-report of pain and functional status. Higher monthly household income is predictive of low levels of pain and better functional status, and not being engaged in paid work activity is predictive of increased levels of pain and poor functional status. Good overall coping and high negative-internal coping were found to be predictive of decreased pain levels and better functional status. The factor negative-internal coping, marked by avoidance of social

interaction, was one of the factors obtained by subjecting the London Coping with Rheumatoid Arthritis Questionnaire to factor analysis.

The finding that socio-demographic factors are significant predictors of RA health status is not an unexpected one. Having a low socio-economic status implies that limited social, economic and other resources are available. The subjects in this study are not only of low socio-economic status but also have to live with the challenge of having a chronic illness (RA). RA requires that the individual afflicted with the disease have adequate resources, including access to and the advantage to afford medical care in order to manage the disease. In a review of the socio-economic context of health in South Africa, Lund and Patel (1995) emphasise the point that domains outside the health sector affect health status. They report that marginalised groups such as the poor are particularly affected. Poor women and children are reported to be at risk. The health status of RA patients in this study, therefore, will be compromised because of their low socio-economic status. The fact that a greater number of women are diagnosed with RA also deserves special attention in light of Lund and Patel's (1995) report. If the health of poor women is at risk, then the health status of the subjects in this study, the majority of whom were women and already afflicted with a chronic disease, continues to be at risk.

The finding regarding the predictive value of coping in relation to RA outcome corroborates with previous research findings that psychological factors play a significant role in mediating RA and its outcome (Newman & Mulligan, 2000). However, the finding that increased negative-internal coping is predictive of reports of decreased pain and better functional status, is not consistent with studies reported in the literature. Previous studies have shown that negative and avoidant cognitive coping strategies are associated with poorer outcome while active strategies such as "information-seeking" and "active coping" have been associated with better outcome (Manne & Zautra, 1992). Covic, Adamson and Hough (2000) found in their study of male and female RA patients that the best predictors of high pain levels were both physical disability and passive coping. It is clear, therefore, that the finding in this study with respect to the predictive power of negative-internal coping on pain and functional status is not consistent with these findings. However, as suggested earlier, it is possible that those RA patients using negative-internal coping strategies are private copers who avoid social



interaction but have the necessary psychological resources to cope with their experience of pain and functional limitation. In addition, the sample in this study differs from those in the previous studies by virtue of the fact that the study was conducted in South Africa, a developing country, among subjects of low socio-economic status. Socio-economic status, social and cultural factors are expected to influence personality development. Personality would be one psychological factor among many that would influence the relationship between an individual's appraisal of a stressor such as RA, and the individual's choice of coping strategies to deal with the illness condition. The fact that negative-internal coping was found to be a significant predictor of pain intensity and functional status in this study requires further investigation. Specifically, the impact of socio-economic status on personality development, as well as the impact of personality on psychological coping resources and ultimately health outcome in RA and other chronic diseases, need to be addressed.

#### **7.4.3.3 Model Two: Predictors of Swollen and Tender Joint Status**

Hierarchical multiple regression was conducted to obtain the significant predictors of swollen and tender joint status. The socio-demographic variable employment status and the psychological variable negative internal-coping were found to be significant predictors of swollen and tender joint status. RA patients in this study who were not involved in paid work activities were more likely to have poor joint status. Increased negative-internal coping was predictive of decreased joint involvement (better swollen and tender joint status).

Numerous explanations could be offered for the finding regarding employment status and swollen and tender joint status. One possible explanation is related to the gender imbalance of the sample as the majority of the subjects are women. An assumption can be made that the unemployed women in the sample were home-makers involved in physically demanding household tasks which may cause a strain on their joints, thereby, worsening their joint status. An alternate explanation is that those RA patients not engaged in paid work activities spent more time being preoccupied with their condition (consequently worsening their condition through possible catastrophic thoughts) instead of engaging in behavioural measures to improve their physical status (active coping). The finding of the predictive value of

employment status to joint status, may also serve to confirm the established relationship between low socio-economic status and poor health outcome (Marks *et al.*, 2000). As mentioned previously, this study was conducted among RA patients of low socio-economic status. It is expected that individuals with limited economic resources will also have limited social, psychological and other resources needed to enhance coping with a chronic illness such as RA, resulting in poor health status.

An unusual and unexpected finding was that increased negative-internal coping predicted better swollen and tender joint status, a finding similar to that found for pain and functional status. Decreased joint involvement was predicted for those RA patients who privatised their coping and avoided social interaction. As mentioned previously the use of avoidant coping is usually associated with poor health outcome (Newman & Mulligan, 2000), a relationship which was not confirmed in this study. The finding regarding negative-internal coping as a predictor of joint functioning parallels the finding with pain and functional status as an outcome measure. Investigating the pathways between socio-economic status, psychological factors (including personality) and health outcome among low socio-economic individuals with RA is required.

#### **7.4.3.4 Model Three: Predictors of Helplessness**

Hierarchical multiple regression was conducted to obtain the significant predictors of the psychological outcome variable helplessness (AHI). Both monthly household income (a socio-demographic variable) and total coping (a psychological variable) were found to be significant predictors of the psychological outcome variable, helplessness.

Higher income and better overall coping were both found to be predictors of decreased levels of helplessness. It is expected that higher levels of income would enable individuals to have more resources and easier accesses to resources in order to meet the challenges of RA. Consequently, those individual's who earn more experience lower levels of helplessness. RA individual's who are better able to cope with a debilitating and unpredictable illness condition like RA, experience less helplessness. Better overall (total) coping implies that subjects are

proactive in their attempt to meet the challenges of RA and have a sense of being able to control the disease course through behavioural (active coping), cognitive (coping through positive thoughts) and affective (maintaining a positive mood) attempts. These proactive attempts will lead to individuals feeling less helpless because of the perception of being able to control future disease course.

#### **7.4.3.5 Model Four: Predictors of Depression**

The socio-demographic variables educational level, sex and monthly household income and the psychological variables negative-internal coping and positive-interactive coping were found to be significant predictors of depression. Better educational level, higher levels of income, increased negative-internal coping and increased positive-interactive coping were predictive of lower levels of depression. In addition, women had a greater chance of becoming depressed.

The results obtained in this study concerning the significant predictors of depression are consistent with the findings of previous studies. The finding that the psychological variable negative-internal coping was a predictor of depression is, however, not consistent with the findings of studies reported in the literature. This unexpected finding is in keeping with that found for two other RA outcome measures in this study, namely self-report of pain and functional status and swollen and tender joint status.

The finding that socio-demographic variables significantly predict depression, in this study, is supported by findings of a study conducted by Harrison, Barrow, Gask and Creed (1999). Harrison *et al.* (1999) used a postal survey method to assess the social determinants of general health by using the General Health Questionnaire (GHQ) in a stratified sample of individuals across the North Western Regional Health Authority in the United Kingdom. Results of the survey by Harrison *et al.* (1999) indicated that socio-demographic factors are the strongest predictors of depression and anxiety. Furthermore, the survey identified the most vulnerable groups of people as those with chronic limiting physical illness, and those with no one to communicate with. Employment status was reported to be the strongest predictor with an increase in morbidity among the unemployed and those who were ill or disabled. The survey

also found an increased risk of depression among those categorised as economically inactive, particularly those who are unable to work because of ill-health.

The finding that women RA patients are more at risk for depression is also supported by previous research. It has been reported that women suffer more from hypertension, kidney disease, and autoimmune diseases such as rheumatoid arthritis (Litt, 1993), and that they also suffer twice the rate of depression (Marks *et al.*, 2000).

Escalante, del Rincon and Mulrow (2000) confirmed previous findings on depression in RA patients in their study of 236 patients of Hispanic ethnic background. Depressive symptoms in RA are explained partly by the physical manifestations of the disease, including pain and disability. Other important determinants of depression in RA are socio- demographic and psychological factors.

While there is evidence that negative and avoidant coping strategies are associated with poorer health outcomes and active coping strategies are associated with better health outcomes, Manne and Zautra (1992) conclude in their review of coping and arthritis that the evidence in this regard is inconclusive due to the methodological differences in the studies, as well the use of different theories that guided the studies.

The finding in this study that increased active coping marked by social interaction (positive-interactive coping) is a significant predictor of lower levels of depression is consistent with the general findings in this regard (Newman & Mulligan, 2000). Increased negative-internal coping as a predictor of lower levels of depression, however, requires further investigation. The fact that this finding differs from the findings of studies conducted in developed countries, is reason to consider both socio-demographic factors and sociocultural factors to explain why the use of avoidant coping strategies marked by avoidance of social interaction (negative-internal coping) in this investigation, was predictive of lower levels of depression.

#### **7.4.3.6 Model Five: Predictors of Depression**

The RA health outcome measure self-report of pain and functional status obtained through factor analysis was entered into the multiple regression to ascertain its value in predicting depression. Self-report of pain and functional status, negative-internal coping and positive-interactive coping were found to be predictive of depression. Monthly household income was no longer found to be a significant predictor of depression when pain and functional status was entered into the regression equation in the second set of regressions. This result is indicative of multicollinearity between income, and pain and functional status.

In model five as compared to model four, therefore, factors representing the subjective experience of RA were found to be more predictive of depression than socio-economic factors. Increased negative-internal coping was found to be predictive of lower levels of depression (an unusual finding), increased pain and poor functional status was found to be predictive of increased levels of depression, and finally increased positive-interactive coping was found to be predictive of lower levels of depression.

While positive, active coping is known to be associated with psychological well-being (depression), avoidance coping is known to be associated with decreased psychological well-being (increased depression) (Newman & Mulligan, 2000). The finding, in this study that increased negative-internal coping was found to be predictive of lower levels of depression is not consistent with previous studies. Again, this difference could be due to the coping choice(s) of the subjects of low socio-economic status. If socio-economic status is seen to be one of the factors influencing personality development, and certain characteristics of the personality are seen to be antecedents of coping as suggested by Wheaton (1983) and Kobasa (1979), then the unusual finding in this study might be explained by the relationship between personality and coping choice. Further investigation is required in this regard.

The impact of pain and disability on depression has been recognised in previous studies (Newman & Mulligan, 2000). Pain and functional disability are seen to be the two most

difficult effects of RA that a patient has to contend with. RA patients who experience prolonged, severe pain and disability often have increased levels of depression.

#### **7.4.3.7 Model Six: Predictors of Helplessness**

When pain and functional status was entered into the regression equation in the second set of hierarchical multiple regressions, it was found to be a significant predictor of helplessness. Total coping remained a predictor of helplessness, although monthly household income did not. As compared to model three, therefore, factors representing the subjective experience of RA were more predictive of helplessness than socio-economic factors. These results, once again confirm the importance of the subjective experience (the interaction of perception of physical status and other psychological factors such as coping) of RA.

#### **7.4.3.8 Model Seven: Predictors of swollen and tender joint status**

Negative-internal coping and helplessness (AHI) were predictive of swollen and tender joint status. Once again the finding that increased negative-internal coping was a significant predictor of better the swollen and tender joint status, was an unexpected one. One possible explanation is that certain personality characteristics influence the choice of coping strategies, which in turn impacts on health status.

A greater sense of helplessness is a significant predictor of swollen and tender joint status in this study. RA patients who develop a greater sense of helplessness because of their perceived inability to control the course and the effects of the disease have poor health outcomes.

#### **7.4.3.9 Model eight: Predictors of Pain and Functional Status**

In model eight the predictors of pain and functional status were assessed by entering the outcome variables in set 1 into the regression equation. Only the psychological variables increased negative-internal coping, total coping, helplessness and depression were found to be significant predictors of pain and functional status. Increased negative-internal coping and total coping were predictive of lower levels of pain and better functional status, and a higher level of helplessness and increased levels of depression were predictive of increased pain levels and poor functional status.

Psychological factors were once again highlighted as important predictors of pain and functional status. The finding that the negative coping strategy negative-internal coping is predictive of better health status (pain and functional status) may be explained by the association between personality and coping in a low socio-economic context, although this postulation needs further investigation.

## **Part B**

### **7.5 Moderating Role of Psychosocial Variables**

#### **7.5.1 Introduction**

It was hypothesised that psychosocial factors would moderate the relationship between the objective measures of RA and the subjective experience of RA (moderating hypothesis). Moderated regression was used to assess the stress-reducing function of the psychosocial variables coping, network social support, helplessness and causal attribution. As discussed in Chapter Six (Part B) the objective experience of RA was measured by the instruments which required the rheumatologist's assessment of the subjects disease (RA) status according to objective, specified criteria, and the subjective experience of RA was measured by self-administering instruments which assessed the RA subjects psychological well-being (severity of depression) and pain and functional ability (degree of disability).

#### **7.5.2 Coping**

The coping factors proactive coping, positive-interactive coping and negative-internal coping that were obtained by subjecting the LCRAQ to a factor analysis were used to assess these factors moderating role. Results that were significant indicated, firstly, that proactive coping moderated the relationship between erythrocyte sedimentation rate (ESR) and functional disability (as measured by the HAQ), secondly, that negative-internal coping moderated the relationship between the number of tender joints and depression as well as disability, and finally, that positive-interactive coping moderates the relationship between the number of tender joints, tender joint counts and pain and class, (disability) and AIMS-Physical (RA subjects perception of their physical status as a result of their illness condition).

The finding that an increase in joint inflammation with a corresponding increase in functional disability was true only for those RA subjects who are low on a measure of proactive coping is



consistent with the findings of other studies which report the use of active coping strategies as being positively related to psychological well-being and factors such as disability (Newman & Mulligan, 2000). Those RA subjects, therefore, who do not actively engage in coping activities (behavioural coping strategies) and do not have positive thoughts about accepting and living with a chronic condition (cognitive coping strategies) will experience greater functional disability during the periods that they have joint inflammation, as measured by the ESR. As mentioned in Chapter Five (section 5.8.3.2), a higher ESR value, is indicative of more severe joint inflammation.

An increase in joint activity which is an indication of the “active” phase of the disease RA with a corresponding increase in the level of pain (one of the main symptoms of RA) was true only for those individuals who were low on positive-interactive coping. Those RA patients, therefore who did not use active coping strategies and more especially those patients who did not engage positively in social interaction with others, experienced a higher level of pain as a result of increased joint activity. A study conducted by Newman *et al.* (1990) also found that the group of RA patients reporting less pain, stiffness, and disability and better psychological well-being tended to use more open and active coping strategies.

Increased joint activity and a corresponding increase in depression and perceived disability as a result of RA was true only for those RA subjects who were high on negative-internal coping (marked by avoidance behaviour, specifically of social interaction). Those RA individuals, therefore who were private copers and did not openly engage at a social level about their disease experienced decreased psychological well-being and increased levels of perceived disability. A consistent finding as reported in the literature which is also consistent with the findings in this study regarding the use of negative-internal coping strategies is that the use of passive or avoidant coping strategies is negatively related to psychological well-being and factors such as disability (Newman & Mulligan, 2000).

### **7.5.3 Network Social Support**

Positive informational support moderated the relationship between active inflammation (as measured by ESR) and pain, and between class (disability) and mood (AIMS-Affect). Those RA individuals who experienced greater levels of pain as a result of increased joint inflammation as measured by the ESR were low on the positive informational support they received. In addition those individuals with increased disability (objectively measured), who experienced a corresponding decrease in psychological well-being was found to be true only for those low in positive informational support. Network members may provide information regarding the benefits of engaging in behaviours that positively influence the subjective experience of RA (pain and mood in this study). The fact that positive informational support is not forthcoming may result in poor health outcomes, especially during the active phase of the illness.

Positive emotional support was found in this study to moderate the relationship between swollen joint counts and functional disability (as measured by the HAQ). This relationship was in the reverse direction, however. Increased joint activity with a corresponding increase in the level of disability was only true for those RA subjects with too much positive emotional support. It is possible that those individuals who received greater positive emotional support during the active phase of the illness were more disabled because emotional support reinforces the patients' poor physical health status as a result of RA. Increased positive emotional support may not provide the necessary psychological resources to assist the patient to confront the functional limitations that usually accompanies increased joint activity in RA individuals.

Problematic tangible support moderated the relationship between the number of tender joints and depression as well as functional disability (as measured by the HAQ), swollen joint counts and disability as well as mood, and number of swollen joints and mood. Overall, therefore, these results indicate that increased joint activity with a corresponding decrease in psychological well-being, and an increase in disability was true only for those individuals who had high scores on the negative or problematic tangible support they received from the members in their support network. During the active phase of the illness, therefore, those RA patients receiving tangible support that does not match their need may experience higher levels of depression and disability. According to Revenson *et al.* (1988) negative support interactions

which do not meet the recipients needs, or are perceived as unsupportive may increase the probability of negative mental and physical health outcomes.

Problematic informational support moderated the relationship between tender joint count and depression, swollen joint count and disability, mood and perception of physical health status (AIMS-Physical), and finally number of swollen joints and disability. Overall, therefore, the finding that the relationship between joint status and psychological well-being and functional status (disability) is moderated by problematic informational support is similar to that found for problematic tangible support in that during the active phase of the illness the needs of the recipient of support is mismatched to the type of support that is being offered by the provider of support. Cohen (1988) in reviewing psychosocial process models states with respect to information-based models that integration in a social network could also operate to the detriment of health. Information provided by members of the network support may be well intended but misleading to the recipients and may influence them to adopt behaviours that may lead to poor health outcomes.

Problematic esteem support moderated the relationship between swollen joint count and disability as well as perception of physical health status (AIMS-Physical). If the support provided to the RA individual during the active phase of the illness does not enhance their self-esteem, self-identity and a sense of control, it is reasonable to assume that the resultant effect will be poor health status.

Finally, problematic emotional support moderated the relationship between swollen joint counts and functional disability. Increased joint activity with a corresponding increase in functional disability was true only for those high in problematic emotional support. During the active phase of the illness if the emotional support provided by the members of the network of support does not match the emotional needs of the RA individual, these individuals experience a greater degree of functional impairment.

#### **7.5.4 Helplessness**

Helplessness as measured by the AHI, moderated the relationship between swollen joint count and depression, number of tender joints and functional disability, and tender joint count and pain, disability (as measured by both the HAQ and VAS-D). Overall, these results indicate that increased joint activity with corresponding increase in depression, pain and disability are only true for those RA individuals with an increased sense of helplessness. Helplessness in RA individuals is often the result of the unpredictability of the disease and the difficulty in obtaining satisfactory symptom relief (Newman & Mulligan, 2000). Helplessness has been found to be related to pain, disability and depression (e.g. Stein, Wallston & Nicassio, 1988; Stein, Wallston, Nicassio & Castner, 1988). Smith *et al.* (1990) found that disease severity and depression is mediated by helplessness in RA individuals.

### **7.5.5 Causal Attribution**

Causal attribution at the time of onset of RA, as well as at the time the study was conducted, moderated the relationship between class (extent of disability) and pain, number of tender joints and mood as well as functional disability, and tender joint count and mood. Overall, the results indicate that an increased objective measure of disability with a corresponding increase in the level of pain, increased joint activity and a corresponding decrease in psychological well-being and functional status were true for those who made causal attributions at the time of onset of RA as well as at the time the study was conducted. Further, the moderating effect was greater for those RA individuals who attributed the cause for the disease to external factors (existing outside the individual).

## **7.6 Summary of findings**

### *Predictive Models*

Socio-economic factors and coping emerged as the strongest predictors of the four RA outcome measures self-report of pain and functional status, swollen and tender joint status, helplessness and depression. The first four models indicate, therefore, that social, economic

and psychological (coping) resources impact significantly on the subjective and objective RA health outcome of the sample in this study. However, in developing the second set of predictive models (models five to eight) in which the predictive power of the three subjective health status measures self-report of pain and functional status, helplessness and depression, and the objective health status measure swollen and tender joint status, were being assessed it was found that psychological factors and the subjective experience of RA had a greater impact than socio-economic factors on each of the health status measures, namely, self-report of pain and functional status, swollen and tender joint status, helplessness and depression. The subjective experience of RA was, therefore, a stronger predictor of the quality of life of the subjects in this study.

These findings must be understood within the socio-economic context of health. This study was conducted among RA individuals of low socio-economic status in South Africa, which is a developing country. It differs from previous studies that were conducted in predominantly developed countries such as North America, among middle-income RA patients. Socio-economic factors and coping were found to be significant predictors of objective and subjective RA health outcomes in this low socio-economic sample of out-patient clinic patients. The subjective health outcomes included psychological well-being measured by helplessness and depression. When socio-economic factors are considered with factors representing the subjective experience of RA individuals as predictors, the subjective, psychological factors are found to be more significant predictors of health status despite the limited socio-economic resources available to the subjects in this study. Coping (total or overall coping, negative-internal coping and positive-interactive coping), psychological well-being (helplessness and depression), and self-report of pain and functional status were the significant predictors of RA health outcome.

None of the other psychological factors including social support, causal attribution, and internal and external control were found to be significant predictors of disease outcome. One possible reason why coping was found to be the only significant psychological predictor in this study is that the psychological constructs, social support and cognitive illness representation, are subsumed under coping (coping resources), i.e. they play a role in the

ultimate expression of an individual's ability to cope. An unexpected finding in this study was the fact that negative-internal coping was found to be a significant predictor of good health status. It is suggested that further research be conducted to assess why an avoidance coping style (negative-internal coping) has a positive outcome in this low socio-economic sample of RA patients.

### *Psychosocial factors as moderators*

Coping, network social support, helplessness and causal attribution were found to moderate the relationship between the objective experience of RA (those measures undertaken by the rheumatologists, namely: class, 28-Joint Count, and ESR)) and the subjective experience of RA which included measures of mood state, pain and disability. The findings in this study confirm the stress-reducing function of psychosocial factors in RA, a chronic disease. Antonovsky (1979) has referred to moderating variables that have potentially stress-neutralising or stress-reducing effects, as resistance resources.

While it might be argued that conceptually, an individual's appraisal of and eventual ability to cope with a stressful illness such as RA, depends on the coping resources available, this study has demonstrated that coping resources such as social support, degree of helplessness and causes that patients assign to disease onset, can act as independent moderators of RA health status. Network social support, for example, was found to play a significant role in moderating the relationship between the objective experience of RA and the subjective experience of RA but was not found to be a significant predictor of RA health status, as was hypothesized. This finding, therefore, lends support to the moderating hypothesis (social support as a moderating variable) and not the direct-effects hypothesis (social support as a predictor).

Positive coping strategies were found to moderate the relationship between disease activity, and pain and disability while negative or avoidance coping moderated the relationship between disease activity, and depression and disability. Positive network support was found, in this study to moderate the relationship between disease activity, and pain and mood. However, despite the positive emotional support from the members making up the network of support,

RA patients in this study had high levels of disability as a result of increased joint inflammation (poor joint status). Problematic network support moderated the relationship between disease activity, and depression and disability. A RA patient's cognitive processing (the way he or she thinks about his or her illness) was found to moderate health status, in this study. Those subjects with an increased sense of helplessness had poor joint status, were more disabled and experienced a greater severity of pain. Subjects who assigned both internal and external causes for the disease at the time of onset and at the time the study was conducted, had poor joint status and limited functional ability, and experienced increased levels of pain and more severe depression, although this finding had more significance among those RA patients who perceived the origins of the disease to lie outside the individual (external causes). These psychological factors, therefore, play an important stress-reducing function between disease activity and the quality of life of RA patients in this study.

## **7.7 Theoretical Implications of this study**

### **7.7.1 Introduction**

This study was an investigation into the role of socio-demographic and psychosocial factors in RA health outcome. For the purposes of this study the role of psychosocial factors has been conceptualised firstly, in terms of a health-sustaining function and secondly, in terms of a stress-reducing function. To assess the health-sustaining function of psychosocial factors, stepwise multiple regression analysis was conducted using psychosocial factors as predictors of both objective and subjective RA health outcome. The stress-reducing function of psychosocial factors was assessed using moderated multiple regression which helped confirm the hypothesised role of psychosocial factors in moderating the relationship between the objective experience of RA and the subjective experience of RA.

In developing the multivariate, predictive model for RA in this study, a number of significant inter-correlations were found between the socio-demographic variables, psychosocial variables and variables representing RA health outcome. The statistics of structural equation modelling (SEM) could have been considered due to the number of inter-correlations between the

variables. However, due to the limited available resources, locally, to support SEM this statistical method was placed on the agenda for future research endeavours. The predictive models for RA were, therefore, calculated and presented as multiple regressions.

Section 7.7.2 will address the theoretical implications of the significant findings of the study. The various factors that contribute to RA health outcome are considered within a biopsychosocial framework. Models are used to show that a RA individual's well-being is determined by the interactive effects of economic, demographic, medical, socio-cultural and psychological factors. Three models are also used to demonstrate the complexity of the relationship between disease severity, disability and psychological well-being. A theoretical understanding of the psychological factors (coping, perceived social support, causal attribution and cognitive illness representation) pertinent in this study are discussed within a health psychology context.

### **7.7.2 Models Developed**

#### *Preliminary Comment*

Prior to presenting the models developed in this study, the salient aspects of the socio-demographic features of the sample will be discussed. A comment on the relationship between duration of illness (actual number of years of RA) and psychosocial factors and factors representing RA health outcome will also be made. The low socio-economic status of this sample differentiates this study from previous studies that were conducted in developed countries among middle-income RA individuals. For greater conceptual clarity, it is important to understand the idiosyncrasies of this sample with regard to their socio-demographic status and how this may influence the medical, social and psychological status of the subjects.



The first socio-demographic feature worthy of comment is that the majority of subjects in this study had never married. The single status of these individuals could be an indication of the psychosocial effects of RA in those individuals with the disease that are not involved in relationships defined by permanency, such as marriage. However, it may also be argued that the sample in this study is a biased one because of the high number of single people participating. It is possible that single individuals with RA seek health care, and married and individuals engaged in relationships, do not.

A second aspect of this hospital-based out-patient clinic sample of RA individuals concerns indices of socio-economic status. The majority of patients were not engaged in paid work activities and had low monthly household incomes. A large number of patients were not receiving financial assistance from the state, in the form of disability grants, despite their poor functional status as a result of their condition, RA. For the subjects in this study with low socio-economic status, having RA could further jeopardise their economic condition. One might expect that being diagnosed with a condition like RA reduces the success rate for finding employment, particularly if there is accompanying disability. This lack of opportunity for gainful employment may in turn exacerbate the already compromised physical and psychological status of these patients (Marks *et al.*, 2000).

The fact that duration of illness did not have a significant effect on psychosocial or RA health outcome variables in this study calls to question the often assumed position that individuals with recent onset RA differ from those with established disease. In reviewing the psychological effects of RA, writers such as Newman *et al.* (1993) have discussed coping in recently diagnosed RA individuals separately from coping in individuals with established disease, suggesting, therefore, that these two groups of patients must be investigated as two distinct groups. The results of this study failed to support the idea that the length of disease impacts significantly on psychosocial factors and disease health outcome factors.

### *Model One*

Figure 7.1 represents the model developed based on the hypothesis that socio-demographic factors and psychosocial factors are significant predictors of RA health outcome in a sample of low socio-economic clinic-based RA patients in South Africa, a developing country.

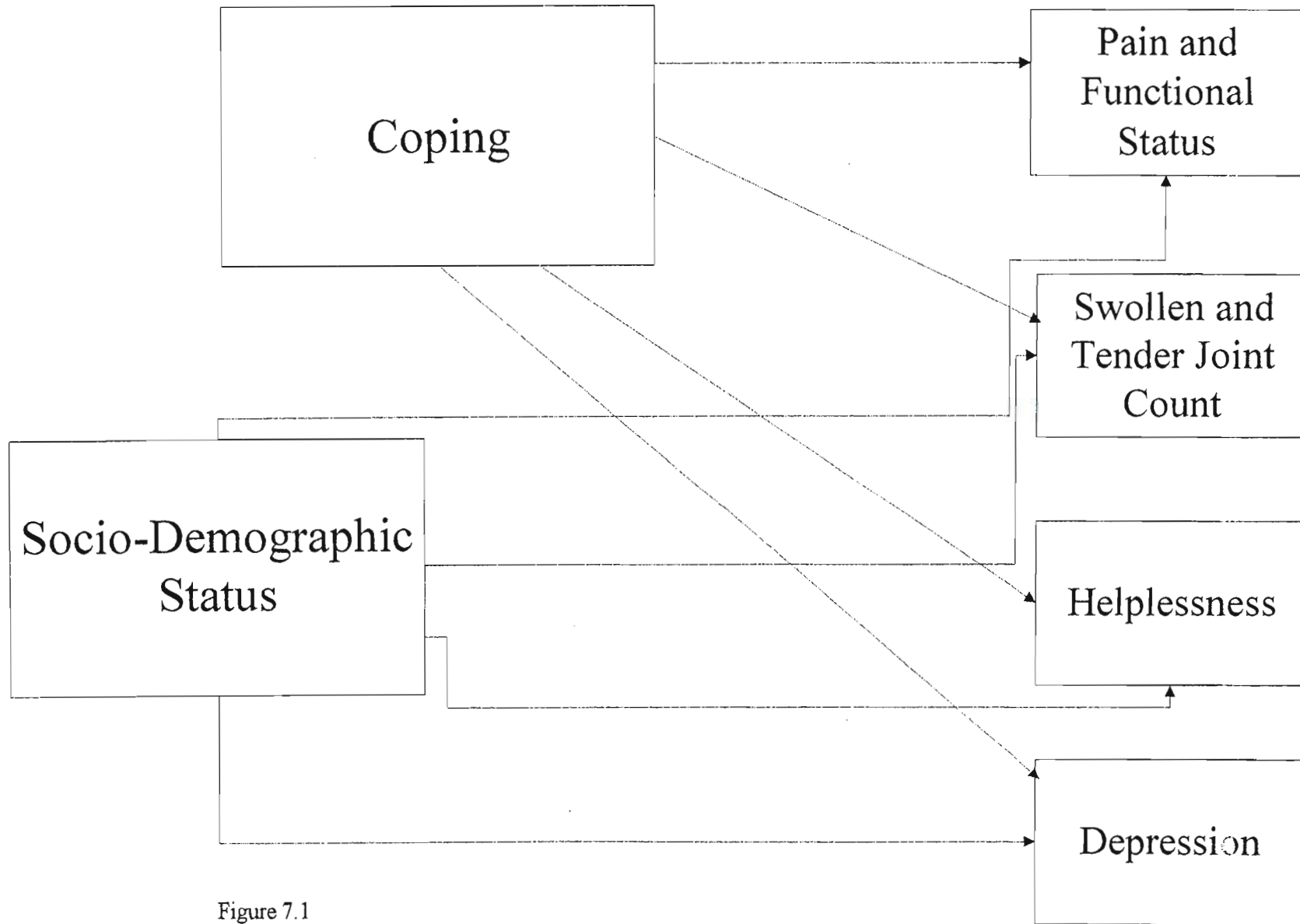


Figure 7.1  
Model representing predictors of RA health status

As illustrated in Figure 7.1 both socio-demographic factors and the psychological factor coping significantly predicted both objective and subjective RA health status measures. Overall coping (total coping), negative-internal coping and positive-interactive coping were the most significant predictive psychological factors.

The finding that socio-demographic and coping factors were found to be the most significant predictors of RA health outcome, will be located within the theoretical framework of Lazarus and Folkman's (1984) interactional model of stress and coping. In the interactional model of stress and coping, stress is conceptualised as a relationship between the individual and the environment, and the subsequent interaction between the two.

RA may be construed of as a continuous stressor facing those individuals who have been diagnosed with the disease. The poor socio-economic status that characterizes the individuals in this study is an additional stressor, which was possibly in existence prior to the onset of the disease. RA patients make primary appraisals regarding the stress of RA (such as the chronicity and unpredictability of symptom flare-ups), and secondary appraisals to assesses his or her ability to cope with the disease. In making the secondary appraisals, an assessment is made of the available resources, such as social and economic ones, that would facilitate the process of coping. The way in which individuals cope with the specific demands posed by the stressor, will influence health outcome or the quality of life of individuals with RA.

Specific coping strategies may be used to cope with the challenges of a chronic disease such as RA. Coping strategies have behavioural, cognitive and affective components that may have either a positive or a detrimental effect on health outcome. Active strategies (defined by proactive coping and positive-interactive coping in this study) impacts positively on health outcome while passive or avoidant strategies (defined by negative-internal coping in this study) impact negatively.

The finding in this study that negative-internal coping (avoidant coping strategy) has the same impact on RA health outcome as does positive or active strategies is a deviation from the stress

and coping paradigm of Lazarus and Folkman (1984). A possible reason for this deviation lies in the factors that influence coping choice. Cognitive appraisal, the role of disease activity, the role of interpersonal relationships, and the role of personality disposition are considered by Manne and Zautra (1992) to be the factors influencing coping choice. Socio-economic factors may in turn influence the factors that influence coping choice. The way in which a socially and economically disadvantaged RA individual appraises his or her illness condition and conducts his or her social relationships, may influence the choice of negative-internal coping as a strategy. A few studies have found a significant relationship between socio-economic status and a reliance on certain coping strategies (e.g. Haan, 1977; Menaghan, 1983; Pearlin & Schooler, 1978). These studies, however, report findings relevant to individuals of higher socio-economic status such as the study by Haan (1977) who reported that individuals of high socio-economic status are more likely to use more adaptive forms of coping and are less likely to rely on defensive strategies involving rigidity and irrationality. Personality disposition is also influenced by socio-economic conditions, consequently poor socio-economic status may predispose individuals to developing a highly defensive personality as a means of preserving a sense of “self”. These individuals may more than likely use avoidance coping strategies. It has been found that individuals with an “easygoing” disposition are more likely to rely on active coping strategies (Holahan & Moos, 1985). Personality disposition, combined with low socio-economic standing might explain why the use of both positive and negative coping strategies has a similar influence on RA health outcome in this study.

Further research is required to investigate the relationships between socio-demographic factors, coping (specifically avoidance coping strategies) and RA health outcome.

### *Model Two*

Figure 7.2 represents model two which is based on the premise that factors representing RA health status may also be conceptualised as predictors of RA health status (as explained in Chapter Six). This model also attempts to highlight the complex nature of RA, a chronic, unpredictable and debilitating disease.

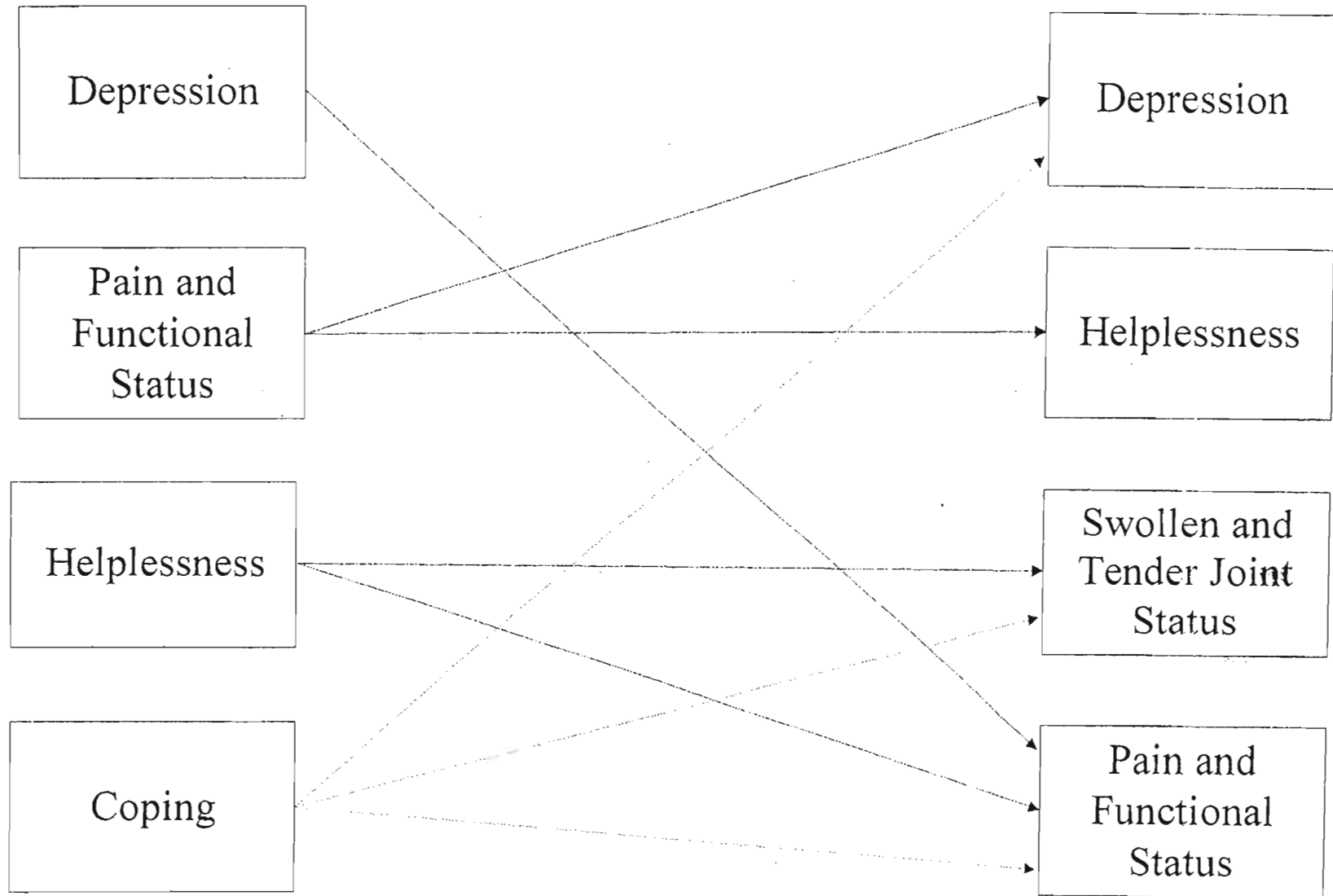


Figure 7.2  
Model representing subjective  
predictors of RA health status

As illustrated in Figure 7.2 when coping, mood (depression and arthritis helplessness) pain and disability were found to significantly predict RA health outcome, socio-demographic factors were not found to be significant predictors. Psychological factors (coping, depression and helplessness) and perception of pain severity and the degree of disability, therefore, are stronger predictors of RA health status than socio-demographic factors. Severity of joint inflammation (measured objectively) was also not found to be a significant predictor of RA health status.

The model illustrated by Figure 7.2 demonstrates the importance of the subjective experience of RA in predicting RA health outcome. Once again the importance of the way an individual with RA copes, is emphasised. Coping strategies impact on psychological well-being (depression), symptom reporting and disability (joint status and pain and functional status)). When the subjective experiences of RA were considered as predictors of health status in this study, positive coping strategies were predictive of good health status and negative coping strategies were predictive of poor health status. This finding is consistent with the stress and coping paradigm of Lazarus and Folkman (1984).

Figure 7.2 suggests that the subjective experiences of RA (depression, helplessness, pain and functional status) may be conceptualised both as predictors of health status and as health outcomes (for e.g. increased levels of depression can predict severity of pain and degree of disability, and severity of pain and level of disability may predict the severity of depression, as was found in this study). This finding is consistent with current theory in health psychology that emphasises the complexity of the relationships between the biological, psychological and social components of health, as compared to the traditional disease model which focuses on symptom management to effect good health outcome. RA reflects the complex nature of a chronic illness. The individual with RA has to negotiate the disease course (including flare-ups of symptoms and accompanying disability), take cognisance of daily responsibilities (at work and at home) and attempt to nurture significant social relationships.

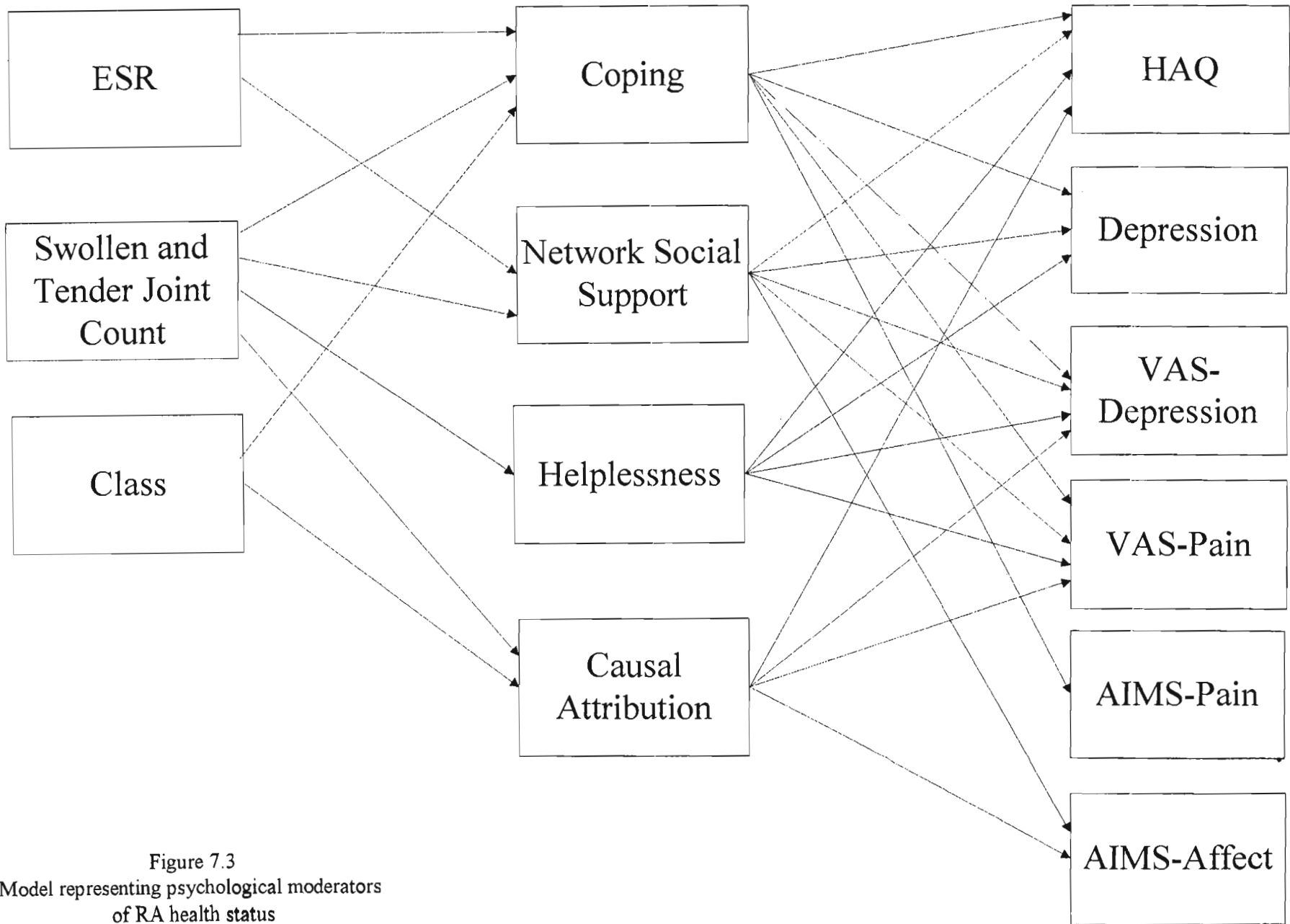


Figure 7.3  
 Model representing psychological moderators  
 of RA health status



### *Model Three*

Figure 7.3 illustrates the moderating or stress-reducing effect of the psychological factors coping, network social support, helplessness and causal attribution. These psychological factors are shown to moderate the relationship between the objective experience (laboratory and clinical measures) of RA and the subjective experience of RA (psychological well-being, pain perception and disability).

Increased disease activity is expected to impact directly on the subjective experience of RA (e.g. raised ESR levels and poor joint status is expected to be significantly associated with increased levels of depression, increased pain severity and poor functional status). The fact that previous research has not consistently found this association between disease activity and RA health outcome triggered health researchers to investigate what other factors intervene between disease activity and health outcome. A proliferation of research has been conducted on social and psychological factors as intervening variables in RA health outcome to explain, for example, why poor joint status does not automatically lead to poor functional status. Figure 7.3 clearly illustrates how, in this investigation, psychological factors play a significant moderating role between the objective experience of RA and the subjective experience of RA.

Within the stress-coping paradigm of Lazarus and Folkman (1984), positive coping strategies are significantly associated with good health outcomes and negative coping strategies are significantly associated with poor health status. This study demonstrates that those RA individuals who have minimal positive and proactive cognitions and do not actively engage in behaviours to cope with RA, experience higher levels of pain and greater functional disability. Those RA individuals, who engaged in avoidance behaviour, defensive behaviour and had negative social interactions with others, experienced higher levels of depression and disability. Although studies have shown that personality influences the coping process (e.g. Cronkite & Moos, 1984; Kobasa *et al.*, 1982), in the case of RA it is possible that pre-morbid personality may have little bearing on whether an individual uses positive or negative coping strategies. The unpredictable, uncertain and chronic nature of the disease may have led to a change in the

personality characteristics of these individuals. Another possibility is that RA individuals no longer have stable personality traits.

Network social support was found, in this study, to moderate RA health outcome. Several mechanisms of social support have been postulated (Shumaker & Hill, 1991). One of these mechanisms is that social support might work by promoting healthy behaviours, such as adhering to medical advice. Cohen and Syme (1985) suggest that an individual's perception of the willingness of others to provide help, may result in increased self-esteem, stability and control over the environment, which in turn reduces the likelihood of individuals engaging in unhealthy behaviour, such as following a poor dietary regimen.

While there has been empirical and theoretical support for the beneficial effects of social support (e.g. Revenson *et al.*, 1988), there has been a dearth of studies on the separate effects of positive and problematic support and health outcome. Furthermore, the effects of the components of positive social support such as informational, emotional, tangible and esteem support on health status have not been investigated. The effects of problematic informational, emotional, tangible, esteem and negative social interactional support on health status has also been under-investigated. This study has addressed this gap in research and has explored the moderating effect of the components of both positive and problematic social support on RA health status.

In this study, those RA patients who received little positive informational support experienced greater levels of pain and more severe depression, confirming the suggestion that individuals who are provided with information to help combat the ill-effects of the disease, are more likely to adhere to treatment or take proactive steps to meet the challenges of the disease. The moderating effect of positive emotional support, however, was in the reverse direction. Individuals with increased swollen joint count were more disabled if they received high levels of positive emotional support. It is possible that excessive emotional support reinforces the perception of increased disability and does not assist the RA individual adopt proactive behavioural and cognitive measures to deal with active disease process (swollen and tender joints).

Finally both helplessness and causal attribution can be located in cognitive theory. The central axiom of the learned helplessness theory developed by Seligman (1975) is controllability. Learning about the uncontrollability of trauma has powerful effects on subsequent behaviour and provides the link between such learning and depression. Learned helplessness theory may well explain the moderating effect of helplessness on health status in this study. RA individuals who have learned that they are not able to control the resultant pain and disability arising from active disease process, experience worse pain and greater disability. This experience of helplessness, therefore, is associated with poor health status.

Causal attribution as a moderator of health status may be understood within the context of attribution theory. Attribution theory is concerned with the way people explain events (Kelly & Michela, 1980). People's attributions for serious illness are associated with their emotional well-being, health behaviour, and confidence in their capacity to control the outcomes of the problem (Affleck *et al.*, 1987). In the context of this study, assigning internal (intra-individual) and external (outside the individual) causes for the onset of RA moderated health outcomes. Worse health outcome was associated with RA individuals who assigned external factors as the cause of their illness. Individuals who locate the cause for their illness as originating outside themselves possibly abdicate themselves from taking responsibility for their health which may then lead to a failure in adopting proactive behaviours which will ultimately impact on health status.

### *Concluding comment*

The results of this study have highlighted, on the one hand, the need to consider developing a complex theoretical model of chronic illness that should include economic, social, cultural, psychological and medical constructs. Numerous significant associations found between socio-demographic factors, social, cultural and psychological factors, and factors representing RA health status confirms the complex nature of RA. On the other hand, the results also demonstrate that it is not entirely necessary to have a primary psychological theoretical framework within which to locate RA. RA and its effects, particularly the social and

psychological effects, may be understood from different theoretical perspectives. The social and psychological constructs under study will ultimately determine the theoretical framework selected by a health psychologist/researcher.

## **7.8 Limitations of this study**

The limitations of this study will be addressed against the backdrop of a review of the literature with regard to the inadequacies of previous studies that investigated the medical, social and psychological aspects of RA. This manner of presentation lends itself to providing an integrated and more meaningful argument when critically analysing this study.

It was hypothesised that psychological and social factors would be significant predictors of objective and subjective RA health status (or quality of life). Overall coping and positive and negative coping strategies, perceived social network support, cognitive illness representation and causal attribution were considered to be the main psychological factors. It is fairly clear that the overall results of this study are consistent with the findings of previous studies reported in the literature, regarding the role of psychological factors in disease outcome, specifically RA health outcome. However, some of the findings in this study appear to be peculiar to this sample, although the similarity to findings of studies conducted in developed countries is also evident. The finding that the coping strategy negative-internal coping had a similar effect on RA health outcome to the positive coping strategies proactive coping and positive-interactive coping, is an unexpected one. The answer may lie in the influence of an individual's personality on his or her choice of coping strategy or strategies. Investigating the relationship between personality and coping in chronic illness conditions, in individuals of low socio-economic status may provide depth to an already existing theory, or provide a new theoretical perspective. As has been mentioned, previous studies investigating the complexities of RA were based in developed countries such as North America among samples of middle-income individuals afflicted with the disease.

Coping as a psychological construct should be investigated in greater detail, and should include aspects of how individuals with RA cope similarly or differently in task related activities or

specific social situations (e.g. during social interactions, activities of daily living, and carrying out certain role expectations). A stable overall coping disposition in people with RA should not be assumed. In addition, the influence of cultural and other similar factors on coping need to be considered when coping is assessed. A qualitative study by Abraido, Lanza, Guier and Revenson (1996) illustrates this point. Their study investigated coping in Latinas with arthritis and found that in a low socio-economic sample of 109 arthritis patients, the most commonly reported strategy was actively participating in activities followed by the use of religion or prayer. Another study by Jordan, Lumley and Leisen (1998) showed that there are ethnic differences in the use of coping strategies of individuals with RA. What emerges from the present study is that while it is important to obtain a psychosocial profile of individuals with RA, and develop a data base for future research in population groups that have not been previously investigated such as individuals of low socio-economic status in developing countries, it is equally important that each of the psychosocial constructs are investigated in detail.

Another limitation of this study is that it is a cross-sectional one and it is, therefore, not possible to make causal inferences. Research conducted in the area of health psychology, in particular studies conducted in developed countries (e.g. Crotty *et al.*, 1994), have been investigating causal pathways by which relevant biological, psychological and social variables affect disease outcome. Although a longitudinal design is considered to be ideal, it is not always cost effective, and as Parker and Wright (1995) point out, the design presents with some inadequacies. Longitudinal studies conducted to investigate the direction of causality have not produced consistent findings. This point is illustrated by two separate studies. Brown (1990) in a longitudinal study of 242 RA patients over six waves of data collection provided support for a causal model in which pain predicts subsequent depression. In another investigation by Parker *et al.* (1992) the reverse was found to be the case. They found that depression exerted a greater influence over pain.

Self-reporting, which was the main method used for data collection in this study, may be seen to be a limitation. A critical look at this method may provide an understanding of some of the unexpected findings. While research participants experiences may be easily, ethically and

economically obtained through self-report rather than through direct observation, the limitations of self-reporting must also be considered (Smith, Wallston & Dwyer, 1995).

Nisbett and Wilson (1977) raise two concerns about subject's self-reports. The first is that they can mislead investigators, and the second is that subjects may mislead by providing answers to questions they know very little about. Smith *et al* (1995) emphasize, however, that it is not difficult to rectify the difficulties raised by Nisbett and Wilson (1977). In the first instance, they point out that in reviewing the literature it is clear that most studies using self-reports rarely report that subjects were uncooperative, particularly if the research was carried out in a professional manner, and in keeping with the code of ethics in research. In the second instance, investigators they say should make a point of developing measures in a way that does not require subjects to respond to matters that they have little knowledge about. In the third and final instance, many of the correlations reported in studies of health and adaptation may be inflated or created as an artefact of individual differences in the personality trait of neuroticism or negative affectivity.

In an attempt to partially address the limitations of studies reliant on self-report data, Smith *et al* (1995) conducted an investigation in which the impact of negative affectivity (NA) on self-reports was evaluated by using data from an ongoing longitudinal study of coping and adaptation to rheumatoid arthritis. The results of this study suggest that reports of pain, impairment, and associated variables reflected disease related outcomes and processes, and not just NA. In a longitudinal study of patients with RA, Ward (1994) investigated whether patients self-report measures of arthritis activity was confounded by mood. The results revealed that depression may confound self-reports of pain and "global" arthritis status somewhat, but has minimum influence on self-reported functional disability.

Finally, another methodological difficulty raised by Ali-Gombe, Adebajo, and Silman (1995) applies to comparing the severity of arthritis in population groups. While this concern may belong in the medical domain, medical factors such as disease severity often measured by recording joint destruction is known to intercorrelate with other factors, including psychological ones, to impact on disease outcome. Ali-Gombe *et al.* (1995) point out that while

the current literature highlights variation in RA populations, the spectrum of RA in African blacks for example, is not dissimilar to that seen in Western populations. To address the methodological inadequacies Ali-Gombe *et al.* (1995) suggest that researchers take the following into account when conducting surveys to assess the difference in the severity profile of different population groups:

- Participants of the survey should reside in the same defined geographical area.
- A standardised procedure of evaluating disease severity is utilised at the outset particularly for the patients who are likely to be followed up in the same health service centre over a period of time.
- Disease criteria should be used to permit the inclusion of those with inactive disease.
- Try to identify the ethnic origins of all the patients rather than assuming that they have the same ethnic identity as it is incorrect to assume in the case of African Blacks, for example, that they have a single ethnic identity. Genetic studies have enabled researchers to establish that there are differences between individual groups that may seem to share a common ancestry.
- Researchers from outside the culture should be cautious about the interpretations they make about the group under study.

In the light of the suggestions made by Ali-Gombe *et al.* (1995) the present study may be seen to have limitations in methodological aspects regarding patients' inclusion in the study. Subjects in this study met the criteria for a diagnosis of definite RA, but they were not further sub-divided for data analysis according to the recommendations made by Ali-Gombe *et al.* (1995) regarding factors such as race and ethnicity.

To enhance the value of research investigating the complexities of RA in the future, the limitations of the present study must be taken into account. It is suggested, therefore, that the following aspects be followed up:

- (1) A comparative study should be conducted to explore the economic, social and cultural differences of populations and how these factors might impact on psychological factors, and RA health status.
- (2) Psychological coping should be investigated further in RA individuals of low socio-economic status in order to ascertain the impact of limited resources on the coping process. Investigating the impact of personality on coping is particularly important for those RA individuals of low socio-economic status. Research questions around the concepts of resilience and hardiness may help inform why individuals with limited resources engage in coping strategies that lead to positive health outcomes.
- (3) Cultural factors must be taken into account when investigating social support in individuals with RA. If the providers of support are perceived to be family members, it must be borne in mind that in certain communities family is defined by the significant others from different sub-systems, such as the family of origin, marital family and extended family (which includes relatives). Differences in the type of positive and problematic support that is provided by significant others in each of the sub-systems might arise which may have different moderating effects on health status, or may impact directly on health status.
- (4) Cultural factors must also be taken into account when investigating causal attributions and cognitive illness representations in order to understand how RA patients construct cognitions around their illness experience.
- (5) The statistical method of structural equation modelling (SEM) must be employed if and when the resources become available. The numerous interrelationships and bidirectional relationships between disease variables, socio-demographic variables, social variables and psychological variables makes SEM a more suited statistical method.



- (6) A longitudinal study will allow for the provision of causal explanations between certain variables, enabling the researcher to state with greater confidence the direction and strength of the significant relationships between variables.

## **7.9 Contributions**

This study has made the following significant contributions:

- This study is the first known study to explore comprehensively, the interrelationships between socio-demographic factors, psychological factors, social factors, disease factors and factors representing objective and subjective RA health outcomes in a low socio-economic, clinic-based sample in a developing country, South Africa. The quality of life (medical and psychosocial health outcomes) of these RA patients is now better understood. Furthermore, the moderating role of psychosocial factors between objective and subjective health outcomes has also been demonstrated. The results of this investigation highlight the importance of psychological and social factors in contributing to the complex nature of RA, and can confirm previous findings that psychosocial factors often have a greater impact than disease measures on RA disease course (Newman & Mulligan, 2000). These findings lend support to the biopsychosocial approach in health psychology and confirm the need for the development of a multidisciplinary management plan, with the guiding principal of greater collaboration between health professionals for the maximum benefit of the recipients of a health service.
- This study provides the database for future more complex investigations, including pathways analysis and longitudinal designs. Further research may be conducted on specific psychological aspects of the study where the results were not found to be consistent with previous studies. Investigation into the psychological construct of causal attribution, for example, would be useful in order to understand why such a large number of subjects, in this study, did not attribute causes for their illness (RA). The unexpected finding regarding

negative-internal coping having the same effect on RA health outcomes as positive coping is also worth exploring.

- This study, having established a database, may help investigators contain research costs when designing longitudinal studies. Since the significant psychological predictor and moderator variables have been established, the aim of future research should be to enhance the understanding of the role of psychological factors in RA.
- The multivariate, predictive models developed for RA in this study highlight the need to modify and re-visit existing psychological theoretical approaches to coping, perceived network social support, cognitive illness representations, attribution and psychological well-being (helplessness and depression). Since coping was the only psychological variable found to predict health outcome, the relationship of other environmental and psychological variables to coping needs to be explored (e.g. socio-economic status and social support as coping resources).
- This study is the first known psychological study, in South Africa, conducted among a clinic sample of low socio-economic RA patients. The results of this study will contribute to an already existing body of mainly medical literature on RA in South Africa. This study will, hopefully, serve to initiate interdisciplinary research projects with the aim of improving the quality of life of RA individuals in South Africa.

## **7.10 Recommendations**

The fact that socio-economic factors were significantly associated with psychological and disease factors in this study, the economic impact of RA and other chronic illnesses must be seriously considered. A large number of the subjects in this study were not receiving a state disability grant, nor were they engaged in paid work activities. The poor economic position of RA patients must be brought to the attention of health and economic policy makers as these RA individuals are at risk for a further deterioration in their health status. Individuals with a

chronic illness and deteriorating health status who continue to require treatment from state health services, could in the long-term increase overall state health expenditure, if they are not adequately supported. The aim of both medical and psychological intervention should be to enable individuals with RA to live a reasonable quality of life, which requires at least an acceptable subsistence level. If individuals have sufficient economic resources to meet their daily needs, their social and psychological position would be slightly elevated so that the mechanisms needed to facilitate more adequate and adaptive coping with a chronic illness such as RA, are present.

Fifield and Reisine (1996) suggest that gender, class and ethnicity/race must be seen as three systems of stratification. These systems work separately and together to shape institutions, social location, opportunity, interpersonal relations, the distribution of disease, and the experience of illness. In the health context, therefore, gender, class and ethnicity/race must be considered as important variables that shape health outcomes.

There is increasing evidence of the importance of considering gender differences in health outcomes. Women, particularly those inflicted with a chronic disease like RA have become the focus of research attention (e.g. Hough *et al.*, 1999; Reisine and Fifield, 1995) because they have been historically prejudiced, both in a social and an occupational context, and consequently are expected to have worse health outcomes than males. In addition there is an increased physiological risk of arthritis among women. Social class is generally associated with quality of life (health status) and is particularly pertinent in individuals with a chronic illness with fewer socio-economic resources. Finally, taking ethnicity/race into account allows the researcher to obtain a deeper understanding of the illness experience by taking cultural factors into consideration by using a qualitative approach. Inexpensive quality of life measures need to be developed for use in the state services. As a starting point existing scales that have been found to be valid for use in certain populations, such as the BDI used in this study to measure depression, may be used as a screening tool to detect depression that may otherwise not be detected in an overburdened health service. It is expected that helping an individual manage his or her depression may lead to a general improvement in the health status of the patient. It has

been established that psychological factors such as depression, along with other factors such as socio-economic ones, impact significantly on health outcomes.

Complex research designs are needed to establish how certain variables, such as depression can be both an independent and an outcome variable (Beckham, *et al.*, 1992).

## **7. 11 Conclusion**

This study appears to be the first known study to investigate the socio-demographic and psychological aspects of RA in a clinic based low socio-economic adult sample of RA patients in South Africa. The results of the study demonstrate that while socio-demographic factors are found to be significantly associated with psychological factors and factors representing RA health outcome, psychological and subjective factors and not socio-demographic factors are significant predictors of RA health status. In addition, the results of the study confirm the stress-reducing function of psychological factors in RA health outcome. A study such as this has implications for the future management of RA patients. It highlights the need for greater collaboration between health service professionals to enhance and maintain the quality of life of individuals with a chronic disease such as RA, and helps to firmly locate the health psychologist within a health service framework.

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## APPENDICES

## Appendices

- Appendix 1 Biographical Inventory
- Appendix 2 The London Coping with Arthritis Questionnaire
- Appendix 3 Factor Loadings on the three factors from the LCRAQ  
Scree Plot for Coping
- Appendix 4 Illness Specific Social Support Scale (IS-SSS)
- Appendix 5 Semi-structured questionnaire: Causal Attribution and Cognitive Illness  
Representation
- Appendix 6 Arthritis Helplessness Index (AHI)
- Appendix 7 Beck Depression Inventory (BDI)
- Appendix 8 28-Joint Count
- Appendix 9 Measures of Pain-Visual Analogue Scale (VAS)
- Appendix 10 Arthritis Impact Measurement Scale<sup>2</sup> (AIMS<sup>2</sup>) pain sub-scale
- Appendix 11 Measure of Disability-Visual Analogue Scale (VAS)
- Appendix 12 Arthritis Impact Measurement Scale (AIMS<sup>2</sup>)
- Appendix 13 HAQ
- Appendix 14 Factor Loadings on the Health Status Measures  
Scree Plot for the Health Status Measures
- Appendix 15 Multiple Regressions

# Appendix 1



Thank you for your participation in this research project on rheumatoid arthritis.

Date :

**Part A : Personal Details and Biographical Inventory**

A1. Name :

A2. File no. :

A3. Age in years :

A4. Tel : (W)

(A/H ,Home , or any other contact )

\_\_\_\_\_

\_\_\_\_\_

A5. One or both of the following questions will apply to you : (Please indicate if both apply to you)

(a) Which state hospital do you attend for treatment for your arthritis ?

(b) Do you attend a private medical practitioner who treats you for your arthritis between clinic visits?

A6. Area in which you live :

A7. Type of transport used to get to the hospital or doctors rooms :

(a) PUBLIC : Bus  Taxi  Train

(b) PRIVATE : Own Vehicle  Hired Vehicle

If hired , please state cost of hiring vehicle.

A8. Did you have to be accompanied to the hospital or doctor ? (If yes , please state reason(s) ).

Yes

No

Reason(s):

Please make a cross (x) in the appropriate columns.

**A9. Sex**

Male  Female

**A10. Marital Status**

Never Married   
Married   
Separated   
Divorced   
Widowed   
Living with partner

**A11. Religion**

Section A:

Hindu  Moslem  Christian  Other

If **Hindu** , please specify language group.

Hindi   
Gujerati   
Tamil   
Telegu   
Other (Please specify )

If **Moslem** , please specify language group.

Urdu   
Gujerati   
Other (Please specify )

If Christian, please specify denomination .

Catholic	<input type="checkbox"/>
Protestant	<input type="checkbox"/>
Anglican	<input type="checkbox"/>
Baptist	<input type="checkbox"/>
Presbyterian	<input type="checkbox"/>
Methodist	<input type="checkbox"/>
Pentecostal	<input type="checkbox"/>
Zionist	<input type="checkbox"/>
Other (Please specify )	<input type="checkbox"/>

### More questions concerning religion.

Did you change your religion after becoming ill?

Yes  No

If yes , at which stage of your illness did you change your religion ?

Why did you change your religion ?

Has changing your religion made any difference to your life?

Yes  No

If yes ,please specify in what way is your life different ?

### A12. African Language Groups

Zulu  Xhosa  Other(please specify)

A13. **Highest educational level attained**

- |                              |                          |
|------------------------------|--------------------------|
| No formal schooling          | <input type="checkbox"/> |
| Up to Std 1                  | <input type="checkbox"/> |
| Std 2 - 4                    | <input type="checkbox"/> |
| Std 5 -7                     | <input type="checkbox"/> |
| Std 8 - 10                   | <input type="checkbox"/> |
| Post - matric qualifications | <input type="checkbox"/> |
| Other (please specify )      | <input type="checkbox"/> |

Please specify what your post matric qualifications are.

A14. **Employment**

Employed  Unemployed

If employed please state occupational status

A15. **Net monthly income**

- |                                  |                          |
|----------------------------------|--------------------------|
| Less than R1 000,00              | <input type="checkbox"/> |
| Between R 1 000,00 and R 2000,00 | <input type="checkbox"/> |
| Between R 2000,00 and R 3 000,00 | <input type="checkbox"/> |
| Between R 4 000,00 and R 5000,00 | <input type="checkbox"/> |
| Between R 5 000,00 and R 6000,00 | <input type="checkbox"/> |
| More than R 6000,00              | <input type="checkbox"/> |

A16. **Financial Aid**

Are you on a disability grant ?

Yes  No

**If you are on disability grant ,please answer the following questions.**

How long have you been on disability grant ?

How much do you get ?

If you are not on a disability grant ,do you receive any other form of financial compensation from the government ?

Yes  No

If yes ,please specify.

**A16. Dependants**

Is anyone financially dependent on you ?

Yes  No

If yes , please specify the nature of your relationship to the dependant .

A17. Are you financially dependent ?

Yes  No

A18. Do you live on your own ?

Yes  No

If yes :Do you own your home ?

Yes  No

If no :With whom do you live ?

What is the occupation of the person with whom you are living ?

## Appendix 2

(1)

**“THE LONDON COPING WITH RHEUMATOID ARTHRITIS  
QUESTIONNAIRE”**

Here are some different statements that people commonly make to describe how they personally cope with rheumatoid arthritis.

Could you please think of the problems you may sometimes have because of your illness and say for each statement how often you adopt the particular approach to problems ?

Alternatives to be placed under each question.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>NEVER</b>	<b>ALMOST NEVER</b>	<b>SOMETIMES</b>	<b>QUITE OFTEN</b>	<b>VERY</b>	<b>ALWAYS</b>

1. I try to stay as active as possible.

2. I try to read books or articles about my illness.

3. I try to rest as much as possible.

4. I tell myself that the pain doesn't really hurt.

5. I find talking with friends and family about the problem of arthritis helpful.

6. I try to become involved in as many activities as possible to take my mind off the problems of the disease.

7. I keep my pain to myself, so few of my friends know that I am in pain.

8. I try to exercise the joints as much as possible.

9. If other people are sympathetic, it helps me to cope.

(2)

10. I compare myself with other people who have worse health problems.
11. Having rheumatoid arthritis has helped me to find new faith or some important truth about life.
12. I pray to God for relief from arthritis.
13. My arthritis can make me self conscious, so that I avoid people.
14. I ask questions of my doctor about the illness.
15. I walk as much as I can in order to stay active.
16. I pray to God that the pain will get better someday.
17. I find it easier to cope with arthritis by expressing my feelings outwardly.
18. I tell myself that my arthritis is not really that bad.
19. I keep any worries I may have about arthritis to myself.
20. Having rheumatoid arthritis has made me develop into a better person.
21. When I'm in pain I prefer to be alone.
22. I try to find as much information about the problem as possible.
23. I take the view that there is very little anyone can do about the disease.
24. I find myself wishing that I never had arthritis.
25. I try to ignore the problem by looking only at the good things in my life.
26. I try to avoid situations where my arthritis would become evident.



(3)

27. When it gets bad I find myself taking it out on others around me .
28. I tell myself not to think about my arthritis.
29. Resting at times during the day helps me cope.
30. I ask other people to help with those things I can't manage because of my arthritis .
31. I find the best way to deal with morning stiffness is to push myself to get active.
32. There are some things that I avoid eating or drinking because they are not good for my arthritis.
33. There are some special things I buy to eat or drink because of my arthritis.
34. I try to keep my weight down because of my arthritis.
35. Re-organising my daily routine helps me get through the problems of arthritis.
36. One important way I cope is by simply accepting the problem of my arthritis.

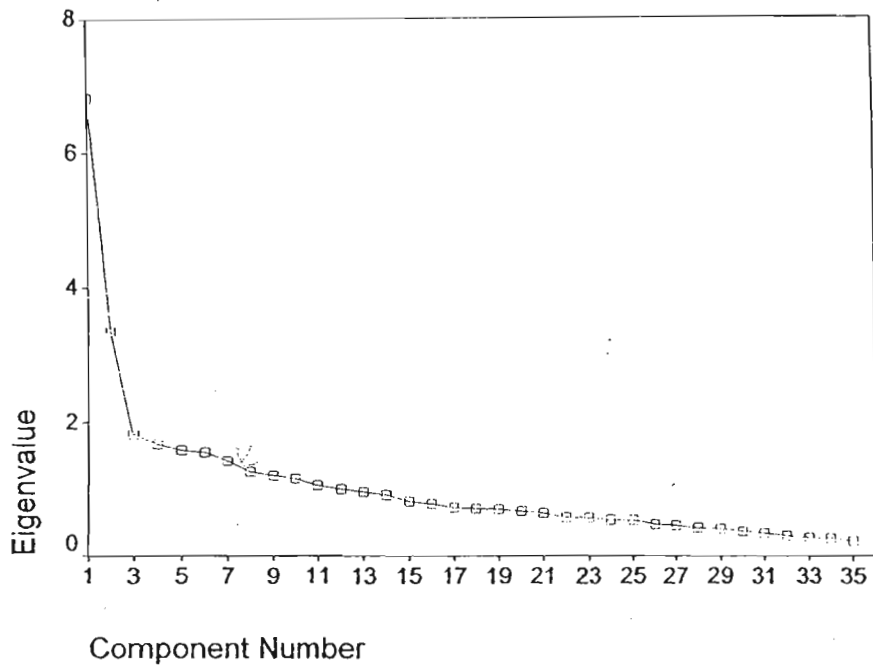
## Appendix 3

Factor Loadings on the three factors extracted from the LCRAQ

ITEM	COPING FACTORS		
	Proactive Coping (Factor 1)	Negative -Internal (Factor 2)	Positive- Interactive (Factor 3)
1. I try to stay as active as possible.	0,52		
2. I try to read books or articles about my illness.	0,41		
5. I find talking with friends and family about the problem of arthritis helpful.			0,68
6. I try to become involved in as many activities as possible to take my mind off the problems of the disease.	0,53		
7. I keep my pain to myself, so that few of my friends know that I'm in pain.		0,46	
8. I try to exercise the joints as much as possible.	0,64		
9. If other people are sympathetic, it helps me to cope.			0,47
10. I compare myself with other people who have worse health problems.			0,44
11. Having rheumatoid arthritis has helped me to find new faith or some important truth about life.			0,57
13. My arthritis can make me self-conscious, so that I avoid people.		0,72	
15. I walk as much as I can in order to stay active.	0,69		
17. I find it easier to cope with arthritis by expressing my feelings outwardly.			0,53
18. I tell myself that my arthritis is not really that bad.	0,57		
19. I keep any worries I may have about arthritis to myself.		0,54	
20. Having rheumatoid arthritis has made me develop into a better person.			0,41
21. When I'm in pain I prefer to be alone.		0,55	
22. I try to find as much information about the problem as possible.	0,46		

23. I take the view that there is very little anyone can do about the disease.		0.48	
24. I find myself wishing that I never had arthritis.		0.44	
25. I try to ignore the problem by looking only at the good things in my life.	0,59		
26. I try to avoid situations where my arthritis would become evident		0.60	
27. When it gets bad I find myself taking it out on others around me.		0,65	
28. I tell myself not to think of my arthritis.	0,56		
31. I find the best way to deal with morning stiffness is to push myself to get active.	0,66		
32. There are some things that I avoid eating or drinking because they are not good for my arthritis.	0,41		
34. I try to keep my weight down because of my arthritis.			0.48
35. Re-organising my daily routine helps me get through the problems of arthritis.			0,53
36. One important way to cope is by simply accepting the problem of my arthritis.	0,58		
E(loadings) <sup>2</sup> **	4,52	4,12	3,31

# Scree Plot



## Appendix 4

## ILLNESS - SPECIFIC SOCIAL SUPPORT SCALE

NAME:

FILE NO.:

Social Network Support Received :

We would like to find out about your relationships with other people in your life who are important to you. Please think about up to 5 people **OTHER THAN YOUR SPOUSE OR YOUR DOCTOR** who are closest to you--these can be family or friends. Write in their names or initials and their relationship to you below.

FIRST NAME OR INITIALS	RELATIONSHIP TO YOU
1.	
2.	
3.	
4.	
5.	

Next, we will ask you about some of the ways in which these people, who make up your close social network, support and help you. (These are the same questions we asked about your spouse, so please bear with us.)

We are interested in knowing how much support you receive from your network, rather than the average of the amount received from each person. In other words, we realise that not every member of your social network will help you in every way, so that it is not really possible to add together the support you receive from each of these people as a group and give an overall answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
NEVER	ALMOST NEVER	SOMETIMES	ALMOST ALWAYS	ALWAYS

On the scale above, select the number which best indicates how often your social network responds to you in that way when you are not feeling well because of your illness.

Part A

1. Listen to you.
2. Are there for you when you need them.
3. Boost your spirits.
4. Show that they understand what you're going through.
5. Cheer or comfort you.
6. Make you feel they care.
7. Share the upset with you.
8. Make you feel you have something positive to contribute to others.
9. Give you positive feedback about the way you're coping with your illness.
10. Tell you that you are a worthwhile person.
11. Do small favours for you, e.g., pick up a few groceries or watch the children.
12. Help out in a crisis, even if they have to go out of their way.
13. Give up some of their time and energy to take care of something you need done.
14. Help you with what you need to do to cope with your illness.
15. Give you information or advice if you want it.
16. Tell you how they solved a similar problem.



17. Refer you to someone who could help you.
18. Help you explore alternatives.
19. Talk about important decisions with you.

**PART B**

1. Express too much worry or pessimism about your illness.
2. Minimise the impact of your illness.
3. Try to say the right thing, but don't know how.
4. Find it hard to understand the way you feel.
5. Don't talk to them about your own problems because you don't want to burden them.
6. Make you feel like you can't take care of yourself.
7. Seem to be taking you for granted.
8. Make you feel you acted inappropriately or did something wrong.
9. Break promises to help you or do something for you.
10. Do things that conflict with the way you think they should be done.
11. Expect you to be able to do too much.
12. Seem uncomfortable talking about your illness.
13. Become annoyed when you don't accept their advice.
14. Try to change the way you're coping with your illness in a way you don't like.
15. Give you information or makes suggestions that you find unhelpful or upsetting.
16. Hurt your feelings by something they say or do.
17. Argue with you.

18. Invade your privacy.

19. Treat you as though they do not respect or value you as a person.

## Appendix 5

NAME:

FILE NO.:

Date :

**Part B : Please answer the following questions related to your condition of Rheumatoid Arthritis (R.A.)**

B1. What type of arthritis do you have?

B2. When were you informed by the doctor that you have rheumatoid arthritis?

B3. How often do you visit the doctor for treatment of your arthritis ?

B4. Have you consulted a traditional healer about your arthritis ?

Yes  No

If yes , were you given any traditional medicines ?

Yes  No

How much did you pay the traditional healer ?

**Part C : Open-ended Questions**

C1.

(a). When you were first informed by the doctor that you had rheumatoid arthritis , what did you believe caused the illness ?

- (b). How did you feel at the time of being told that you had rheumatoid arthritis ?
- (c) When you were first informed by the doctor that you had rheumatoid arthritis ,what were your main symptoms ?
- (d). Did you believe that each symptom had a different cause ?
- (e). How did you cope with the symptoms you were experiencing at the time ?  
Please specify whether you coped differently with each symptom.

C2.

- a) Currently, what do you believe is causing the illness ?

**b)** How do you feel about having rheumatoid arthritis ?

**c)** Currently, what are the main symptoms that you are experiencing ?

**d)** Do you believe that every symptom has a different cause ?

**e)** How do you cope with each of these symptoms ?

C3

a) Do you feel that your symptoms are worse during certain periods ?

Yes  No

b) If yes, what do you believe causes your symptoms to be worse during these periods ?

C4

a) Do you feel that your symptoms are much better during certain periods ?

Yes  No

If yes, what do you believe causes your symptoms to improve during these periods ?

C5

a) Do you believe that you are able to control the disease ?

Yes  No

If yes, how ?

C6

a) Do you believe that your doctor is able to control the disease ?

Yes  No

If yes, how?

C7

Do you know of any medical explanations for rheumatoid arthritis ?

Yes  No

If yes, please explain.

C8

What have you learned from your doctor about rheumatoid arthritis ?



C9

Pain is one of the major stressors of R.A. Could you please list other stressors from most to least stressful.

C10

a) Please describe the pain you experience because of your R.A.

b) Please describe how you feel when you are ill.

c) Please describe how you feel when you are well.

C11

What have you learned from others about R.A?

C12

a) How would you describe your personality prior to experiencing the symptoms of R.A?

b) Has your personality “changed” since you began to experience the symptoms that were related to the condition of R.A. or since you were diagnosed as having R.A.?

Yes  No

If yes, please explain.

C13

a) Does any member of your immediate or extended family suffer from or has suffered from any Rheumatic condition?

Yes  No

If yes, please specify condition and how this person is related to you ?

C14

Would you like to say anything more about your condition?

## Appendix 6 .

(1)

### ARTHRITIS HELPLESSNESS INDEX

Select your answer and write the corresponding number in the space provided next to each item.

	1	2	3	4	
	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE	
1.	Arthritis is controlling my life				<input type="checkbox"/>
2.	Managing my arthritis is largely my own responsibility				<input type="checkbox"/>
3.	I can reduce my pain by staying calm and relaxed				<input type="checkbox"/>
4.	Too often, my pain just seems to hit me out of the blue				<input type="checkbox"/>
5.	If I do all the right things, I can successfully manage my arthritis				<input type="checkbox"/>
6.	I can do a lot of things myself to cope with my arthritis				<input type="checkbox"/>
7.	When it comes to managing my arthritis, I feel I can only do what my doctor tells me to do				<input type="checkbox"/>
8.	When I manage my personal life well, my arthritis does not flare up as much				<input type="checkbox"/>
9.	I have considerable ability to control my pain				<input type="checkbox"/>
10.	I would feel helpless if I couldn't rely on other people for help with my arthritis				<input type="checkbox"/>
11.	Usually, I can tell when my arthritis will flare up				<input type="checkbox"/>
12.	No matter what I do, or how hard I try, I just can't seem to get relief from my pain				<input type="checkbox"/>
13.	I am coping effectively with my arthritis				<input type="checkbox"/>

(2)

14. It seems as though fate and other factors beyond my control affect my arthritis

15. I want to learn as much as I can about arthritis

THANK YOU

## Appendix 7

(1)

## BECK INVENTORY

NAME : .....

DATE : .....

Please choose the response that most applies to you and note this number in the brackets provided next to each item.

1.    0     I do not feel sad.  
      1     I feel sad.  
      2     I am sad all the time and I can't snap out of it.  
      3     I am so sad or unhappy that I can't stand it.                   [    ]
  
2.    0     I am not particularly discouraged about the future.  
      1     I feel discouraged about the future.  
      2     I feel I have nothing to look forward to.  
      3     I feel that the future is hopeless and that things  
            cannot improve.   [    ]
  
3.    0    I do not feel like a failure.  
      1     I feel I have failed more than the average person.  
      2     As I look back on my life, all I can see is a lot of failures  
      3     I feel I am a complete failure as a person.                   [    ]
  
4.    0     I get as much satisfaction out of things as I used to.  
      1     I don't enjoy things the way I used to.  
      2     I don't get real satisfaction out of anything anymore.  
      3     I am dissatisfied or bored with everything.                   [    ]
  
5.    0     I don't feel particularly guilty.  
      1     I feel guilty a good part of the time.  
      2     I feel quite guilty most of the time.  
      3     I feel guilty all the time.                                       [    ]



(2)

6. 0 I don't feel I am being punished.  
1 I feel I may be punished.  
2 I expect to be punished.  
3 I feel I am being punished. [ ]
7. 0 I don't feel disappointed in myself.  
1 I am disappointed in myself.  
2 I am disgusted with myself.  
3 I hate myself. [ ]
8. 0 I don't feel I am any worse than anybody else.  
1 I am critical of myself for my weakness or mistakes.  
2 I blame myself all the time for my faults.  
3 I blame myself for everything bad that happens. [ ]
9. 0 I don't have any thoughts of killing myself.  
1 I have thoughts of killing myself, but I would not carry them out.  
2 I would like to kill myself.  
3 I would kill myself if I had the chance. [ ]
10. 0 I don't cry anymore than usual.  
1 I cry more now than I used to.  
2 I cry all the time now.  
3 I used to be able to cry, but now I don't cry even though I want to. [ ]
11. 0 I am no more irritated now than I ever am.  
1 I get annoyed or irritated more easily than I used to.  
2 I feel irritated all the time now.  
3 I don't get irritated at all by the things that used to irritate me. [ ]

(3)

12. 0 I have not lost interest in other people.  
1 I am less interested in other people than I used to be.  
2 I have lost most of my interest in other people.  
3 I have lost all of my interest in other people. [ ]
13. 0 I make decisions about as well as I ever could.  
1 I put off making decisions more than I used to.  
2 I have greater difficulty in making decision than before.  
3 I can't make decisions at all anymore. [ ]
14. 0 I don't feel I look any worse than I used to.  
1 I am worried that I am looking old or unattractive.  
2 I feel that there are permanent changes in my appearance that make me look unattractive.  
3 I believe that I look ugly. [ ]
15. 0 I can work about as well as before.  
1 It takes an extra effort to get started at doing something.  
2 I have to push myself very hard to do anything.  
3 I can't do any work at all. [ ]
16. 0 I can sleep as well as usual.  
1 I don't sleep as well as I used to.  
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.  
3 I wake up several hours earlier than I used to and cannot get back to sleep. [ ]
17. 0 I don't get more tired than usual.  
1 I get tired more easily than I used to.  
2 I get tired from doing almost anything.  
3 I am too tired to do anything. [ ]

(4)

18.  My appetite is no worse than usual.  
1 My appetite is not as good as it used to be.  
2 My appetite is much worse now.  
3 I have no appetite at all anymore. [ ]

19.  I haven't lost much weight, if any, lately.  
1 I have lost more than 2.27kg.  
2 I have lost more than 4.55kg.  
3 I have lost more than 6.82kg. [ ]

I am purposely trying to lose weight by eating less. Yes.....No.....

20.  I am no more worried about my health than usual.  
 I am worried about physical problems such as aches and pains; or upset stomach; or constipation  
2 I am very worried about physical problems and it's hard to think of much else.  
3 I am so worried about my physical problems, that I cannot think about anything else. [ ]

21.  I have not noticed any recent change in my interest in sex.  
1 I am less interested in sex than I used to be.  
2 I am much less interested in sex now.  
3 I have lost interest in sex completely. [ ]

## Appendix 8

NAME	
FILE NO.	

## MEASURES OF DISEASE AND DISABILITY

### A. ACR Criteria

Criterion	Definition	Present
1. Morning Stiffness	Morning stiffness in and around the joints, lasting at least one hour before maximal improvement.	<input type="checkbox"/>
2. Arthritis of 3 or more joints	At least 3 joint areas simultaneously have had soft tissue swelling or fluid (not bony overgrowth alone) observed by a physician. The 14 possible areas are right or left PIP, MCP, wrist, elbow, knee, ankle and MTP joints.	<input type="checkbox"/>
3. Arthritis of hand	At least one area swollen (as defined above) in a MCP or PIP joint.	<input type="checkbox"/>
4. Symmetric arthritis	Simultaneous involvement of the same joint areas (as defined in 2) on both sides of the body (bilateral involvement of PIP's , MCP's is acceptable without absolute symmetry).	<input type="checkbox"/>
5. Rheumatoid nodules	Subcutaneous nodules, over bony prominences or extensor surfaces, or in juxta-articular regions, observed by a physician.	<input type="checkbox"/>
6. Serum rheumatoid	Demonstration of abnormal amounts of serum rheumatoid factor by any method for which the result has been positive in <5% of normal control subjects.	<input type="checkbox"/>

## 7. Radiographic

Radiographic changes typical of rheumatoid arthritis on posteroanterior hand and wrist radiographs, which must include erosions or unequivocal bony decalcification localised in or most marked adjacent to the involved joints (osteoarthritis changes alone do not qualify)

PIP = proximal interphalangeal joint  
 MCP = metacarpophalangeal joint  
 MTP = metatarsophalangeal joint

**B. DURATION OF MORNING STIFFNESS**

The duration of morning stiffness is the interval of time between waking and the time when sensation of stiffness begins to wear off:

Average duration of morning stiffness over the last 3 days :

Hours   Minutes

**C. PATIENT ASSESSMENT OF ARTHRITIS PAIN**

Please make a mark on the line to show how much pain you are having because of your arthritis.

No ..... Worst  
 pain ..... possible pain

DDC                      Score

**D. PATIENT ASSESSMENT OF DISABILITY**

Please make a mark on the line to show how disabled you are because of your arthritis.

No ..... Completely  
 disability ..... disabled

DDD                      Score

**E. PHYSICIAN'S GLOBAL ASSESSMENT** : (tick ONE box only, using scale below)

Very Good	Good	Fair	Poor	Very Poor
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

DDE Score

**F. PATIENT'S GLOBAL ASSESSMENT** : (tick one box only, using scale below)

"Considering all the ways your arthritis affects you, how are you feeling today?"

Very Good	Good	Fair	Poor	Very Poor
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5

DDF Score

For both E & F :

- |           |   |   |
|-----------|---|---|
| Very Good | : | Asymptomatic and no limitation of normal activities.  |
| Good      | : | Mild symptoms and no limitations of normal activities.                                      |
| Fair      | : | Moderate symptoms and limitations of some normal activities.                                |
| Poor      | : | Severe symptoms and an inability to carry out most activities                               |
| Very Poor | : | Very severe symptoms which are intolerable and inability to carry out all normal activities |

**G. AMERICAN COLLEGE OF RHEUMATOLOGY REVISED CRITERIA FOR CLASSIFICATION OF FUNCTIONAL STATUS IN RHEUMATOID ARTHRITIS.**

- |           |   |   |
|-----------|---|---|
| Class I   | : | Completely able to perform usual activities of daily living. (self-care, vocational, and avocational) |
| Class II  | : | Able to perform usual self care and vocational activities, but limited in avocational activities.     |
| Class III | : | Able to perform usual self care activities, but limited in vocational and avocational activities.     |

Class IV : Limited in ability to perform usual self care - vocational and avocational.

Class

### H. ASSESSMENT OF JOINT TENDERNESS/ PAIN AND SWELLING

		RIGHT SIDE		LEFT SIDE	
	JOINT NUMBER	TENDERNESS/ PAIN	SWELLING	TENDERNESS / PAIN	SWELLING
<i>UPPER EXTREMITY</i>					
SHOULDER	1				
ELBOW	2				
WRIST	3				
MCP I	4				
MCP II	5				
MCP III	6				
MCP IV	7				
MCP V	8				
THUMB 1P	9				
PIP II	10				
PIP III	11				
PIP IV	12				
PIP V	13				
KNEES	14				

• **Tenderness Pain Score Key**

- 0 = None (not tender)
- 1 = Positive response to questioning (tender).
- 2 = Spontaneous elicited (tender and winced)
- 3 = Withdrawal by patient on examination (tender, winced and withdrawn)



- **Swelling Score Key**

- 0 = None
- 1 = Detectable synovial thickening without loss of bony contours
- 2 = Loss of distinctiveness of bony contours
- 3 = Bulging synovial proliferation with cystic characteristics

**DO NOT SCORE ARTIFICIAL JOINTS : Enter NAp**

## Appendix 9

VAS-PAIN

No pain .....

Worst possible pain

## Appendix 10

(5)

### ARTHRITIS PAIN

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>SEVERE</b>	<b>MODERATE</b>	<b>MILD</b>	<b>VERY MILD</b>	<b>NONE</b>

#### DURING THE PAST MONTH ...

38. How would describe the arthritis pain you usually had ?

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

#### DURING THE PAST MONTH...

39. How often did you have severe pain from your arthritis ?

40. How often did you have pain in two or more joints at the same time ?

41. How often did your morning stiffness last more than one hour from the time you woke up ?

42. How often did your pain make it difficult for you to sleep ?

### WORK

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>PAID</b>	<b>HOUSE</b>	<b>SCHOOL</b>	<b>UNEMPLOYED</b>	<b>DISABLED</b>	<b>RETIRED</b>
<b>WORK</b>	<b>WORK</b>	<b>WORK</b>			

#### DURING THE PAST MONTH ...

43. What has been your main form of work ?

## Appendix 11

VAS-DISABILITY

No disability .....

Completely disabled

## Appendix 12



(1)

## AIMS 2

NAME:

FILE NO.:

### MOBILITY LEVEL

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

### DURING THE PAST MONTH ...

1. How often were you able to drive a car or use public transportation ?
2. How often were you out of the house for at least part of the day ?
3. How often were you able to do errands in the neighbourhood ?
4. How often did someone have to assist you to get around outside your home ?
5. How often were you in a bed or chair for most or all of the day ?


### WALKING AND BENDING

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

### DURING THE PAST MONTH ...

6. Did you have trouble doing vigorous activities such as running, lifting heavy objects, or participating in strenuous sports ?
7. Did you have trouble either walking several blocks or climbing a few flights of stairs ?
8. Did you have trouble bending, lifting or stooping ?
9. Did you have trouble either walking one block or climbing one flight of stairs ?
10. Were you unable to walk unless assisted by another person or by a cane, crutches, or walker ?


(2)

### HAND AND FINGER FUNCTION

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

#### DURING THE PAST MONTH ...

11. Could you easily write with a pen or pencil ?
12. Could you easily button a shirt or a blouse ?
13. Could you easily turn a key in a lock ?
14. Could you easily tie a knot or a bow ?
15. Could you easily open a new jar of food ?


### ARM FUNCTION

#### DURING THE PAST MONTH ...

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

16. Could you easily wipe your mouth with a napkin ?
17. Could you easily put on a pullover sweater ?
18. Could you easily comb or brush your hair ?
19. Could you easily scratch your lower back with your hand ?
20. Could you easily reach shelves that were above your head ?


(3)

### SELF-CARE TASKS

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALWAYS</b>	<b>VERY OFTEN</b>	<b>SOMETIMES</b>	<b>ALMOST NEVER</b>	<b>NEVER</b>

### DURING THE PAST MONTH ...

- 21. Did you need help to take a shower or bath ?
- 22. Did you need help to get dressed ?
- 23. Did you need help to use the toilet ?
- 24. Did you need help to get in or out of bed ?

1
2
3
4
5

### HOUSEHOLD TASKS

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALWAYS</b>	<b>VERY OFTEN</b>	<b>SOMETIMES</b>	<b>ALMOST NEVER</b>	<b>NEVER</b>

### DURING THE PAST MONTH

- 25. If you had the necessary transportation, could you go shopping for groceries without help ?
- 26. If you had kitchen facilities, could you prepare your own meals without help ?
- 27. If you had household tools and appliances, could you do your own housework without help ?
- 28. If you had laundry facilities, could you do your own laundry without help ?

1
---

2
---

3
---

4
---

**SOCIAL ACTIVITY**

On the scale below, select the most appropriate answer.

- |             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|
| <b>1</b>    | <b>2</b>    | <b>3</b>    | <b>4</b>    | <b>5</b>    |
| <b>ALL</b>  | <b>MOST</b> | <b>SOME</b> | <b>FEW</b>  | <b>NO</b>   |
| <b>DAYS</b> | <b>DAYS</b> | <b>DAYS</b> | <b>DAYS</b> | <b>DAYS</b> |

**DURING THE PAST MONTH ...**

- 29. How often did you get together with your friends or relatives ?
- 30. How often did you have friends or relatives over to your home ?
- 31. How often did you visit friends or relatives at their homes ?
- 32. How often were you on the phone with close friends or relatives ?
- 33. How often were you at a meeting of church, club, team or other group ?


**SUPPORT FROM FAMILY AND FRIENDS**

On the scale below, select the most appropriate answer.

- |               |              |                  |               |              |
|---------------|--------------|------------------|---------------|--------------|
| <b>1</b>      | <b>2</b>     | <b>3</b>         | <b>4</b>      | <b>5</b>     |
| <b>ALWAYS</b> | <b>VERY</b>  | <b>SOMETIMES</b> | <b>ALMOST</b> | <b>NEVER</b> |
|               | <b>OFTEN</b> |                  | <b>NEVER</b>  |              |

**DURING THE PAST MONTH...**

- 34. Did you feel that your family or friends would be around if you needed assistance ?
- 35. Did you feel that your family or friends were sensitive to your personal needs ?
- 36. Did you feel that your family or friends were interested in helping you solve problems ?
- 37. Did you feel that your family or friends understood the effects of your arthritis?


(5)

**ARTHRITIS PAIN**

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>SEVERE</b>	<b>MODERATE</b>	<b>MILD</b>	<b>VERY MILD</b>	<b>NONE</b>

**DURING THE PAST MONTH ...**

38. How would describe the arthritis pain you usually had ?

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL</b>	<b>MOST</b>	<b>SOME</b>	<b>FEW</b>	<b>NO</b>
<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>	<b>DAYS</b>

**DURING THE PAST MONTH...**

39. How often did you have severe pain from your arthritis ?

40. How often did you have pain in two or more joints at the same time ?

41. How often did your morning stiffness last more than one hour from the time you woke up ?

42. How often did your pain make it difficult for you to sleep ?

**WORK**

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>PAID</b>	<b>HOUSE</b>	<b>SCHOOL</b>	<b>UNEMPLOYED</b>	<b>DISABLED</b>	<b>RETIRED</b>
<b>WORK</b>	<b>WORK</b>	<b>WORK</b>			

**DURING THE PAST MONTH ...**

43. What has been your main form of work ?

(6)

If you answered 4, 5 or 6, please skip the next four questions and go on to the next page.

On the scale below, select the most appropriate answer.

1	2	3	4	5
ALL	MOST	SOME	FEW	NO
DAYS	DAYS	DAYS	DAYS	DAYS

**DURING THE PAST MONTH ...**

44. How often were you unable to do any paid work, housework or schoolwork ?
45. On the days that you did work, how often did you have to work a shorter day ?
46. On the days that you did work how often were you unable to do your work as carefully and accurately as you would like.
47. On the days that you did work how often did you have to change the way your paid work, housework or school work is usually done .

**LEVEL OF TENSION**

On the scale below, select the most appropriate answer.

1	2	3	4	5
ALWAYS	VERY	SOMETIMES	ALMOST	NEVER
	OFTEN		NEVER	

**DURING THE PAST MONTH ...**

48. How often have you felt tense or highly strung ?
49. How often have you been bothered by nervousness or your nerves?
50. How often were you able to relax without difficulty ?
51. How often have you felt relaxed and free of tension?
52. How often have you felt calm and peaceful ?

(7)

## MOOD

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALWAYS</b>	<b>VERY OFTEN</b>	<b>SOMETIMES</b>	<b>ALMOST NEVER</b>	<b>NEVER</b>

### DURING THE PAST MONTH ...

53. How often have you enjoyed the things you do ?
54. How often have you been in low spirits ?
55. How often have you felt that nothing turned out the way you wanted it to ?
56. How often have you felt that others would be better off if you were dead ?
57. How often did you feel so down in the dumps that nothing would cheer you up ?

8
2
2
5
3

## SATISFACTION

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>VERY SATISFIED</b>	<b>SOMEWHAT SATISFIED</b>	<b>NEITHER SATISFIED NOR DISSATISFIED</b>	<b>SOMEWHAT DISSATISFIED</b>	<b>VERY DISSATISFIED</b>

### DURING THE PAST MONTH ...

58. How satisfied have you been with each of these areas of your health ?

MOBILITY LEVEL	(eg. do errands)
WALKING AND BENDING	(eg. climb stairs )
HAND AND FINGER FUNCTION	(eg. tie a bow )
ARM FUNCTION	(eg. comb hair )
SELF-CARE	(eg. take bath )
HOUSEHOLD TASKS	(eg. housework )
SOCIAL ACTIVITY	(eg. visit friends )
SUPPORT FROM FAMILY	(eg. help with problems )
ARTHRITIS PAIN	(eg. joint pain )
WORK	(eg. reduce hours )
LEVEL OF TENSION	(eg. felt tense )
MOOD	(eg. down in the dumps )

4
4
4
4
4
4
4
2
2
4
3
3





**AREAS OF HEALTH**

You have now answered questions about different **AREAS OF HEALTH**. These areas are listed below. Please up to three areas in which you would **MOST LIKE TO SEE IMPROVEMENT**. Please read all 12 areas of health choices before making your decision:

- 60. MOBILITY LEVEL (eg. do errands)
- WALKING AND BENDING (eg. climb stairs )
- HAND AND FINGER FUNCTION (eg. tie a bow )
- ARM FUNCTION (eg. comb hair )
- SELF-CARE (eg. take bath)
- HOUSEHOLD TASKS (eg. housework )
- SOCIAL ACTIVITY (eg. visit friends )
- SUPPORT FROM FAMILY (eg. help with problems )
- ARTHRITIS PAIN (eg. joint pain )
- WORK (eg. reduce hours )
- LEVEL OF TENSION (eg. felt tense )
- MOOD (eg. down in the dumps )


Please make sure that you have checked no more than three areas for improvement.

**CURRENT AND FUTURE HEALTH**

On the scale below, select the most appropriate answer.

- |                  |             |             |             |
|------------------|-------------|-------------|-------------|
| 1                | 2           | 3           | 4           |
| <b>EXCELLENT</b> | <b>GOOD</b> | <b>FAIR</b> | <b>POOR</b> |

61. In general would you say that your **health now** is .....

3

On the scale below, select the most appropriate answer.

- |                       |                           |   |                              |                          |
|-----------------------|---------------------------|---|------------------------------|--------------------------|
| 1                     | 2                         | 3   | 4                            | 5                        |
| <b>VERY SATISFIED</b> | <b>SOMEWHAT SATISFIED</b> | <b>NEITHER SATISFIED NOR DISSATISFIED</b> | <b>SOMEWHAT DISSATISFIED</b> | <b>VERY DISSATISFIED</b> |

62. How satisfied are you with your **health now** ?

4

(10)

On the scale below, select the most appropriate answer.

0	1	2	3	4	5
NOT A PROBLEM FOR ME	DUE ENTIRELY TO OTHER CAUSES	DUE LARGELY TO OTHER CAUSES	DUE PARTLY TO ARTHRITIS AND PARTLY TO OTHER CAUSES	DUE LARGELY TO MY ARTHRITIS	DUE ENTIRELY TO MY ARTHRITIS

63. How much of your problem with your **health now** is due to your arthritis ?

1

On the scale below, select the most appropriate answer.

1	2	3	4
EXCELLENT	GOOD	FAIR	POOR

64. In general do you expect that your **health 10 years from now** will be ... ..

2

On the scale below, select the most appropriate answer.

1	2	3	4
NO PROBLEM AT ALL	MINOR PROBLEM	MODERATE PROBLEM	MAJOR PROBLEM

65. How big a problem do you expect your arthritis to be **10 years from now** ?

2

On the scale below, select the most appropriate answer.

1	2	3	4	5
VERY WELL	WELL	FAIR	POOR	VERY POORLY

66. Considering all the ways your arthritis affects you , how well are you doing compared to other people your age ?

3

67. What is the main type of arthritis that you have?

Rheumatoid Arthritis

Other

68. How many years have you had arthritis?

**MEDICATION**

On the scale below, select the most appropriate answer.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>ALL DAYS</b>	<b>MOST DAYS</b>	<b>SOME DAYS</b>	<b>FEW DAYS</b>	<b>NO DAYS</b>

**DURING THE PAST MONTH ...**

69. How often have you had to take medication for your arthritis?

70. Is your health currently affected by any of the following medical problems?

- High blood pressure
- Heart disease
- Mental illness
- Diabetes
- Cancer
- Alcohol or drug use
- Lung disease
- Kidney disease
- Liver disease
- Ulcer or other stomach disease
- Anaemia or other blood disease

71. Do you take medicine everyday for any problem **other than** your arthritis?

72. Did you see a doctor **more** than three times last year for any problems other than arthritis?

## Appendix 13

## STANDFORD HEALTH ASSESSMENT QUESTIONNAIRE

We are interested in learning how your illness affects your ability to function in daily life. Please feel free to add any comments on the back of this page

PLEASE TICK THE ONE RESPONSE WHICH BEST DESCRIBES YOUR USUAL ABILITIES OVER THE PAST WEEK:

	Without <i>ANY</i> difficulty	With <i>SOME</i> difficulty	With <i>MUCH</i> difficulty	<i>UNABLE</i> to do
<b>1. <u>Dressing and Grooming</u></b>				
Are you able to:				
Dress yourself, including tying shoelaces and doing buttons?	.....	.....	.....	.....
Shampoo your hair?	.....	.....	.....	.....
<b>2. <u>Rising</u></b>				
Are you able to:				
Stand up from an armless straight chair?	.....	.....	.....	.....
Get in and out of bed?	.....	.....	.....	.....
<b>3. <u>Eating</u></b>				
Are you able to:				
Cut your meat?	.....	.....	.....	.....
Lift a full cup or glass to your mouth?	.....	.....	.....	.....
Open a new carton of milk (or soap powder)?	.....	.....	.....	.....
<b>4. <u>Walking</u></b>				
Are you able to:				
Walk outdoors on flat ground?	.....	.....	.....	.....
Climb up five steps?	.....	.....	.....	.....

PLEASE TICK ANY AIDS OR DEVICES THAT YOU USUALLY USE FOR ANY OF THESE ACTIVITIES:

.....	Cane	.....	Devices used for dressing (button hook)
.....	Walking frame	.....	zipper pull, long handled shoe horn, etc.
.....	Crutches	.....	Built-up or special utensils
.....	Wheelchair	.....	Special or built-up chair

PLEASE TICK ANY CATEGORIES FOR WHICH YOU USUALLY NEED HELP FROM ANOTHER PERSON:

.....	Dressing and grooming	.....	Eating
.....	Rising	.....	Walking

PLEASE TICK THE ONE RESPONSE WHICH BEST DESCRIBES YOUR USUAL ABILITIES OVER THE PAST WEEK:

	Without <i>ANY</i> difficulty	With <i>SOME</i> difficulty	With <i>MUCH</i> difficulty	<i>UNABLE</i> to do
5. <u>Hygiene</u> Are you able:				
Wash and our entire body?	.....	.....	.....	.....
Take a bath?	.....	.....	.....	.....
Get on and off the toilet?	.....	.....	.....	.....
Walk outdoors on flat ground?	.....	.....	.....	.....
6. <u>Reach</u> Are you able to:				
Reach and get down a 5lb object (e.g. a bag of potatoes) from just above your head?	.....	.....	.....	.....
Bend down to pick up clothing from the floor ?	.....	.....	.....	.....

7. Grip

Are you able to:

- Open car doors? .....
- Open jars, which have been previously opened? .....
- Turn taps on and off .....

8. Activities

Are you able to:

- Run errands and shop? .....
- Get in and out of a car? .....
- Do chores such as vacuuming, housework or light gardening? .....

PLEASE TICK ANY AIDS OR DEVICES THAT YOU USUALLY USE FOR ANY OF THESE ACTIVITIES:

- ..... Raised toilet seat .....
- ..... Bath seat .....
- ..... Jar opener (for jars previously opened) .....
- ..... Bath rail .....
- ..... Long handled appliances for reach .....
- ..... Other (specify) .....

PLEASE TICK ANY CATEGORIES FOR WHICH YOU USUALLY NEED HELP FROM ANIOTHER PERSON:

- ..... Hygiene .....
- ..... Reach .....
- ..... Gripping and opening things .....
- ..... Errands and housework .....

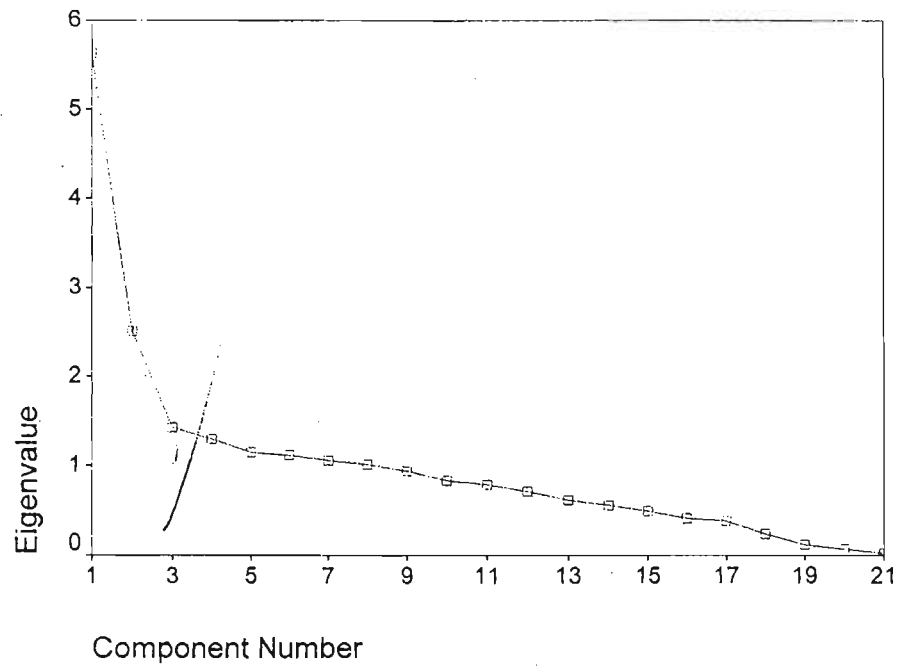
## Appendix 14



Factor Loadings on the Outcome Measures

ITEM	Self-report of Pain & Functional Status (Factor 1)	Swollen & Tender Joint Status (Factor 2)	Affect (Factor 3)
1. Class	0,71		
2. Number of Tender Joints		0,82	
2. Tender Joint Count		0,77	
2. Number of Swollen Joints		0,93	
2. Swollen Joint Count		0,89	
3. AIMS Physical	0,65		
5. HAQ	0,42		
7. BDI Total			0,87
8. BDI Factor 1			0,76
8. BDI Factor 2			0,43
9. AHI Total			0,61
10. VAS Pain	0,58		
11. VAS Disability	0,62		
12. AIMS Affect			0,49
13. AIMS Symptom (Pain)	0,56		
E(loadings) <sup>2</sup>	3,45	3,35	2,71

### Scree Plot



### Component Matrix<sup>a</sup>

---

a. 3 components extracted.

## Appendix 15

The significant predictors of RA Quality of Life, and RA health status were reported in Chapter 6. In appendix 15, the excluded variables are reported.

Set One:

Appendix 15

# DV: Self-Report of Pain's Functional Status

Excluded Variables: REGR factor 1 for coping



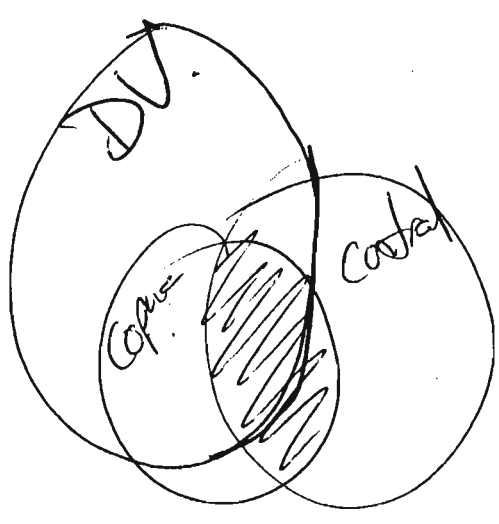
## Excluded Variables<sup>c</sup>

Model		Beta In	t	Sig.	Partial Correlation
1	M_COPING	-.257 <sup>a</sup>	-3.986	.000	-.283
	REGR factor 1 for coping	-.172 <sup>a</sup>	-2.596	.010	-.189
	REGR factor 3 for coping	-.163 <sup>a</sup>	-2.465	.015	-.180
	M_CNTL_I	.163 <sup>a</sup>	2.415	.017	.176
	M_CNTL_E	.048 <sup>a</sup>	.691	.491	.051
2	REGR factor 1 for coping	-.050 <sup>b</sup>	-.663	.508	-.049
	REGR factor 3 for coping	-.049 <sup>b</sup>	-.660	.510	-.049
	M_CNTL_I	.098 <sup>b</sup>	1.432	.154	.106
	M_CNTL_E	.044 <sup>b</sup>	.652	.515	.048

DV: Swollen & Tender Joint Status

Excluded Variables<sup>c</sup>

Model		Beta In	t	Sig.	Partial Correlation
1	REGR factor 2 for coping	-.248 <sup>a</sup>	-3.468	.001	-.248
	M_CNTL_I	.140 <sup>a</sup>	1.936	.054	.142
	M_CNTL_E	.152 <sup>a</sup>	2.112	.036	.154
2	M_CNTL_I	.101 <sup>b</sup>	1.410	.160	.104
	M_CNTL_E	.093 <sup>b</sup>	1.275	.204	.094



DV: AHI

	.417
--	------

**Excluded Variables<sup>c</sup>**

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	DV1 unweighted revised	.340 <sup>a</sup>	4.761	.000	.333	.851
	DV2 unweighted	.194 <sup>a</sup>	2.817	.005	.204	.985
2	DV2 unweighted	.078 <sup>b</sup>	1.075	.284	.080	.821

a. Predictors in the Model: (Constant), M\_COPING, income

b. Predictors in the Model: (Constant), M\_COPING, income, DV1 unweighted revised

c. Dependent Variable: AHI-TOT

Handwritten marks: a circled 'a', a checkmark, and some illegible scribbles.

# DV: Joint Status

## Excluded Variables<sup>c</sup>

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics	
					Tolerance	
1	BDI-TOT	.101 <sup>a</sup>	1.297	.196	.096	.819
	AHI-TOT	.175 <sup>a</sup>	2.459	.015	.179	.955
2	BDI-TOT	.034 <sup>b</sup>	.403	.688	.030	.700

a. Predictors in the Model: (Constant), REGR factor 2 for coping, I\_EMPLOY

b. Predictors in the Model: (Constant), REGR factor 2 for coping, I\_EMPLOY, AHI-TOT

c. Dependent Variable: DV2 unweighted

## Regression



# DV: Pain and Functional Status

\_\_\_\_\_ BDI-TOT \_\_\_\_\_  
\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

## Excluded Variables<sup>c</sup>

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics	
					Tolerance	
1	BDI-TOT	.269 <sup>a</sup>	3.884	.000	.278	.758
	AHI-TOT	.265 <sup>a</sup>	4.097	.000	.292	.864
2	BDI-TOT	.198 <sup>b</sup>	2.764	.006	.202	.678

a. Predictors in the Model: (Constant), M\_COPING, REGR factor 2 for coping, I\_EMPLOY, income

b. Predictors in the Model: (Constant), M\_COPING, REGR factor 2 for coping, I\_EMPLOY, income, AHI-TOT

c. Dependent Variable: DV1 unweighted revised



DV : AHI

Model		Beta In	t	Sig.	Partial Correlation
1	Education level	-.108 <sup>a</sup>	-1.473	.142	-.108
	I_EMPLOY	.113 <sup>a</sup>	1.556	.122	.114
	M_COPING	-.247 <sup>a</sup>	-3.533	.001	-.253
	REGR factor 1 for coping	-.220 <sup>a</sup>	-3.127	.002	-.225
	REGR factor 3 for coping	-.231 <sup>a</sup>	-3.279	.001	-.236
	M_CNTL_I	.184 <sup>a</sup>	2.572	.011	.187
2	Education level	-.090 <sup>b</sup>	-1.261	.209	-.093
	I_EMPLOY	.093 <sup>b</sup>	1.313	.191	.097
	REGR factor 1 for coping	-.125 <sup>b</sup>	-1.523	.130	-.112
	REGR factor 3 for coping	-.144 <sup>b</sup>	-1.800	.074	-.132
	M_CNTL_I	.128 <sup>b</sup>	1.766	.079	.130

DV: Depression

Excluded Variables<sup>f</sup>

Model		Beta In	t	Sig.	Partial Correlation
1	I_SEX	.174 <sup>a</sup>	2.425	.016	.177
	income	-.177 <sup>a</sup>	-2.431	.016	-.177
	M_COPING	-.182 <sup>a</sup>	-2.554	.011	-.186
	REGR factor 1 for coping	-.237 <sup>a</sup>	-3.383	.001	-.243
	REGR factor 2 for coping	-.404 <sup>a</sup>	-6.063	.000	-.410
	M_CNTL_I	.140 <sup>a</sup>	1.910	.058	.140
2	I_SEX	.188 <sup>b</sup>	2.651	.009	.193
	M_COPING	-.173 <sup>b</sup>	-2.461	.015	-.180
	REGR factor 1 for coping	-.230 <sup>b</sup>	-3.318	.001	-.239
	REGR factor 2 for coping	-.386 <sup>b</sup>	-5.753	.000	-.393
	M_CNTL_I	.123 <sup>b</sup>	1.690	.093	.125
3	M_COPING	-.176 <sup>c</sup>	-2.536	.012	-.186
	REGR factor 1 for coping	-.219 <sup>c</sup>	-3.189	.002	-.231
	REGR factor 2 for coping	-.379 <sup>c</sup>	-5.749	.000	-.394
	M_CNTL_I	.134 <sup>c</sup>	1.874	.063	.138
4	M_COPING	-.190 <sup>d</sup>	-2.987	.003	-.218
	REGR factor 1 for coping	-.225 <sup>d</sup>	-3.585	.000	-.259
	M_CNTL_I	.079 <sup>d</sup>	1.180	.240	.088
5	M_COPING	-.098 <sup>e</sup>	-1.330	.185	-.099
	M_CNTL_I	.047 <sup>e</sup>	.716	.475	.054

# Set Two:

DV: Depression

## Excluded Variables<sup>c</sup>

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	DV1 unweighted revised	.256 <sup>a</sup>	3.715	.000	.268	.768
	DV2 unweighted	.048 <sup>a</sup>	.739	.461	.055	.909
2	DV2 unweighted	-.037 <sup>b</sup>	-.554	.580	-.042	.799

a. Predictors in the Model: (Constant), REGR factor 1 for coping, REGR factor 2 for coping, I\_SEX, income, Education level

b. Predictors in the Model: (Constant), REGR factor 1 for coping, REGR factor 2 for coping, I\_SEX, income, Education level, DV1 unweighted revised

c. Dependent Variable: BDI-TOT

## Regression