

**PERCEIVED STRESS, COPING BEHAVIOUR AND HEALTH OUTCOMES
AMONG SOUTH AFRICAN UNDERGRADUATE MEDICAL STUDENTS**

by

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Submitted in partial fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

In the Department of Behavioural Medicine

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University of KwaZulu- Natal

SEPTEMBER 2003

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PREFACE

This study represents original work by the author and has not been submitted in any form to another university. Where use has been made of the work of others, it has been duly acknowledged in the text.

The research described in this thesis was carried out at the Nelson R. Mandela School of Medicine and in the Department of Behavioural Medicine, University of KwaZulu - Natal under the supervision of Professor L. Schlebusch (Head of the Department).

This project stems from this researcher's interaction both professionally (as a clinical psychologist and lecturer), and personally (as a friend) with undergraduate and postgraduate medical students and their families. This led to an awareness of the difficulties experienced by these individuals in the course of their studies as well as the continuing impact of these problems on them and their families subsequently. The aim of this study is to raise awareness of the problems experienced by these students among their educators and provide some guidelines for assistance to these individuals who offer so much to others.

ACKNOWLEDGEMENTS

I would like to thank my Promoter, Professor Lourens Schlebusch for his valuable advice, encouragement and support. My sincere thanks to Mrs. Cathy Connolly of the Biostatistics Unit of the Medical Research Council for her statistical direction, unending patience, good humour and support. This thesis would have not been possible without her input. I would also like to thank all the students who participated in this study, the university lecturers who gave me access to their classes, and the Medical Students Representative Council for their support of this study. My thanks also to Mrs Fatima Ebrahim and Mrs Vasi Perumal for all their secretarial assistance. My sincere thanks also to Dr Enver Karim for being a good friend, advisor and “big brother”.

Finally, my thanks to my Aunts Amina, Hafiza and Fatima Kharwa for all the love, support and encouragement that I have received from them throughout my life.

GLOSSARY

- Apartheid: Legal, racial segregation
- Clinical Group: Undergraduate medical students in their fourth to sixth years of study. The focus is on clinical work in hospitals (including attending ward rounds, and having consultations with and physical examinations of patients). Face-to-face case presentations also occur, with students being graded by consultants.
- Pre-clinical Group: Undergraduate medical students in their first to third years of study. The coursework consists primarily of basic sciences but also includes cadaver dissection.
- DSM: Diagnostic and Statistical Manual of Mental Disorders.
(American Psychiatric Association, 1994)

ABSTRACT

This empirical study assessed the perceived stressors in medical school environment and psychological outcomes in undergraduate medical students in a non - western sample. The sample consisted of African and Indian students in the Clinical group (N = 149) and a matched Control group, the Pre-clinical group (N = 158) bringing the total number of participants to 307. The research dealt with perceived stressors, coping mechanisms and outcomes in a medical school environment. Outcome was assessed using self-report instruments which examined stress symptoms and psychological distress. Both bivariate and multivariate correlational analyses were performed to investigate correlations and the predictive value of risk factors for psychological distress. The findings indicate that there are no significant differences in the perception of stressors in the medical school environment between the Pre-clinical and Clinical groups. Maladaptive coping strategies, perceived stressors and female gender have important roles to play in predicting psychological distress. High self-esteem and good social support for both groups, as well as optimism in the Clinical group protects against psychological distress. Strengths and limitations of this study as well as implications for intervention strategies among undergraduate medical students are also discussed.

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CHAPTER ONE

INTRODUCTION

The study of stress among undergraduate students has gained momentum world - wide as students themselves and those who work with them, for example student counsellors, have become increasingly aware of the debilitating effects of stress (Archer & Lamnin, 1985). Various researchers have found that university students are at risk for the development of psychological distress and need professional help or they cannot function as students (Guthrie, Black, Bagalkote, Shaw, Campbell & Creed, 1998).

This is particularly important when undergraduate medical students are considered. There is support from various sources that medical education may be a health hazard for many young and impressionable medical students (Muller, 1984; Mosley, Perrin, Neral, Dubbert, Grothues & Pinto, 1994). Whilst medical training shares many characteristics with other graduate and professional programmes, (for example examinations and information overload) there are some specific and unique features present in medical education. The length, rigidity and intensity of the training period from the beginning of the medical training through to internship is unequalled in any other graduate or professional programme. Furthermore, although other educational programmes may span the same number of years, they do not involve the same total and inflexible commitment during those years (Nadelson, Notman & Preven, 1983).

Medical students also have to face disturbing experiences such as dissecting cadavers (Home, 1990), encounters with patients (Lloyd & Gartrell, 1983) and dealing with death and dying (Coombs & Virshup, 1994). Thus, studies have shown that the long length or duration and intense pressures and demands of medical education can be emotionally taxing and can have detrimental effects on the academic performance, physical health and psychological well-being of students (Mosley et al. 1994; Guthrie et al. 1998).

This has important implications when one considers that the way in which medical students cope with the stressors of medical school may lay the groundwork for their future professional lives where stress is central to their work. Adaptive or maladaptive skills developed during their medical training may lay the groundwork for future professional adjustment. The long term psychosocial well-being of doctors is of particular concern given their higher than average rates of psychological distress, chemical dependency and suicide (Schreiber & Doyle, 1993; Lineman, Lara, Hakko & Lindquist, 1996).

These factors also have an impact on patient care as doctors directly or indirectly influence the health of the society in which they live and work. This is done directly through their clinical and preventive work and indirectly as role models for society (Bewley, 1990). Healthy medical students are likely to become healthy doctors who can then model and promote healthy lifestyles with their patients (Wolf, 1994).

The literature indicates that medical students experience psychological distress throughout their undergraduate training. This is manifested in various forms, for example, depression (Zoccolillo, Murphy & Wetzell, 1986; Rosal, Ockene, Ockene, Barrett, Ma & Herbert,

1997), anxiety (Vitaliano, Russo, Carr & Heerwagen, 1984; Vitaliano, Mauro, Russo & Mitchell, 1989) and licit and illicit substance use (Webb, Ashton, Kelly & Kamali, 1998). Whilst much research has been done in this area recently, the majority of the studies have been characterised by methodological flaws which limit the generalizability of the findings. Some of the limitations are as follows:

- Very few studies look at stress and its outcomes in medical students over the duration of the medical course.
- Many studies use non-standardised measures of unknown validity thus rendering the interpretation of results difficult.
- Studies use small sample sizes.
- Studies assess the presence or absence of particular conditions, for example, depression, anxiety, alcohol use, etc. They do not assess for general psychological health, the deterioration of which could provide early and rapid identification of students at risk.
- The majority of the studies have been undertaken in first world or western countries, for example, the United States and the United Kingdom. Very few studies make reference to non-western students who are not minorities in their universities (unlike first world or western countries where Black and Asian students are considered to be minority students).
- Studies do not attempt to link up their findings to any conceptual or theoretical models to explain variability in medical student's psychological distress. Hence, there is a need for the development of a model which is multi-factorial and which

investigates interactions between stress, personality variables, coping mechanisms and outcome variables.

A recent advance in the stress and coping literature has been the development of a dynamic, transactional process oriented stress model, Lazarus's transactional stress and coping model (Lazarus & Folkman, 1984; Cohen, Kessler & Gordon, 1995). This model emphasises the dynamic and transactional relationship which exists between an individual's cognitive appraisal and a number of coping mechanisms that buffer stress outcomes. The role of personality characteristics, for example, dispositional optimism are also explored.

This model therefore provides a suitable theoretical framework from which to explore the investigation of perceived stress, coping behaviour and health outcomes in South African undergraduate medical students. The following objectives were envisaged for the study:

- to assess perceived sources of stress for undergraduate medical students within the medical school environment;
- to delineate health outcomes (stress related symptoms and psychological distress);
- to establish the effects of psychosocial mediating variables, namely self esteem and optimism and the role of coping behaviours on health;
- to establish if demographic variables such as age, gender, ethnicity and social support (loneliness) affect any of the factors researched.

In conclusion, a review of the literature indicated that there are potential negative effects of emotional distress on medical students and the impairment of functioning in medical school and practice settings post graduation. This makes it important to clarify the incidence and severity of the problem and in addition to specify the relevant factors contributing to it.



In the South African context much time, effort and valuable resources are spent on the training of medical students (and where medical doctors are an important human resource). This knowledge can assist in the design of intervention strategies to improve the emotional well-being of medical students and to prevent the negative consequences associated with psychological distress.

CHAPTER TWO

CONCEPTUALISING PERCEIVED STRESS, COPING BEHAVIOUR AND HEALTH OUTCOMES IN UNDERGRADUATE MEDICAL STUDENTS

There has been a proliferation of research in the area of stress and coping over the past few decades, particularly in the area of psychosocial influences on health (Bretznitz & Goldberger, 1982; Cohen et al. 1995).

This area (also known as health psychology) has the following focus: the identification and amelioration of behaviours and symptoms leading to diseases resulting in the reduction of well being; as well as research on behaviours which promote or influence improvement or recovery (Schlebusch,1990).

Stress has been defined by Lazarus and Folkman (1982) as a perception or judgement by an individual that environmental and or internal demands tax or exceed the individual's resources for managing them .This can lead to either adaptive or maladaptive outcomes for the individual. The capacity to deal with these demands depends on both internal factors (such as appraisal) and external factors (such as environmental coping resources, for example, social support).

Maladaptive outcomes may be manifested physically (for example, as cardiac problems), psychologically (for example, as emotional distress) or socially (for example, as social isolation) (Cohen et al. 1995).

Considerable research has been conducted on the well-being of undergraduate medical students and the precipitating stressful events in their environment. Vitaliano et al (1989) and Wolf (1994) report on the sequelae as for example: high mortality rates, emotional difficulties, academic problems, high attrition rates, drug and alcohol abuse, concerns over grades or exams and general dissatisfaction. It appears that stress experienced by undergraduate medical students impacts negatively at various levels. Referring to medical education and research, Engel (1977, 1982) reported that this area could profit from the application of the biopsychosocial model of health as it incorporates the physical, behavioural, cognitive and environmental component of health and permits multilevel, multivariate analysis of events.

The aim of this chapter is thus to evaluate current approaches to stress and coping behaviour and to place the area of perceived stress among undergraduate medical students in a biopsychosocial and transactional stress and coping framework .

CONCEPTUALIZING STRESS, COPING AND OUTCOMES

While research in the area of stress has proliferated, it does not represent a cohesive or consistent field of enquiry. It has become popularised, in that stress tends to be blamed for all conditions and or may become trivialized and not treated seriously (Sutherland & Cooper,1990).

There are conceptual inconsistencies which lead researchers such as Locke and Colligan (1986, p.43) to refer to a “semantic nightmare”. This appears to be a result of the study of

stress from various divergent disciplines, for example, medicine, behavioural and social sciences. This has led to each discipline investigating stress from its own unique perspective. Sutherland and Cooper (1990) identify two perspectives or conceptualisations which differ according to their emphasis on where the locus of control exists:

- The stimulus based or environmental perspective views stress as a disruptive environmental agent. Stress is perceived as the degree of demand being placed on the individual resulting in a specific stress response. Stress is viewed as an independent variable. The identification of potential sources of stress is the central theme of the stimulus based model of stress.
- The response based or biological model views stress as a response to disturbing stimuli. Any event that produces a stress response is assumed to be a stressor. The response may be at a physiological, psychological and/or behavioural level. Stress is viewed as a dependent variable.

A third approach is the psychological approach which places the locus of stress in the interaction between the person and his or her environment and has been best proposed by the work of Lazarus (Lazarus & Folkman, 1984). This interactive or transactional model of stress which considers the stressor source (or stimuli producing stress reactions), the perception of the situation and the response is a useful model for the study of stress.

Historically, in terms of the Environmental perspective, this approach links health and disease to certain conditions in the external environment. This approach which can be

traced to Hippocrates in the fifth century B.C. proposes that some environmental force impinges on the organism in some disruptive way. In the 1930's Adolf Meyer believed that life events could be shown to have etiological importance for a variety of physical illnesses (Sutherland & Cooper, 1990). This approach was further popularised by Holmes & Rahe's (1967) publication of the Social Readjustment Rating Scale (SRRS), which provided normatively generated differential weights in a checklist manner. The checklist approach proposes that one's level of experienced stress is embodied in the cumulative amount of changes or readjustment brought about by events occurring in one's life. This has led to a tremendous amount of research in the area. However, correlations between life events and illness hover around 0.30, suggesting that life events alone do not account for more than 10% of the variance (Cohen et al. 1995). Other difficulties identified with this approach are: there is more concern with the magnitude of the life change than with whether the change is positive (for example, a promotion), or negative (for example, a job loss); life event scales may not include an adequate and representative sample of major events that occur in a person's life; that minor hassles are more important than life events and that individuals rate the severity or magnitude of stressors differently (Cohen et al. 1995). This model also fails to include the role or impact of personal and environmental coping resources, for example, self esteem, and the availability or level of social support which may act as buffers for the consequences or sequelae of stress (Sutherland & Cooper, 1990).

With regards to the Biological perspective, historically, the response based approach views stress in terms of a dependent variable, with the main concern being the manifestation of stress. Emotional stress as causal in ischaemic heart disease was proposed as early as 1860 by Claude Bernard, who was the first to suggest that the internal environment of a living

organism must remain fairly constant despite exterior changes. Walter Cannon subsequently went on to develop this concept of stability or balance and described it as homeostasis (Sutherland & Cooper, 1990).

However, it was Hans Selye (1956) who formulated stress as a General Adaptation Syndrome (GAS) and defined it as the non-specific response of the body to any demand made upon it. He described three stages to the stress response: an alarm stage, which is the immediate psycho-physiological response and where the reaction is one of 'Fright or Flight'; the second stage is that of resistance where an adaptation response and or return to equilibrium replaces the alarm reaction. Resistance does not go on indefinitely. If the alarm reaction is elicited too intensely or frequently over an extended period, the energy needed for adaptation becomes depleted and the third stage which is exhaustion or collapse or death occurs. Various theorist's have challenged Selye's conceptualisation of stress: it has been perceived as being too simplistic and valid for some stressors, for example, the physical factors of heat and cold but cannot adequately explain psychosocial stress (Sutherland & Cooper, 1990). Further, it has been suggested that stressors may pose little or no threat over a cumulative time period and that this perspective fails to take into account the individual's subjective experiences and perception's of stress (Lazarus, 1966).

The Psychological perspective grew out of the interest in individual differences on the effects of stress on performance. This was stimulated by the Second World War and the Korean War. The dominant view until then had been a simplistic one where stress or anxiety resulted in impaired performance either by heightening drive tension or by creating interference or distraction. It became increasingly apparent that there were important

individual differences in response to stress: performance was not uniformly impaired or facilitated. This led to a realization of the importance of personal factors such as coping, which resulted in changes in the formulation or conceptualisation of stress (Lazarus & Folkman,1984).

The psychological stress perspective places emphasis on the organism's perception and evaluation of the potential harm posed by objective environmental experiences. This model proposes that events influence only those persons who appraise them as stressful, that is perceived stress. Stress appraisals are determined not solely by the stimulus condition or the response variables but by individual's interpretations of their relationships to their environments, that is, the perception that one is experiencing stress is a result of both the interpretation of the meaning of the event and an evaluation of how adequate coping resources are (Cohen et al. 1995).

Lazarus and his fellow researchers (Lazarus, 1966; Lazarus & Folkman,1984; Folkman, Lazarus, Dunkel-Schetter, De Longis & Gruen,1986) have been some of the most prolific and influential researchers in the area of stress and coping and its effect's on outcomes.

Their definition proposed an interactive or transactional model of stress as a "particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well being" (Lazarus & Folkman, 1984, p.19).

They further highlight the importance of two processes which mediate the person-environment relationship: cognitive appraisal and coping. Cognitive appraisal is an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful. Coping is the process through which the individual manages the demands of the person – environment relationship that are appraised as stressful and the emotions they generate (Lazarus & Folkman, 1984).

Appley & Trumbull (1986) state that there are three parallel systems that function to maintain a person and provide the necessary means to deal with stressors over that individual's lifetime. These systems are identified as: Physical or physiological, which include genetic, prenatal or developmental factors; Psychological, which include personality, self esteem, motivation, intellect and goals; and Social which include financial resources, social support, values and religious beliefs.

Thus, there are certain key areas which need to be incorporated into the stress and coping model: the role played by stressors; the role played by mediating variables, for example, cognitive appraisal, personal and environmental coping resources; the mediating role of coping strategies; and the manifestation of stress responses.

1. Stressors

As there have been difficulties in defining the concept of stress, it became necessary to use a term which differentiated between stress stimuli and stress response. The term "Stressor" is used to refer to a wide variety of exogenous and endogenous stimuli which can range

from minor frustrations to major disasters. Stressors may be physical, psychosocial or socio-cultural in nature (Schneiderman & McCabe, 1985).

Turner and Wheaton (1995) have divided stressors into three categories: cataclysmic events or extreme stressors, personal stressors or negative life events, and daily hassles:

Extreme stressors have been the most widely reported on in the literature (in terms of post traumatic and acute stress disorders). Weiner (1985) identifies these as noxious agents generating fear, frequently producing unavoidable injury and encompassing things like earthquakes, terrorism, rape and assault. The characteristics of these stressors are that they cannot be avoided, opportunities to respond to them are limited and there is no predictable end to the event.

Personal stressors are also known as negative life events. Schneiderman and McCabe (1985, p.13) regard change as the essence of stress and defined it as “a change or threat of change demanding adaptation by the organisms”. These life events range from death, divorce and job loss (Thoits, 1995) and can include the adaptation process to the academic and social systems of the educational environment. Current research in this area now includes such issues as the subjective magnitude of the stressor, the context of the threat and the individuals personal control over the event, time and duration of the stressor (Cohen et al. 1995).

Daily hassles are chronic, low intensity minor events and daily frustrations or difficulties such as time pressures, delays and losing things. It has been pointed out by Cohen and

Willis (1985) that these do not occur in isolation: when multiple problems occur or accumulate over a long period of time they can diminish or reduce the individuals capacity to problem-solve acute stressors. They also propose that chronic daily hassles may increase psychological vulnerability to acute stressors by stripping or undermining people of their various coping resources (biological, psychological and social).

2. Coping Mechanisms

“Men are disturbed not by things themselves, but by the views which they take of things”

(Epictetus, as quoted by Fontana, 1989, p.63)

There are two critical processes that mediate the person-environment relationship: cognitive appraisal and coping. Although certain environmental demands and pressures create stress in many people, individual and group differences in the degree and kind of reaction are always apparent. People differ in their sensitivity and vulnerability to certain types of events, as well as in their interpretations or reactions. Laux & Vossel (1982) discuss two styles of coping which have been the most heavily researched. These are the vigilant and avoidant modes of coping: individuals using a vigilant style of coping are alert to any threats, while individuals with an avoidant style usually deal with a threat by not admitting it. This view was developed further by Roth and Cohen (1986) who summarized two basic modes of coping with stressful information: approach and avoidance, which they described as cognitive and emotional activity that is oriented either toward or away from threats. While these styles are not mutually exclusive, approach styles are characterized by behaviours such as tackling, vigilant focusing and sensitizing. Such styles which involve turning to others for help and information seeking are problem based strategies or problem

focused coping and involve attempting to change the nature of the stressor and bringing the stressor back under control (Moos and Billings, 1982). Of concern in this style of coping is an increase in anxiety and stress especially if there is no possibility of changing the situation or for emotional assimilation of the threat. The approach style can lead to worrying that is time consuming or non-productive (Roth & Cohen,1986).

Avoidance styles include such strategies as denying problems or threats, engaging in fantasies, repression, with the aim being to reduce or neutralize anxiety or minimize the threat of the stressor. The drawback to the use of this style is that appropriate problem solving is not utilized and proper treatment is delayed and have less positive adaptational outcomes extracting a price later on. Roth and Cohen (1986) have suggested that approach (attention) styles are more suitable to positive long term outcomes while avoidance (rejection) styles are more effective for short term outcome especially when emotional coping resources are limited.

With regards to coping with threats, Janis and Mann (1977) describe vigilance and hyper-vigilance as basic patterns of coping with realistic threats. In vigilance, the individual who is making a decision searches carefully for relevant information, assimilates it in an unbiased manner and carefully appraises the alternatives before making a decision. Vigilance can be regarded as adaptive and generally leads to decisions of best quality, although they can be maladaptive if the danger is imminent and a quick and immediate response is required.

In hyper-vigilance, the individual searches desperately for a way out of the dilemma or situation and impulsively grasps a solution that promises relief. The individual overlooks or does not explore fully the range of consequences of his or her choice because of emotional excitement (hyper-arousal), distorted cognitions (for example, repetitive thinking) and cognitive constriction (for example, reduction in immediate memory). In its most extreme form, hyper-vigilance can be construed as 'panic'. Such individuals are overly alert to the threatening aspects of their experiences. As such hyper-vigilance can be construed as a defective or maladaptive pattern of decision-making as it reduces the chance of avoiding or averting serious losses.

Hyper-vigilance may often alternate with feelings of numbness, denial of loss, efforts to ward off exposure to reminders of the stressful events and the manifestations of defensive avoidance tendencies. The readiness to be hyper-vigilant appears to be related to personal variables; low ego strength, low self-confidence, low problem-solving ability and a poor ability to develop and use social support. Factors implicated in the antecedents of hyper-vigilance are lack of contact with family members or supportive persons, restrictions of activity, lack of perceived control over events, lack of preparatory information regarding the stressful events to be expected as well as what to do to build up coping skills. Time pressure is also one of the major determinants of hyper-vigilance. It is proposed that hyper-vigilance is fostered by deadline pressures whenever individuals must take action to avert a threatened loss especially when it concerns goals or personal values such as academic achievement. Some individuals are under constant time pressures either as a result of situational demands (exogenous factors) or personality dispositions (endogenous factors), or both. Such individuals become hyper-vigilant more easily than others in response to, for

example, deadlines which often lead to ill considered decisions. This can also be tied to Type A personality where a chronic sense of time urgency is a major component of that personality type (Janis & Rodin, 1982).

However, Folkman and Lazarus (1988) have suggested that coping styles consist not just of approach - avoidance strategies or behaviours or defensive processes to cope with the complex demands of any stressful encounter but a wide range of cognitive and behavioural strategies that involve both problem solving (instrumental), as well as emotion or affect regulating (palliative) functions. They differentiate between coping strategies that act as mediators of the stress process and psychosocial resources which act as moderators of the stress process. Mediators can be defined as variables that are generated within encounters and which change the relationship between the stressor and the outcome variable. As a mediator, coping arises during the encounter and changes or transforms the original appraisal and its attendant emotion in some way. Moderators are antecedent conditions such as gender, socio-economic status, or personality traits that interact with other conditions in producing outcomes (Folkman & Lazarus, 1988).

Thus, Lazarus & Folkman's (1984) stress and coping model sees coping as occurring in a specific context and which involves two basic cognitive processes, that is, primary and secondary appraisal which are mediated through specific coping strategies and moderated through personal and environmental coping resources such as personality dispositions and social support.

2.1. Appraisal

According to Monroe & Kelly (1995, p.131), much of the current stress theory revolves around the cognitive process of appraisal which they suggest is a more refined concept than perception that pertains to the evaluation of stressors and their dimensions. Appraisal can be viewed as a 'final common pathway' in which diverse influences are integrated and the meaning of the encounter is synthesized. It is a pathway through which coping strategies and personal and environmental resources are mediated.

Appraisal is basically an individual's evaluation of events and of their own coping resources. It has to do with the degree of threat any specific stressor imposes upon an individual such that the perception of the threat is either less than, matches or exceeds that individual's ability to cope.

Lazarus & Folkman (1984) make the distinction between two forms of appraisal: Primary and Secondary. Primary appraisal involves the evaluation of the environmental situation with regards to the individual's well being. Monroe and Kelly (1995) posit three types of primary appraisal: irrelevant, benign-positive and stressful. Of interest to us are those events or situations appraised as stressful and these can be further characterized as: Harm or Loss which refers to situations in which the individual has experienced some damage or loss; Threat which involves anticipated or possible future damage or losses; and Challenge which refers to situations which present with possibilities for growth or mastery or change (Folkman & Lazarus, 1985). Regarding secondary appraisal, this pertains to the capabilities of the individual for dealing with the situation: "it is a complex evaluative process that

takes into account which coping options are available, the likelihood that a given coping option will accomplish what it is supposed to, and the likelihood that one can apply a particular strategy or set of strategies effectively” (Lazarus & Folkman, 1984, p.35). The individual determines what physical resources (for example, an individual’s health); psychological resources (for example, levels of optimism) and social or material resources (for example, levels of social support, finances) are available to cope with stress (Holroyd & Lazarus,1979). Primary appraisal thus refers to the question: “Am I OK?’, whereas secondary appraisal refers to the question: “What can I do?” (Miller, 1992, p.20).

Theorists have raised concerns regarding the confounding of the concept of appraisal with other aspects of an individual’s phenomenology or ongoing awareness, for example, anxious rumination, worry, fear, and catastrophizing thoughts. It is felt that appraisal can be linked not only with the vast cognitive content of consciousness but also with processes outside of conscious awareness, for example, defense mechanisms. It has been suggested that appraisal includes various factors such as: the context and identity salience of the stressor, the individual’s belief system and self regulatory processes. It is therefore a complex concept requiring further elucidation and research (Thoits,1995).

2.2. Coping Strategies

Lazarus and Folkman (1984, p.141) define coping strategies as “constantly changing cognitive and behavioural efforts to manage specific external and or internal demands that are appraised as taxing or exceeding the resources of the person”. They go on to further

elucidate that coping refers to efforts to manage (master, minimize, reduce or tolerate) a troubled person - environment relationship (Folkman & Lazarus, 1985).

Lazarus and Folkman (1984) have further distinguished between three main types of coping (which is seen as a process):

- i) an appraisal type of coping which attempts to define the meaning of the event or situation;
- ii) emotion focused coping which attempts to regulate distressing emotions . It aims to manage emotional distress without necessarily changing the meaning of the event or stressor directly. Strategies such as avoidance, minimization, distancing, selective attention, positive comparisons and finding positive value from negative events are utilized. In general, emotion focused coping is more likely to be used when the individual makes an appraisal that harmful, threatening or challenging environmental conditions cannot be changed or modified;
- iii) problem focused coping, where the individual attempts to do something to change (for the better) the problem causing the distress. This implies that the individual feels that there is some degree of control over the situation , that is when a condition is appraised as amenable to change. Strategies used include defining the problem, generating alternative solutions, weighting the advantages or disadvantages of the alternatives, choosing among them and acting.
- iv) Another possibility which exists is that of not engaging in any direct coping behaviour, that is, passivity in the face of stressful events. This issue of passive

response to a stressor is a controversial one, both conceptually and empirically and does not lead to any clear conclusions (but which deserves to be mentioned). The question is “Is a passive response to a stressor adjustive or not?”. In some cases passivity in the face of an uncontrollable stressor is adjustive, as it does not increase ones risk for psychological distress (Cohen, Evans, Stokols & Krantz, 1986). These are situations in which one chooses to remain passive as opposed to having one’s passivity forced on them because they have no effective active strategies. One may choose a passive strategy because not responding is perceived to be the most effective (or at least temporarily useful) way of dealing with the situation. When not responding is perceived by the subject as an individual coping strategy (or chosen as a temporary state that the individual perceives can be replaced at any time with an effective coping strategy), it is an effective way of coping with an uncontrollable stressor. Is passivity a preferred state? When it is, it’s an effective means of coping and when it’s not, it results in helplessness related effects. Choosing not to directly cope with a stressor does not imply total passivity - one strategy is to accept the event and cope with its emotional impact. It is possible that the effectiveness of passivity (a lack of direct coping attempts) in the face of an uncontrollable stressor may be partly or wholly due to refocusing efforts on an aspect of the experience that is controllable (Cohen et al. 1986).

The literature points towards little consistency with regard to which coping strategies are most efficacious in reducing psychological distress or ill health (Thoits,1995). Most researchers assume that individual’s personality variables play a role in the choice of

coping strategy: individual's high in self esteem or perceived control are more likely to use active, problem focused coping responses. Low esteem or low perceived control should predict more passive or avoidant emotion focused coping. Researchers also point out that there is no one strategy that individuals use when coping with stress, in fact multiple tactics are used. It has been found that coping flexibility is important: successful copers are those who are able to adjust their behavioural and emotional repertoires to fit the changing demands of their lives. Individual's who combine problem focused and emotion focused strategies in dealing with stressors may be less susceptible to negative health outcomes than those who rely on one or the other coping style exclusively (Cohen et al. 1986). Further, some strategies such as emotion focused coping involving denial or substance use may be beneficial in the short term, but have deleterious effects in the long term (Thoits, 1995). Thus, coping has both short and long term implications that may involve changes in various aspects of an individual's functioning: well being, somatic health, emotional health and social functioning (Cohen et al. 1995).

Attempts have been made by researchers to understand and categorize coping styles, for example, Folkman and Lazarus (1985) developed the Ways of Coping Checklist which identified eight factors or dimensions: confrontive coping, distancing, self control, seeking social support, acceptance, avoidance, problem solving and positive re-appraisal. The findings indicated that some forms of coping, for example, planful problem solving have a positive effect on emotional responses but others, such as confrontive coping and distancing makes things worse (Folkman & Lazarus, 1988). Some researchers have raised concerns about the validity of the measures used in coping research.

Carver, Scheier & Weintraub (1989) reviewed the Ways of Coping checklist and found that the distinction between problem focused and emotion focused coping was too simple. They felt that responses to the checklist formed several factors rather than just the two. It was felt that researchers viewed factors other than problem focused coping as variations on emotion focused coping. However, these factors often diverged in characteristics to the point of being inversely correlated, an example would be Denial and Acceptance. Hence, they developed a coping measure to study the diversity of potential coping responses. This resulted in the development of the COPE Scale (Carver et al. 1989) which measures 14 “relatively” distinct and clearly focused coping strategies categorized into adaptive and maladaptive responses. Researchers have stated that although no coping strategies can be considered to be adaptive or maladaptive in themselves, approach or engagement strategies are more likely than avoidance or disengagement strategies to modify stressful situations and may be associated with more adaptive outcomes (Mosley et al. 1994).

In their review of self reported assessments of coping measures, but with the focus being the Ways of Coping Checklist, Stone, Greenberg, Kennedy-Moor and Newman (1991) concluded that coping measures do not discriminate adequately between cognitive, emotional and behavioural coping styles. Other concerns were whether or not subjects were rating the various coping questions on the basis of outcome (as opposed to or versus the effectiveness of the strategy), as well as whether or not emotion focused coping (such as defense mechanisms) can be reliably reported upon by patients. Further, Thoits (1995) found that the effectiveness of any one strategy may depend on abstract properties of the stressor (for example, chronic versus acute; or controllable versus uncontrollable); on specific subtypes of stressors (for example, death of a loved one, illness, interpersonal

problems) or on some combination of both aspects. Carver & Scheier's (1989) COPE scale has also come under criticism: certain items appear to confound coping efforts with emotional outcome, specifically distress; for example, an item on the Focus on and Venting of Emotions subscale – "I get upset and let my emotions out" merges distress and expression or strategy. However, Stanton, Danoff-Burg, Cameron & Ellis (1994) do give credit to researchers like Carver & Scheier (1989) for the inclusion of items involving emotional processing and expression in their assessment instruments (particularly when research literature on coping with stress cites the benefits of processing and expressing emotions associated with stressful events). Constant themes in the criticism of coping measures appear to be that coping styles, behavioral styles, cognitive styles, personality styles as well as emotional distress and outcomes are confounding and/or contaminating each other, thus producing assessment instruments which are unreliable. Thoits (1995) also highlights one of the key difficulties in research on coping strategies: that differing research designs and measurement schemes make comparisons across studies problematic and thus findings less cumulative.

2.3. COPING RESOURCES

Various researchers (Thoits, 1995; Cohen et al. 1986; Sutherland & Cooper, 1990) have suggested that the relationship between stress and its outcome varies with individual's pre-existing factors: individual differences or vulnerability may account for the fact that two individuals exposed to exactly the same situation may react in completely different ways. Differences in psychosocial coping resources may render some individuals more vulnerable to the negative effects of stress than others. Folkman and Lazarus (1984) define

psychological vulnerability as the being the relationship between the individuals pattern of commitments and his or her resources for warding off threats to those commitments. Sutherland and Cooper (1990, p.64) define vulnerability as “factors that protect or predispose”. Vulnerability can thus be defined as a particular weakness associated with one of the personal or environmental coping resources (Thoits,1995).

Coping resources can be defined as social and personal characteristics which individuals draw upon when dealing with stressors (Thoits,1995). There are three most frequently studied personal coping resources. These are: personal control or mastery over life; self esteem; and optimism. These coping resources are presumed to influence the choice and or the efficacy of the coping strategies that people use in response to stressors (Folkman, 1984; Thoits, 1995). Researchers such as Sutherland and Cooper (1990), have attempted to isolate idiosyncratic styles. The following are important constructs:

- i) Extraversion and Introversion, which suggests that this dimension mediates a response to a potential stressor and thus influences vulnerability. The extravert is seen as geared to respond and will attempt a response when given the opportunity, whilst the introvert reacts more negatively and suffers more tension;
- ii) Type A behaviour (TAB): interest in this concept has been fuelled by the reported links between TAB and increased risk of heart disease. TAB pattern characterizes the individual as highly competitive, unrelenting, hard driving, achievement orientated, aggressive, restless and impatient especially when unable to rapidly overcome obstacles to their own satisfaction.

- iii) Stability-Neuroticism, the latter which Eysenck (1967) identified as a factor of personality which predisposed a person to respond to stress with neurotic symptoms; have all been investigated. However, some of these constructs have been criticized for being vague and for producing confounding between variables. An example is that of the Type A construct which is not unitary but is multidimensional thus making inferences from this type of construct difficult to interpret (Sutherland & Cooper, 1990, p.80).

There are also environmental and or situational factors which individuals draw upon. These can be demographic factors such as gender, social support, and religious or spiritual input. Thoits (1995) has done an extensive review of the area and has found that demographic variables such as age and/or gender and the availability of social support have yielded certain indicators for vulnerability to stress.

2.3.1. PERSONAL RESOURCES

2.3.1.1. Control

A sense of personal control or mastery over life is the most frequently examined coping resource in the literature (Thoits,1995). Researchers such as Bandura (1982) have suggested that all behaviour is mediated through changes in personal control .

Janis & Rodin (1979, p.499) state that “human beings are not merely interested in avoiding pain and seeking pleasure but are motivated to achieve mastery”. Control is thus seen as

the ability to regulate or influence outcomes through selective responding. Perceived control refers to expectations of having the power to participate in making decisions in order to obtain desirable consequences. It consists of two aspects:

- i) a sense of freedom of choice, being aware of opportunities to select preferred goals and means.
- ii) in terms of control over outcomes, it refers to the person's belief in a causal link between his or her own actions or capability to act and the consequences thereof. The core belief of different individuals in different situations is that they are responsible for the outcomes that accrue to them through their own efforts.

Control has been divided into primary and secondary control (Thomson, Collins, Newcomb & Hunt, 1996). Primary control is the belief that desired outcomes can be achieved through ones own actions. Secondary control involves deriving a sense of control through their ability to accept or adjust to existing realities. Although it is a passive strategy it is different from helplessness because the process involves a belief that some aspect of the situation is being improved through acceptance or through forces outside the individual.

Skinner (1996) has reported that personal control is linked to such positive outcomes such as health, optimism, achievement, persistence, motivation, coping, self esteem personal adjustment and success and failure. Lack of control has been linked to physical, psychological and social symptoms.

Sutherland and Cooper (1990) see locus of control as a possible important moderator of responses to a stressful situation. The construct which they attribute to Rotter (1966) is based on a social learning theory interactionist view of a person. Locus of control refers to the extent to which the individual perceives that he or she has control over a given situation. Individuals with an internal locus of control believe that he or she has control over what happens and that decisions made and actions taken influence personal outcomes. The belief that he or she plays a role in determining the events that impinge upon him or her is viewed as a factor in the expectation of coping with a stressful situation and affecting change, thus he or she suffers less threat and fewer adverse consequences than the externally oriented individual who tends to believe in luck or fate. The external believes that he or she has little influence upon situations and outcomes.

Rotter (1966) proposes that internality is associated with academic success and motivation to achieve. The external appears to be less able to deal with frustration, tends to be more anxious and is less concerned with achievement; thus psychological adjustment and coping ability are poorer. Externals are likely to be compliant and conforming individual, prone to persuasion and ready to accept information, whereas internals prefer to be in control and resist efforts aimed at manipulating their behaviour. It has been also suggested that the most basic difference between internals and externals is the way in which they seek knowledge about their environment: internals put more effort into obtaining information because they feel in control of the reinforcement or reward that results from their subsequent behaviour.

Specific effects of a continual inability to control important events are suggested by Seligman's (1975) Learned Helplessness theory. He has proposed that when persons or animals learn that their reinforcements are independent of their responses, (that is, they lack control over their outcomes), this learning undermines their motivation to initiate further instrumental responses, interferes with learning that other outcomes are controllable and causes a depression of mood. Other researchers modified this concept suggesting that the impact of helplessness on these outcomes increases when the individual lacks a requisite controlling response that is available to others (personal helplessness), and when persons attribute their helplessness to long lived and recurrent – stable causes and to causes that are important for a wide range of outcomes (Cohen, Evans, Stokol & Krantz, 1986).

Learned helplessness in humans provides evidence that depriving someone of control over important outcomes ultimately results in concerns about personal competence, as well as decreased motivation and manifests itself in reported deficits such as depression, anxiety and hostility.

In the Social Learning approach, the influence of environmental events on behaviour is largely determined by cognitive processes, which govern what environmental influences are attended to, how they are perceived and how the individual interprets them. It emphasizes the human capacity for self-directed behaviour change (Wilson, 1989).

Bandura's (1977) Social Learning Theory states that personal efficacy expectations will determine the persistence in mastering coping tasks. He maintains that the stronger the sense of self-efficacy the more active the efforts will be in coping with obstacles. He thus

perceives self-competence as an important mediator of coping ability although he emphasizes that it cannot be assessed without consideration of contextual factors and learned skills.

Research also points towards the need to consider personality styles as mediators of response to stress. To this effect Kobasa (1979) proposed the concept of “hardiness”. She proposed that persons who experience high levels of stress without falling ill have a personality structure differentiating them from persons who become ill under stress. It was postulated that in highly stressful situations, hardy individuals do not fall ill because of their feelings of commitment, control or challenge. Hardy individuals attempt to interpret situations in less stressful ways (Rhodewalt & Zone, 1989). “Hardy” persons are considered to possess three general characteristics: i) the belief that they can control or influence the events of their experience, (this is similar to the internal oriented person in locus of control theory that is, control versus powerlessness; ii) an ability to feel deeply involved in or committed to the activities of their lives, that is, commitment versus alienation and iii) the anticipation of change as an exciting challenge to further development, that is challenge versus threat.

Kobasa (1982) suggests that hardiness facilitates a form of coping that includes: the ability to keep specific stressors in perspective, knowing that one has the resources with which to respond, and seeing stressor situations as opportunities for change (even undesirable events are seen as possibilities rather than threats). This theory was criticized by researchers such as Sutherland and Cooper (1990) who felt that the theory had limited generalizability as the sampling was limited to male, middle and upper level executives and professional groups.

Wallston (1989) also criticized Kobasa's theory saying that it is similar to Bandura's (1977) social learning theory of self efficacy and that combining all three factors into one confounds research efforts. This criticism was further expanded by Hull, van Treunen & Virnelli (1987), who proposed that hardiness is not a unitary phenomenon and that of the three subcomponents only commitment and control are systematically related to health outcomes. Florian, Mikulincer & Taubman, (1995) also found that two components of hardiness - commitment and control improved mental health through the mediation of appraisal and coping. Commitment improved mental health by reducing the appraisal of threat and the use of emotion-focused strategies and by increasing secondary appraisal. Control improved mental health by reducing the appraisal of threat and by increasing secondary appraisal and the use of problem solving and support seeking strategies. These researchers suggest that the challenge component should be eliminated from the hardiness concept as it shows no association with other hardiness components and has no significant value in the structural model linking hardiness to mental health.

Tap (1985) has used Kobasa's (1979,1982) concept of hardiness and Seligman's (1975) theory of learned helplessness as dichotomies to highlight the extremes of effective and ineffective coping. He sees ineffective coping as a lack of control, as helplessness and or pessimism . This view is also supported by Cohen et al. (1986) who see this as "giving up" and emphasize that it could be detrimental to health maintenance and to the achievement of challenging goals. Tap (1985) sees effective coping as hardiness which he suggests manifests as beliefs about control of the environment, optimism and the potential to be successful.

There have been criticisms of the value of the construct of control: these have encompassed the various interpretations that researchers have applied to the concept. Litt (1988) differentiates between two aspects of control: perceived control (as discussed above) and self efficacy (which is defined as self competence). Skinner (1996) has noted that there are three aspects to the concept of control: perceived, actual and potential control. Skinner (1996) states that lack of clarity on this concept has resulted in there being confounding of research findings.

Thus it would appear that the concept of control is more complex than it appears. Irrespective of this most researchers are of the opinion that personal control, actual, perceived (or potential) can alter the way in which a person appraises an event and has significant effects on physical, psychological and social well being. Janis and Rodin (1979) state that control results in stress reduction, through:

- i) self regulated administration, which allows for actual control and which is positively reinforcing and may sometimes decrease the effects of painful stimuli and
- ii) that increased sense of control in the face of uncertain threats leads to increased predictability ,which is stress reducing. Janis and Rodin (1979) feel that both can be true depending on the type of control that is provided. Most researchers are of the view that personal control can alter the manner in which a person appraises an event and that it has a wide ranging effect on individual's mental, physical and social well being.

2.3.1.2. SELF ESTEEM

Self esteem has been defined as an individual's total positive and negative thoughts about himself or herself that is stable over time (Rosenberg,1965). Coopersmith (1967) has defined it as a global self construct having to do with self appraisal or valuation of one's own self. Other researchers have proposed that self esteem is a multi-dimensional, multifaceted fluctuating attribute which while having a baseline, changes according to the roles and expectations of the self and others (Fleming & Courtney, 1984; Marsh, 1986). As such, self esteem also incorporates factors such as physical attractiveness and ability, ideal self, moral self, self expectations and self regard (Marsh, 1986). Brown and Dalton (1995) believed that with regard to function, self-esteem is related to the regulation of feelings of self worth which include terms such as "proud" versus "humiliated" and "pleased with myself" versus "ashamed of myself". These rise and fall in response to internal and environmental events. Hence, self esteem is seen as a capacity to respond to events in ways that protect or restore feelings of self worth. The basic assumption is that self esteem is an important determinant of the way in which people respond to positive and negative events. Self-esteem is thus most closely tied to behaviour when responses to failure, disappointment or rejection are involved. Thus low self esteem individuals place a greater negative value on not attaining a goal than individuals with high self esteem.

In terms of self esteem's relationship to stress, it is seen as a psychological resource that influences the stress and coping process, presumably by preventing people from becoming overwhelmed by stressful events (De Longis, Folkman & Lazarus, 1988). They found that high levels of self esteem moderated the presentation of patients with psychological and

somatic problems, suggesting that persons with low psychosocial resources are vulnerable to illness when their stress levels increase even if they have very little stress in their lives.

Kobasa (1979), in a study of the role of personality as a mediator on the effects of stressful life events on illness onset found that not all individuals exposed to stress fell ill. A variable which can be described as “alienation from self”, (as opposed to commitment to self) was a strong discriminator of the subjects who showed high levels of illness after encountering stress.

Rhodewalt & Zone (1989) proposed that concepts of alienation from self and others manifests itself as an existential malaise that is similar to the trait of negative affectivity, which is characterized by amongst others, a negative view of self. Hence, such non-hardy individuals tend to display a negative and exaggerated reporting style that accounts for both reported high levels of undesirable life change and somatic complaints. Such individuals through their choice of situations, appraisal of situations, self evaluations and interpersonal interactions create social worlds that are subjectively and often objectively more stressful than the experiences of those without these characteristics. This has led researchers to suggest that self-esteem may act as a buffer between the appraisal of stressors and stress outcome that is, buffering the damaging consequences of stress exposure (DeLongis, Folkman & Lazarus, 1988; Thoits, 1995). However, there is still confusion regarding whether self esteem is a stressor, as there are researchers for example, Miller (1992) who feel that low self esteem should be considered as a stressor as it involves a daily experience of self devaluation; and whether self esteem is a personal or impact variable (Thoits, 1995).

2.3.1.3. OPTIMISM

There is a wide body of research which proposes and supports the view that the personality dimension of Optimism – Pessimism plays an important role in a wide range of behavioural and psychological outcomes when people confront adversity (Scheier & Carver, 1992).

This concept, which has primarily been investigated by Scheier & Carver (1985); Scheier, Weintraub & Carver (1986), & Scheier, Carver & Bridges (1994), proposes that optimism may be an important mediator of how people respond to the demands of a stressor and is thus a predictor of outcome. The idea is that people's actions are greatly influenced by their expectations about the consequences of these actions. Scheier & Carver (1985) have defined it as a tendency to believe that one will generally experience good versus bad outcomes in life. It is seen as a process that underlies the self-regulation of behaviour and as a stable characteristic of personality (Scheier & Carver, 1992).

These differences in outcome derive partly from the differences between optimists and pessimists in the manner in which they cope with the challenges in their lives. Optimists differ from pessimists in their stable coping differences and in the kinds of coping responses that they spontaneously generate when given hypothetical coping situations (Scheier et al. 1994).

This has led Scheier & Carver (1985) to develop a brief measure of optimism which they called the Life Orientation Test (LOT). However, both the integrity of the construct of optimism as well as the scale have come under criticism. Much of the criticism involves the

issue of a third variable, that is, whether the effects attributable to optimism might really be due to variance shared with other variables, for example, trait anxiety. Other variables that can be considered to have conceptual overlap are neuroticism or negative affectivity, self mastery and self esteem (Scheier et al. 1994).

Scheier et al. (1994) attempted to address these criticism's in their revision of the LOT scale by responding that optimism may be a stronger independent predictor of some outcomes than of others, with shared variance explaining the results. An example is the overlap between optimism and neuroticism. The authors propose that neuroticism is conventionally viewed as a multifaceted construct that consists partly of the absence of optimism that is pessimism. There is thus a conceptual link between the two.

The authors have also proposed that the construct of self mastery or perception of personal control over life events incorporates a strong sense of positive expectancy for the future, but weds to it a sense of personal responsibility for that expectancy, which is what optimism is tapping. Bandura (1989) appears to agree with this when he attests to research that links well-being with an optimistic sense of personal efficacy. Therefore, optimism can be seen as an existential form of self-efficacy or an existential belief about the control ability of the environment (Scheier et al. 1994).

The same authors have also proposed that self esteem shares ground with optimism in that someone who has the capacity for high self esteem or self worth would also have positive outcomes to life's contingencies. There is an ascription that there is an intrinsic tie between feelings of worth or the self's value and positive outcomes. They further note that as there

is a significant conceptual overlap between constructs, one should therefore expect some form of correlation and a certain amount of shared variance (Scheier et al. 1994).

Regarding how optimists and pessimists cope with stress, Scheier, Weintraub & Carver (1986) found that optimism correlated positively with problem focused coping, use of positive reinterpretation, acceptance and resignation on Folkman and Lazarus' (1985) Ways of Coping Scale. It was also found that optimism correlated negatively with the use of denial and distancing. This is in keeping with Bandura's (1989) theory that normal people distort reality in a positive direction with the result that they show self enhancing biases resulting in more positive or better outcomes.

2.3.2. ENVIRONMENTAL RESOURCES

2.3.2.1. Situational or Demographic

Demographic and situational factors have been considered to have an important role as moderators of stress outcome. Differences within groups such as age, ethnicity, gender, socioeconomic status and educational levels have all been investigated (Cohen et al. 1986; Sutherland & Cooper, 1990). Research provides supports for the hypotheses that women, the aged, unmarried individuals and those from low socioeconomic backgrounds experience high psychological distress (Thoits, 1995).

It has been suggested that individuals belonging to the lower socioeconomic groups have few resources such as skills, level of education and low personal control and self-efficacy.

Hence, they are more vulnerable to feelings of powerlessness, alienation and lack of control (Thoits, 1995), which could lead to feelings of demoralization. Another perspective that has been argued (Turner & Marino, 1994) is that the relationship between social status, life change and psychological distress often depends on the nature and type of event being examined. Disadvantaged groups are not generally vulnerable to all types of stress but appear to be vulnerable to specific subsets of stressors for example in terms of gender, women are more vulnerable to disturbances in their networks that is, events which occur to their loved ones in their social networks. Men are more vulnerable to financial and job related stressors (Thoits, 1995).

Membership of a particular racial and a minority group can affect an individual's response to stress in addition to being a source of stress in itself (Sutherland & Cooper, 1990). Racial prejudice may promote feelings of inadequacy, inferiority, thus impacting on coping style. Perceptions of inequality could be a source of demoralization (Cattell, 2001).

Age also plays an important role in the response to stress. Adaptation and coping must be assessed within the context of age appropriate developmental tasks that must be accomplished by all (Field, McCabe & Schneiderman, 1998). Each life stage has its own particular vulnerability, for example, Arnett (2000) proposes that the age 18-25 is a distinct period in terms of identity correlations and involves exploring a variety of possible life directions in love, work and worldviews, (especially when little has been decided about for certain and when the scope of independent exploration of life's possibilities is greater).

Marital status is also strongly related to physical and mental health status. Married people are healthier and enjoy higher levels of social integration than do the divorced, single or widowed. Divorced people have been shown to be more at risk for physical illnesses, accidents and suicidal behaviour as compared to single or married individuals (Cochrane, 1988).

Transition and change, for example relocation also pose as stressors. Relocation involves the simultaneous loss of close experiences of familiar psychosocial environment and exposure to a new environment, which may include cultural or linguistic differences. In the case of an individual leaving home to reside elsewhere over a period of time, the separation from close family at home can be considered a stressor leading to illness related symptoms. However, relocation need not be a stressful life event if the goal is upward mobility and success. Factors such as distance from home, decisional control over the move (voluntary or involuntary), satisfaction with the new environment and initial state of mental health all combine to determine responses (Fisher, 1988).

2.3.2.2. Social Support

Social support is the most frequently studied psychosocial resource in the stress and coping literature. It has its roots in the discipline of sociology which proposes that psychological well-being is associated with social integration (Sutherland & Cooper, 1990). Social support refers to helpful functions performed for an individual by significant others for example, family members, friends, colleagues and relatives. As such it can be considered a social “fund” from which people may draw upon when handling stressors (Thoits, 1995).

Social support can take many forms:

- i) socio-emotional aid, for example, sympathy and group belonging which convey to the individual feelings of caring and of being valued;
- ii) instrumental aid, for example, action and the provision of material which allow the fulfillment of duties such as child rearing;
- iii) informational aid, for example, advice or feedback which facilitate problem solving efforts (Cohen & Wills, 1985).

Personality variables affect the mobilization, receipt and evaluation of social support. Attributes such as physical attractiveness, social skills; the ability to self disclose and social competence are all instrumental in developing social support and promoting psychological adjustment (Brisette, Scheier & Carver, 2002).

The literature consistently provides evidence that those individuals with greater number of relationships (with friends, family, colleagues and neighbors) report less distress (such as symptoms of physical and psychological ill health) and greater positive affect, regardless of their stress levels than those who possess few such relationships (Cohen & Willis, 1985; De Longis et al. 1988; Turner & Marino, 1994; Emmons & Colby, 1995; Brisette et al. 2002).

Research also indicates that emotional support from significant others, for example, partners or family, accounts for much of the variance of social support (DeLongis et al. 1988). A consistent finding in the literature is that overall happiness is related to the quality of interpersonal relationships (Emmons & Colby, 1995). This is supported by

research done by Koopman, Gore-Felton, Marouf, Butler, Field, Gill, Chen, Israelski & Spiegel (2000) on HIV positive patients. This research found that those individuals who had attachment styles which were anxious and individuals who were less secure in their interactions with significant others were more likely to experience greater stress. However, Bolger, Foster, Vinokur & Ng (1996) questioned the capacity of close relationships in promoting adjustment to life crises like breast cancer. They found that distress among crisis victims undermined support processes, that is, there was little expression of concern, empathy and affection in significant others. The converse of this is that individuals who are involved in interpersonal discord are the most unhappy. It has therefore been suggested that social support provides predictability, security and assistance. This may account for why it acts to change levels of distress experienced in diverse patient populations, for example, patients undergoing bone marrow transplant for cancer (Jacobsen, Sadler, Booth - Jones, Soety, Weitzner & Fields, 2002).

The absence of intimate relationships is found to result in social isolation and loneliness. Loneliness is the personal and subjective experience of discomfort and psychological pain. It consists of emotions such as unhappiness, distress, futility, helplessness, isolation, apathy, oversensitivity, withdrawal, irritability and suspicion. This can also lead to feelings of alienation from others (Schlebusch, 2000). Researchers have expounded on the negative effects of isolation as including addiction, suicide, antisocial behavior and physical illness (Russell, Peplum & Cutrona, 1980). The benefits of intimate relationships (or a lack of loneliness) has been demonstrated in various studies with such diverse populations as patients recovering from coronary heart disease and students (Locke & Colligan, 1986; Newby-Fraser & Schlebusch, 1997).

Other studies have reported a relationships between cigarette smoking and loneliness (Xiang,Wang, Stallones,Yu, Gimbel & Yang, 2000) and correlations between a reduction in natural killer T cell activity and loneliness (Locke & Colligan,1986). Research also points towards a relationship between relational failure, social incompetence and loneliness. Factors implicated in relational failure are low self esteem, shyness, introversion and lack of assertiveness. These are proposed to inhibit support seeking or allow inappropriate self disclosure (Hobfall, 1988; Kleinke, 1991).

A criticism of the research on social support is that it has been used in different semantic contexts and is plagued by persistent conceptual problems (Winnubst, Bunk & Marcelissen, 1988). These authors go on to state that conceptual ambiguity characterizes research on social support, and that predictive validity has been emphasized at the expense of construct validity. Lakey, McCabe, Fiscaro & Drew (1996) state that social support was initially viewed as a unitary construct, but distinctions have been made between two forms of social support: enacted and perceived social support. Enacted social support refers to specific assistance such as advice giving or reassurance, whilst perceived support involves a global impression that support would be available if needed. This is similar to Cohen and Wills' (1985) model referred to earlier. However, the models of social support differ primarily on the extent to which perceived support is a characteristic of the environment or the individual.

Social support is seen as a buffer to stress and its negative somatic consequences. As such, through the mediation of the appraisal and coping process, the individual is buffered from

seeing a situation as helpless and threatening to self-esteem (Lazarus & Folkman, 1984). However, Winnubst et al. (1988) proposed that affective factors such as shame, guilt and self-esteem can be barriers against supportive acts. Asking for social support often implies disclosing feelings of weakness and vulnerability, which may threaten ones self concept or self-esteem. Cohen & Wills (1985) also suggest that certain mechanisms underly social support. These include social support as coping assistance; as a bolster for self esteem; as supportive feedback and as encouraging a sense of mastery or competence. According to Lakey et al. (1996), the mechanisms underlying social support still need to be adequately clarified.

3. HEALTH OUTCOME

Stress is an important mediator of health - behaviour relationships because its broad effects can influence a range of bodily systems and behaviour. Studies increasingly suggest that psychological processes and emotional states influence the etiology and the progression of disease and contribute to overall host resistance or vulnerability to illness (Baum & Posluszny, 1999).

Researchers are interested in stress effects ranging from minor changes in behaviour to dramatic clinical symptoms. Such effects are often viewed as the *raison d'être* for stress research (Bretznitz & Goldberger, 1982). Whilst stress outcome was traditionally the domain of psychosomatic research it has been incorporated into behavioural medicine. It now encompasses a broad agenda covering, for example, well-being, early detection,

prevention, etiology of disease, outcome, predictors of prognosis, post-illness adjustment and quality of life (Baum & Posluszny, 1999).

Implicit in this is the understanding that the manifestation or outcomes of stress may be present along the three levels proposed by Engel (1980) that is, the biological or physical, the psychological or emotional and the social (Sutherland & Cooper, 1990). These are not discrete levels but are interrelated with the failure of coping efforts at any of these levels resulting in a possible increase in an individual vulnerability on other levels, (for example, if an individual has chronically poor coping patterns it may lead to diseases like peptic ulcers or asthma) (Bretznitz & Goldberger, 1982). The study of stress outcomes therefore covers biological or physical; psychological or emotional and social levels of well-being or distress.

3.1. Biological Outcome

Stress has direct psycho-physiological effects on health. Psychosocial stimuli cause changes in bodily functioning and may result in diverse pathological manifestations (Sutherland & Cooper, 1990; Cohen et al. 1995). There are two areas which have received the most attention: the sympathetic adrenal medullary system (SAM) and the hypothalamic pituitary adrenal cortical axis (HPA), (Bretznitz & Goldberger, 1982; Cohen et al. 1986; Cohen et al. 1995).

Interest in the impact of SAM activation on bodily reactions to emergency or stressful situation can be traced to Cannon's (1929) early work on the flight and fight responses. He

proposed that the SAM system reacts to various emergency states with increased adrenalin (epinephrine) secretion. If SAM activation is excessive, persistent, repeated over time or occurs often, it may lead to a sequence of responses resulting in ill health. Schlebusch (2000) likens the SAM to the accelerator of a vehicle which prepares the body for action as it produces different physiological changes to make one more alert and active in crisis situations requiring survival.

There is secretion of catecholamines epinephrine (adrenaline) and norepinephrine (noradrenaline). This results in various effects: haemodynamic changes, (for example, production of additional blood platelets to assist with the clotting of blood in the case of injury); increased blood pressure and heart rate and the production of endorphins (to block out immediate effects of pain) (Cohen et al. 1986; Schlebusch, 2000).

Schore (2002) in a review of the developmental precursors of posttraumatic stress disorder proposed that traumatic attachments in childhood (which are expressed in episodes of hyper-arousal and dissociation) are imprinted into the developing limbic system of the maturing right brain. Thus early abuse negatively impacts on the developmental trajectory of the right brain which is dominant for attachments, affective regulation and the modulation of stress.

In addition, long term immune system activity is repressed until the emergency or stressful situation is over (Schlebusch, 2000). This is also substantiated by Maddock & Pariante's (2001) review which looks at the evidence linking stress with health, particularly cardiovascular disease, cancer and depression. The review (covering the period 1996 to

2000) found strong evidence that chronic stress appears to result in the suppression of the immune response. Acute stress is associated with immune activation and suppression, with inflammatory cytokines which are soluble mediators of the immune response resulting in depression. They further proposed that the “Stress-Cytokine-Depression” model is a biological pathway to explain the link between stressful life events and depression. Other researchers, (for example, O’ Leary, 1990) have found that biochemical measures like natural killer T cells have been used to determine stress response.

The second important area in the biological outcome of stress is the Hypothalamic Pituitary Adreno-cortical axis (HPA). In his work, Selye (1956, 1974) described a general physiological response, the General Adaptation Syndrome (GAS) occurring in response to aversive stimulation. In the first stage (Alarm) the pituitary gland secretes hormones which remain stable in the second stage. In the third stage, if the stressor is severe, somatic defences are depleted. The anterior pituitary and adrenal cortex lose their capacity to secrete hormones, and the organism can no longer adapt to the stressor. Symptoms appear, and if stress continues unabated, vulnerable organs (determined by genetic and environmental factors) break-down. This results in illness and ultimately death (Selye,1956). However, later researchers propose that physiological events occur throughout all stages of the stress response which do not involve such generalized consequences. Specific as well as general reactions to stressor occur (Bretznitz & Goldberger, 1982; Cohen et al. 1986). Reactions can take the form of mobilization of fat, conversion of nutrients to glucose and a rise in blood sugar levels (Schlebusch, 2000). Researchers argue that both the SAM and the HPA overlap. Schlebusch (2000) describes them as operating in the manner of a brake and accelerator of a motor vehicle, functioning

smoothly to orchestrate the numerous complex activities continuously taking place in the body (the cognitive, affective domains and the neurochemical areas of the brain).

The stress literature consistently points towards the negative outcomes which are the result of prolonged activation of certain systems which manifest as physical and psychological disorders (Everly, 1989; Sutherland & Cooper, 1990). The Type A behaviour (TAB) personality is one of the most well researched areas in the stress literature. The TAB pattern has been found to be linked to coronary heart disease (CHD). Anger is associated with physiological responses which promote ischaemia or arterial occlusion, heart attacks and arrhythmias (Virrier & Mittelman, 1996). There have been several factors other than genetic vulnerabilities that have been identified as risks for heart disease. These are high serum cholesterol levels, cigarette smoking, high blood pressure, obesity, glucose intolerance, physical inactivity and certain socio-cultural and psychosocial factors (Sutherland & Cooper, 1990).

Research on the effects of stress have also focused on other illnesses and diseases such as asthma, the common cold, upper respiratory tract infections, diabetes mellitus, cancer, rheumatoid arthritis, multiple sclerosis and HIV or AIDS (Cohen et al. 1995; Baum & Posluszny, 1999). It has also been found that stressors can influence pathogenic states by causing negative affective or emotional states, (for example, changes in alertness, irritability, anxiety and depression). These can affect decisions involving health risks and affect health indirectly, that is, impact on biological and behavioral coping patterns. This can contribute to overall host resistance or vulnerability to others (Baum & Posluszny, 1999).

The primary biological pathway linking emotion to disease is thought to be through the hormones. This area is one of the most commonly investigated in the stress literature (Stone, 1995). Adrenal hormones especially catecholamines and corticoids have been established as principal drivers of stress. However, Cohen et al. (1995) propose that emotional responses are not always required for stressful events to influence disease processes. The effort involved in actively coping with any stressor may also alter many of the same biological processes influenced by emotional response and therefore influence disease development independently of the emotional response.

The direct effects of stress and emotions are supplemented or modified by behaviour which affects health independently but can also mitigate, improve or modify stress effects by reducing its effects and enhancing mood or affect. Stress can also suppress these behaviours or their benefits. Poor diet, smoking, alcohol and drug use have different direct effects on disease processes and indirect effects on physiology and mood or behavior. Smoking, for example, and other forms of tobacco use such as snuff contribute to heart disease, hypertension, stroke, cancer and other conditions affecting the lungs and airways. These agents which may be intended as stress reducing, may end up becoming risk factors if they are used routinely and long term (Baum & Posluzny, 1999).

The importance of psychosomatic or health psychology has been reflected in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (APA, 1994) as Somatization Disorder and Somatic Disorders not otherwise specified. It recognizes the importance of how thoughts, feelings and behaviours affect our health and well-being and evolving

conceptions of mind – body relationships. Many measures have been utilized to investigate stress outcome, (for example, blood flow, digestion, skeletal muscle tone, skin conductance, natural killer cell activity, cortisol and serotonin levels, increase latent viral activity, lymphocyte proliferation and cytokine production). Symptoms such as headaches, irritability and excitability have also been included as measures of psychosomatic function (Baum & Posluzny, 1999; Cohen et al. 1995).

Regarding research measures, researchers such as Scheuch (1986) suggest that self reported measures of psychomatic symptoms correlate well with physical measures and are viable alternatives to physical tests. Research has also gradually shifted away from the confirmation of links between psychosocial or behavioural factors and health outcomes to investigations of mechanisms whereby health benefits or harm occur. It is recommended that more such research take place (Baum & Posluzny, 1999).

3.2. PSYCHOLOGICAL OUTCOME

Whilst the biological stressor stimuli lead to a relatively restricted range of physiological responses, the psychological stress literature posits a broad range of outcomes as stress indicators (Cohen et al. 1995). Psychological distress measures are used by researchers as prima facia evidence of stress outcomes (Derogatis & Melisaratos, 1982). The various diverse measures include concepts such as the study of psychopathology and symptoms of psychiatric disorders; measurements of cognitive impairment; emotional disequilibrium; life satisfaction and quality of life and impaired social relationships. The measures of distress often take the form of self report symptom checklists which use either psychiatric

or psychological symptoms or physical or biological; emotional or mental; and behavioural symptoms (Sutherland & Cooper, 1990).

Self-report measures of distress have come under criticism for reasons such as bias in recall, (that is “effort after meaning” leading to events being over-reported or exaggerated, ambiguity of terms or definitions), (Paykel & Dowlatshahi,1988). However, they have various advantages, for example, they are often brief, are cost efficient and the data is derived from the perspective of the individual experiencing the phenomenon themselves that is, subjective experience. Self-report measures are considered to be the most useful and flexible modality of measuring stress outcomes (Derogatis & Melisaratos, 1982).

One of the main measures of distress are psychiatric disorders or psychopathology (Rabkin,1982; Thoits,1995). Psychopathology as a mental health - stress outcome has been identified and incorporated into the DSM IV (APA, 1994) where it has been classified as Somatoform, Mood or Stress Disorders. It has attempted to improve diagnosis by including stressor identification as one of its axes (Axis 4) on its multi-axial classification system. Including this in the classification recognizes and emphasizes the role and importance stressors play in the pathogenesis of mental illnesses. There are various examples of stress related disorders which are not only different in terms of their symptoms, but also differ with regards to the onset, type of stressor and the duration of the condition. Some examples of stress related conditions are: Adjustment Disorders, Brief Psychotic Disorder, Post-traumatic Stress Disorder (APA,1994). Schlebusch (2000) also cites Dissociative Disorders, Anxiety Disorders and Suicidal Behaviour as other forms of psychopathological stress outcomes.

To briefly discuss some of the disorders mentioned above: Adjustment Disorders occur when individuals are subjected to overwhelming stress, for example, divorce or natural disasters of varying severity. When this occurs individuals show an unhealthy response which is evident in impaired social and or occupational functioning and mood variations which occur within a period of three months of the event. Brief Psychotic disorder is characterized by the presence of psychotic features, for example, hallucinations which occur shortly after a stressor which most people consider to be markedly stressful. (Schlebusch, 2000; APA, 1994).

Substance related disorders (abuse and dependence) are also important. Substances such as alcohol are often used for stress relief and can be considered a maladaptive way of coping (Cohen et al. 1995; Schlebusch, 2000).

3.2.1. Emotional Equilibrium

Emotional equilibrium has long been considered another measure of stress outcome. Herzlich (1973) in her assessment of both ill (clinical) and healthy populations found that her subjects described health as a state of equilibrium. It included aspects such as physical and psychological well-being, absence of fatigue, freedom of movement, good social relationships as well as a lack of awareness of their bodies (implying that there should be no physical discomfort). As such, health is not regarded as a perfect state, but as equilibrium that individuals need or maintain or want to restore when it is disrupted. Emotion refers to a broad class of phenomena encompassing behavioural, cognitive,

physiological and subjective feeling components (Stone,1995). Emotions can therefore be categorized as either positive or negative, have levels of associated physical arousal, (for example, palpitations), as well as states such as anger, anxiety and depression.

The rationale for measuring emotion is its central position in understanding the effects of stress on somatic outcomes, as well as the importance of the construct as an outcome measure in its own right (Stone, 1995). In their discussion of their model of stress, Cohen et al. (1995) place affective or emotional responses to stressors after appraisal and coping but before physiological and or behavioural responses. Lazarus & Folkman (1984) suggest that positive or negative mood is a feeling which occurs as an immediate effect of a stressor, whilst morale (and hence it's negative expression - demoralization) is the long term result.

Therefore according to this model unless there is a appraisal of a demand and an inability to cope, there is no subsequent affective response and hence no physiological or behavioural responses leading to negative outcomes (Stone, 1995). Research supports this model showing that emotional distress and dysphoric emotion are highly inter-correlated with a broad array of illnesses including depression, anxiety, embarrassment and non-assertive behaviour (Cohen et al. 1995, Schlebusch, 2000, Kemeny, Reed, Bower & Gruenewald, 2000).

3.2.2. Post Traumatic Stress Disorder (PTSD)

The research literature has recently been abundant/proliferate in its attention to Acute Stress and Post Traumatic Stress Disorder (PTSD). This was first included in the DSM I in 1952. The response to stress was put under the heading “Gross Stress Reactions’ and subsequent editions (with the exception of the DSM II which was used from 1968 to January 1980), included this diagnosis.

Symptoms of this disorder include dissociativeness, anxiety, intrusive thoughts, emotional numbness or arousal and avoidance behaviours amongst others (Horowitz, 1986; APA, 1994; van der Kolk & McFarlane, 1996; Schlebusch, 2000). It has also been suggested that extreme stress results in difficulties with the regulation of affect, alterations in attention and consciousness, (for example Dissociative Amnesia), alterations in somatic states as well a loss of trust and hope (van der Kolk 1996; Schlebusch, 2000).

The stressors which result in these symptoms are considered to be out of the range of normal human experience and include events like rape and earthquake. PTSD is more severe and long lasting if the source is of human design and involves loss of control, power or status (Cox, 1998). Regarding time frames, Acute Stress Disorder occurs within a month of exposure to the stressful event, whilst PTSD onset may occur up to six months after the event and may last indefinitely (APA, 1994).

In the previous editions of the DSM (I-III), impairment in social, occupational and other areas of functioning was not included. However, it was included as a diagnostic criterion in

the DSM IV (APA, 1994). This shows the scope and the extent of the disorder and indicates different patterns of symptoms during the different stages. There are two current models of PTSD. This includes van der Kolk's (1996) Biological model which likens PTSD to opium-like withdrawal symptoms and Horowitz's (1986) Dynamic Information Processing Model. According to this model, individuals' inner models change as a result of serious life events. The tendency to integrate one's inner models and reality is called the "Completion Tendency". Before the integration or completion, information from and reactions to the traumatic experience are stored in active memory and thus account for the intrusive thoughts victims experience. Avoidance is used to escape from the experience and hence promotes PTSD (Janoff- Bulman, 1988). These symptoms together with panic attacks, increased arousal and depressive symptoms are specific and reliable indicators of PTSD (McFarlane, 1988; van der Kolk, 1996).

3.3. SOCIAL OUTCOME

Stress affects not only an individual's biological or psychological health but his or her social and interpersonal functioning as well. Various researchers, for example, Cohen et al. 1986; and Sutherland and Cooper (1990) propose that stress on an individual is stress on a family, on the work sphere, on interpersonal domains and socio-cultural groups and organizations that the individual belongs to.

Stress can interfere with the number and quality of social resources available which may result in outcome problems. Thoits (1995) & Bolger, Foster, Vinokur and Ng (1996) give examples of cases where life crises may increase an individual's dependency on family and

may change the dynamics of the roles between the affected individual and his or her family. This may occur especially if family members are affected or threatened by the individuals life crisis, or if they are overwhelmed by chronic exposure to the victims difficulties or concomitant distress. They may push too hard or too much for the individual to recover quickly. This may result in isolation or avoidance of further support, with further negative consequences or effects. This then raises the issue of whether social support is a mediating or outcome variable. There is thus evidence that social support acts both as a buffer and an outcome of stress and thus can be interacting in a circular and dialectical manner (Thoits,1995).

CONCEPTUALIZING STRESS, COPING BEHAVIOUR AND HEALTH OUTCOMES IN UNDERGRADUATE MEDICAL STUDENTS

“Medical trainees are the future gatekeepers for the health of the people and it is they who will determine the quality of health care in our rapidly changing world. Therefore none can discount the significance of the journey through medical school nor watch with disinterest the intriguing process whereby students who struggle to master medicine are transformed into physicians” (Coombs, 1978, p. xii).

Entry into and attendance at a medical school presents students with a unique set of stressors and coping tasks. It places particular demands (personal and environmental) on their resources which may have a positive or a negative outcome. In recent years there is a considerable body of research in the area of medical education, it's stressors, individuals personality or dispositional variables and environmental factors which parallels that of stress, coping and health outcomes research.

Whilst medical education and training share many characteristics with other graduate and professional training programmes, for example, examinations and information overload, there are some specific and unique features. The length, rigidity and intensity of the training period from the beginning of medical school through internship is unequalled in any other graduate or professional programme. Although other educational programmes may span the same number of years, they do not involve the same total and inflexible commitment during those years (Nadelson et al. 1983).

Researchers such as Wolf (1994) have gone so far as to suggest that medical education cannot be considered to be an optimal state of health and in fact can be considered to be a health hazard for many young and impressionable medical students. Other researchers acknowledge that medical education and the medical school environment is a stressful one (Vitaliano, Mauro, Mitchell & Russo, 1989; Rospenda, Halpert & Richman, 1994).

Medical education involves physiological, psychological and social stressors that are mediated by students appraisal of their adaptive coping ability as well as their genetic and or dispositional vulnerabilities. Medical students face many stressors, they often do not seek help or wait for a long time to do so especially when they experience psychosocial or psychiatric problems. Some reasons for this, as given in the Canadian Medical Association Policy Summary (1998), are as follows:

- i) an inability to recognize their symptoms;
- ii) an entrenched belief that seeking help is acknowledging weakness or vulnerability;
- iii) fear of negative consequences, for example, the embarrassment of having fellow students find out;
- iv) being identified as an “impaired “ student with concomitant limitations placed on future professional functioning, for example, having to work under supervision post qualification;
- v) fear of breaches of confidentiality;
- vi) skepticism or antagonism towards mental health professionals.

Central to examining medical education from a stress, coping behaviour and health outcome perspective is the study of students perceptions of their medical school experiences. They may appraise these experiences as a threat, loss or challenge (Holroyd & Lazarus, 1979; Folkman & Lazarus, 1985). Differences in coping behaviours can be expected if one individual perceives medical education as a threat or a loss and another as a challenge. As discussed previously, this appraisal process can be primary or secondary in nature. As such it involves an evaluation of the degree of threat or stressfulness to the person, as well as the degree to which the individual believes that he or she has coping mechanisms or options available to them.

According to Wolf (1994) there are many stressors that medical students have to face in the medical school environment. To briefly highlight some of them: there are implicit and explicit demands for academic performance; limited time available for personal or interpersonal issues; the loss or reduction of social interactions and recreational activities, the socialization into the “hidden curriculum” of medical education, (for example, learning the values of being a medical professional), and caring for sick and dying patients.

Whilst almost all researchers agree on the existence of medical school stress, the source of the stress is not clear. Some researchers attribute it to the medical school environment while others attribute it to student characteristics (especially personality variables such as optimism and self- esteem). Yet others believe that such perceptions are the result are the combination of these two factors. Demographic factors such as age, gender are also considered to make students vulnerable to the development of psychological distress or psychiatric symptoms.

Coping resources, for example, social support play an important role in mediating stress and health outcomes. Different researchers have identified different coping strategies that medical students use to alter or manage the problems causing the distress. It appears that a variety of strategies are used to deal with the perceived stressors. Coping strategies such as reappraisal can prevent or reduce feelings of helplessness, hopelessness and powerlessness. They can increase feelings of challenge, competence and hope and thereby facilitate positive health outcomes. All the above could be considered to be losses or threats or challenges. The appraisal of loss, threat or challenge depends on the meaning becoming a qualified medical doctor or successfully negotiating medical school holds for the student as well as his or her vulnerability and perceived coping ability.

The outcomes of perceived medical school stress are both immediate and long term. The consequences can lead to difficulties in physical health, psychological well-being and social and occupational functioning. The outcome of these three areas varies according to the vulnerability, and personal and environmental resources of the individual medical student. (Cohen et al. 1995; Wolf, 1994).

An adaptive outcome for medical educators is ensuring a healthy doctor who delivers quality medical care. For medical students an adaptive outcome involves ensuring that they are in good health (physically, mentally) to ensure that they can face the rigours and demands of private practice or anything else that they may choose to do.

4. Epidemiology

Stress is part of everyone's life and a certain amount of stress is necessary as it contributes to optimal performance. A degree of stress often spurs individuals on to achieve more by providing energy and motivation to perform optimally. Such positive stress was called eustress by Hans Selye (Schlebusch, 2000). In an academic environment, an over-relaxed attitude can lead to complacency and a failure to do sufficient work. When stress becomes overwhelming and is not managed properly, it can have negative effects and lead to physical, mental, social and spiritual difficulties.

There has been an increasing amount of literature on the mental health of doctors. Studies of these individuals' shows that they are much more stressed than the general public (Firth-Cozens, 2001). The figures quoted are that between 17 – 34% of medical doctors experience mental health problems or psychological morbidity (Tyssen, Vaglum, Gronvold & Ekeberg, 2001; Paice, Rutter, Wetherell, Winder & McManus, 2002; Peterlini, Tiberio, Saadeh, Pereira & Martins, 2002).

This psychological distress in doctors manifests itself in various forms. High divorce rates (Ritson, 2001); alcohol and drug use or abuse (Johnson, Michels & Thomas, 1990), suicide (Samkoff, Hockenberry, Simon & Jones 1995; Butterfields, 1998), anxiety and depression (Peterlini et al. 2002); later burnout (Wolf, 1994) and decreased life satisfaction (Wetterneck, Linzer, McMurray, Douglas, Schwartz, et al, 2002) are common. It is estimated that 10 – 20% of all medical students who complete their medical training and become doctors will at some time in the course of their professional careers suffer a

treatable psychiatric disorder (Cockrell, 1991). With regards to undergraduate medical students, many studies cite the presence of high levels of psychological morbidity. Dickstein, Stephenson & Hinz (1990) report that between 4% and 18% identify themselves as being impaired and seek psychiatric assistance annually. Other researchers such as Guthrie, Black, Shaw, Hamilton and Creed (1995) and Firth (1986) estimate that over one third of medical students show psychological morbidity. Researchers such as Firth-Cozens (2001, p.6) propose that there is "...Something about the ... experience of being a ... medical student which causes the increase in symptoms".

5. Perceived Stressors

Medical school and the practice of medicine is stressful and medical students are not immune to the pathologic responses to stress (Cohen, 1996). What is it about medical school experience that makes them experience high levels of psychological distress?

- (i) Medical students start out with the deck stacked against them. Entry into medical school is an extremely competitive process with many students applying but only a few being accepted. In the United Kingdom approximately 10 000 students apply for 5000 places each year (James & Chilvers, 2001).

Since medicine needs more specific course pre-requirements than other faculties, scholars often have to plan their careers early (for example, whilst still at secondary school) in order to study medicine. (Cavenagh, Dewberry & Jones, 2000). Medicine as a career has to be entertained as early as age 13 or 14 in order to follow

the correct academic routes. High academic standards are required to gain entry into medicine (Dangerfield, 2001; Simpson & Budd, 1996). Once they have commenced their studies medical students have no options (other than giving up medicine) for a period of six years if they wish to practice as a doctor. There are no viable exit points for them once they are enrolled in a study programme. They have to follow the course for the full period in order to attain the degree, which enables them to practice.

- (ii) Once accepted into medical school, these students must continue to meet the high standards set for them by others, such as lecturers or tutors (Henning, Ey & Shaw, 1998). Sometimes, high achievement is demanded and an unhealthy, competitiveness with peers is fostered (Coles, 1994). Many of these students who previously have been at the top of the class have to adjust to (what is for them) the novel experience of finding themselves at the middle or even below average grading curves (Clark, 1998; Enns, Cox, Sareen & Freeman, 2001).
- (iii) Medical students are also concerned about the “information overload” and pressure to learn large quantities of new information in the curriculum (Coles, 1994; Enns et al. 2001).
- (iv) There are concerns about the medical school environment, which many students feel present, multiple hurdles rather than opportunities for assessing progress (Coles, 1994). Medical students often perceive the medical school environment as

authoritarian (Wolf and Kissiling, 1983), with lecturers or tutors being seen as unsupportive.

- (v) Many students also struggle with questions about their ability to endure the demands of medical education and the ability to successfully complete medical education (Vitaliano, Maiuro, Mitchell & Russo, 1989; Stewart, Betson, Marshall, Wong, Lee & Lam, 1995). They are also afraid of educational failure and worry about achieving success in examinations (Aktekin, Karaman, Senol, Erdem, Erengin & Akaydin, 2001). Many just hope to survive medical education (Fields & Toffler, 1993). Medical students also have to face disturbing experiences, such as dissecting cadavers (Home, 1990); encounters with patients (Lloyd & Gartrell, 1983) and death and dying (Coombs & Virshup, 1994). Moore, West, Testa & O'Donnell (1998, p.158) quote a fourth year student as stating "like it or not, we've all been socialized to accept a lot more misery matter of factly than we have before. My tolerance level for that behaviour has grown".
- (vi) On an average, medical students spend 29% more time studying than students in other faculties (Helmert, Danoff, Steinert, Leyton & Young, 1997). This time is often spent studying at the expense of personal or social relationships. There is also limited or no time for leisure or recreational activities (Wolf, 1994). Coombs and Virshup (1994) go so far as to state that medical students lifestyles progressively narrow as they exclude recreation, cultural, familial and spiritual activities.

(vii) Also important in medical schooling, is professional socialization or “rites of passage”. Here students from their first year of studying, begin to acquire the attitudes, values, ethics, behaviours and lifestyles of physicians (Wolf 1994). Professional socialization thus entails tacit rather than explicit learning based on an apprenticeship model. It is the “informal” curriculum or the unwritten ethical codes of practice (Pope & Coldicott, 2002). This also involves (particularly in clinical years) establishing and maintaining relationships with interns, registrars, consultants, nursing staff and other allied health professionals. There are also constant face -to -face evaluations, questioning processes at case presentations and ward rounds, etc. (Nadelson et al. 1983; Satterwhite, Satterwhite & Ennarson 1998). Coombs (1978, p.3) quotes a senior student as stating, “Going through medical school is like getting your hand caught in a meat grinder. It just keeps grinding and scooping up more of you as it goes. You gradually get bundled up into a processed package and pop out as a doctor”.

(viii) This direct interaction also opens medical students to perceived mistreatment (including interpersonal conflict between students and teachers, sexual harassment and verbal abuse). This has been found to be widespread and pervasive during medical education (Silver & Glicker 1990; Kassenbaum & Cutler 1998; CMA Policy Summary, 1998). In a study in 14 medical schools in the United States, Nora, McLaughlin, Fosson, Stratton, Murphy–Spencer, Fincher et al. (2002) found that both male and female students reported gender discrimination and sexual harassment in all specialities. However, female students perceived the prevalence to be significantly higher in a number of specialities than males did. The harmful

consequences of these assaults and insults are reflected in the term “traumatic de-idealization” (Kay,1990). This refers to an undercutting of self esteem and the lowering of ideals about teachers and the medical profession (Pope & Coldicott, 2002; Wolf 1994). In fact, medical students do not feel that their teachers are good role models in teaching the doctor-patient relationship (Maheux, Beandoin, Bericson, Côte, Des Marchais & Jean, 2002). Medical students also give accounts of their own, personal and often very negative experiences during their clinical attachments particularly in certain departments (Field & Lennox 1996).

- (ix) Medical students also feel that in foregoing their personal interests and interpersonal ties, they experience feelings of emotional isolation and alienation (Coombs & Fawzy, 1986). Academic superiority is emphasized at the expense of personal growth and development (Wolf, 1994). To add to this, many medical students feel isolated from mainstream campus life and facilities particularly if the medical school campus is separate to the main campus. Dock (1998, p.718) states that “many medical schools are further away from the University in practice and atmosphere (in that) ... many universities which have their engineers and lawyers on the main campus, have the medical school miles distant”. This serves to further reinforce medical students social isolation and alienation. If for example, the sports facilities are on the main campus, medical students are less likely to take important time off to use these. This also limits opportunities to interact with students from other faculties who may be sources of social support.

- (x) Financial responsibilities or debt, are potential problems for many medical students who graduate and have loans to pay off (Wolf, 1994; Ariyan, 2000). There is anecdotal evidence implying high levels of debt in individual cases. Many students have overdrafts, bank loans and amounts owing on credit cards. A study of medical student debt in the United Kingdom indicated that 89% of students had an overall average debt of £5979, rising to a maximum of £27 350. There was an increase in debt as courses (year of study) progressed, with later years (fifth years) having the highest amount. There was a limited correlation with social class or parental income in relation to debt (Dangerfield, 2001). This appears to be an increasing source of stress as there are limited bursaries or scholarships available and increasing competitiveness for those that are available. Many students therefore take out bank loans, which have to be settled upon graduation.
- (xi) Another relatively recent stressor is the prospect of limited practice opportunities or unemployment upon completion of their training particularly in first world countries such as Canada (CMA Policy Summary, 1998). Generally, concerns about the future feature on the list of medical school stressors (Stewart et al. 1995). In the South African context there has been the addition of one year of community service, which commenced in 1999 and thus impacted on the medical students who participated in this study. These students then had to undertake an extra year of working within the national health system. This prevented them from studying or working in the open labour market for a further year.

Some literature also indicates that while these generalized stressors are common to medical students irrespective of year of study, stress appears to increase as student's progress through medical school (Huebner, Royer & Morrell 1981).

In the pre-clinical years, academic demands such as dealing with massive amounts of material to be mastered and preparing for examinations appear to dominate. In the clinical years, major stressors are dealing with sick and dying patients and dealing with medical and allied professional personnel (Wolf, 1994). There are indications that there is a shift in attitudes, values, moods and personality during the course of medical education. Cynical attitudes increase and expressions of humanitarian feelings decrease as students progress through medical school. Graduating medical students perceive that they become more cynical over the course of their medical education (Wolf, 1994). This appears to be due to depersonalization as a form of self protection from becoming emotionally involved with patients. Thus the human qualities of the patient can be avoided successfully and it enables a clear and fault free diagnosis and treatment plan to be drawn (Humphries & Kaney, 1998).

There are also indications that upon entering medical school, students emotional status resembles that of the general population. However, there is a rise in emotional distress (such as depression) over the course of medical school, suggesting that emotional distress during medical school is chronic and persistent rather than episodic (Rosal et al. 1997). Further, medical students in their clinical years also scored poorly on domestic satisfaction, role definition, depression and subjective stress (Helmers et al. 1997). Aktekin et al. (2001) in their study of first year medical students reported that their students psychological health

deteriorated over the course of the year. It thus appears that graduating medical students are worse off psychosocially than when they enter as first years (Wolf, 1994). Therefore, it is important to assess if there are any differences between preclinical and clinical students. Researchers such as Linn & Zeppa (1984) and Huebner et al. (1981) propose that stressfulness increases in the clinical years as students progress through medical school. It thus appears that while stressors may differ a little depending on the year of study, there are generalized stressors common to all years of medical school training.

6. COPING MECHANISMS OF UNDERGRADUATE MEDICAL STUDENTS

Whilst stress in medical training is of rising concern, not all medical students respond to medical education with the development of stress symptoms and the development of psychological distress (Stewart, Betson, Lam, Marshall, Lee & Wong, 1997). The ways in which medical students cope with the stressors of medical school education and training rather than the stressors themselves may be the primary determinant of their health (Lazarus and Folkman, 1984). In research undertaken by Alexander & Haldane (1979), final year students unanimously felt that learning to cope with stress is an important ingredient in the training of a doctor.

Researchers are looking at the role of medical students personality characteristics and coping behaviour on academic performance and psychosocial functioning at medical school (Wolf, 1994, Humphries & Kaney 1998). Personality attributes, attitudes and values are better able to forecast how students are likely to perform during the clinical years, than do measures of intellectual ability alone (Peng, Khaw & Edariah, 1995).

This has led researchers to look at the mediating influences of coping strategies and the moderating influences of psychosocial coping resources (Wolf 1994).

6.1 Coping Strategies

Lazarus and Folkman (1984) propose that problem-focused coping (which is directed at managing or altering the problem causing the distress) and emotion-focused coping (which is directed at regulating emotional responses to the problem) are two strategies that have been identified for dealing with stress.

Individuals who use active coping strategies (planning, seeking social support) show good adjustment to stress events. Individuals who use avoidant coping strategies (denial, wishful thinking) are at greater risk for developing adverse or negative responses to stress (Aspinwall & Taylor, 1992, Folkman & Lazarus, 1988).

Despite the importance of this mediating variable, very few investigations looking at medical student stress, examine the role of coping in attenuating the impact of the stress encountered during medical education (Mosley et al. 1994). Regarding undergraduate medical students, the literature indicates that a variety of different coping strategies are used most frequently (Wolf, Faucett, Randall & Balson, 1988). The use of religion as an emotion-focused strategy has also been implicated in medical students (Ko, Kau & Fones, 1999).

Vitaliano, Maiuro; Russo & Mitchell (1989) in a longitudinal study with first year medical students found that problem focused coping (and seeking social support) decreased while emotion focused strategies increased. Further, they found that social support did not exert a protective role against psychological distress.

Mosley et al. (1994) in a study of third year medical students found that coping efforts contributed significant variance to the prediction of distress well above that accounted for by stress alone. Coping efforts which could be called engagement (Problem focused) strategies were negatively associated with psychological morbidity (in this case depression). Coping efforts classified by disengagement strategies were positively associated with psychological morbidity.

It thus appear that most of the limited research in the area of coping strategies among medical students, points towards the fact that a variety of coping strategies are used in specific stressful encounters (Wolf, 1994).

In a study of first year undergraduate medical students, Chan (1992) found that they used problem focused strategies (including seeking social support) from friends, as well as maladaptive strategies such as rumination and pre-occupation with problems without taking steps towards problem solving. Strategies such as poor emotional regulation, blaming oneself and brooding were perceived as unhelpful.

Chan (1992) concluded that coping skills aimed at active problem solving, appropriate emotional regulation and seeking out and maintaining social support should be

systematically taught rather than to be left to the medical students to acquire in a haphazard manner.

6.2 Coping Resources

Various researchers propose that there are personality variables which may have an impact on the emotional adjustment of medical students (Stewart et al. 1995; Vitaliano et al. 1988). In fact, Peng, Khaw and Edariah (1995, p.283) state that “the importance of personality in the context of medical education cannot be overemphasized”.

Vitaliano et al. (1988) state that distress is a function of individual differences in vulnerability (personality characteristics) and or resources. However, few studies have looked at specific personality variables such as self esteem and optimism. Researchers such as Firth-Cozens (1997) have pointed out that there is a need for studies to explore the importance of personality for mental health among doctors (and future doctors).

Thomas (1975 p.194) proposed that “...psychological stamina is of vital importance to the entering medical student Superior intelligence alone is not enough”. She went on to quote Sir James Pagit (St. Bartholomens Hospital Reports, 1869) that “the personal character, the very nature, the will must be strong if the student is to survive the rigours of medical school”. Researchers such as Humphris and Kaney (1998) and Firth-Cozens (2001) have proposed that personality attributes make certain medical students vulnerable to psychological distress. They suggested that the study of a few well defined personality factors would be useful in understanding the development of psychological distress.

6.2.1 Personal Coping Resources

6.2.1.1 Self esteem

The selection criteria for admittance to most medical school is prior academic achievement. It is those applicants with the best school leaving marks who are selected. Generally, it is those students who have performed in the top 2% of the matriculating population (in three of four subjects – chemistry, physics, biology and mathematics) who are selected (Powis, 1994). He argues that the “myopic focus on academic achievement has led to an inflated view of the academic ability required for medical studies. It has led to the spurious argument that unless you score in the top 2% in your school matriculation examination you will not succeed in the study of medicine at University” (Powis, 1994, p.455).

Hence, the students selected into medicine are among the brightest (Pope & Coldicott, 2002). However, very few studies have assessed the role of self esteem in such a sample. Bramness, Fixdal & Vaglum (1991) found that medical students reported significantly lower self esteem than the general population. Gender differences were also reported with male students reporting lower self esteem preclinically. Bramness et al. (1991) thus reported that this was not in keeping and in fact contrary to the notion that medical students as a group were highly confident in themselves and their abilities.

A possibility may be that medical students need to learn to solve a conflict between what is acceptable performance from their own perspective and the level of attainment as assessed on the academic clinical course. Burns (1980) states that this could be perfectionistic

thinking involving the setting of unrealistic standards, rigid and indiscriminate adherence to these standards, and the equating of performance to self worth.

While Guthrie et al. (1995) did not assess self esteem, they used open ended questions to ask students to describe stressful events. They found that 12.5% of medical students described incidents which resulted in them feeling inadequate in comparison with their peers. Statements such as, “feeling not as brainy as the rest of the group” and “realizing that everyone is cleverer than me” were made by students. Wolf, Von Almen, Faucett, Randall & Franklin (1991) found that self esteem decreased over the course of the first year of medical school study.

Parkerson, Broadhead & Tse (1990) found that medical students who were very satisfied with life had higher self esteem and enjoyed better health status (that is experienced little or no psychological distress). In a study of 169 medical students perceptions of stress and career choice, Linn & Zeppa (1984) found that surgery and internal medicine were cited as two of the most stressful specialities in medicine. Of interest is that those students who subsequently chose careers that they perceived as most stressful had significantly high self esteem and experienced lower levels of unfavourable stress. These authors have suggested some students may be able to tolerate stress better and may even thrive in an environment they perceive as stressful.

Research by Pyskoty, Richman & Flaherty (1990) found differences in the self esteem of medical students both along the course of the first year of medical school as well as along the variable of race (the minority status) of being Black and Hispanic. They found that

when medical students began medical school minority (Black) students reported higher self esteem. However, after one year Black students reported slightly lower self esteem. Hispanic students also started of with high self esteem and continued to display this throughout the year. It thus appears that minority status students such as American Blacks and Hispanics have advantages over white students. This led Pyskoty et al. (1990) to propose that medical students internal resources rather than external resources are more protective against psychological distress. The negative impact on medical students self esteem of abuse in medical school has also been researched by Rosenberg and Silver (1984).

6.2.1.2. Optimism

Research in this area on medical students is also limited with very few researchers having explored this aspect. One of the few to explore the role of dispositional optimism using the Life Orientation Test (LOT) of Scheier and Carver (1990) in medical students were Stewart et al. (1995). The results indicated that optimism protected against the development of psychological distress.

In a subsequent study attempting to predict stress in first year medical students, Stewart et al. (1997) found that students who began the year with amongst other variables, low dispositional optimism were at higher risk for developing symptoms of depression and anxiety. This reinforced their previous findings that dispositional optimism served a protective function. Whilst not directly measuring optimism, Eron (1958) in a longitudinal

study found that medical students attitudes became more cynical as they progressed through medical school.

6.2.2. Environmental Coping Resources

Some studies on medical students have found that there are certain demographic or situational factors which have influenced or moderated outcome. Studies have highlighted gender, ethnic differences and marital status.

6.2.2.1. Gender

Regarding gender, there are differences for males and females medical students. Women increasingly make up to 50% of graduates from medical schools. Various researchers (Hojat, Gonnella & Gang Xu, 1995; CMA Policy Summary, 1998; Field & Lennox 1996; Wall, Bolden, Borril, Carter, Golya, Hardy, Haynes, Rick, Shapiro & West, 1997) have found that female doctors show high prevalence of psychological distress.

Guthrie et al. (1998) report that there are no significant differences between the percentages of men and women who scored as cases in any year of study. However, in terms of percentages women consistently scored as cases over the different years of study (in year one, 39.2%; year four, 34.5% and year five, 25.9%). These findings have also been supported by Toews, Lockyer, Dobson, Simpson, Brownell, Brenneis, McPherson and Cohen's (1997) research undertaken at four medical schools in Canada which found that women reported higher overall levels of stress. Lloyd & Gartrell (1981) have investigated

sex differences in first year medical students. They found that initially, female students were as well adjusted as male medical students. They showed comparable levels of ego resiliency, psychiatric symptomatology and life satisfaction. However, by midyear, the female students were more troubled. They had developed more total symptoms, more depression and more anxiety and had become more interpersonally sensitive and reported less life satisfaction. Female students also reported more stress as they were subjected to more role conflict and less familial support for their academic pursuits. This provides support for the role of environmental stress in a study of medical students.

In addition to these factors, other areas of concern for female medical students may be that choosing to study medicine may place a woman in direct conflict with traditional role expectations of society. While there is cultural change with women receiving a great deal more support than they have in the past to study medicine, they often still question what it would do to their “femininity” (as poorly defined and in flux as this concept is) (Nadelson & Notman, 1983).

There is also an absence of institutional support systems for women. Female students have few medical school faculty members who are role models, as most medical school faculty members (particularly at senior levels) are men (Nadelson & Notman, 1983; Toews et al. 1997). Female medical students also report different experiences of the medical school environment: they report feeling excluded, isolated and not regarded as serious. They also describe some absence of peer support and negative attitudes towards female doctors. Nadelson & Notman (1983) state that many women in medical training continue to feel the subtle effects of institutional practices which are set up without them in mind. These issues

can best be illustrated by the case of Dr Frances Conley, a neurosurgeon who resigned from Stanford University in 1991 after charging her colleagues with 25 years of “gender insensitivity” (Charney & Russell, 1994).

Further, the training years occur during the period of time when peers who are not studying medicine are more free to explore interpersonal relationships and commitments. However, the demands of medical training often preclude intensive commitment or involvement. In the past, female doctors have chosen not to marry or have children or have done this and limited their professional commitments. Unlike women, men have not been constrained to make such choices (Nadelson & Notman, 1983).

This is supported by Field and Lennox’s (1996) research among first and fifth year medical students: female students were seen as being disadvantaged both in terms of career choice and their ability to achieve career goals. Some female students made decisions on career choices with an awareness of domestic responsibilities versus career commitments, particularly as students advanced through to the clinical years.

Role proliferation and consequent role strain is also of concern for women students who will go to become medical doctors. Heins, Fahey & Leiden (1984) found that even though female doctors spend 90% as much time as men in medical work, they tended to assume full responsibility for home and family as well. There are often problems in integrating career and marriage, with dual responsibilities often resulting in role overload and conflict. Training is stressful and lonely and time demands often exclude families and are often cited

as reasons for failure in marriages and close relationships (Nadelson & Notman,1983; Toews et al. 1997).

However, Firth (1986), found that fourth year female students did not report higher levels of general stress than male students. Female students did not represent a greater proportion of the group at risk. However, in terms of reporting of different types of stressful events, women reported that more stressful incidents had occurred but this did not translate into symptomatology. Guthrie et al. (1995) also found that more women reported feeling stressed than men (61.5% versus 50%).

The role of gender has not been studied in terms of other medical school stressors, but it has been increasingly studied in relation to student abuse in medical schools. Heru (2001) found that 50 – 75% of female medical students reported discrimination or harassment. White (2000) surveyed medical students experiences of sexual harassment during medical training and found that 38% of her sample, (both men and women) reported sexual harassment. Women reported 80% of the incidents.

Bickel and Ruffin (1995) found that 63% of women reported at least one incident of mistreatment and 42% of women reported being “publicly belittled or humiliated” as opposed to 36% of the male students. Eight times as many women said that they had been subjected to offensive sexist remarks or names directed personally to them. Nine times as many women reported that they had been subjected to unwanted sexual advances by medical school personnel and twice as many believed that they had lower evaluation or

grades because of their gender overall. In this sample 63% of women named clinical faculty in their hospitals as abusers.

Researchers such as Silver & Glicker (1990) have reported on the high costs of medical student abuse, for example, diminished ability to work and participate in the learning environment. Other sequelae involve female students avoiding certain specialities (such as surgery) for post - graduate training because of past episodes of abuse or harassment experiences (Heru, 2001). More than half of Silver & Glicker's (1990) sample said that the episode of abuse affected them for more than a month, with 16% stating that the episode would always affect them. Of greater concern is the perpetuation of the abuse when these students go on to become teachers or lecturers. The cycle of abuse may continue as part of the "normal cultural experience" of medical school training.

Discrimination on the basis of gender impedes academic success and career satisfaction among women. Giving local statistics, Moodley (1995) referred to the Nelson R. Mandela School of Medicine, University of Natal admissions and found that one third of the graduates in 1994 were women. In 1970 there were 18 male and 6 female graduates. In 1995, these numbers were almost equivalent (67 males and 63 females). He also found that while large numbers of females were entering postgraduate programmes and progressing into academia, the majority of these women were not achieving leadership positions, (for example, there were only three female professors in the medical school in 1995). Addressing the issues of gender and race, Moodley (1995) further went on to state that there were conscious or unconscious biases against women and people of colour which hamper their career paths. In a feedback loop, this contributes to a lack of role models or

“old girls networks” and this leads to isolation, poor career choices and a perpetuation of distrust of women moving up through the ranks.

6.2.2.2.1 Ethnicity

The impact of ethnicity on stress, coping and health outcomes has been briefly explored in medical students. However, this has chiefly been done in the context of “minority” students (Black, Hispanic, Asian) studying in predominantly “White” universities in western or first world societies. The results of such studies point towards the following:

Shervington, Bland & Myers (1996) report that African Americans students often feel isolated and alienated in predominantly “White” medical establishments. Bonnet and Douglas (1983) studied 147 Black medical students and found that these students felt that the university administration’s attitude toward them was less than enthusiastic and that their abilities were perceived as being less than average by their white colleagues. These students felt that white students were better able to relate to white teachers (faculty) and white faculty were unfair to minority students.

Shervington et al. (1996) also reported that female African-American students have to faced the double challenges of sexism and racism. However, in clinical rotations, gender inequities were at times more stressful than those of race. In their qualitative study, 80 – 90% of the students attributed their stress to academic pressure and 10 – 20% cited race and or gender. Those with higher reported stress levels rated race or gender higher.

Black medical students in first year of medical school are also reported to perceive more stressors than white medical students in the same environment (Strayhorn, 1980). This view is supported by Coburn & Jovaisas (1975) study of first year medical students which found that students from subgroups differing from the “mainstream” reported more stress than their mainstream counterparts. Black and Hispanic medical students reported greater social support, higher self esteem, lower anxiety and greater internal locus of control when entering medical school. However over the course of the year, Black students manifest slightly lower self esteem and higher levels of hostility and external locus of control. Hispanic students continued to report higher self esteem and greater social support but had increased external locus of control and higher substance (alcohol) consumption.

Recently there have been studies assessing various aspects of stress, coping behaviours including personality in medical students who are not minorities in their medical schools. The studies have taken place in countries such as China including Hong Kong (Stewart et al. 1995, 1997); Singapore (Ko, Kua & Fones, 1999); Malaysia (Peng, Khaw & Edariah, 1995); West Indies (Foster-Williams, Thomas, Gordan & Williams-Brown 1996); India (Supe 1998); Turkey (Aktekin, Karaman, Senol, Erdem, Erengin & Akaydin, 2001) and Zimbabwe (Vaz, Mbajjorgu & Acuda, 1998).

The results show that these “non - western” medical students experience the same stressors that western or first world medical students do. Vaz et al. (1998) found that 64.5% of first year Zimbabwean medical students aged between 18 and 24 years reported experiencing various levels of stress and or depression. Twelve percent of these students were at serious risk for suicide. In their sample of Singaporean medical students, Ko et al. (1999) found

that 57% of medical students experienced psychological distress. Perceived stressors were difficulty keeping up with reading high volumes of academic work and difficulty in tutorials, limited time for personal activities and peer competition.

In their studies of medical students in Hong Kong, Stewart et al. (1995, 1997) found equally high levels of distress. Sources of stress related to concerns about the medical school environment and curriculum, whether the students had the endurance and ability (the stamina) to be successful as well as the loss of social and recreational contacts. In Supe's (1998) study on Indian medical students, 73% reported to be stressed, with the academically stronger individuals (those with more than 95% of marks) being more stressed.

In their study of Turkish medical students, Aktekin et al. (2001) also reported high levels of psychological distress (47.9%). This was similar to that reported by Stewart et al. (1995) for Chinese students. Concerns or stressors were: dissatisfaction with social activities, worrying about the future; relations with members of the opposite sex; concerns about educational failure and success in examinations. Other concerns were financial problems, and dissatisfaction both with the quality of the medical education as well as with lecturers.

Stewart et al. (1997) examined the role of coping strategies in Chinese medical students and found that students relying on primarily avoidant coping strategies were at higher risk for developing depression and anxiety.

It thus appears that irrespective of ethnicity, medical students in both western and non-western societies experience high levels of distress and in fact, students in non-western cultures appear to experience higher rates of psychological distress.

6.2.2.3. Age

This difference may be due to age. Whilst very few studies address this area, the literature points towards younger medical students experiencing greater distress (Stewart et al. 1995). As pointed out by Stewart et al. (1995), unlike the educational system in Western countries particularly the United States (where the majority of studies on stress in medical students have been undertaken), in many non-western countries, scholars come straight out of school and into the medical school. The medical degree is awarded following undergraduate education rather than as a post graduate degree. Such students are thus typically younger and less mature than their counterparts in the USA. Medical students in the USA begin their medical education after four years of university. Many of the USA students have left their parental homes four years prior to beginning medical school (to attend college). For many students in non-western countries, moving into a dormitory or coming to medical school in another town or city may be their first experience in living away from home with its concomitant psychosocial sequelae (Pasnau & Stoessel, 1994; Stewart et al. 1995).

In a study of older medical students (25 – 30+) performances, Feil, Kristian & Mitchell (1998) found that older students had identified differences in educational priorities as points

of conflict between themselves and younger students. Older students felt that younger students avoided challenging the thought process and were focused on getting good grades. Older students also missed the social support they had enjoyed before entering medical school. Time constraints, cultural differences between older and younger students and geographic separation from family added to this lack of social support (which was most noticeable in times of crisis). There were no differences in stress levels regardless of students ages or class years. Older students rated lower on scales assessing the outcome of hostility (the affect of anger, irritability, resentment and aggression). Living away from home, making the transition from child or adolescent to adult and coping with an intensive course of study can be difficult for young people (Morrison, 2001).

6.2.2.4 Social Support

Rospenda, Halpert and Richman (1994) in a study of third year medical students found that social support was related to lower levels of academic performance, particularly for women.

Miller (1994) research on first year medical students supported Rospenda et al's. (1994) findings: medical students who were continuously symptomatic (psychologically distressed) either had too little or too much social support that is, support from a relative was either non-existent or very good (indicating perhaps over-dependence on a relative).

Some reasons suggested by researchers for the negative relationship between social support and psychological distress is that the costs of social relationships may outweigh the benefits

(Miller, 1994). Similarly, Zeldow, Daugherty, and McAdams, (1988) propose that social attachments can have negative effects on medical student health in that they may constitute a drain on the resources of time pressured medical students.

Wolf (1994) proposes that in a medical school environment, social ties may place competing demands on the students time and energy and have potentially detrimental effects on health. Poirier, Ahrens & Brauner (1998) also report that as medical students progress through their training, friends and relatives perceptions of them change – students are pulled into the medical fraternity and are perceived as doctors by those they have previously depended upon.

The converse of social support is loneliness and researchers such as Xiang, Wang, Stallones, Yu, Gimbel & Yang (2000) found that medical students cited loneliness as one of the major reasons for first smoking. Smoking was used as an indicator of stress in this study.

Single marital status or the lack of a significant close other, for example, a spouse or partner has been found to increase stress levels and is a predictor of suicidal ideation in medical students (Tyssen, Vaglum, Gronwold & Ekeberg, 2001). However, most forms of social support (from relatives, peers and confidantes) are seen as beneficial by most medical students most of the time (Miller, 1994).

7. HEALTH OUTCOMES

Medical school has a negative impact on the health status and life satisfaction of medical students. Pasnau and Stoessel (1994) report that the University of California (Los Angeles) Mental Health Services for Physicians-In-Training which was founded in 1981 evaluated and referred over one thousand medical students. The complaints ranged from simple adjustment problems to life threatening mental and physical disorders. It is thus apparent that medical school training and the distress it engenders impacts on students at various levels: biological, psychological and social.

7.1 Biological Outcomes

Various researchers have investigated the biological responses to stress in medical students. Most of these studies have focused on immune responsiveness and psychoneuro - immune correlations.

Uchakin, Tobin, Cabbage, Marshall & Sams (2001) undertook to study human immune function which might predispose students to an increased susceptibility to infections. First year medical students were subjected to blood sample collection thirty days before an examination and subjects also had blood collected 24 or 48 hours after their examinations. These authors concluded that stress can significantly alter immune cell distribution and in vitro production and secretion of specific cytokines, for example, there was a significant decline in the percentage of natural killer cells 24 hours after examination. This indicates

that when healthy subjects are exposed to stress, their immuno-competence is compromised.

In a prospective study examining the influence of examination stress and loneliness on herpes virus latency (changes in antibody levels), Glaser, Kiecolt-Glaser, Speicher & Holliday (1985) found that medical students having high scores on the UCLA Loneliness scale had significantly higher Epstein-Barr virus antibody titers than low loneliness scorers. This suggests stress-related immuno-suppression.

The dynamics of stress-related decrease of salivary Immunoglobulin A (sIgA) were examined to establish whether an increase of upper respiratory tract (URT) symptoms can be observed either concurrently with or subsequent to sIgA alterations. Another variable was whether students studying behaviour during examinations could be used to predict changes in sIgA. The findings indicate that a progression suppression of sIgA, outlasting the examination period by more than six days exists. Time spent studying explained a significant proportion in sIgA variation. It thus appears that sIgA is affected by stress and that as medical students spend much time studying, this can have long term implications on their health.

Research on production of pro-inflammatory and immunoregulatory cytokines has also been undertaken in medical students. The findings indicate that students who had high levels of stress stimulated, had high levels of production of tumour necrosis factor alpha (TNF – alpha), inter-lenkin 6 and interferon gamma. Thus changes in the production of pro-inflammatory cytokines and negative immuno-regulatory cytokines take part in the

homeostatic responses to stress and that stress induced anxiety is related to a T-helper – I like response. (Maes, Song, Lin, Jongh, Van Gastel, Kenis, Bosmans, De Meester, Benoy, Neels, Demedts, Janca, Scharpe & Smith, 1998).

A significant reduction of lymphocyte proliferation, IL-2 production and percentage of the lymphocyte CD 19 an increase in plasma cortisol levels during stress in medical students has also been found. This suggests that emotional and mood states affect individuals immunity (Guidi, Tricerri, Vangeli, Frasca, Riccardo-Errani, Di Giovanni, Antico, Menini, Sciamanna, Magnavita & Bartoloni, 1999).

Glaser, Kiecolt-Glaser, Malarkey & Sheridan (1998) subjected injected medical students to a series of 3 injections of Hepatitis B vaccine on the last day of their three day examination block. Of a total of 48 medical students, 12 seroconverted after the first injection. These students were categorized as being the lower stress or lower anxiety group. Students who reported greater social support and lower anxiety and stress demonstrated a higher antibody response to the vaccine and a more vigorous T cell response to Hepatitis B surface antigen. This points towards how stress may alter both the cellular and humoral immune responses to vaccines.

The endocrine response to stress has been studied in female medical students by Amario, Marti, Molina, and de Pablo & Valdes (1996). These authors found that prolactin, cortisol and glycemia all increased under stress.

Marshall, Agarwal, Lloyd, Cohen, Henninger & Morris (1998) undertook to assess cell mediated immune responses to stress. Their findings indicated that psychologically stressful situations shift IFN gamma (Type 1) cytokines towards Type 2 and may result in immune dysregulation rather than overall immunosuppression. This, it is proposed may increase the incidence of Type 2 mediated conditions such as increased viral infections, latent viral expression, allergic or asthmatic reactions and auto-immunity during periods of high stress.

Malarkey, Pearl Demers, Kiecolt-Glaser and Glaser (1995) assessed the influence of examinations on adrenocorticotrophic hormones (ACTH), cortisol and or beta-endorphin. They found that medical students who perceived the most stress had significantly higher levels of cortisol. These authors also found that stress associated with examinations produced a dissociation among ACTH, cortisol and beta endorphins.

In another perspective on the impact of stress on immune function, Cohen, Marshall, Cheng, Agarwal & Wei (2000) examined the effects of stress on DNA repair capacity (DRC) which they proposed is central to maintaining a normal cell cycle (defective DRC is one of the factors responsible for carcinogenesis). They found that DRC was significantly higher during times of stress (that is, exams) than after vacation, suggesting a positive association between stress levels and DRC. This points towards the fact that the body has to work harder at times of stress to repair compromised cells.

Lovallo, Pincomb, Edwards, Brackett & Wilson (1986) in their study of medical students both during no exams and exam situations found that cortisol concentrations, heart rate and systolic blood pressure all increased from the no exam to exam situation.

It thus appears that stress has an impact on cell functioning and can lead to compromised immunity at a micro-level. Systems such as cardiac functioning can also be affected. As medical students are constantly being evaluated (in written exams, oral exams, at ward rounds and case presentations), it is highly likely that their biological functioning is constantly highly compromised and the body has to work harder to deal with the negative biological impact of stress.

7.2 Psychological Outcomes

The psychological stress literature posits a broad range of outcomes as stress indicators (Cohen et al. 1995). This applies to the outcome of stress in medical students as well. It has been well documented, is diverse and ranges from studies of psychopathology, general psychological distress, quality of life and substance use or abuse.

Whilst the area of stress symptoms has generally not been studied, (besides psychological or psychiatric morbidity as diagnosed by terms as depression, anxiety, alcohol and drug use), individuals often experience stress symptoms.

Schlebusch (2000) proposes that it is important to get a clear picture of the problems experienced with stress. He has developed a checklist, the Stress Symptom Checklist to

illustrate a wide variety of the signs and symptoms of stress. According to this checklist, stress can be analysed by using Engels (1977) biopsychosocial approach where physical, psychological and behavioral reactions related to interactions are examined. It looks at personal reactions or responses to stress that individuals may themselves not be aware of.

Early research on responses to stress pointed towards medical students who had a significant number of symptoms but who did not readily fit into any diagnostic category and could thus be perceived to be “undiagnosed but psychiatrically ill” (Pitts, Winokur & Stewart 1961). These authors found that 15% of their samples presented with various symptoms such as obsessive concern with routine problems, embarrassment in front of a group, easy fatigueability, sighing, irritability, urinary urgency, nausea, chest pain, headaches, and syncope.

A subsequent study by Thomas & McCabe (1980) assessed medical students awareness of changes in feelings, bodily sensations and behaviour that occurred when they were in stressful situations. They assessed frequency of occurrence of various reactions. The authors found that there were different patterns of human response to stress, consisting of different behavioural and affective reactions which appeared to precede the initial clinical manifestations of some major disease (for example, cancer, hypertension coronary conclusion) or emotional distress (for example, suicide, mental illness) by up to 20 or 30 years. Habits which were significant ranged from general tension, increased difficulty sleeping, loss of appetite, urinary frequency, tendency to check and recheck work, diarrhoea and anger, amongst others.

What was of significance in these students was that:

- (i) Individuals may be ill but not falling into any psychological or psychiatric diagnostic category (Pitt et al. 1961).
- (ii) There are different responses to stress in different individuals (Thomas & McCabe, 1980).

Recent research on medical students also points out that stress reactions such as cognitive disturbances, chronic anger, decreased attention and making mistakes (Peterlini et al. 2002), reduced concentration, poor decision-making (Shapiro, Shapiro & Schwartz, 2000) are common. These are often accompanied by emotional or psychological reactions such as fear, guilt, uselessness, (Guthrie et al. 1995); as well as powerlessness and frustration (Firth, 1986).

In one of the earliest longitudinal studies assessing the outcomes of medical students, the Johns Hopkins Precursors Study (Thomas, 1975), 1337 medical students were followed up for the period 1947 through to 1963. This yielded some important findings: 89 (6.7%) of all medical students left Johns Hopkins before they graduated, 69 (5%) entered medical school in one class and graduated in a later class (with academic failure accounting for a third of those dropping back), a further 14 of the 89 dropouts failed to graduate because of mental illness or character disturbance. Of this sample, 49 (3.7%) of the subjects died prematurely with 17 committing suicide and 54 (4.0%) suffering from mental illness. The findings suggest that poor self image, damaged self esteem and covert depression, anger and fear take their toll when certain students undergo the pressures of medical school.

In a follow up to this study, Chang, Ford, Mead-Cooper-Patrick & Klag (1997) found that of a total sample of 1053 male medical students, 101 men developed clinical depression (with a cumulative incidence at 40 years, being 12,2% including 13 suicides).

In a study of medical students attrition over a 10 year period at one medical school, Simpson and Budd (1996) found that the attrition rate was 14% (283 students). Those who left were academically less able than the control group, with 53% of those who left being asked to withdraw from the course for academic reasons, the rest having left voluntarily. Of these, 30% had personal problems, 9% had a combination of academic and personal problems and 8% had health problems (psychological difficulties were the most common). A range of personal difficulties caused these students to leave the course: some students changed their minds about medicine as a career, some had problems with their future role, some had problems in coping with dissection and some had relationship and family problems, home sickness or social problems. Simpson and Budd (1996) suggested that if medical students are supported better during their time at medical school some problems could be reduced or avoided.

In a study of 217 medical students requesting psychiatric consultation over an eight year period, Dickstein, Stephenson & Hinz (1990) found that on DSM III diagnoses on Axis I, Adjustment Disorder (32%) Mood Disorders (23%) and Anxiety Disorder (13%) were the most common. Parkerson et al. (1990) in their study of 286 first year medical students reported that there was a worsening along all parameters of health and life satisfaction during the course of the year with a marked increase in depressive symptoms.

Regarding empathy, Kliszcz & Rembowski (1998) in a study of first and final year medical students found that there was a decreasing level of empathy in women students, with men becoming more distant. It is hypothesized that this is a defensive mechanism to deal with stressful situations. Researchers also describe that there is a shift in attitudes, values, mood and personality during the course of medical education. Cynical attitudes increased and expressions of humanitarian feelings decreased as medical students progress through medical school. Graduating medical students perceive that they have become more cynical and less idealistic over the course of medical education (Eron, 1995; Wolf, 1989; Johnson & Scott, 1998).

Kay (1990) suggests that this is “traumatic de-idealization”. He states that most students embark on the professional education with excitement, idealism and commitment but emerge disappointed with the process of becoming a doctor, that is, with the professionalization process. This is supported by Firth (1986) who suggests that medical students are concerned that their mentors are less than perfect and that they themselves might repeat the pattern themselves in future.

Other psychological outcomes reported by medical students are feeling of tension, frustration, powerlessness (Firth, 1986), and suspicion (Peng et al. 1995). High hostility scores have been associated with high mortality rates in general. That is, those with high hostility scores have a 6 fold relative risk of dying compared to those with low hostility scores (Barefoot, Dahlstrom & Williams, 1983).

The role of hostility has also been examined by Pyskoty, Richman and Flaherty (1990), who found that after a year of study medical school students reported higher levels of hostility. Vitaliano, Mauro, Mitchell & Russo (1989) have found that medical students reports of levels of suppressed anger increased over the course of their studies. It is proposed that dissatisfaction with medical school is often expressed in terms of hostility.

Coombs (1978) also supports these findings, reporting that during the first two years of medical school, students experience hostility towards the faculty or their instructors. However, these appear to be repressed with very little open belligerence being expressed towards their teachers or instructors. He also reported that hostility dropped in the later years but feelings of irritation, frustration and vexation continued to exist with passive aggressive modes of expression occurring, for example, inattention, not answering, suspicion, etc. Wolf, Von Almen, Faucett, Randall & Franklin (1991) also found that hostility increased in medical students over the course of the first year of study.

Interpersonal sensitivity has also been mentioned in the stress literature on medical students. Lloyd and Gartrell (1981) found that female medical students reported greater increases than male medical students on scales assessing interpersonal sensitivity throughout their year of study.

Depression has been recognized as a significant health problem for medical students. Zoccolillo et al. (1986) have reported that the incidence of major depression during the first two years of medical school is 12%. Clark & Zeldow (1988) have also reported similar rates on the Becks Depression Inventory (BDI) from medical students during their first

three years of study. Chan (1992) in a study of Chinese medical students also found a large proportion of medical students presenting as depressed on the BDI. Vitaliano, Mauro, Russo & Mitchell (1989) found that the percentage of medical students reporting depression doubled over a period of eight months in the first year. Aketkin et al. (2001) found that depression in medical students was twice as prevalent between the beginning of the first year and the end of the first year.

Stewart et al. (1995) found that medical students had high levels of depression as well as anxiety. This was significantly correlated with concerns relating to the medical school environment and curriculum and to whether one had the ability and endurance to be successful. Wolf (1994) quoted a higher figure: that there was a 25% lifetime prevalence for depression and this is three times greater than that for the general population. Stewart et al. (1995) stated that the lifetime prevalence for depression for individuals in medical school is 15%.

Significant levels of anxiety have also been reported in medical students. Lloyd and Gartrell (1981) in their study of first year medical students found that anxiety significantly increased over the course of the year for female students. Hendrie, Clair, Brittain & Fadul (1990) found high levels of anxiety or depression in medical students: 41% in female and 27% in male. Hays, Dickson, Lyles, Ludwig, Martin & Bird (1986) in their study help seeking at the University of Kentucky's medical student support services program, found that of the 11% who sought help, 40% had an adjustment reaction with either depressed, anxiety or mixed mood; 22% had an affective illness and 15% of the students had relationship or marital problems.

Vitaliano, Russo, Carr & Heerwagen (1984) found that anxiety levels in first year students were above the median for psychiatric patients and one standard deviation above the mean relative to non-patient levels. Mosley et al. (1994) found that clinically significant levels of depression were reported by 23% of their third year medical student sample, with 57% reporting high levels of somatic complaints. This was significantly correlated with concerns related to the medical school environment and curriculum and also to whether one had the endurance and ability to be successful.

In their study of Turkish medical students, Aktekin et al. (2001) found that anxiety and depression levels and general psychological distress as measured by Goldberg's 12 item General Health Questionnaire (1972), all rose significantly between the first and second years of study. These researchers concluded that there was a decrease of psychological health in students. Educational demands and social and friendship related factors were found to be reasons for psychological disturbances.

Suicide in medical students has also received attention. Thomas (1975) found that suicide was the most frequent cause of death (34.7%). In a study of suicide rates in United States medical schools, Pepitone-Arreola-Rockwell & Core (1981) found that while rates among men were comparable to the general population, rates for women were three to four times that of the general population. Tyssen, Vaglum, Gronvold & Ekeberg (2001) in a combined study of 522 medical students and young doctors reported that the prevalence of suicidal thoughts was 14%, with the lifetime prevalence being 43%; 8% had planned suicide, whilst 1.4% had attempted suicide. Suicidal ideation in medical school was predicted by a lack of control, personality traits, single marital status, negative life events and psychological

distress (anxiety and depression). They concluded that suicidal thoughts and vulnerability as medical students predicted post-graduate suicidal ideation.

In a South African study by Mayekiso & Ngcaba (2000) assessing suicidal ideation in first year medical students, the findings indicated that 51% of 89 medical students reported a history of feeling that life was not worth living; 23(25,8%) had considered committing suicide; 7 (7.7%) had threatened to commit suicide and that nine students had a history of attempted suicide.

Other negative outcomes involve the use and abuse of substances by medical students. Alcohol use and abuse is highly represented in medical students with the Royal College of Psychiatrists calling it “our favourite drug” as early as 1986 (Wallace, 2000). The foundation of drinking is often laid in the student years with evidence that those who drink in their late teens and early twenties are likely to continue drinking in an abnormal way into adulthood (Ritson, 2001).

“Excessive use”, “heavy drinking” or “problematic use” of alcohol by medical students was estimated at 11% by Clark (1988), 18% by Forney, Ripley & Forney (1988) and 20% by Westermeyer (1988). More recent studies of medical students lifestyles in the United Kingdom show that hazardous drinking and drug misuse are common and rising. A survey of 13 medical schools undertaken in 1994 showed that 26% of medical students were exceeding the recommended limits for sensible drinking (14 units or week for women, 21 units or week for men). A comparable 1998 survey of United Kingdom medical schools showed that this had increased. Amongst those who did drink, 48% of the men and 38% of

the women regularly exceeded sensible weekly units and of concern was that high risk levels of drinking were reported by 12% of men and 7% of women (Ritson, 2001).

In a study by Pickard, Bates, Dorian, Greig & Saint (2000) even higher percentages exceeding sensible limits were reported: 86% reported drinking alcohol (83% men and 88% women). This was at a higher level than the 41% reported by 18 – 24 year old's across the British population in general. Of concern was the increase of binge drinking which was reported by 60.5% of men and 72.2% of women.

Tyssen, Vaglum, Aasland, Gronvold & Ekeberg (1998) reported that 10.5% of students in a Norwegian medical school used alcohol to cope, with there being no differences in gender. Binge or “hazardous” drinking was reported to occur two to three times a month in 14% of all students with men predominating (24%). Use of alcohol to cope was associated with increasing age, mental distress and a lack of religious activity. Senior students used alcohol as a coping mechanism less often, with male gender, religious inactivity, high self esteem and having no children being predictors of hazardous drinking.

A recent South African study by Marais, Calitz, Rataemane & Joubert (2002) found that 28.3% of medical students had used alcohol in a harmful way with social settings often involving peers providing the background. It was found that a number of students used alcohol to cope with stressful situations.

The use of drugs (both illicit and licit, prescription, over-the-counter) is also of concern. Newbury - Birch, White & Kamali (2000) found that cannabis was the most frequently

used drug (45%) in first year medical students. Psychoticism was found to be positively associated with alcohol and illicit drug consumption. Pickard et al. (2000) also reported illicit drug use in their sample: 28.3% of men and 35.6% of women used substances with cannabis being the most commonly used. Other illicit substances such as amphetamines (4.3% men, 67% women), lysergic acid diethylamide – 25 commonly known as LSD (2.2% men and 3.3% women), Ecstasy (2.2% men, 3.3% women), amyl butyl nitrate (2.2% men only) and magic mushrooms (4.3% men and 3.3% women) were also used. It appears that more women were generally using illicit substances than men.

This is different from the results of Westermeyer (1991), who found that of senior medical students, 11.5% of men and 7.3% of women had used marijuana in the past month. It thus appears that rates of substance use are rising especially for women students. McAuliffe, Santangelo, Magnusson, Sobol, Rohman & Weismann (1987) have reported on potential risk factors for all types of drug dependence in medical students as being: easy access to drugs, a family history of abuse, work and home stress, emotional problems and sensation seeking. Of further concern regarding intervention with alcohol (but also applicable to other substances) is that medical students perform academically at high levels in their studies which thus reinforces their denial (Conrad, Hughes, Baldwin, Achenbach & Sheehan, 1988).

A South African study undertaken by Flisher (1989) on psychotropic drug use by fifth year medical students at the University of Cape Town showed that 17.8% of the sample reported the use of a total of 32 psychotropic drugs such as benzodiazepines, stimulants, beta blockers and antidepressants.

To conclude, mental health problems are not respectful of professional status or level of training and that studies show that prevalence rates of psychological disorders among medical students are comparable to those of the general population (Pasnau & Stoessel, 1994). Cohen (1996) stated that medical school is clearly stressful and that medical students were not immune to pathologic responses to stress nor to chemical dependency, alcoholism and mental illness.

7.3. Social Outcome

The negative impact of medical students stress has been alluded to earlier, particularly in terms of social support and psychological outcome. However, due to the pressures experienced at medical school, medical students rarely receive emotional support from school associates and their lifestyles progressively narrow as they exclude recreation, cultural activities, familial and spiritual activities (Coombs & Virshup, 1994). This appears to continue once medical students have graduated and are now working as doctors. In a study of doctors who graduated from one medical school between 1982 and 1986, Hojat et al. (1995) found that both men and women rated lack of leisure time as being the greatest problem. There were gender differences with regards to the decision to take up medicine as a profession: women were less satisfied with this than men and felt it was a less rewarding career than men.

The importance of a caring and supportive marriage and of a psychologically intimate relationship with a loved one have all been emphasized. Medical students with such durable relationships are reported to have better health, be happier and more successful in

their professional lives and in retirement (Coombs & Fawzy, 1982; Coombs 1991; Coombs & Virshup, 1991; Virshup & Coombs, 1993). Medical students were also reported to become more hedonistic during the course of their medical education (Wolf, 1994).

Of concern is the long term effect of medical training on doctors (graduates) and the kind and quality of medical care that they give to their patients (Firth-Cozens, 2001). Coombs and Virshup (1994) emphasize the importance of the well adjusted and non-impaired doctor who can relate compassionately to his or her patients. Cohen (1996) proposes that failure to recognize and effectively deal with an impaired doctor is an abdication of public trust.

8. SUMMARY AND CONCLUSIONS

The issue of perceived medical student stress, coping behaviour and health outcome has been discussed in this chapter from different perspectives that is, the stress and coping literature and the biopsychosocial and transactional models.

The stress and coping perspective can be defined as a dynamic process which is mediated or buffered by individuals perceptions, coping strategies and personal coping resources. Individual differences in human distress and disease result from complex combinations of biological and psychosocial factors.

If individuals are considered to have a weakness in the mediating or moderating domains they are considered to have a vulnerability. Such vulnerabilities may lead to immediate or long term effects in physical health, psychological well-being and social functioning.

This study proposes to use these insights, (which holds that medical student distress is a multivariate phenomenon) to study the concept of perceived medical student stress, their coping behaviour and health outcomes in a sample of Black (African and Indian) South African undergraduate medical students.

9. PROBLEM STATEMENT

There is a diverse cultural population in South Africa, but because of Apartheid (legal separation of races) different medical schools were traditionally nominated for different ethnic groups. The Nelson R Mandela School of Medicine, University of KwaZulu - Natal has traditionally admitted students of Black ethnic origin (African, Coloured and Indian students only). It was only in 1999 that limited numbers of White students were admitted. Thus, Black students have not traditionally constituted a minority at the University of KwaZulu - Natal's medical school

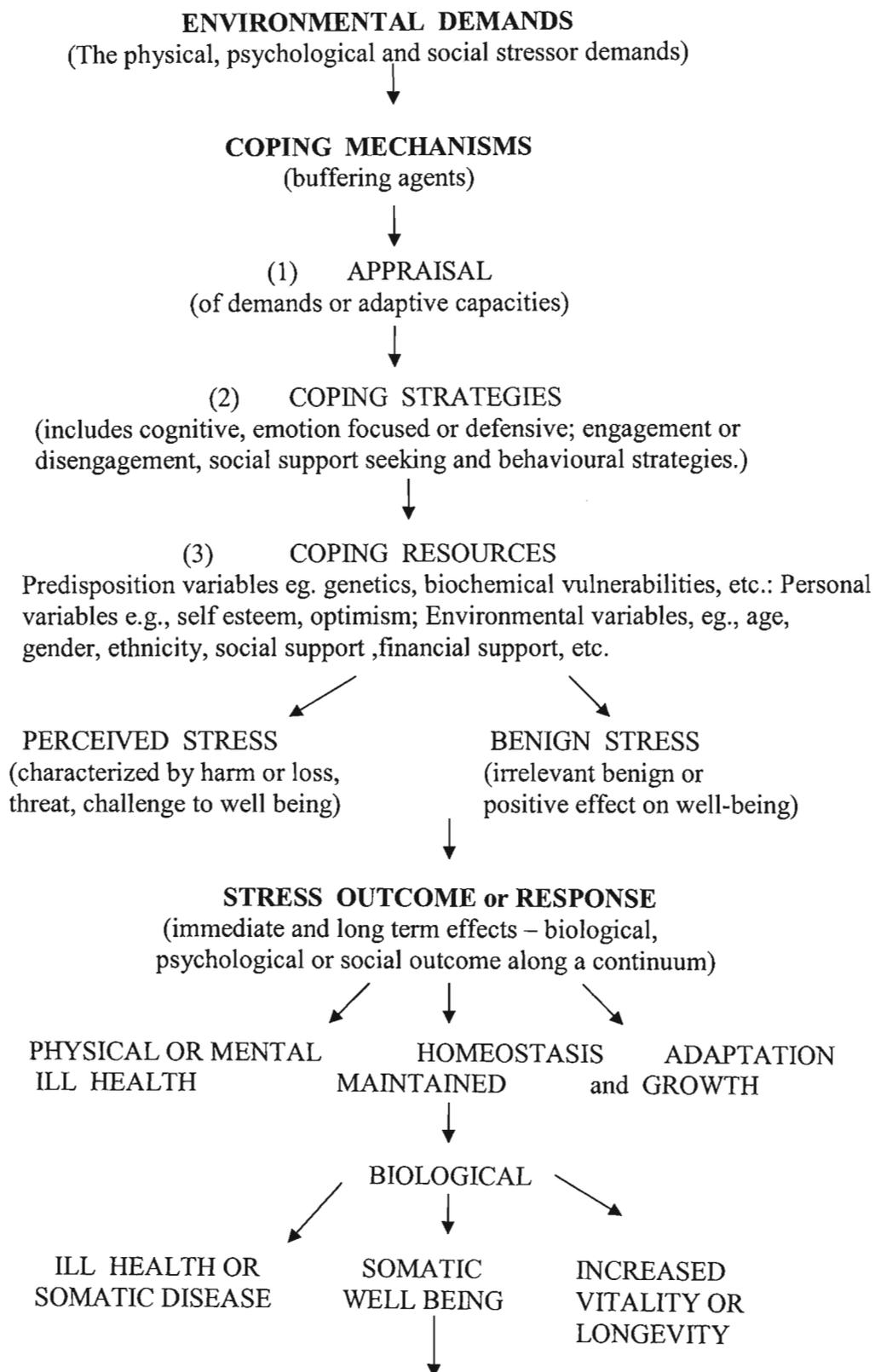
There is also a dearth of literature on medical student stress in the South African context. The present study therefore attempts to address this issue. A multifactorial research design was thus developed with the intention of establishing:

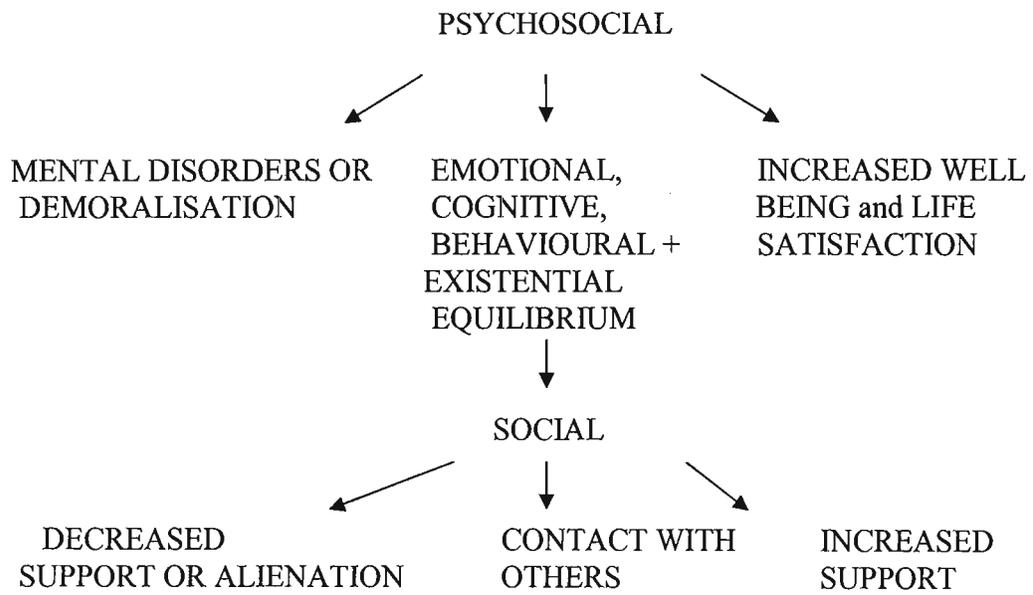
- (i) the perception of medical school stressors or sources of stress.
- (ii) the effect that different personal and environmental variables have on outcomes.

10. CONCEPTUAL MODEL

A unified model of the stress and coping process was used. This is based on Engels (1980) biopsychosocial model and Lazarus & Folkman's (1984) Transactional Stress and Coping Model. A review of the literature indicates that stressful situations trigger individual appraisal processes. These are then mediated through specific coping strategies and are moderated through physical, personal and environmental resources. These result in risk or rescue factors that may lead to immediate or long term effects in the biopsychosocial aspects of physical health, psychological well being and social functioning. The model is presented below in Figure 1.

FIGURE 1: A conceptual, unified model of stress, coping and outcome process





11. RESEARCH QUESTIONS

1. What are the perceived sources of stress for Pre-clinical and Clinical medical students within the medical school environment?
2. What are the effects of psychosocial mediating and moderating variables on health outcomes (stress related symptoms and psychological distress) for the Pre-clinical and Clinical groups?
 - 2.1. What are the differences in moderating variables between the Pre-clinical and Clinical groups?
 - 2.2. What are the differences in mediating variables between the Pre-clinical and Clinical groups?
 - 2.3. What are the differences in health outcomes (stress symptoms and psychological distress) between the Pre-clinical and Clinical groups?
3. Is there a relationship between the perceived stressors and the outcome variables?
4. What are the relationships between the moderating variables and the outcome variables?
 - 4.1. What are the relationships between the personal resource variables and the outcome variables?
 - 4.2. What are the relationships between the environmental variables (age and social support) and outcome variables?
 - 4.3. What are the relationships between the environmental variables (gender and ethnicity) and outcome variables?
5. What are the relationships between the mediating variables and outcome variables?
6. What are the associations between the outcome variables?

- 7.1. What are the associations between the environmental variables (age and social support) and the moderating variables?
- 7.2. What are the relationships between the environmental variables (gender and ethnicity) and the moderating variables ?
8. What are the relationships between the moderating and mediating variables?
- 8.1. What associations exist between the personal variables and mediating variables?
- 8.2.1. What associations exist between the environmental variables (age and social support) and the mediating (cope) variables?
- 8.2.2. What associations exist between the environmental variables (gender and ethnicity) and the mediating (cope) variables?
- 8.3. What relationships exist between perceived stressors and mediating cope) variables?
9. What relationships exist between the personal variables?
10. Can psychological distress in medical students be predicted based on a combined data analysis? Which coping variables are predictors of outcome?
11. What are the general predictors of outcome?
12. What is the role of perceived stressors, mediating and moderating variables on the outcome variables?

CHAPTER THREE

RESEARCH METHODOLOGY

1. Purpose of the study

This multifactorial study proposes to examine the perceived stress that South African undergraduate students at one university report, their means of coping including the role of social support as well as its impact on their psychological health.

The primary aim was to investigate the perceived stress of being in a medical school environment and to delineate health outcomes (stress related symptoms and psychological distress). The secondary aim was to investigate the interrelationship among variables, that is to identify the variables which habituate or facilitate positive or negative outcomes.

The sample consisted of undergraduate medical students from the Nelson R. Mandela School of Medicine, University of KwaZulu - Natal, Durban, which is the only medical school in the province of KwaZulu - Natal. Under "Apartheid" or racial segregation in South Africa, this medical school was one of the very few to accept Black (African, Indian and Coloured) students.

Hence, two groups of medical students of African and Indian ethnicity were asked to participate in order to investigate or elucidate the consequences of stress in the medical school environment. Coloured students were excluded because of their small numbers

(Lehman and Sanders, 1999) at the time of data collection. It was felt that statistical analysis of the small numbers would not be viable. The two groups were made up of Pre-clinical students and Clinical students. The Control group was made up of Pre-clinical students who were in their first to third year of study. The coursework consisted primarily of basic sciences. The Experimental group consisted of medical students in their Clinical years of study (fourth to sixth years). These students were exposed to clinical work in hospitals (including ward rounds, consultations with and physical examinations of patients).

It was decided to compare the two groups (Pre-clinical and Clinical) instead of using students from other faculties because although there are characteristics shared with other graduate programmes (information overload, examinations, etc.), the medical training programme has some specific and unique features which are unequalled in other programmes. These are the length, rigidity, intensity of the training period, a total and inflexible commitment to the programme (Nadelson et al. 1983), dealing with issues such as dissecting cadavers, death and dying (Home, 1990; Coombs and Virshup, 1994), and professional socialization (Wolf, 1994). Furthermore, it is important to engage in research looking at the differences between the two groups as literature indicates that stress appears to increase as students progress through medical training (Huebner et al. 1981). Thus differentiating Pre-clinical and Clinical students on sources of stress and other relevant dimensions is a valuable approach for gaining an understanding of stress, coping behaviour and health outcomes in medical education.

In view of the unified stress and coping model discussed previously, the research sample were hypothesized as experiencing stressors in the medical school environment which necessitated the activation of coping mechanisms that determined their mental health outcomes.

A biographical or demographic questionnaire was formulated and various psychometric assessments were gathered to serve as a battery which would operationalize the research model developed.

2. Sample Description

The sample was drawn from undergraduate medical students. A total sample of 307 subjects were drawn from two groups: the Clinical group, (which was the Experimental group) and the Pre-clinical group (which was the Control group).

The Clinical Group (Experimental group) consisted of 149 medical students in the fourth to sixth year of study. The Pre-clinical group (Control Group) consisted of 158 medical students in the first to third year of study.

3. Method of Data Collection

The Medical Students Representative Council (MSRC) was approached to obtain permission to conduct this study. This was granted and the study was undertaken with the knowledge and support of the MSRC.

Inclusion criteria were that the subjects should all be English literate, be able to understand the study and be willing to voluntarily participate in the study. As the study involved the filling in of self-report questionnaires, the subjects had to be willing to fill in the self-report or rating questionnaires themselves. The study sample was mixed, including both male and female students from the African and Indian ethnic groups. The subjects were not required to fill in any names or student numbers on the Biographical or Demographic questionnaire, and anonymity and confidentiality of all participants was guaranteed.

In each year of study, a randomly selected department (which was involved in lectures to the students) was asked for time to explain the study to the students. It involved showing them the questionnaires, answering any questions and addressing concerns that the students had and to let them decide whether they wished to participate or not. As faculty support of this study was strong, all departments approached agreed to let the researcher present the study to the students.

The researcher then presented the study to all students and informed them that participation in the study was voluntary and that should they chose not to participate this would not be held against them in anyway (that is, they would not be victimized or penalized). The questionnaires (together with a detachable sheet giving written information on the study) were then handed out to the students for perusal. Those who agreed to participate were given information on how the questionnaire would be collected. Arrangements were made with the Medical Library for the collection of the questionnaires. A sealed box was placed at the entrance or exit of the library so that students could drop the questionnaire into it.

Arrangements were also made to collect the questionnaire at the end of designated lecture periods from the students. The data was collected over a two week period and all participants were thanked for their assistance.

4. Description of the Psychometric Test Battery

Questionnaires were selected on the following basis: that confounding variables be kept to a minimum and where possible they were proved to be useful in previous research among medical students or student populations. The psychometric battery included four major categories of data as follows: Stressors, Coping Strategies, Coping Resources and Outcomes. A section was included for Biographical / Demographic information for example: age, gender, marital status, etc. All the instruments were printed together and administered on the form of a booklet (as presented in Appendix A).

The final range of variables selected for the psychometric battery was as follows:

1. Stressor variables
2. Coping Mechanisms
 - 2.1. Coping Strategies
 - 2.2. Coping Resources
 - 2.2.1. Personal Resources
 - 2.2.1.1. Self Esteem
 - 2.2.1.2. Optimism
 - 2.2.2. Environmental Variables

- 2.2.2.1. Age
- 2.2.2.2. Gender
- 2.2.2.3. Ethnicity
- 2.2.2.4. Social Support

3. Outcome Variables

3.1. Stress Symptoms

- 3.1.1. Physiological
- 3.1.2. Psychological
- 3.1.3. Behavioural

3.2. Psychological Distress

- 3.2.1. Somatization
- 3.2.2. Obsessive – Compulsiveness
- 3.2.3. Interpersonal Sensitivity
- 3.2.4. Depression
- 3.2.5. Anxiety
- 3.2.6. Hostility
- 3.2.7. Phobic Anxiety
- 3.2.8. Paranoid Ideation
- 3.2.9. Psychoticism

4.1. Biographical or Demographic Questionnaire

This was developed by the researcher to establish biographical or situational or demographic variables. Data included age, gender, ethnic group, year of study, any failures, first or home language, marital status, area of residence, accommodation or living

arrangements whilst at medical school, religious beliefs. Other factors were: employment or profession of parents or primary caregivers, family members in medical profession and a general section for any comments the student wanted to make.

4.2. Medical School Concerns Scale (MSCS)

This scale assesses sources of stress in the medical school environment. Vitaliano, Maiuro, Mitchell and Russo (1989) developed an 11 item scale that described negative attitudes and perceived dissatisfaction regarding the experience of medical school. This instrument has been reported by the authors as having high reliability (internal consistency reliability coefficient $\alpha = 0.83$) and content validity (Vitaliano et al. 1989). This instrument has been adapted for use with Chinese medical students (Stewart et al. 1995). It was further adapted by this researcher to include additional items, for example, item 16, "I am concerned about the future and how the vocational changes will affect my career in medical practice". This was added as national health legislation had just introduced for the first time in South Africa, the community internship which all medical students have to undertake on completion of their training and prior to full registration with the Health Professions Council. This would result in students being placed as junior doctors (after their general internship year) for an additional year in rural hospitals or clinics.

This has resulted in an instrument named the Medical Schools Concerns Scale with items focusing on five areas:

- (i) Medical school curriculum and environment.

- (ii) Personal or competence and endurance.
- (iii) Social or recreational life.
- (iv) Finances.
- (v) Future or vocational training.

All items were rated on a five point Likert Scale. Scores for each of the five areas or categories were obtained by adding and averaging scores for all items within each area after negatively worded items were reversed with higher scores reflecting greater concern.

4.3. Self Esteem Inventory (SEI)

The Self Esteem Inventory (SEI) developed by Fleming and Courtney (1984) was utilized to obtain a global measure of subjects self esteem. This scale is a revision of Fleming and Watts (1980) instrument and is a uni-dimensional, hierarchically organized global self esteem scale. In their revision of the scale Fleming and Courtney (1984) administered the scale to a sample of 259 students. The reliability coefficient for global self esteem was found to be 0.75 and test – retest correlations were found to be significant beyond the 0.001 level which was based upon re-test data of 48 students. The authors have also reported significant convergent validity (Fleming & Courtney, 1984).

4.4. Life Orientation Test (LOT)

The LOT was developed by Scheier and Carver (1985). It is a 13 item scale answered in a Likert format. The LOT is defined as a measure of generalized expectancies of good

outcomes or alternatively, optimism. The authors also contend that the LOT possesses adequate predictive and discriminant validity. Cronbach's alpha was .87 in various studies. (Scheier, Carver & Bridges, 1994; and Brissette, Scheier & Carver, 2002).

4.5. Brief COPE Inventory (Brief COPE)

The Cope inventory was developed by Carver, Scheier and Weintraub (1989) as a theoretically based approach to the assessment of coping strategies. The Brief COPE (Carver, 1997) is an abbreviated version of the COPE Inventory as earlier patient samples became impatient at responding to the full instrument (both because of the length and redundancy of the full protocol, as well as the long time spent answering it). The scale has alpha reliabilities all exceeding the value of .50 regarded as minimally acceptable. Thus there is internal reliability as well as validity (Carver, Scheier & Weintraub, 1989; Carver, 1997). The Brief COPE has only two items per scale and these are the following 14 scales:

- 4.5.1. Self Distraction – which was the mental disengagement scale but with a slight expansion of mentioned means of self distraction. Activities such as daydreaming, escaping through sleep etc., succeed in distracting the person from thinking about the stressor.
- 4.5.2. Active Coping – a process of taking active steps to try to remove or ameliorate stressors. It includes initiating direct action and effort in order to obtain a coping result.

- 4.5.3. Denial – a response which may be useful in minimizing or ignoring distress. Denial may be useful in the early stages of stressor adjustment but can be considered to be maladaptive in later situations that require more active coping efforts.
- 4.5.4. Substance Use – this involves the use of drugs to ease the pain or to facilitate escape.
- 4.5.5. Use of Emotional Support – this is the perceive ability to get moral support, sympathy and or understanding from those around one.
- 4.5.6. Use of Instrumental Support – this involves seeking assistance or information that will assist the person in coping better with the stressor.
- 4.5.7. Behavioural Disengagement – this involves a reduced effort to deal with the stressor in a manner similar to learned helplessness and could be considered to be a maladaptive coping strategy.
- 4.5.8. Venting – this is the tendency to ventilate the emotions surrounding the event or stressor.
- 4.5.9. Positive Reframing – this was formerly the positive reinterpretation and growth scale. It is a type of emotional strategy that involves focusing on altering the distressing emotions but with no growth.

4.5.10. Planning – this involves coping with stressors by planning action strategies in order to best handle the problem.

4.5.11. Humour – this involves an adaptive emotion focused coping strategy.

4.5.12. Acceptance – this is considered to be the opposite of the denial scale and is important in situations where the circumstance cannot be directly controlled by the individual and must thus be accommodated rather than be changed.

4.5.13. Religion – this measures the degree to which religion acts as a source of emotional support.

4.5.14. Self Blame – this is a new scale that has been added in as this response has been important in earlier work.

4.6. UCLA Loneliness Scale (ULS:20)

The revised University of California, Los Angeles Loneliness Scale (ULS:20) was developed by Russell, Peplau & Cutrona (1980). It is a 20 item scale scored in reverse to represent social support. It is based on the conceptual similarity of social support to its opposite loneliness (Wallston, Alagna, De Vellis & De Vellis, 1983). It has been developed among a student population and thus measures perceptions about and utilization of social support. The scale appears to be very reliable with a Cronbach's coefficient alpha

of 0.94. High levels of convergent, discriminant and construct validity were also found (Russell, Peplau & Cutrona, 1980).

4.7.1. Stress Symptom Checklist (SSCL)

This 87-item checklist was developed by Schlebusch (2004) to illustrate the signs, symptoms and reactions of stress in order to assist individuals in identifying them before they become victims of a specific physical or psychological disorder.

According to this checklist, stress can be analyzed by using the biopsychosocial approach of Engel (1979, 1980). It comprises an analysis of 18 Physiological, 27 Psychological and 42 Behavioural or Social symptoms. The underlying rationale is that each person reacts to stress in their own unique way and this checklist assists individuals to obtain a clearer picture of unpleasant stress symptoms they experienced and which they were perhaps unaware of. In answering the SSCL (which requires < 10 minutes to complete and score) participants have to place a tick or a cross if they are experiencing symptoms along any of the three categories. The maximum score is 87 with < 8 indicating low; 9 – 15 mild; 16 – 30 moderate; 31 – 45 severe and > 46 profound stress. Good reliability coefficients averaging from 8 to 9, as well as convergent validity (ranging from 0.4 to 0.6) was obtained (Schlebusch, 2004).

4.7.2. Brief Symptom Inventory (BSI)

This is a brief psychological self-report inventory developed from its longer parent instrument, the SCL - 90 - R by Derogatis and Spencer in 1982 (Derogatis & Melisaratos, 1983).. The scale comprises 53 items which reflect nine primary symptom dimensions of stress. It's greatest application has been in clinical and research settings where time is of the essence. It provides multi-dimensional symptom measurement in a short period. It consists of the following dimensions:

4.7.2.1 Somatization (SOM): This reflects psychological distress arising from perception of bodily dysfunction. Complaints focus on cardiovascular, gastrointestinal, respiratory and other symptoms with strong autonomic mediation. Aches and pains and discomfort localized in the gross musculature are also frequent manifestations.

4.7.2.2. Obsessive - Compulsive (O-C): The focus of this dimension is on thoughts and actions that are experienced as unremitting and irresistible by the patient but are of an ego-alien or unwanted nature e.g., having to double check actions, difficulty making decisions and trouble concentrating.

4.7.2.3. Interpersonal Sensitivity (IS): This dimension focuses on feelings of personal inadequacy and inferiority. Self deprecation, feelings of uneasiness and marked discomfort during interpersonal interactions also characterize individuals with high levels of interpersonal sensitivity.

4.7.2.4. Depression (DEP): .This reflects a broad range of signs and symptoms of the clinical depressive syndromes. Symptoms of dysphonic affect and mood, withdrawal of interest in life activities and loss of vital energy and feelings of hopelessness and futility are reflected in this dimension.

4.7.2.5. Anxiety (ANX): This dimension subsumes a set of symptoms usually associated clinically with high manifest anxiety. Restlessness, nervousness and tension are all indicative of anxiety, as are experiences reflecting free - floating anxiety and panic.

4.7.2.6. Hostility (HOS): This is organized around three categories of hostile behaviour: thoughts, feelings and actions. Typical experiences cover feelings of annoyance and irritability, urges to break things, arguments and uncontrollable temper outbursts.

4.7.2.7. Phobic Anxiety (PHOB): The symptoms that comprise this dimension are those termed phobic anxiety states or agoraphobia. Phobic fears oriented towards travel, open spaces, crowds are all represented by this dimension.

4.7.2.8. Paranoid Ideation (PAR): This dimension is conceived as syndromal in nature and as a mode of thinking. The primary characteristics of paranoid ideation though are projection, hostility, suspiciousness, and fear of loss of autonomy.

4.7.2.9. Psychoticism (PSY): This dimension sees psychoticism as a continuum, progressing from a mildly alien lifestyle at one extreme to floridly psychotic status at

another. This dimension also represents signs of a schizoid, alienated lifestyle as well as dramatic symptoms of psychoses. In most non-psychiatric populations this dimension measures social alienation.

The nine symptom dimensions thus provide a profile of the individuals psychological status in psychopathological terms. The BSI has good reliability with Cronbach's co-efficient alpha ranging from 0.71 on the Psychoticism dimension to 0.85 for Depression. The BSI also has good validity (coefficients > .30) ((Derogatis & Melisaratos, 1983).

5. Data Analysis

The data from the questionnaires or inventories were transposed onto a spreadsheet programme for analysis. The data was then analysed using the Statistical Package for Social Sciences (SPSS for Windows) and was accomplished in conjunction with the Institute of Biostatistics at the South African Medical Research Council (MRC).

CHAPTER FOUR

RESULTS

This study was designed to be a multifactorial explanation of the relative effects of a specific external stress stimuli and of psychosocial mediating variables on health outcomes, (namely psychological distress or psychopathology). The results are presented in terms of descriptive data (which are presented first), as well as inferential data.

1. DESCRIPTIVE DATA

There was a total sample of 307 volunteer participants. These were divided into two groups. The Clinical (Experimental) group consisted of 149 participants primarily in clinical placements. The Pre-clinical (Control) group consisted of 158 participants whose course work consisted primarily of basic sciences in lecture and tutorial form.

When this study was planned in 1998, there were a total number of 797 students enrolled at the Nelson R Mandela School of Medicine, hence a total of 800 questionnaire booklets was printed and distributed with 315 questionnaires being returned. However, 8 were incomplete and were therefore not included in data analysis.

1.1. Age

The results as indicated in Table 1 show that in terms of age, the subjects in the Clinical (Experimental) Group ranged from 20 to 29 ($\underline{M} = 22.49$; $\underline{SD} = 1.78$).

The age of the participants for the Pre-clinical (Control) group ranged from 15 to 41 ($\underline{M} = 20.11$; $\underline{SD} 2.94$). While there was a wider age range from the Preclinical group, the mean age for the two groups were not significantly different.

Table 1: Age Distribution

Group	Range	Mean	SD
Preclinical	15-41	20.11	2.94
Clinical	20-29	22.49	1.78

1.2. Gender

In terms of gender in the Clinical group, 55 (36.9%) of the subjects were male and 94 (63.1%) were female. In the Preclinical group, 61 (38.6%) were male and 97 (61.4%) were female. The results are indicated in Table 2.

There were more females participants than males in both groups with 190 (61.89%) of the total sample being female as opposed to 117 (38.11%) being male.

Table 2: Gender

Group	Male		Female		Total	
	N	%	N	%	N	%
Preclinical	61	38.61	97	61.39	158	100
Clinical	56	36.91	93	63.09	149	100
Total	117	38.11	190	61.89	307	100

1.3. Ethnicity

As indicated in Table 3, in the Clinical group 56 (37.5%) of the participants were African and 93 (62.4%) were Indian. In the Pre-clinical group, 61 (38.6%) were African while 97 (61.4%) were Indian. Thus the majority of the total sample were Indian.

Table 3: Ethnicity

Group	African		Indian		Total	
	N	%	N	%	N	%
Preclinical	61	38.6	97	61.4	158	100
Clinical	56	37.6	93	62.4	149	100
Total	117	38.11	190	61.89	307	100

1.4. Failure at Medical School

In the Clinical Group, 26 (17.45%) reported having repeated a year or more of medical school, with 123 (82.55%) stating that they had no failures.

In the Pre-clinical group 18 (11.39%) reported having repeated a year or more, with 140 (88.61%) reporting no failures.

When both groups in medical school were combined in terms of years repeated, 44 (14.33%) of the total sample had failed one year or more as indicated in Table 4.

Table 4: Failure

Group	Yes		No		Total	
	N	%	N	%	N	%
Preclinical	18	11.39	140	88.67	158	100
Clinical	26	17.45	123	82.55	148	100
Total	44	14.33	263	85.67	307	100

1.5. First (Home) Language

Regarding subjects first (home) language, English was identified as being the first language of 94 (63.1%) of the Clinical group, followed by Zulu 19 (12.75%); Sotho 14 (9.4%);

Xhosa 12 (8.05%) with 10 (6.71%) subjects stating that “other” (nonspecified) languages were their first language as indicated in Table 5.

In the Pre-clinical group, a similar pattern was apparent, with 98 (62%) of subjects reporting that they were English speaking, 25 (15.8%) Zulu speaking, 11 (7%) being Xhosa speaking and 18 (11.4%) reported speaking “other” languages.

Table 5: First Language

Group	English		Zulu		Xhosa		Other		Sotho		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Preclinical	98	62.03	25	15.82	11	6.96	18	11.4	6	3.80	158	100
Clinical	94	63.1	19	12.75	12	8.06	10	6.71	14	9.40	149	100
Total	192	62.54	44	14.33	23	7.49	28	9.12	20	6.52	307	100

1.6. Marital Status

The majority of the participants in the Clinical group reported being single, 116 (77.85%); 24 (16.11%) reported being in a relationship, 8 (5.37%) stated that they were married and 1 (0.67%) reported cohabiting.

In the Pre-clinical group, there was a similar trend : 138 (87.34%) reported being single; 18 (11.39%) reported being in a relationship; and 1 (0.63%) reported being married and 1 (0.63%) reported being widowed. Thus the majority of the sample were single.

Table 6: Marital Status

Group	Single		In a relationship		Married		Cohabiting		Widowed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Preclinical	138	87.34	18	11.39	1	0.63	0	0	1	0.63	158	100
Clinical	116	77.85	24	16.11	8	5.37	1	0.67	0	0	149	100
Total	254	82.74	42	13.68	9	2.93	1	0.325	1	0.325	307	100

1.7. Area of Residence

In the Clinical group, the majority of the students reported coming from an urban area, that is, 131 (87.92%); with 18 (12.08%) being from a rural area.

In the Pre-clinical group, the majority 128 (81.01%) were from urban areas and 30 (18.99%) were from rural areas. Overall, the majority of students came from urban areas as indicated in Table 7.

Table 7: Area of Residence

Group	Urban		Rural		Total	
	N	%	N	%	N	%
Preclinical	128	81.01	30	18.99	158	100
Clinical	131	87.92	18	12.08	149	100
Total	259	84.36	48	15.64	307	100

1.8. Accommodation Whilst at University

In the Clinical group, 77 (51.68%) of the students reported living at home whilst at medical school; 44 (29.58%) reported living at University residences, 11 (7.38%) reported living in apartments, with 9 (6.04%) reporting sharing accommodation with others; 5 (3.36%) reported living with relatives and 3 (2.01%) reported that they lived with a partner.

In the Pre-clinical group, similar trends were noted: 74 (46.84%) lived with their families at home; 48 (30.38%) lived in University residences, 11 (6.96%) shared accommodation; 9 (5.70%) lived in a flat, 8 (5.06%) lived with relatives and 8 (5.06%) had “Other” (non specified) living arrangements. The results are presented in Table 8.

Table: 8 Accommodation or Living Arrangements

Group	Home		University Res		Off Campus		Flat		Relatives		Other		Partner	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Preclinical	74	46.84	48	30.38	11	6.96	9	5.70	8	5.06	8	5.06	0	0
Clinical	77	51.68	44	29.58	9	6.04	11	7.38	5	3.36	0	0	3	2.01
Total	151	49.18	92	29.97	20	6.51	20	6.51	13	4.24	8	2.61	3	0.98

1.9. Religion

In the Clinical group, 63 (42.28%) classified themselves as being of the Christian faith; 61 (40.94%) of the Hindu faith; 22 (14.77%) followed Islam, 1 (0.67%) person each stated that they followed Traditional religious practices; Christian and Traditional, and other (non specified) faiths.

In the Pre-clinical group, 66 (41.77%) followed Hinduism, 56 (35.44%) Christianity, 23 (14.56%) Islam, 7 (4.43%) other (non specified religious practices), 3 (1.90%) Christianity and Traditional practices, with a further 2 (1.27%) following a combination of Traditional, Christian and “other” religious practices. The results are presented in Table 9.

Table 9: Religious Beliefs

Group	Christian		Hindu		Muslim		Tradit.		Tradit, & Christ.		Other		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
PreClin	56	35.44	66	41.77	23	41.56	0	0	5	3.17	7	4.43	158	100
Clin	63	42.28	61	40.94	22	14.77	1	0.67	1	0.67	1	0.67	149	100
Total	119	38.76	127	41.36	45	14.66	1	325	6	1.95	8	2.60	307	100

1.10. Family or Relatives in Medicine

In the Clinical group, 42 (28.19%) of medical students reported that they had family or relatives who were medical doctors.

In the Pre-clinical group 46 (29.11%) reported that they had family and relatives in the medical profession. The findings are presented in Table 10.

Table 10: Relatives in Medicine

Group	Yes		No		Total	
	N	%	N	%	N	%
Preclinical	46	29.11	112	70.89	158	100
Clinical	42	28.19	107	71.81	149	100
Total	88	28.66	219	71.34	307	100

2. INFERENCEAL DATA

RESEARCH QUESTION 1

WHAT ARE THE PERCEIVED SOURCES OF STRESS FOR UNDERGRADUATE MEDICAL STUDENTS?

The relative impact of the different concerns or demands within the medical school environment as measured by the Medical School Concerns Scale are presented in Table 11. Reliability was assessed using the Cronbach's coefficient alpha and was found to be $\alpha = 0.75$.

The top five concerns of undergraduate medical students in all years in rank order were:

- 1) Item 10 (I am concerned about failing examinations in medical school) – 52%.
- 2) Item 12 (I am concerned about the financial burden as a result of studying medicine) – 45.9%.
- 3) Item 7 (Medical school controls one's life and leaves too little time for other activities). – 44%
- 4) Item 4 (I am concerned that I will not be able to master the entire pool of medical knowledge) – 40%.
- 5) Item 16 (I am concerned about the future and how the vocational changes will affect my career in medical practice) – 33%

In terms of the differences between the Clinical and Pre-clinical groups the top five concerns are:

Clinical or Experimental] Group

- 1) Item 10 (I am concerned about failing examinations in medical school).
- 2) Item 7 (medical school controls ones life and leaves too little time for other activities).
- 3) Item 3 (Teachers do not help students survive medical school).
- 4) Item 4 (I am concerned that I will not be able to master the entire pool of medical knowledge).
- 5) Item 12 (I am concerned about the financial burden as a result of my studying medicine).

Pre-clinical (Control) groups

- 1) Item 10 (I am concerned about failing examinations in medical school).
- 2) Item 7 (medical school controls ones life and leaves too little time for other activities).
- 3) Item 12 (I am concerned about the financial burden as a result of my studying medicine).
- 4) Item 16 (I am concerned about the future, and how the vocational changes will affect my career in medical practice).
- 5) Item 4 (I am concerned that I will not be able to master the entire pool of medical knowledge).

The results indicate that four of the top five concerns are shared by both the Clinical and Pre-clinical medical students. The only two differences are that Pre-clinical students ranked item 16 (I am concerned about the future, and how the vocational changes will affect my career in medical practice) as number four, while Clinical students ranked it as number eight on their list of concerns within the medical school environment.

The other difference is that Clinical group ranked item 3 (Teachers do not help students survive medical school) as number three while Pre-clinical students ranked it number 12.

A stepwise discriminant analysis was undertaken to see which concerns differentiate the two groups. Two items were identified as significant (in favour of the Clinical group): Item 3 (Teachers do not help students survive medical school (partial $r = 0.129$; $p < .001$); and Item 8 (medical school is old and bureaucratised) (partial $r = 0.0164$; $p < .05$).

Furthermore, as indicated in Table 12, the Clinical Group had higher mean scores on the Medical School Concerns Scale ($M = 55.31$, $SD = 8.22$) indicating more concerns with perceived stressors than the Pre-clinical group ($M = 51.59$, $SD = 9.13$, $p < .001$).

Table 11: Medical School Concerns

Item No.	Perceived Stressors (Medical School Concerns)s	Group				Combined		p. value
		Pre-clinical		Clinical		Mean	SD	
		Mean	SD	Mean	SD			
1.	Medical School makes one into a doctor at the expense of one's personality and interests	3.39	(1.30)	3.83	(1.22)	3.60	(1.28)	.002 **
2.	Medical School fosters a sense of anonymity and isolation among students	3.12	(1.34)	3.46	(1.22)	3.28	(1.29)	.02 *
3.	Teachers do not help students survive medical school	3.08	(1.32)	4.00	(1.05)	3.53	(1.28)	<.001 ***
4.	I am concerned that I will not be able to master the entire pool of medical knowledge	3.63	(1.32)	3.98	(1.26)	3.80	(1.30)	.02 *
5.	I am concerned that if I do not succeed in medical school my life will be ruined	3.15	(1.52)	3.3.	(1.32)	3.22	(1.43)	.36
6.	Medical School is more of a threat than a challenge	2.22	(1.28)	2.64	(1.40)	2.42	(1.35)	.005 **
7.	Medical School controls one's life and leaves too little time for other activities	3.98	(1.22)	4.07	(1.13)	4.03	(1.17)	.49
8.	Medical School is cold and bureaucratized	3.18	(1.34)	3.81	(1.13)	3.49	(1.28)	<.001 ***

Item No.	Perceived Stressors (Medical School Concerns)	Group				Combined		p. value
		Pre-clinical		Clinical		Mean	SD	
		Mean	SD	Mean	SD			
9.	I am concerned that I will be unable to endure the long hours associated with clinical training and practice	2.85	(1.37)	3.05	(1.29)	2.95	(1.33)	.19
10.	I am concerned about failing examinations in medical school	4.18	(1.17)	4.13	(1.13)	4.16	(1.15)	.71
11.	I will have to learn material that is irrelevant	3.08	(1.29)	3.07	(1.15)	3.07	(1.22)	.91
12.	I am concerned about the financial burden as a result of my studying medicine	3.87	(1.35)	3.89	(1.31)	3.88	(1.33)	.9
13.	I believe I am adequately prepared to go through medical school	3.59	(1.38)	3.50	(1.23)	3.54	(1.31)	.5
14.	The Medical School curriculum is boring and uninteresting	2.30	(1.15)	2.44	(1.19)	2.37	(1.17)	.3
15.	I am concerned about finding a job after I complete my training	2.28	(1.41)	2.38	(1.39)	2.33	(1.4)	.5
16	I am concerned about the future and how the vocational changes affect my career in medical practice	3.70	(1.29)	3.75	(1.22)	3.72	(1.25)	.7

* p < .05; ** p < .01 *** p < .001

RESEARCH QUESTION 2

WHAT ARE THE EFFECTS OF PSYCHOSOCIAL MEDIATING AND MODERATING VARIABLES ON HEALTH OUTCOMES, THAT IS, THE DEVELOPMENT OF STRESS SYMPTOMS AND PSYCHOLOGICAL DISTRESS FOR THE PRE-CLINICAL AND CLINICAL GROUPS?

2.1 What are the differences in moderating variables between the Pre-clinical and Clinical groups?

The respective differences in personal and environmental moderating variables between the Clinical and Preclinical groups were identified. T tests revealed no significant differences between the two groups on the variables of self esteem, optimism and social support as reflected below in Table 12. However, an analysis of mean scores on the three variables showed that the Clinical group had lower self esteem ($\underline{M} = 122.6$, $\underline{SD} 47.84$); were less Optimistic ($\underline{M} = 41.26$, $\underline{SD} 9.76$), and had lower Social support that is were more lonely ($\underline{M} = 54.36$, $\underline{SD} 10.65$) than the Pre-clinical groups: Self esteem ($\underline{M} = 126.6$, $\underline{SD} 45.15$, $p > .5$); Optimism ($\underline{M} = 42.94$, $\underline{SD} 9.46$, $p > .1$); Social support ($\underline{M} = 55.93$, $\underline{SD} 11.75$, $p > .1$).

2.2 What are the differences in mediating variables between the Pre-clinical and Clinical groups?

The BRIEF COPE scale of Carver et al. (1989) was used as a mediating variable in this study. Cronbach's coefficient alpha was used for reliability which was found to be $\alpha = .73$.

Analysis of Table 12 indicates the following: The Clinical group used the coping mechanism of Denial ($p < .05$) and Substance Use ($p < 0.001$) more than the Pre-clinical group did.

The findings also show that the coping strategies used significantly by Pre-clinical students were: Active coping ($p < 0.001$); Use of Emotional support ($p < .05$); Use of Instrumental Support ($p < .01$); Positive Reframing ($p < .01$); Acceptance ($p < .01$); Religion ($p < .01$), Self Blame ($p < .05$) and Planning ($p < 0.001$). In terms of the use of the coping strategies, an analysis of Table 12.1 indicates that the Pre-clinical group has higher coping scores, ($M = 67.30$, $SD 9.76$) that is, they appear to be using significantly more coping strategies (as indicated above) than the Clinical group ($M = 63.68$, $SD 9.61$, $p < .01$).

Thus, the Clinical group appear to be using fewer coping strategies as well as those which could be considered to be maladaptive or disengaging in nature (Denial and Substance Use).

2.3. What are the differences in health outcome variables (stress symptoms and psychological distress) between the Pre-clinical and Clinical groups.

The Stress Symptom Checklist (Schlebusch, 2004) consisting of three subscales, the physiological, psychological and behavioural was used to assess for stress symptoms. Reliability was assessed using Cronbach's coefficient alpha and was as follows: Physiological $\alpha = 0.91$; Psychological $\alpha = 0.95$, Behavioural $\alpha = 0.96$.

In addition, the Brief Symptom Inventory (BSI) (Derogatis & Spencer, 1982) was used to assess for psychological distress along nine symptom subscales or dimensions. Reliability was assessed using Cronbach's coefficient alpha and was found to be $\alpha .96$

The findings as indicated in Table 12 show that for the Behavioural dimension of the Stress Symptom Checklist, the Pre-clinical group reported significantly more stress symptoms ($\underline{M} = 19.40$, $\underline{SD} 11.6$) than the Clinical group ($\underline{M} = 16.60$, $\underline{SD} 10.70$, $p < .05$).

Further analysis indicated that the Pre-clinical group endorsed certain items (listed below) on the Behavioural subscale of the Stress Symptom Checklist :

- 1) BR8 – the need to constantly take work home (Chi-Square = 10.84, $df = 2$, $p < .01$).
- 2) BR11 – low interest in work (Chi-Square = 6.80, $df = 2$, $p < .05$).

- 3) BR16 – difficulty in showing any feelings (Chi-Square = 7.19, df = 2, $p < .05$).
- 4) BR17 – worrying (Chi-Square = 6.54, df = 2, $p < .05$).
- 5) BR19 – making unnecessary mistakes (Chi-Square = 6.480, df = 2, $p < .05$).
- 6) BR20 – the need to regularly work late (Chi-Square = 12.09, df = 2, $p < .05$).
- 7) BR 22 – difficulty in completing one task before rushing onto the next (Chi-Square = 6.60, df = 2, $p < .05$).
- 8) BR24 – nail biting (Chi-Square = 7.15, df = 2, $p < .05$).
- 9) BR25 – an excessive appetite (Chi-Square = 11.12, df = 2, $p < .05$).
- 10) BR27 – frantic bursts of energy (Chi-Square = 7.93, df = 2, $p < .05$).

In terms of psychological distress as measured by the nine dimensions of the Brief Symptom Inventory, the significant findings were as follows: The Pre-clinical group had higher levels of Psychoticism (indicating social alienation in non-psychiatric samples) (\underline{M} = 11.60, \underline{SD} 4.87) than the Clinical group (\underline{M} = 10.37, \underline{SD} 4.07, $p < .05$).

Table 12: Differences in perceived stressors, mediators, moderators and outcome variables

	Pre-clinical		Clinical		p value
	Mean	(SD)	Mean	(SD)	
Stressors					
Medical School Concerns	51.59	(9.13)	55.31	(8.22)	0.0002***
Moderators					
<u>Personal Variables</u>					
Self esteem	12.66	(45.15)	122.6	(47.84)	0.50
Optimism	42.94	(9.46)	41.26	(9.76)	.13
<u>Environmental Variables</u>					
Social support	55.93	(11.75)	54.36	(10.65)	.22
Mediators					
<u>Cope</u>					
Self distraction	5.1	(1.7)	4.9	(1.6)	0.30
Active coping	5.8	(1.5)	5.0	(1.8)	<0.001***
Denial	3.3	(1.6)	3.7	(1.6)	0.02*
Substance use	2.5	(1.3)	3.3	(1.7)	<0.001***
Use of Emotional support	5.3	(1.9)	4.9	(1.6)	0.04*
Use of Instrumental support	5.2	(1.9)	4.6	(1.6)	0.005***
Behavioural disengagement	3.4	(1.6)	3.6	(1.6)	0.30
Venting	4.5	(1.7)	4.7	(1.6)	0.20
Positive Reframing	5.5	(1.7)	4.9	(1.7)	0.002***

	Pre-clinical		Clinical		p value
	Mean	(SD)	Mean	(SD)	
Planning	6.0	(1.6)	5.0	(1.7)	<0.001***
Humour	4.2	(1.9)	4.1	(1.8)	0.60
Acceptance	5.8	(1.6)	5.2	(1.7)	0.005***
Religion	5.7	(2.1)	5.1	(2.0)	0.01*
Self blame	5.1	(1.8)	4.7	(1.8)	0.03*
<u>Outcome Variables</u>					
Stress Symptom					
Physiological	7.8	(4.71)	7.73	(4.10)	.80
Psychological	12.54	(8.20)	11.20	(7.28)	.14
Behavioural	19.4	(11.60)	16.60	(10.70)	.04*
Psychological Distress					
Somatization	12.73	(5.91)	12.60	(4.92)	.65
Obsessive Compulsive	16.03	(5.73)	15.47	(5.45)	.41
Interpersonal Sensitivity	10.64	(4.16)	10.62	(3.89)	.90
Depression	14.28	(6.23)	14.52	(5.13)	.36
Anxiety	13.52	(5.66)	12.81	(5.26)	.32
Hostility	10.65	(4.45)	11.46	(4.46)	.08
Phobic Anxiety	9.12	(3.74)	9.21	(4.40)	.55
Paranoid Ideation	11.52	(4.54)	11.28	(4.15)	.93
Psychoticism	11.60	(4.87)	10.37	(4.07)	.04*

* p <.05 level ** p <.01 *** p < .001

Table12.1: Coping Strategies

Preclinical		Clinical		p value
Mean	(SD)	Mean	(SD)	
67.30	9.76	63.68	9.61	.0012**

** $p < .01$

RESEARCH QUESTION 3

IS THERE A RELATIONSHIP BETWEEN THE PERCEIVED STRESSORS AND THE OUTCOME VARIABLES?

The Medical School Concerns Scale (MSCS) was used to assess the stressors experienced in the Medical School environment. Outcome measures were assessed using the Stress Symptom Checklist (SSCL) for stress symptoms and the Brief Symptom Inventory (BSI) was used to assess psychological distress.

The Spearman's correlation coefficient was undertaken for both the Clinical and Pre-clinical groups and the results as presented in Table 13 indicate the following:

For the Pre-clinical group, there was a significant positive relationship between the stressors and all outcome measures. Physiological stress symptoms were positively correlated with perceived stressors ($r = .38, p < .001$), as were Behavioural stress symptoms or reactions ($r = .37, p < .0001$). Interpersonal Sensitivity ($r = .47, p < .0001$), Depression ($r = .42, p < .0001$), both Obsessive Compulsive and Hostility ($r = .40, p < .0001$) respectively, followed by Anxiety ($r = .39, p < .0001$), Psychoticism ($r = .38, p < .0001$) and Paranoid Ideation ($r = .34, p < .0001$) were also positively correlated. Somatization was also positively correlated. ($r = .20, p < .05$), as was Phobic Anxiety ($r = .24, p < .01$).

For the Clinical group, Psychological stress symptoms were positively correlated with stressors ($r = .23, p < .01$), followed closely by Behavioural stress symptoms ($r = .22, p < .01$), whilst physiological stress symptoms were also correlated ($r = .19, p < .05$). In terms of psychological distress, there were significant positive correlations for all outcomes with Obsessive Compulsiveness ($r = .42, p < .0001$), and Anxiety ($r = .33, p < .0001$) having the highest correlation, and Paranoid Ideation having the lowest correlation ($r = .17, p < .05$).

The results indicate that whilst both groups perceive significant stressors in the medical school environment, the Pre-clinical group appear to experience more stress symptoms and psychological distress than the Clinical group.

Table 13: Relationship Between Perceived Stressors And Outcome Variables

OUTCOME	STRESSOR (MEDICAL SCHOOL CONCERNS)	p. VALUE
	r	
PRECLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	.26	0.0009 ***
PSYCHOLOGICAL	.38	< .0001***
BEHAVIOURAL	.37	< .0001***
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	.20	.01*
OBSS, COMPULSIVE	.40	< .0001***
INTER. SENSITIVITY	.47	< .0001***
DEPRESSION	.42	< .0001***
ANXIETY	.39	< .0001***
HOSTILITY	.40	< .0001***
PHOBIC ANXIETY	.24	0.0025**
PARANOID IDEATION	.34	< .0001***
PSYCHOTICISM	.38	< .0001***

OUTCOME	STRESSOR (MEDICAL SCHOOL CONCERNS)	p. VALUE
	r	
CLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	.19	.02 *
PSYCHOLOGICAL	.23	.004**
BEHAVIOURAL	.22	.007**
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	.30	0.0003 ***
OBSS. COMPULSIVE	.42	< .0001***
INTER. SENSITIVITY	.25	0.0022 **
DEPRESSION	.30	0.0001***
ANXIETY	.33	< .0001***
HOSTILITY	.28	0.0006 ***
PHOBIC ANXIETY	.22	0.0087 **
PARANOID IDEATION	.17	0.0345 *
PSYCHOTICISM	.22	0.0062 **

* $p < .05$ ** $p < .01$ *** $p < .001$

RESEARCH QUESTION 4

WHAT ARE THE RELATIONSHIPS BETWEEN THE MODERATING VARIABLES AND OUTCOME VARIABLES?

4.1. What are the relationships between the personal resources and the outcome variables?

Findings indicate that there were significant negative correlations between personal resource variables of Self esteem and Life Orientation (Optimism) and outcome variables as indicated in Table 14.

For the Pre-clinical group, the findings indicate that Physiological stress symptoms were significantly negatively correlated with Self esteem ($r = -.40, p < .05$) as were Behavioural stress symptoms ($r = -.46, p < .0001$). Psychological stress symptoms were negatively correlated with both Self esteem ($r = -.54, p < .0001$) and Optimism ($r = -.35, p < .0001$).

There were significant negative correlations in terms of psychological distress, and the variables of Self esteem and Optimism along all parameters: Somatization was negatively correlated with Self esteem ($r = -.36, p < .0001$) and Optimism ($r = -.16, p < .05$), Obsessive Compulsiveness was negatively correlated with both Self esteem ($r = -.53, p < .0001$) and Optimism ($r = -.33, p < .0001$). The outcome of Interpersonal Sensitivity was negatively correlated with Self Esteem ($r = -.63, p < .0001$) and Optimism ($r = -.45, p < .0001$) as was Depression with Self esteem ($r = -.60, p < .0001$) and Optimism ($r = -.52,$

$p < .0001$). Anxiety was negatively correlated with both Self esteem ($r = -.50, p < .0001$) and Optimism ($r = -.32, p < .0001$). Hostility was negatively correlated with both Self esteem ($r = -.42, p < .0001$) and Optimism ($r = -.31, p < .0001$). Phobic Anxiety was also negatively correlated with Self esteem ($r = -.44, p < .0001$) and Optimism ($r = -.32, p < .0001$).

Paranoid Ideation was also negatively correlated with Self esteem ($r = -.45, p < .0001$) and Optimism ($r = -.31, p < .0001$). The outcome variable of Psychoticism was also negatively correlated with Self esteem ($r = -.53, p < .0001$) and Optimism ($r = -.43, p < .0001$).

With regards to the Clinical group, the following emerged:- Psychological stress symptoms were significantly negatively correlated with both Self esteem ($r = -.49, p < .0001$) and Optimism ($r = .36, p < .0001$). Behavioural stress symptoms were negatively correlated with Self esteem ($r = -.36, p < .0001$) and Optimism ($r = -.29, p < .001$).

In terms of psychological distress there were significant negative correlations between Self esteem and Optimism and all outcome variables.

Table 14: Relationships between Personal Resources and Outcome variables

OUTCOME	PERSONAL RESOURCES	
	SELF ESTEEM	OPTIMISM
PRECLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	- .40 ***	- .23 **
PSYCHOLOGICAL	- .54 ***	- .35 ***
BEHAVIOURAL	- .46 ***	- .29 **
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	- .36 ***	- .16 *
OBSS-COMPULSIVE	- .53 ***	- .33 ***
INTER-SENSITIVITY	- .63 ***	- .45 ***
DEPRESSION	- .60 ***	- .52 ***
ANXIETY	- .50 ***	- .32 ***
HOSTILITY	- .42 ***	- .31 ***
PHOBIC ANXIETY	- .44 ***	- .32 ***
PARANOID IDEATION	- .45 ***	- .31 ***
PSYCHOTICISM	- .53 ***	- .43 ***
CLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	- .26 **	- .21*
PSYCHOLOGICAL	- .49 ***	- .36 ***
BEHAVIOURAL	- .36 ***	- .29 ***

OUTCOME	PERSONAL RESOURCES	
	SELF ESTEEM	OPTIMISM
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	- .34 ***	- .29 ***
OBSS-COMPULSIVE	- .46 ***	-.42 ***
INTER-SENSITIVITY	- .65 ***	- .55 ***
DEPRESSION	- .56 ***	- .59 ***
ANXIETY	- .52 ***	- .48 ***
HOSTILITY	- .38 ***	- .42 ***
PHOBIC ANXIETY	- .42 ***	- .45 ***
PARANOID IDEATION	- .31 ***	- .43 ***
PSYCHOTICISM	- .49 ***	- .50 ***

* $p < .05$ ** $p < .01$ *** $p < .001$

4.2. WHAT ARE THE RELATIONSHIPS BETWEEN THE ENVIRONMENTAL VARIABLES AND THE OUTCOME VARIABLES?

4.2.1. What are the relationships between the environmental variables of age and social support and the outcome variables?

A number of correlation patterns were established among the Pre-clinical and Clinical groups with respect to the effects of the environmental variables of age and social support on outcome variables. The findings are indicated in Table 15.1.

For the Pre-clinical group, psychological stress symptoms were significantly negatively correlated with Social support, ($r = -.34, p < .0001$), as were Behavioural stress symptoms ($r = -.31, p < .0001$). In terms of psychological distress, the outcome variable of Somatization was negatively correlated with Social support ($r = -.27, p < .01$). Other subscales assessing psychological distress were all also significantly negatively correlated with Social support: Obsessive Compulsiveness ($r = -.33, p < .0001$); Interpersonal Sensitivity ($r = -.48, p < .0001$); Depression ($r = -.52, p < .0001$); Anxiety ($r = -.29, p < .0001$); Hostility ($r = -.35, p < .0001$); Phobic Anxiety ($r = -.33, p < .0001$); Paranoid Ideation ($r = -.46, p < .0001$) and Psychoticism ($r = -.59, p < .0001$).

For the Clinical group, in terms of psychological distress, the outcome of Interpersonal Sensitivity was negatively correlated with Social support ($r = -.46, p < .0001$). Furthermore, Depression was also negatively correlated with Social support ($r = -.55, p < .0001$). Both Paranoid Ideation ($r = -.42, p < .0001$) and Psychoticism ($r = -.53, p < .0001$)

were negatively correlated with Social support. The outcome subscale of Hostility was negatively correlated with Social support, ($r = -.34, p < .0001$).

The outcome of Phobic Anxiety was also negatively correlated with Social support, ($r = -.34, p < .0001$). Hence, the findings indicate that social support plays an important role in the health outcomes. Social support also appears to be significantly negatively correlated with severe forms of psychological distress such as Paranoid Ideation, Depression and Psychoticism (indicating social alienation).

For the Clinical group there were positive correlations between the outcomes subscales of Hostility ($r = .16, p < .05$) and Phobic Anxiety ($r = .17, p < .05$) indicating that the older students were more hostile and phobically anxious than the younger students (Pre-clinical group).

Table 15.1: Relationships Between Environmental Resources (Age And Social Support) And Outcome Variables

OUTCOME	AGE	SOCIAL SUPPORT
	r	r
PRECLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	.01	-.23 **
PSYCHOLOGICAL	-.04	-.34 ***
BEHAVIOURAL	.03	-.31 ***
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	.10	-.27 **
OBSS. COMPULSIVE	.07	-.33 ***
INTER. SENSITIVITY	-.05	-.48 ***
DEPRESSION	-.08	-.52 ***
ANXIETY	.02	-.29 ***
HOSTILITY	.09	-.35 ***
PHOBIC ANXIETY	-.11	-.33 ***
PARANOID IDEATION	.01	-.46 ***
PSYCHOTICISM	-.03	-.59 ***

OUTCOME	AGE	SOCIAL SUPPORT
	r	r
CLINICAL		
STRESS SYMPTOMS		
PHYSIOLOGICAL	-.14	-.12
PSYCHOLOGICAL	-.13	-.27 **
BEHAVIOURAL	-.14	-.17 *
PSYCHOLOGICAL DISTRESS		
SOMATIZATION	.02	-.19 *
OBSS-COMPULSIVE	.02	-.16 *
INTER-SENSITIVITY	-.06	-.46 ***
DEPRESSION	.10	-.55 ***
ANXIETY	.00	-.28 ***
HOSTILITY	.16 *	-.34 ***
PHOBIC ANXIETY	.17 *	-.34 ***
PARANOID IDEATION	.05	-.42 ***
PSYCHOTICISM	.14	-.53 ***

* $p < .05$ ** $p < .01$ *** $p < .001$

4.2.2. What are the relationships between the environmental variables of gender and ethnicity and outcome variables?

The relationships between the environmental variables of gender and ethnicity and outcomes were established among the Pre-clinical and Clinical groups. These are reflected in Table 15.2.

The findings indicate that in the Pre-clinical group, females experienced more Physiological stress symptoms ($M = 8.42$, $SD 4.50$) than males ($M = 6.86$; (SD) 4.91 , $p < .01$). Females also had higher scores on the subscale assessing Somatization ($M = 13.43$, $SD 6.43$) than Males ($M = 11.64$, $SD 4.83$, $p < .05$). Females had higher scores on the Depression subscales ($M = 15.04$, $SD 6.75$) than their male counterparts ($M = 13.08$, $SD 5.13$, $p < .05$). Females also had higher Anxiety scores ($M = 14.31$, $SD 6.10$) than males ($M = 12.26$, $SD 4.66$, $p < .05$)

In terms of ethnicity, Indian students had higher scores on the outcome of Interpersonal Sensitivity ($M = 11.16$, $SD 4.45$) than their African colleagues ($M = 9.82$, $SD 3.56$, $p < .05$). Indian students also reported higher levels of Depression ($M = 15.12$, $SD 6.18$) than African students ($M = 12.97$, $SD 6.13$, $p < .05$).

For the Clinical group, female students reported higher scores on the subscales assessing Physiological stress symptoms ($M = 8.49$, $SD 3.77$), Psychological stress symptoms ($M = 12.45$, $SD 7.21$) and Behavioural stress symptoms ($M = 17.93$, $SD 10.36$). This compares as follows for the males: Physiological stress symptoms ($M = 6.45$, $SD 4.34$, $p < .01$);

Psychological ($M = 8.98$, $SD = 6.92$, $p < .01$) and Behavioural ($M = 14.22$, $SD = 11.00$, $p < .05$). There were no significant differences for any of the outcome variables viz a viz gender and race for the Clinical group.

TABLE 15.2: Relationships Between Environmental Variables (Gender and Ethnicity) and Outcome Variables

OUTCOME	GENDER		ETHNICITY	
	MALES	FEMALES	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
PRECLINICAL				
STRESS SYMPTOMS				
PHYSIOLOGICAL	6.89 (4.91)	8.42 (4.50) *	7.37 (4.97)	8.10 (4.54)
PSYCHOLOGICAL	10.96 (8.51)	13.54 (7.89)	11.26 (8.16)	13.35 (8.18)
BEHAVIOURAL	18.39 (2.31)	20.02 (11.15)	18.49 (11.51)	19.96 (11.68)
PSYCHOLOGICAL DISTRESS				
SOMATIZATION	11.64 (4.83)	13.43 (6.43) *	12.89 (5.88)	12.64 (5.96)
OBSS.COMPULSIVE	15.75 (5.61)	16.20 (5.83)	15.74 (5.93)	16.21 (5.63)
INTER.SENSITIVITY	9.97 (3.71)	11.06 (4.40)	9.82 (3.56)	11.16 (4.45)*
DEPRESSION	13.08 (5.13)	15.04 (6.75) *	12.97 (6.13)	15.12 (6.18)
ANXIETY	12.26 (4.66)	14.31 (6.10) *	12.61 (4.54)	14.10 (6.21)

OUTCOME	GENDER		ETHNICITY	
	MALES	FEMALES	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
HOSTILITY	10.13 (3.94)	10.98 (4.74)	10.36 (3.60)	10.84 (4.93)
PHOBIC ANXIETY	8.66 (3.10)	9.41 (4.08)	9.12 (3.76)	9.13 (3.75)
PARANOID IDEATION	11.76 (4.10)	11.37 (4.82)	11.74 (4.44)	11.38 (4.62)
PSYCHOTICISM	11.77 (4.84)	11.50 (4.91)	11.08 (5.07)	11.93 (4.74)
CLINICAL				
STRESS SYMPTOMS				
PHYSIOLOGICAL	6.45 (4.34)	8.49 (3.77)*	7.59 (4.05)	7.82 (4.15)
PSYCHOLOGICAL	8.98 (6.92)	12.45 (7.21)*	11.40 (7.64)	11.03 (7.09)
BEHAVIOURAL	14.22 (11.00)	17.93 (10.36)*	17.39(11.56)	16.06 (10.21)
PSYCHOLOGICAL DISTRESS				
SOMATIZATION	12.26 (5.55)	12.80 (4.53)	11.63 (4.30)	13.19 (5.20)
OBSS.COMPULSIVE	14.62 (5.25)	15.97 (5.54)	15.36 (6.17)	15.54 (5.01)
INTER.SENSITIVITY	9.82 (3.69)	11.09 (3.95)	10.23 (4.20)	10.85 (3.70)
DEPRESSION	14.18 (5.03)	14.72 (5.21)	14.57 (5.56)	14.49 (4.89)
ANXIETY	11.95 (5.29)	13.32 (5.21)	12.57 (6.34)	12.96 (4.53)
HOSTILITY	11.51 (4.750)	11.44 (4.31)	11.16 (4.45)	11.65 (4.48)
PHOBIC ANXIETY	9.11 (4.46)	9.27 (4.39)	8.79 (4.25)	9.46 (4.49)

OUTCOME	GENDER		ETHNICITY	
	MALES	FEMALES	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
PARANOID IDEATION	11.08 (3.79)	11.40 (4.37)	11.50 (3.83)	11.14 (4.36)
PSYCHOTICISM	10.13 (3.69)	10.51 (4.30)	10.50 (4.38)	10.29 (3.90)

* $p < .05$ ** $p < .01$

RESEARCH QUESTION 5

WHAT ARE THE RELATIONSHIPS BETWEEN THE MEDIATING VARIABLES AND THE OUTCOME VARIABLES?

The associations or relationships between the mediating variables (as measured by the Brief Cope) and the outcome variables (as measured by the Stress Symptom Checklist and the Brief Symptom Inventory) are indicated in Table 16.

For the Pre-clinical group the coping strategy of Self Distraction was positively correlated with Physiological ($r = .22, p < .01$), Psychological ($r = .19, p < .05$) and Behavioural ($r = .20, p < .01$) stress symptoms. It was also positively correlated with the following outcomes: Obsessive Compulsiveness ($r = .25, p < .01$), Interpersonal Sensitivity ($r = .23,$

$p < .01$), Depression ($r = .28, p < .01$), Anxiety ($r = .23, p < .01$), Psychoticism ($r = .28, p < .01$), Phobic Anxiety ($r = .17, p < .05$) and Paranoid Ideation ($r = .20, p < .05$).

Denial was positively correlated with Physiological ($r = .27, p < .01$), Psychological ($r = .39, p < .0001$) and Behavioural stress symptoms ($r = .38, p < .0001$). Denial was also positively correlated with Obsessive Compulsiveness ($r = .35, p < .0001$), Interpersonal Sensitivity ($r = .31, p < .0001$), Depression ($r = .38, p < .0001$), Anxiety ($r = .40, p < .0001$), Phobic Anxiety ($r = .33, p < .0001$), Paranoid Ideation ($r = .32, p < .0001$) as well as Psychoticism ($r = .36, p < .0001$).

The coping strategy of Planning was positively correlated with Obsessive Compulsiveness ($r = .16, p < .05$). The coping strategy of Behavioural Disengagement was also positively correlated with Psychological stress symptoms ($r = .32, p < .0001$). Behavioural Disengagement was also positively correlated with Depression ($r = .31, p < .0001$) and Psychoticism ($r = .31, p < .0001$).

The coping strategy of Venting was positively correlated with: Somatization ($r = .21, p < .01$), Obsessive Compulsiveness ($r = .33, p < .0001$), Interpersonal Sensitivity ($r = .32, p < .0001$), Depression ($r = .27, p < .0001$), Anxiety ($r = .32, p < .0001$), Hostility ($r = .36, p < .0001$), Phobic Anxiety ($r = .23, p < .01$), Paranoid ideation ($r = .33, p < .0001$) and Psychoticism ($r = .18, p < .05$).

The coping strategy of Self Blame was positively correlated with all outcomes: Physiological ($r = .25, p < .0001$) Psychological ($r = .41, p < .0001$) and Behavioural ($r = .36,$

$p < .0001$) stress symptoms. The coping strategy of Self Blame was also positively correlated with Somatization ($r = .26, p < .01$), Obsessive-Compulsiveness ($r = .46, p < .0001$), Interpersonal Sensitivity ($r = .46, p < .0001$), Depression ($r = .43, p < .0001$), Anxiety ($r = .42, p < .0001$), Hostility ($r = .35, p < .0001$), Phobic Anxiety ($r = .27, p < .0001$), Paranoid Ideation ($r = .31, p < .0001$), and Psychoticism ($r = .42, p < .0001$).

The coping strategy of Substance Use was also positively correlated with Physiological ($r = .21, p < .01$), and Behavioural ($r = .19, p < .05$) stress symptoms. It was also positively correlated with Somatization ($r = .22, p < .01$), Obsessive – Compulsiveness ($r = .19, p < .05$), Depression ($r = .18, p < .05$) and Psychoticism ($r = .18, p < .05$).

For the Clinical group, in terms of psychological distress, the coping strategy of Denial was positively correlated with Somatization ($r = .36, p < .0001$), Interpersonal Sensitivity ($r = .36, p < .0001$), Depression ($r = .44, p < .0001$), Anxiety ($r = .38, p < .0001$), Hostility ($r = .33, p < .0001$), Phobic Anxiety ($r = .43, p < .0001$), Paranoid Ideation ($r = .34, p < .001$), as well as Psychoticism ($r = .44, p < .0001$).

Further positive correlations for the Clinical group were established between the coping strategies of Substance Use and: Somatization ($r = .25, p < .01$), Hostility ($r = .31, p < .0001$), Phobic Anxiety ($r = .36, p < .0001$), Psychoticism ($r = .34, p < .0001$), Depression ($r = .28, p < .01$), Anxiety ($r = .19, p < .05$) and Paranoid Ideation ($r = .27, p < .0001$).

The coping strategy of Behavioural Disengagement was also significantly positively correlated with Somatization ($r = .36, p < .0001$), Obsessive Compulsiveness ($r = .32, p < .0001$), Depression ($r = .50, p < .0001$), Anxiety ($r = .31, p < .0001$), Hostility ($r = .40, p < .0001$), Phobic Anxiety ($r = .37, p < .0001$), Paranoid Ideation ($r = .36, p < .0001$) and Psychoticism ($r = .40, p < .0001$).

The coping strategy of Use of Emotional Support was positively correlated with Obsessive Compulsiveness ($r = .17, p < .05$). The coping strategy of Use of Instrumental Support was positively correlated with Interpersonal Sensitivity ($r = .25, p < .01$) and Obsessive Compulsiveness ($r = .20, p < .05$). The coping strategy of Venting, was positively correlated with Obsessive Compulsiveness ($r = .27, p < .01$), Depression ($r = .26, p < .01$), Paranoid Ideation ($r = .28, p < .0001$), Psychoticism ($r = .21, p < .01$), as well as Somatization ($r = .18, p < .05$), Interpersonal Sensitivity ($r = .18, p < .05$), Anxiety ($r = .18, p < .05$), and Phobic Anxiety ($r = .19, p < .05$).

Finally, the coping strategy of Self Blame was positively correlated with all outcomes: Somatization ($r = .21, p < .05$), Obsessive Compulsiveness ($r = .31, p < .0001$), Interpersonal Sensitivity ($r = .50, p < .0001$), Depression ($r = .48, p < .0001$), Anxiety ($r = .41, p < .0001$), Hostility ($r = .29, p < .0001$), Phobic Anxiety ($r = .30, p < .0001$), Paranoid Ideation ($r = .23, p < .01$), as well as Psychoticism ($r = .37, p < .0001$). Self Blame was also positively correlated with the Physiological ($r = .20, p < .05$), Psychological ($r = .36, p < .0001$) and Behavioural ($r = .22, p < .05$) stress symptoms.

The coping strategy of Active Coping was negatively correlated with many of the outcomes: Psychological stress symptoms ($r = -.18, p < .05$), Behavioural stress symptoms ($r = -.23, p < .01$), Obsessive–Compulsiveness ($r = -.23, p < .01$), Interpersonal Sensitivity ($r = -.27, p < .01$), Depression ($r = -.23, p < .01$), Anxiety ($r = -.23, p < .01$), Hostility ($r = -.22, p < .01$), Paranoid Ideation ($r = -.17, p < .05$), and Psychoticism ($r = -.23, p < .01$).

Positive Reframing as a coping strategy was negatively correlated with a number of outcome subscales: Obsessive-Compulsiveness ($r = -.18, p < .05$), Interpersonal Sensitivity ($r = -.22, p < .01$), Depression ($r = -.24, p < .05$), Anxiety ($r = -.18, p < .05$), and Hostility ($r = -.28, p < .0001$).

The coping strategy of Planning was negatively correlated with the following outcomes: Somatization ($r = -.20, p < .05$), Depression ($r = -.18, p < .05$) and Anxiety ($r = -.20, p < .05$). Humour as a coping strategy was negatively correlated with both Psychological stress symptoms ($r = -.21, p < .01$) and Behavioural stress symptoms ($r = -.22, p < .05$).

Finally, the coping strategy of Acceptance was negatively correlated with the following : Somatization ($r = -.25, p < .01$), Interpersonal Sensitivity ($r = -.27, p < .0001$), Depression ($r = -.34, p < .0001$), Anxiety ($r = -.25, p < .01$), Hostility ($r = -.36, p < .0001$), Phobic Anxiety ($r = -.23, p < .01$), Paranoid Ideation ($r = -.22, p < .01$), as well as Psychoticism ($r = -.34, p < .0001$).

To sum up, for the Clinical group, the coping strategies of Denial, Substance Use, Behavioural Disengagement, and Self Blame which could be considered to be disengaging

or maladaptive were positively correlated or associated with certain stress symptoms and psychological distress. The coping strategies of Active Coping, Positive Reframing, Planning, Humour and Acceptance (which can be considered as engagement or adaptive strategies) were negatively correlated with stress symptoms and psychological distress.

For the Pre-clinical group, the coping strategies of Denial, Behavioural Disengagement, Venting and Self Blame were positively correlated with certain outcomes, whilst Acceptance and Use of Emotional Support were negatively correlated with certain outcomes.

TABLE 16: RELATIONSHIPS BETWEEN THE MEDIATING VARIABLES AND THE OUTCOME VARIABLES?

MEDIATING VARIABLES	STRESS SYMPTOMS				PSYCHOLOGICAL DISTRESS								
	Physio	Psych	Beh	Somat	Obs. Comp	Int. Sens	Dep	Anx	Host	Phob	Para	Psych	
C													
oping Measure													
PRECLINICAL													
SELF DISTRACTION	.22 **	.19 *	.20 **	.14	.25 **	.23 **	.28 **	.23 **	.21 *	.17 *	.20 *	.28 **	
ACTIVE COPING	.03	.01	-.03	.01	-.07	-.14	-.12	-.01	-.11	-.12	-.08	-.10	
DENIAL	.27 **	.39 ***	.38 ***	.23 **	.35 ***	.31 ***	.38 ***	.40 ***	.30 ***	.33 ***	.32 ***	.36 ***	
SUBSTANCE USE	.21 **	.16	.19 *	.22 **	.19 *	.07	.18 *	.15	.14	.10	.10	.18 *	
USE OF EMOT. SUPPORT	-.01	-.04	-.01	.01	-.01	.00	-.14	.03	-.05	-.04	-.11	-.19*	
USE OF INST. SUPRT	-.01	.00	.00	.12	.07	.04	-.05	.07	.05	.06	.01	-.11	

MEDIATING VARIABLES	STRESS SYMPTOMS			PSYCHOLOGICAL DISTRESS									
	Coping Measure	Physio	Psych	Beh	Somat	Obs. Comp	Int. Sens	Dep	Anx	Host	Phob	Para	Psych
BEHAVIOURAL DISENGAGEMENT	.23 **	.32 ***	.30 ***	.19 *	.27 ***	.28 ***	.31 ***	.27 ***	.29 ***	.29 ***	.15	.29 ***	.31 ***
VENTING	.05	.15	.11	.21 **	.33 ***	.32 ***	.27 ***	.32 ***	.36 ***	.23 **	.33 ***	.18 *	
POSITIVE REFRAMING	.04	-.00	.01	.10	.02	.04	.01	.08	.01	.03	.05	.02	
PLANNING	-.04	-.01	.01	.06	.16*	.09	.04	.10	.02	.01	.11	.08	
HUMOUR	-.04	-.13	-.08	.08	.05	-.12	-.14	-.12	.08	-.04	.01	-.13	
ACCEPTANCE	-.13	-.19*	- .17*	-.09	-.11	-.07	-.13	- .21**	-.14	-.13	-.10	-.18*	
RELIGION	.14	.10	.13	.04	-.03	.01	-.07	.03	-.09	.06	.03	-.01	

MEDIATING VARIABLES	STRESS SYMPTOMS			PSYCHOLOGICAL DISTRESS								
	Coping Measure	Physio	Psych	Beh	Somat	Obs. Comp	Int. Sens	Dep	Anx	Host	Phob	Para
SELF BLAME	.25 **	.41 ***	.36 ***	.26 **	.46 ***	.4 ***	.43 ***	.42 ***	.35 ***	.27 ***	.31 ***	.42 ***
CLINICAL												
SELF DISTRACTION	-.01	.06	.02	-.08	.03	.02	.02	-.14	-.06	-.13	.04	.03
ACTIVE COPING	-.11	-.18 *	- .23**	-.12	-.23 **	-.27 ***	-.23 **	-.23 **	-.22 **	-.11	-.17*	-.23 **
DENIAL	.18*	.10	-.01	.36 ***	.26 **	.36 ***	.44** *	.38 ***	.33 ***	.43 ***	.34 ***	.44 ***
SUBSTANCE USE	-.01	-.10	-.10	.25 **	.16	.10	.28 ***	.19 *	.31 ***	.36***	.27 ***	.34 ***
USE OF EMOT. SUPRT	.10	.07	.07	-.01	.17*	.10	-.03	.04	.02	-.03	.02	-.03

MEDIATING VARIABLES	STRESS SYMPTOMS				PSYCHOLOGICAL DISTRESS							
	Coping Measure	Physio	Psych	Beh	Somat	Obs. Comp	Int. Sens	Dep	Anx	Host	Phob	Para
USE OF INST. SUPRT	.12	.11	.06	.10	.20*	.25**	.11	.13	.07	.11	.13	.14
BEHAVIOURAL DISENGAGEMENT	.23 **	.24 **	.22 **	.36 ***	.32 ***	.27 ***	.50 ***	.31 ***	.40 ***	.37 ***	.36 ***	.40 ***
VENTING	.08	.08	.09	.18 *	.27 **	.18 *	.26 **	.18 *	.20 *	.19 *	.28 ***	.21 **
POSITIVE REFRAMING	.06	-.06	-.09	-.11	-.18*	-.22 **	-.24**	-.18*	-.28***	-.12	-.16	-.21***
PLANNING	-.67 ***	-.07	-.14	-.20*	-.14	-.14	-.18*	-.20*	-.16	-.11	-.10	-.16
ACCEPTANCE	-.11	-.13	-.16	-.25**	-.15	-.27** *	-.34***	-.25**	-.36***	-.23**	-.22**	-.34***

MEDIATING VARIABLES	STRESS SYMPTOMS			PSYCHOLOGICAL DISTRESS									
	Physio	Psych	Beh	Somat	Obs. Comp	Int. Sens	Dep	Anx	Host	Phob	Para	Psych	
	RELIGION	.01	.02	.01	-.03	.11	-.03	-.00	.05	-.06	-.05	-.10	-.09
SELF BLAME	.20*	.36***	.22**	.21*	.31***	.50**	.48*	.41**	.29***	.30***	.23**	.37***	

* P < .05

** P < .01

*** P < .001

RESEARCH QUESTION 6

WHAT ARE THE ASSOCIATIONS BETWEEN THE OUTCOME VARIABLES?

In order to establish if there were any correlations or associations between the different outcome variables a correlational analysis was undertaken. The findings which are shown in Table 17 indicates that there were significant correlations at varying levels of statistical significance for almost all outcome variables for both the Pre-clinical and the Clinical groups.

For the Pre-clinical group, Somatization was positively correlated with Obsessive-Compulsiveness ($r = .55, p < .0001$), Interpersonal Sensitivity ($r = .42, p < .0001$), and Depression ($r = .51, p < .0001$). Somatization was also positively correlated with Anxiety ($r = .62, p < .0001$), as well as Hostility ($r = .46, p < .0001$), Phobic Anxiety ($r = .56, p < .0001$), Paranoid Ideation ($r = .50, p < .0001$) and Psychoticism ($r = .52, p < .0001$). In terms of stress symptoms, Somatization was positively correlated with Physiological ($r = .55, p < .0001$), Psychological ($r = .44, p < .0001$) and Behavioural stress symptoms ($r = .39, p < .0001$).

In terms of the outcome of Obsessive Compulsiveness, there were significant positive correlations with all other outcome variables, with the highest being Anxiety ($r = .71, p < .0001$), followed by Paranoid Ideation ($r = .68, p < .0001$), Psychoticism ($r = .67, p < .0001$). Similarly, Interpersonal Sensitivity ($r = .65, p < .0001$), Depression ($r = .64, p < .0001$), Phobic Anxiety ($r = .59, p < .0001$), Hostility ($r = .56, p < .0001$) and finally

Somatization ($r = .55, p < .0001$) were all also positively correlated . Regarding stress symptoms, Obsessive Compulsiveness was also positively correlated with Behavioural ($r = .57, p < .0001$), Psychological ($r = .53, p < .0001$) and Physiological ($r = .44, p < .0001$).

Regarding Interpersonal Sensitivity, this was associated with all outcomes. The highest correlations were with Depression ($r = .74, p < .0001$), Psychoticism ($r = .71, p < .0001$), Paranoid Ideation ($r = .68, p < .0001$), and Anxiety ($r = .67, p < .0001$). The lowest (though still significant) positive correlation was with Physiological stress symptoms ($r = .34, p < .0001$).

The outcome variable of Depression, was positively correlated with all outcomes but the most significant correlations were with Psychoticism ($r = .80, p < .0001$), Interpersonal Sensitivity ($r = .74, p < .0001$), and Anxiety ($r = .68, p < .0001$). Anxiety was also positively correlated with all outcomes, with the highest correlation being with Obsessive Compulsiveness ($r = .71, p < .0001$), Depression ($r = .68, p < .0001$), Interpersonal Sensitivity ($r = .67, p < .0001$).

The outcome variable of Hostility was positively correlated with almost all outcomes. The most significant was with Paranoid Ideation ($r = .63, p < .0001$) and the lowest was with Physiological stress symptoms ($r = .23, p < .01$). Phobic Anxiety was positively correlated with all outcomes but most notably with Paranoid Ideation ($r = .68, p < .0001$), Anxiety ($r = .62, p < .0001$) and Interpersonal Sensitivity ($r = .61, p < .0001$).

Similarly, Paranoid Ideation was positively correlated with all outcome variables as well, but most highly with Interpersonal Sensitivity ($r = .68, p < .0001$), Obsessive Compulsiveness ($r = .68, p < .0001$), Phobic Anxiety ($r = .67, p < .0001$). Psychoticism ($r = .67, p < .0001$). Psychoticism was also positively correlated with all outcomes, but most highly with Depression ($r = .80, p < .0001$), Interpersonal Sensitivity ($r = .71, p < .0001$), Paranoid Ideation ($r = .67, p < .0001$) and Obsessive Compulsiveness ($r = .67, p < .0001$).

In terms of stress symptoms, almost all outcome variables are associated with Physiological stress symptoms, with the outcome of Hostility ($r = .23, p < .01$) having the weakest significance. Very high positive correlations were established with Psychological ($r = .85, p < .0001$), and Behavioural stress symptoms ($r = .83, p < .0001$). In terms of Psychological stress symptoms, there were significant positive correlations with all outcomes, for example, Depression ($r = .59, p < .0001$), Psychoticism ($r = .54, p < .0001$), Physiological stress symptoms ($r = .85, p < .0001$) and Behavioural stress symptoms ($r = .90, p < .0001$). Finally, with regards to Behavioural stress symptoms, there were significant positive correlations with almost all outcomes and particularly high correlations with Psychological ($r = .89, p < .0001$) and Physiological stress symptoms ($r = .83, p < .0001$).

With regards to the Clinical group, the following emerged: Somatization was significantly positively correlated with all outcomes with the highest correlations being with Anxiety ($r = .72, p < .0001$), Phobic Anxiety ($r = .70, p < .0001$) and Psychoticism ($r = .62, p < .0001$). The lowest correlation was with Behavioural stress symptoms ($r = .23, p < .01$). Obsessive-Compulsiveness was significantly positively correlated with all outcomes, for example,

Anxiety ($r = .77, p < .0001$), Depression ($r = .67, p < .0001$), and Somatization ($r = .67, p < .0001$).

Similarly, Interpersonal Sensitivity was also positively correlated with all outcome variables with the most significant being Depression ($r = .76, p < .0001$), Psychoticism ($r = .74, p < .0001$), and Anxiety ($r = .74, p < .0001$). The lowest significant positive correlation was with Behavioural stress symptoms ($r = .39, p < .0001$). The outcome of Depression was also positively correlated with all outcome variables, for example, Psychoticism ($r = .77, p < .0001$), Interpersonal Sensitivity ($r = .76, p < .0001$), and Anxiety ($r = .69, p < .0001$).

Anxiety was also significantly positively correlated with all outcome variables, for example, Obsessive Compulsiveness ($r = .77, p < .0001$), Somatization ($r = .72, p < .0001$), Interpersonal Sensitivity ($r = .72, p < .0001$) and Phobic Anxiety ($r = .71, p < .0001$). Hostility was positively correlated with all outcome variables with the highest correlation being with Psychoticism ($r = .66, p < .0001$). Phobic Anxiety was positively correlated with all outcome variables, with the highest correlations being with both Psychoticism and Anxiety ($r = .71, p < .0001$) respectively, as well as Somatization ($r = .70, p < .0001$).

Paranoid Ideation also showed positive correlations with all outcome variables, for example, Psychoticism ($r = .64, p < .0001$), Hostility ($r = .61, p < .0001$), Depression ($r = .61, p < .0001$) and Interpersonal Sensitivity ($r = .61, p < .0001$). The lowest significant correlation was with Psychological stress symptoms ($r = .30, p < .0001$). In terms of the outcome variable of Psychoticism, there were significant positive correlations with all

outcome variables. There were very high correlations with Depression ($r = .77, p < .0001$), Interpersonal Sensitivity ($r = .74, p < .0001$), Phobic Anxiety ($r = .71, p < .0001$) and Hostility ($r = .66, p < .0001$).

Regarding the stress symptoms: the Physiological stress symptoms were significantly positively correlated with all outcomes, including Hostility ($r = .29, p < .001$), Paranoid Ideation ($r = .22, p < .0001$) and Psychoticism ($r = .29, p < .0001$). Strong positive correlations were obtained with Psychological stress symptoms ($r = .83, p < .0001$) and Behavioural stress symptoms ($r = .79, p < .0001$).

Psychological stress symptoms were significantly positively correlated with Behavioural stress symptoms ($r = .87, p < .0001$) and Physiological stress symptoms ($r = .83, p < .0001$) as well as with other outcome variables, for example, Interpersonal Sensitivity ($r = .54, p < .0001$), and Anxiety ($r = .47, p < .0001$).

Finally, regarding Behavioural stress symptoms, these were significantly positively correlated with Psychological stress symptoms ($r = .87, p < .0001$) and Physiological stress symptoms ($r = .79, p < .0001$). Behavioural stress symptoms were positively correlated with all outcomes, for example, Obsessive Compulsiveness and Interpersonal Sensitivity ($r = .39, p < .0001$) respectively, Anxiety ($r = .37, p < .0001$) and Depression ($r = .35, p < .0001$).

TABLE 17: Relationships between the Outcome Variables

Pre-Clin.	Somat.	Ob-Com.	Interp.	Depres.	Anx.	Hostil.	Phobic	Paran.	Psycho.	Physio	Psychol.	Behav.
SOMAT.		0.54825 <.0001	0.41982 <.0001	0.50451 <.0001	0.61979 <.0001	0.46043 <.0001	0.58573 <.0001	0.49952 <.0001	0.51460 <.0001	0.55285 <.0001	0.43703 <.0001	0.39069 <.0001
OB-COM.	0.54825 <.0001		0.65060 <.0001	0.64038 <.0001	0.71231 <.0001	0.55814 <.0001	0.58500 <.0001	0.67640 <.0001	0.67039 <.0001	0.44280 <.0001	0.52745 <.0001	0.56802 <.0001
INTERP.	0.41982 <.0001	0.65060 <.0001		0.73757 <.0001	0.67128 <.0001	0.53319 <.0001	0.61275 <.0001	0.67917 <.0001	0.71063 <.0001	0.33646 <.0001	0.54264 <.0001	0.45589 <.0001
DEPRESS.	0.50451 <.0001	0.64038 <.0001	0.73757 <.0001		0.67788 <.0001	0.50416 <.0001	0.54258 <.0001	0.59915 <.0001	0.79692 <.0001	0.44696 <.0001	0.59224 <.0001	0.49091 <.0001
ANXIETY	0.61979 <.0001	0.71231 <.0001	0.67128 <.0001	0.67788 <.0001		0.53993 <.0001	0.62151 <.0001	0.58217 <.0001	0.60550 <.0001	0.46229 <.0001	0.53083 <.0001	0.48163 <.0001
HOSTIL.	0.46043 <.0001	0.55814 <.0001	0.53319 <.0001	0.50416 <.0001	0.53993 <.0001		0.50869 <.0001	0.63118 <.0001	0.53406 <.0001	0.23131 0.0035* *	0.30515 <.0001	0.29986 0.0001
PHOBIC.	0.58573 <.0001	0.58500 <.0001	0.61275 <.0001	0.54258 <.0001	0.62151 <.0001	0.50869 <.0001		0.66967 <.0001	0.57025 <.0001	0.38413 <.0001	0.46952 <.0001	0.38808 <.0001

Pre-CLin.	Somat.	Ob-Com.	Interp.	Depres.	Anx.	Hostil.	Phobic	Paran.	Psycho.	Physio	Psychol.	Behav.
PARAN.	0.49952 <.0001	0.67640 <.0001	0.67917 <.0001	0.59915 <.0001	0.58217 <.0001	0.63118 <.0001	0.66967 <.0001		0.67073 <.0001	0.32859 <.0001	0.41205 <.0001	0.40727 <.0001
PSYCHO.	0.51460 <.0001	0.67039 <.0001	0.71063 <.0001	0.79692 <.0001	0.60550 <.0001	0.53406 <.0001	0.57025 <.0001	0.67073 <.0001		0.42469 <.0001	0.54296 <.0001	0.46213 <.0001
PHYSIO.	0.55285 <.0001	0.44280 <.0001	0.33646 <.0001	0.44696 <.0001	0.46229 <.0001	0.23131 0.0035* *	0.38413 <.0001	0.32859 <.0001	0.42469 <.0001		0.84394 <.0001	0.82418 <.0001
PSYCHOL	0.43703 <.0001	0.52745 <.0001	0.54264 <.0001	0.59224 <.0001	0.53083 <.0001	0.30515 <.0001	0.46952 <.0001	0.41205 <.0001	0.54296 <.0001	0.84394 <.0001		0.89566 <.0001

Table 17: Relationship between outcome variables

Clinic	Somat.	Ob-Com.	Interp.	Depres.	Anx.	Hostil.	Phobic	Paran.	Psycho.	Physio	Psychol.	Behav.
Somat.		0.66774 <.0001	0.53326 <.0001	0.56050 <.0001	0.71604 <.0001	0.53147 <.0001	0.70173 <.0001	0.50286 <.0001	0.61570 <.0001	0.41309 <.0001	0.290830 .0003***	0.22816 0.0051**
Ob-Com.	0.66774 <.0001		0.62867 <.0001	0.67086 <.0001	0.77292 <.0001	0.53583 <.0001	0.59127 <.0001	0.47417 <.0001	0.63994 <.0001	0.38475 <.0001	0.39579 <.0001	0.38614 <.0001
Interp.	0.53326 <.0001	0.62867 <.0001		0.75974 <.0001	0.71483 <.0001	0.57544 <.0001	0.59078 <.0001	0.60454 <.0001	0.73625 <.0001	0.40978 <.0001	0.43425 <.0001	0.38756 <.0001
Depres	0.56050 <.0001	0.67086 <.0001	0.75974 <.0001		0.69070 <.0001	0.61427 <.0001	0.59595 <.0001	0.60443 <.0001	0.76500 <.0001	0.35703 <.0001	.045591 <.0001	0.38457 <.0001
Anx.	0.71604 <.0001	0.77292 <.0001	0.71483 <.0001	0.69070 <.0001		0.60917 <.0001	0.70548 <.0001	0.46180 <.0001	0.67530 <.0001	0.42024 <.0001	0.46864 <.0001	0.37269 <.0001
Hostil.	0.53147 <.0001	0.53583 <.0001	0.57544 <.0001	0.61427 <.0001	0.60917 <.0001		0.60549 <.0001	0.60327 <.0001	0.65872 <.0001	0.28726 0.0004** *	0.28054 0.0005** *	0.19453 0.0174*

Clinic	Somat.	Ob-Com.	Interp.	Depres.	Anx.	Hostil.	Phobic	Paran.	Psycho.	Physio	Psychol.	Behav.
Phobic	0.70173 <.0001	0.59127 <.0001	0.59078 <.0001	0.59595 <.0001	0.70548 <.0001	0.60549 <.0001		0.53140 <.0001	0.70945 <.0001	0.32031 <.0001	0.28990 0.0003** *	0.19384 0.0179*
Paran	0.50286 <.0001	0.47417 <.0001	0.60454 <.0001	0.60443 <.0001	0.46180 <.0001	0.60327 <.0001	0.53140 <.0001		0.63775 <.0001	0.21909 0.0073**	0.28905 0.0003** *	0.19264 0.0186*
Psycho	0.61570 <.0001	0.63994 <.0001	0.73625 <.0001	0.76500 <.0001	0.67530 <.0001	0.65872 <.0001	0.70945 <.0001	0.63775 <.0001		0.28463 0.0004** *	0.37165 <.0001	0.25699 0.0016**
Physio	0.41309 <.0001	0.38475 <.0001	0.40978 9<.0001	0.35703 <.0001	0.42024 <.0001	0.28726 0.0004** *	0.32031 <.0001	0.21909 0.0073**	0.28463 0.0004** *		0.82852 <.0001	0.78457 <.0001
Psycho	0.29083 <.0001	0.39579 <.0001	0.53425 <.0001	0.45591 <.0001	0.46864 <.0001	0.28054 0.0005** *	0.28990 0.0003** *	0.28905 0.0003** *	0.37165 <.0001	0.82858 <.0001		0.86936 <.0001

Clinic	Somat.	Ob- Com.	Interp.	Depres.	Anx.	Hostil.	Phobic	Paran.	Psycho.	Physio	Psychol.	Behav.
Behav	0.22816 <.0001	0.38614< .0001	0.38756< .0001	0.34857< .0001	0.37269 <.0001	0.194530 .0174*	0.19384 0.0179*	0.19264 0.0186*	0.25699 0.0016**	0.78457 <.0001	0.86936 <.0001	

*p <.05

**p <.01

***p <.001

RESEARCH QUESTION 7

7.1.1. WHAT ARE THE RELATIONSHIPS BETWEEN THE ENVIRONMENTAL VARIABLES AND PERSONAL VARIABLES

What are the relationships between the environmental variables of Age and Social support and the personal resource variables?

Regarding the relationship between the environmental variables of age and social support and the personal variables of Self esteem and Optimism, the findings as indicated in Table 18.1 show that for the Pre –clinical group, Self esteem was positively correlated with Social support ($r = .40, p < .0001$). Life orientation (Optimism) was also positively correlated with Social support ($r = .45, p < .0001$). For the Clinical group, similar findings were obtained: Self esteem was positively correlated with both Social support ($r = .47, p < .0001$) and Optimism ($r = .55, p < .0001$).

Table 18.1: Relationships between the environmental variables and personal variables

PERSONAL RESOUCE	ENVIRONMENTAL VARIABLES	
	AGE	SOCIAL SUPPORT
	r	R
PRECLINICAL		
SELF ESTEEM	-.08	.40***
OPTIMISM	.07	.45***
CLINICAL		
SELF ESTEEM	-.10	.47***
OPTIMISM	-.04	.55***

*** $p < .0001$

7.2 What are the relationships between the environmental variables of gender and ethnicity and personal resource variables?

Relationships were examined in terms of the environmental variables of ethnicity and gender and the personal resource variables of Self esteem and Life orientation (Optimism), the following were the results which are reflected in Table 18.2.

For the Pre-clinical group, in terms of ethnicity, Indian students had significantly lower Self esteem ($\underline{M} = 120.02$, $\underline{SD} 45.14$), than African students ($\underline{M} = 137.15$, $\underline{SD} 43.50$, $p < .05$).

Regarding Life orientation (Optimism), Indian students ($\underline{M} = 40.76$, $\underline{SD} 9.13$), also appeared to be less optimistic than African students ($\underline{M} = 46.43$, $\underline{SD} 8.98$, $p < .01$).

Female students in the Pre-clinical group, had lower Self esteem than their male colleagues (Females: $M = 119.92$, $\underline{SD} 44.08$; Males: $\underline{M} = 137.31$, $\underline{SD} 45.13$, $p < .05$). In the Pre-clinical group, female students also appeared to be less optimistic ($\underline{M} = 41.63$, $\underline{SD} 9.41$), than male students ($\underline{M} = 45.04$, $\underline{SD} 9.24$, $p < .05$).

For the Clinical group, there were no significant correlations between ethnicity and gender and Self esteem. However, with regards to Life orientation (Optimism), Indian students reported lower levels of optimism ($\underline{M} = 39.45$, $\underline{SD} 9.23$ than African students ($\underline{M} = 44.27$, $\underline{SD} 9.97$, $p < .01$).

The associations were similar for optimism and gender in the Clinical group: female students in the Clinical group were less optimistic ($\underline{M} = 39.87$, $\underline{SD} 9.74$) than their male colleagues ($\underline{M} = 43.64$, $\underline{SD} 9.44$, $p < .05$).

Table 18.2: Relationships between environmental variables and personal variables

PERSONAL RESOURCE	GENDER		ETHNICITY	
	MALE	FEMALE	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
PRECLINICAL				
SELF ESTEEM	137.31 (45.13)	119.92 44.08)*	137.15 (43.50)	120.02 (45.14)*
OPTIMISM	45.04 (9.24)	41.63 (9.41)*	46.43 (8.98)	40.76 (9.13)***
CLINICAL				
SELF ESTEEM	130.07 (53.53)	118.35 (43.90)	132.11 (54.52)	117.00 (42.64)
OPTIMISM	43.64 (9.44)	39.87 (9.74)*	44.27 (9.97)	39.45 (9.23)**

* $p < .05$ ** $p < .01$ *** $p < .001$

RESEARCH QUESTION 8

WHAT ARE THE RELATIONSHIPS BETWEEN MODERATING AND MEDIATING VARIABLES?

What relationships exist between the personal resources and mediating (cope) variables?

For the Pre-clinical group, Self esteem was significantly negatively correlated with the coping strategies of Denial ($r = -.21, p < .01$), Behavioural Disengagement ($r = -.29, p$

<.001) and Self Blame ($r = -.50, p <.001$). Regarding Life orientation (Optimism), there were significant positive and negative correlations with certain coping strategies: Optimism was significantly positively correlated with Active Coping, ($r = .20, p <.05$), Use of Emotional Support ($r = .19, p <.05$), Use of Instrumental Support ($r = .20, p <.05$), Planning ($r = .17, p <.05$) and most significantly with Positive Reframing ($r = .35, p <.01$). Optimism was significantly negatively correlated with the coping strategies of Denial ($r = -.35, p <.001$), Substance Use ($r = -.27, p <.001$) and Behavioural Disengagement ($r = -.35, p <.001$) as reflected in Table 19.

For the Clinical group, Self esteem was also significantly positively correlated with the coping strategies of Active Coping ($r = .43, p <.001$), Positive Reframing ($r = .22, p <.01$), Planning ($r = .20, p <.05$), Humour ($r = .28, p <.001$) and Acceptance ($r = .30, p <.001$). There were significant negative correlations between Self esteem and the following coping strategies: Denial ($r = -.19, p <.05$), and Self Blame ($r = -.41, p <.001$). Regarding Optimism, there were significant positive correlations with the following coping strategies: Active Coping ($r = .41, p <.001$), Positive Reframing ($r = .39, p <.001$), Planning ($r = .27, p <.001$), Acceptance ($r = .39, p <.001$) and Religion ($r = .18, p <.05$). There were significant negative correlations between Optimism and the following coping strategies: Denial ($r = -.21, p <.01$), Substance Use ($r = -.25, p <.01$), Behavioural Disengagement ($r = -.32, p <.001$) and Self Blame ($r = -.34, p <.001$).

TABLE 19: Relationships between personal resources and mediating (cope) variables

COPE	PERSONAL RESOURCES	
	SELF ESTEEM	OPTIMISM
PRECLINICAL		
SELF DISTRACTION	-.12	-.04
ACTIVE COPING	.14	.20*
DENIAL	-.21**	-.35***
SUBSTANCE USE	-.14	-.27 **
USE OF EMOT. SUPPORT	.07	.19 *
USE OF INST. SUPPORT	.11	.20 *
BEHAVIOURAL DISENGAGEMENT	-.29***	-.35***
VENTING	-.16	-.07
POST REFRAMING	.04	.35 ***
PLANNING	.03	.17 *
HUMOUR	.16	.12
ACCEPTANCE	.15	.19 *
RELIGION	.07	.15
SELF BLAME	-.50 ***	-.39***
CLINICAL		
SELF DISTRACTION	-.02	.04
ACTIVE COPING	.43***	.41***

COPE	PERSONAL RESOURCES	
	SELF ESTEEM	OPTIMISM
DENIAL	-.19 *	-.21**
SUBSTANCE USE	-.12	-.25 **
USE OF EMOTIONAL SUPPORT	.01	-.05
USE OF INST. SUPPORT	-.08	-.04
BEHAVIOURAL DISENGAGEMENT	-.28***	-.32 ***
VENTING	-.10	-.12
POSITIVE REFRAMING	.22 **	.39 ***
PLANNING	.20 *	.27***
HUMOUR	.28 ***	.09
ACCEPTANCE	.30***	.39***
RELIGION	.08	.18
SELF BLAME	-.41***	-.34***

* $p < .05$

** $p < .01$

*** $p < .001$

8.2 What relationships exist between the environmental variables of age and social support and mediating (cope) variables?

Spearman's correlation coefficient was used to establish if there were any relationships between the variables of Age and Social support and Cope variables. The findings which are reflected in Table 20.1 show the following: for the Pre-clinical group, Age was positively correlated with the coping strategy of Planning ($r = .28, p < .001$). Regarding Social support, the following coping strategies were negatively correlated: Self Distraction ($r = -.18, p < .05$), Denial ($r = -.22, p < .01$), Substance Use ($r = -.26, p < .01$), Behavioural Disengagement ($r = -.30, p < .001$) and Self Blame ($r = -.24, p < .01$). There were significant positive correlations between Social support and the following coping strategies: Use of Emotional support ($r = .27, p < .001$), and Use of Instrumental Support ($r = .23, p < .01$).

In the Clinical group, the following were significantly correlated with Social support. Positive correlations were established with the following coping strategies: Active Coping ($r = .8, p < .05$), Use of Emotional Support ($r = .22, p < .01$), Positive Reframing ($r = .21, p < .01$) and Acceptance ($r = .23, p < .01$). There were significant negative correlations established with the following coping strategies: Denial ($r = -.18, p < .05$), Substance Use ($r = -.23, p < .01$), Behavioural Disengagement ($r = -.31, p < .001$), and Self Blame ($r = -.32, p < .001$).

Increased age was positively correlated with Substance Use ($r = .34, p < .0001$). Finally, increased age was negatively correlated with the coping strategy of Acceptance ($r = -.20, p < .05$).

Table 20.1: Relationships between the environmental variables of age and social support and cope variables

COPE	ENVIRONMENTAL VARIABLES	
	AGE	SOCIAL SUPPORT
PRECLINICAL		
SELF DISTRACTION	-.03	-.18 *
ACTIVE COPING	.13	.16
DENIAL	.04	-.22 **
SUBSTANCE USE	.15	-.26 **
USE OF EMOT. SUPPORT	.05	.27 ***
USE OF INST. SUPPORT	-.04	.23 **
BEHAVIOURAL DISENGAGEMENT	.01	-.30 ***
VENTING	.09	-.09
POST REFRAMING	.02	.12
PLANNING	.28***	.12
HUMOUR	-.04	.05
ACCEPTANCE	-.03	.14
RELIGION	.02	.06
SELF BLAME	.12	-.24 **

COPE	ENVIRONMENTAL VARIABLES	
	AGE	SOCIAL SUPPORT
CLINICAL		
SELF DISTRACTION	-.01	-.09
ACTIVE COPING	-.1	.18 *
DENIAL	.09	-.18 *
SUBSTANCE USE	.34 ***	-.23 **
USE OF EMOT. SUPPORT	-.11	.22 **
USE OF INST. SUPPORT	-.08	.10
BHAVIOURAL DISENGAGEMENT	.09	-.31***
VENTING	.12	-.09
POSIT. REFRAMING	-.09	.21**
PLANNING	-.13	.03
HUMOUR	-.01	-.09
ACCEPTANCE	-.20 *	.23 **
RELIGION	-.05	.15
SELF BLAME	.10	-.32 ***

* $p < .05$ ** $p < .01$ *** $p < .0001$

8.2.2. What relationships exist between the environmental variables of gender and ethnicity and the mediating (cope) variables ?

In terms of the relationships between the environmental variables of gender and ethnicity and cope variables, the findings which are reflected in Table 20.2 show that for the Pre-clinical group, males used the coping strategy of Humour more than females did ($\underline{M} = 4.58, \underline{SD} 1.85$); and $\underline{M} = 3.96, \underline{SD} 1.91, p < .05$) respectively.

In terms of ethnicity, the findings indicate that African students in the Pre-clinical group used the coping strategy of Active Coping ($\underline{M} = 6.33, \underline{SD} 1.29$) more than Indian students did ($\underline{M} = 5.48, \underline{SD} 1.60, p < .001$). Furthermore, African students also used the coping strategy of Planning more ($\underline{M} = 6.56, \underline{SD} 1.49$, than Indian's did ($\underline{M} = 5.66, \underline{SD} 1.64, p < .001$). African students also used the coping strategy of Religion more than Indian students did (African students: $\underline{M} = 6.35, \underline{SD} 1.97$; Indian students: $\underline{M} = 5.26, \underline{SD} 2.06, p < .01$). Positive reframing was also used more by African students ($\underline{M} = 5.85, \underline{SD} 1.57$) than by Indian students ($\underline{M} = 5.32, \underline{SD} 1.76, p < .05$).

For the Clinical group, Females utilized the coping strategy of Use of Emotional Support more than their male colleagues: Females ($\underline{M} = 5.09, \underline{SD} 1.63$); Males $\underline{M} = 4.53, \underline{SD} 1.56, p < .05$). In terms of ethnicity, in the Clinical group, African students used the coping strategy of Self Distraction more than their Indian colleagues (African students: $\underline{M} = 5.34, \underline{SD} 1.53$; Indian students $\underline{M} = 4.57, \underline{SD} 1.55, p < .01$).

Table 20.2: Relationships between environmental variables of gender and ethnicity and cope variables

COPE	GENDER		ETHNICITY	
	MALES	FEMALES	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
PRECLINICAL				
SELF DISTRACTION	5.07 (1.83)	5.07 (1.64)	5.00 (1.77)	5.12 (1.67)
ACTIVE COPING	6.02 (1.61)	5.67 (1.45)	6.33 (1.29)	5.48 (1.60)***
DENIAL	3.35 (1.65)	3.21 (1.53)	3.23 (1.42)	3.28 (1.67)
SUBSTANCE USE	2.71 (1.68)	2.40 (1.10)	2.72 (1.70)	2.40 (1.08)
USE OF EMOT. SUPRT.	5.07 (1.78)	5.41 (1.91)	5.46 (1.73)	5.17 (1.94)
USE OF INST. SUPPORT	5.10 (1.85)	5.27 (1.96)	5.23 (1.99)	5.19 (1.87)
BEH.DISENGAGEMENT	3.67 (1.71)	3.27 (1.57)	3.26 (1.70)	3.53 (1.59)
VENTING	4.58 (1.47)	4.40 (1.78)	4.64 (1.69)	4.35 (1.65)
POSITIVE REFRAMING	5.74 (1.50)	5.39 (1.81)	5.85 (1.57)	5.32 (1.76)*
PLANNING	6.25 (1.60)	5.86 (1.65)	6.56 (1.49)	5.66(1.64)***
HUMOUR	4.58 (1.85)	3.96 (1.91)*	4.53 (2.02)	4.00 (1.81)
ACCEPTANCE	5.81 (1.68)	5.76 (1.610)	6.00 (1.61)	5.63 (1.64)
RELIGION	5.28 (2.27)	5.93 (1.94)	6.35 (1.97)	5.26 (2.06)**
SELF BLAME	4.90 (1.71)	5.28 (1.81)	4.95 (1.80)	5.22 (1.76)
CLINICAL				
SELF DISTRACTION	4.88 (1.60)	4.85 (1.58)	5.34 (1.53)	4.57 (1.55)**
ACTIVE COPING	5.22 (1.94)	4.93 (1.70)	5.40 (2.18)	4.82 (1.48)

COPE	GENDER		ETHNICITY	
	MALES	FEMALES	AFRICAN	INDIAN
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)
DENIAL	3.62 (1.52)	3.73 (1.71)	3.73 (1.73)	3.67 (1.59)
SUBSTANCE USE	3.44 (1.64)	3.14 (1.77)	3.07 (1.60)	3.36 (1.79)
USE OF EMOT. SUPRT	4.53 (1.56)	5.09 1.63)*	4.72 (1.68)	4.98 (1.58)
USE OF INST. SUPPORT	4.33 (1.43)	4.81 (1.74)	4.38 (1.67)	4.79 (1.62)
BEH. ISENGAGEMENT	3.55 (1.59)	3.67 (1.56)	3.66 (1.46)	3.60 (1.63)
VENTING	4.58 (1.46)	4.81 (1.68)	4.81 (1.75)	4.68 (1.51)
POSITIVE REFRAMING	5.00 (1.62)	4.89 (1.670)	5.18 (1.80)	4.78 (1.54)
PLANNING	4.95 (1.58)	5.06 (1.79)	5.36 (1.92)	4.81 (1.540)
HUMOUR	4.18 (1.90)	4.03 (1.78)	4.38 (1.84)	3.92 (1.79)
ACCEPTANCE	5.15 (1.71)	5.29 (1.70)	5.47 (1.63)	5.10 (1.74)
RELIGION	4.71 (1.98)	5.29 (1.95)	5.18 (1.95)	5.02 (2.00)
SELF BLAME	4.44 (1.81)	4.81 (1.86)	4.95 (2.10)	4.51 (1.67)

* $p < .05$ ** $p < .01$ *** $p < .001$

8.3. What is the relationship between perceived stressors (medical school concerns) and mediating (cope) variables?

The findings which are reflected in Table 20.3, indicate that for the Pre-clinical group, perceived stressors were positively correlated with the coping strategy of Denial ($r = .32, p < .0001$). The coping strategies of Behavioural Disengagement ($r = .27, p < .0001$), Self Blame ($r = .27, p < .0001$) and Substance Use ($r = .19, p < .05$) were all also positively correlated with perceived stressors.

For the Clinical group, the coping strategies of Active Coping ($r = -.19, p < .05$) and Humour ($r = -.19, p < .05$) were negatively correlated with perceived stressors. The coping strategy of Behavioural Disengagement ($r = .17, p < .05$) was positively correlated with perceived stressors.

Table 20.3: Relationship between perceived stressors & coping variables

COPE	STRESSORS (MEDICAL SCHOOL CONCERNS)
PRECLINICAL	
SELF DISTRACTION	.14
ACTIVE COPING	-.11
DENIAL	.32 ***
SUBSTANCE USE	.19 *
USE OF EMOT. SUPPORT	.04

COPE	STRESSORS (MEDICAL SCHOOL CONCERNS)
USE OF INST. SUPPORT	.02
BEH. DISENGAGEMENT	.27***
VENTING	.12
POSTIVE REFRAMING	-.01
PLANNING	-.01
HUMOUR	-.03
ACCEPTANCE	-.05
RELIGION	-.03
SELF BLAME	.27 ***
CLINICAL	
SELF DISTRACTION	-.02
ACTIVE COPING	-.19 *
DENIAL	.08
SUBSTANCE USE	.04
USE OF EMOT. SUPPORT	.04
USE OF INST. SUPPORT	.01
BEH. DISENGAGEMENT	.17 *
VENTING	.06
POSTIVE REFRAMING	-.16
PLANNING	-.15
HUMOUR	-.19 *

COPE	STRESSORS (MEDICAL SCHOOL CONCERNS)
ACCEPTANCE	-.14
RELIGION	-.11
SELF BLAME	.14

* $p < .05$ ** $p < .01$ *** $p < .001$

RESEARCH QUESTION 9

What relationships exist between the personal variables?

The interpersonal relationships between the personal variables of Self esteem and Optimism were established. The findings are reflected in Table 21 and indicate that for the Pre-clinical group, Optimism was positively correlated with Self esteem ($r = .53, p < .0001$). For the Clinical group, Optimism was also positively correlated with Self esteem ($r = .62, p < .0001$). This consistent positive relationship between Optimism and Self esteem suggests that they hold a shared variance for both groups.

Table 21: Relationships between personal variables

OPTIMISM	SELF ESTEEM
PRECLINICAL	0.53***
CLINICAL	0.62***

*** $p < .0001$

RESEARCH QUESTION 10:

Can psychological distress in medical students be predicted based on a combined data analysis?

10.1. Which COPE variables are predictors of outcome?

A stepwise multiple regression was conducted in order to determine which coping variables predicted the outcomes (as assessed using the Brief Symptom Inventory and the Stress Symptom Checklist).

The results which are reflected in Table 22 indicates for the Pre-clinical group, coping strategies which can be considered to be engagement or adaptive strategies such as Active coping and Humour were not significant overall. However, the disengaging or maladaptive

coping strategy of Self Blame ($R^2 = 12\%$, $p < 0.0001$) was positively associated with Obsessive Compulsiveness. Similarly, Self Blame ($R^2 = 16\%$, $p < 0.0001$) was positively associated with the outcome of Interpersonal Sensitivity as well as with the outcome variable of Depression ($R^2 = 10\%$, $p < 0.0001$). Finally, Self Blame was positively associated with Psychological stress symptoms ($R^2 = 11\%$, $p < 0.0001$).

For the Clinical group, the following emerged: Self Blame ($R^2 = 23\%$, $p < 0.0001$) and Denial ($R^2 = 11\%$, $p < 0.0001$) were significantly positively associated with the outcome of Interpersonal Sensitivity. Denial ($R^2 = 10\%$, $p < 0.0001$) and Self Blame ($R^2 = 15\%$, $p < 0.0001$) were significantly positively associated with Depression. Self Blame ($R^2 = 21\%$, $p < 0.0001$) was also positively associated with Anxiety. Denial ($R^2 = 12\%$, $p < 0.0001$) and Substance Use ($R^2 = 10\%$, $p < 0.0001$) were significantly positively associated with Phobic Anxiety. Self Blame was also significantly positively associated with Psychological stress symptoms ($R^2 = 13\%$, $p < 0.0001$).

TABLE 22: Stepwise multiple regression analysis of cope variables on outcome variables

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PRECLINICAL			
STRESS SYMPTOMS			
PHYSIOLOGICAL			
SELF DISTRACTION	5%	0.562	0.006 **

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
SUBSTANCE USE	5%	0.738	0.005 **
SELF BLAME	4%	0.530	0.009 **
ACCEPTANCE	4%	- 0.520	0.01*
RELIGION	6%	0.530	0.002 **
PSYCHOLOGICAL			
DENIAL	4%	1.038	0.009 **
BEH. DISENGAGEMENT	4%	0.977	0.01*
SELF BLAME	11%	1.441	< 0.0001
HUMOUR	3%	- 0.609	0.04 *
RELIGION	3%	0.588	0.03 *
BEHAVIOURAL			
DENIAL	3%	1.349	0.02 *
BEH. DISENGAGEMENT	3%	1.307	0.02 *
SELF BLAME	7%	1.740	0.0006 ***
RELIGION	4%	0.949	0.02 *
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
SUBSTANCE USE	7%	1.164	0.0006***
VENTING	4%	0.685	0.01*
OBSESSIVE COMPULSIVE			
SELF DISTRACTION	3%	0.5147	0.03 *

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
DENIAL	4%	0.612	0.02 *
VENTING	4%	0.623	0.01 *
SELF BLAME	12%	1.087	< 0.0001
PRECLINICAL			
INTERPERSONAL SENSITIVITY			
SELF DISTRACTION	3%	0.358	0.03 *
VENTING	8%	0.661	0.0004***
SELF BLAME	16%	0.884	< 0.0001
ACTIVE COPING	3%	- 0.419	0.02*
HUMOUR	6%	- 0.477	0.002 **
DEPRESSION			
SELF DISTRACTION	6%	0.761	0.002 **
DENIAL	4%	0.692	0.01*
VENTING	5%	0.817	0.004 **
SELF BLAME	10%	0.992	<0.0001
ACTIVE COPING	3%	- 0.567	0.04*
USE OF EMOT. SUPPORT	4%	- 0.545	0.02 *
HUMOUR	9%	- 0.892	0.0002 ***
ANXIETY			
SELF DISTRACTION	4%	0.575	0.01*
VENTING	8%	0.918	0.0004***

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
SELF BLAME	9%	0.884	0.0002 ***
HUMOUR	3%	- 0.471	0.03 *
ACCEPTANCE	7%	- 0.843	0.0006 ***
HOSTILITY			
SELF BLAME	4%	0.483	0.01*
VENTING	7%	0.708	0.0006 ***
ACTIVE COPING	3%	- 0.454	0.03 *
PHOBIC ANXIETY			
VENTING	7%	0.708	0.0006 ***
ACTIVE COPING	3%	- 0.454	0.03 *
PHOBIC ANXIETY			
DENIAL	5%	0.545	0.004 **
SELF BLAME	4%	0.425	0.01*
PARANOID IDEATION			
VENTING	7%	0.694	0.0009 ***
DENIAL	3%	0.538	0.02 *
BEH. DISENGAGEMENT	3%	0.476	0.03 *
PSYCHOTICISM			
SELF DISTRACTION	7%	0.652	0.001**
DENIAL	3%	0.474	0.04 *
SELF BLAME	10%	0.772	0.001**

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
HUMOUR	4%	- 0.437	0.01*
USE OF EMOT. SUPPORT	4%	- 0.412	0.02 *
CLINICAL			
STRESS SYMPTOMS			
PHYSIOLOGICAL			
SELF BLAME	5%	0.483	0.01*
PSYCHOLOGICAL			
SELF BLAME	13%	1.426	< 0.0001
HUMOUR	3%	- 0.656	0.03 *
BEHAVIOURAL			
SELF BLAME	4%	1.194	0.01*
ACTIVE COPING	3%	- 0.998	0.04 *
HUMOUR	3%	- 0.900	0.05 *
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
DENIAL	4%	0.646	0.01*
BEH. DISENGAGEMENT	6%	0.800	0.002 **
OBSESS-COMPULSIVE			
SELF BLAME	5%	0.632	0.007**
BEH. DISENGAGEMENT	6%	0.808	0.003 **
USE OF INST. SUPPORT	6%	0.748	0.003 **

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
ACTIVE COPING	6%	- 0.696	0.002 **
INTERPERSONAL SENSITIVITY			
SELF BLAME	23%	0.903	< 0.0001
DENIAL	11%	0.628	< 0.0001
ACTIVE COPING	8%	- 0.493	0.0006***
USE OF INST. SUPPORT	7%	0.504	0.001**
DEPRESSION			
DENIAL	10%	0.855	< 0.0001
BEH. DISENGAGEMENT	7%	0.773	0.001**
SELF BLAME	15%	0.963	< 0.0001
ACTIVE COPING	5%	- 0.525	0.004**
ANXIETY			
DENIAL	6%	0.708	0.002 **
PLANNING	6%	-0.662	0.003 **
SELF BLAME	21%	1.240	<0.0001
HOSTILITY			
DENIAL	3%	0.439	0.04 *
BEH. DISENGAGEMENT	4%	0.590	0.02*
SELF BLAME	5%	0.482	0.01*
ACCEPTANCE	5%	- 0.534	0.01*

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PHOBIC ANXIETY			
DENIAL	12%	0.848	< 0.0001
SUBSTANCE USE	10%	0.732	0.0001***
SELF BLAME	6%	0.496	0.004 **
PARANOID IDEATION			
DENIAL	5%	0.560	0.007**
BEH. DISENGAGEMENT	3%	0.476	0.03*
VENTING	4%	0.506	0.01*
ACTIVE COPING	3%	- 0.350	0.05 *
PSYCHOTICISM			
SELF BLAME	8%	0.571	0.0007***
DENIAL	9%	0.690	0.0003***
BEH. DISENGAGEMENT	3%	0.425	0.04*
ACTIVE COPING	4%	- 0.415	0.01*

* $p < .05$ ** $p < .01$ *** $p < .0001$

RESEARCH QUESTION 11

What are the general predictors of outcome?

The data analysis attempted to establish general predictors of outcome and therefore a number of factors were selected. These independent variables were the coping strategies divided into the two broad categories of engagement (adaptive) strategies and disengagement (maladaptive strategies) as identified in Table 22; and other variables such as, Self esteem, Life orientation (Optimism) and Social support.

The results as indicated in Table 23 show the following:-

In the Pre-clinical group two factors were significantly associated with the outcome of Obsessive-compulsiveness: these were maladaptive coping strategies ($R^2 = 19\%$, $p < 0.0001$) which were positively associated and Self esteem ($R^2 = 13\%$, $p < 0.0001$) which was negatively associated. Similarly, the outcome of Interpersonal sensitivity was significantly associated with Self esteem ($R^2 = 34\%$, $p < 0.0001$).

For the outcome variable of Depression, maladaptive coping strategies were positively associated ($R^2 = 11\%$, $p < 0.0001$) and Self esteem ($R^2 = 15\%$, $p < 0.0001$) was significantly negatively associated. Life orientation (optimism) was also negatively associated with Depression ($R^2 = 4\%$, $p < 0.01$). In terms of Anxiety, this was positively associated with maladaptive coping strategies ($R^2 = 13\%$, $p < 0.0001$) while Self esteem ($R^2 = 12\%$, $p < 0.0001$) was negatively associated. The outcome of Hostility was

significantly positively associated with maladaptive coping strategies ($\underline{R}^2 = 14\%$, $p < 0.0001$).

Self esteem ($R^2 = 10\%$, $p < 0.001$) was negatively associated with Phobic Anxiety .The outcome of Paranoid Ideation was positively associated with maladaptive Coping strategies ($R^2 = 11\%$, $p < 0.0001$). The outcome variable of Psychoticism was positively associated with maladaptive coping strategies ($\underline{R}^2 = 14 \%$, $p < 0.0001$) and negatively associated with Self esteem ($R^2 = 15 \%$, $p < 0.0001$).

In terms of Psychological stress symptoms, these were positively associated with maladaptive coping strategies ($\underline{R}^2 = 10 \%$, $p < 0.0001$) and negatively associated with Self esteem ($\underline{R}^2 = 18 \%$, $p < 0.0001$). Finally Self esteem was negatively associated ($\underline{R}^2 = 11\%$, $p < 0.0001$) with Behavioural stress symptoms.

For the Clinical group the following emerged: Self esteem ($\underline{R}^2 = 14\%$, $p < 0.0001$) was significantly negatively associated with the outcome of Obsessive Compulsiveness. Self Esteem ($\underline{R}^2 = 21 \%$, $p < 0.0001$) was also negatively associated with the outcome of Interpersonal Sensitivity. The outcome variable of Depression was positively associated with maladaptive coping strategies ($\underline{R}^2 = 22 \%$, $p < 0.0001$). Two factors which were significantly associated with the outcome of Hostility were maladaptive coping strategies ($\underline{R}^2 = 13\%$, $p < 0.0001$) which were positively associated and Life orientation (Optimism) ($\underline{R}^2 = 10 \%$, $p < 0.0001$) which was negatively associated.

Phobic Anxiety and maladaptive coping strategies ($R^2 = 16\%$, $p < 0.0001$) were also positively associated. Similarly, Maladaptive coping strategies ($R^2 = 10\%$, $p < 0.0001$) were positively associated with Paranoid Ideation. Regarding the outcome variable of Psychoticism, maladaptive coping strategies ($R^2 = 14\%$, $p < 0.0001$) were also positively associated. Finally, in terms of stress symptoms, Self esteem ($R^2 = 24\%$, $p < 0.0001$) was significantly negatively associated with the outcome of Psychological stress symptoms. Self esteem ($R^2 = 11\%$, $p < 0.0001$) was also negatively associated with Behavioural stress symptoms.

TABLE 23: St epwise multiple regression of cope variables and moderating variables on outcome variables

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PRECLINICAL			
STRESS SYMPTOMS			
PHYSIOLOGICAL			
MALADAPTIVE COPING	10%	0.432	< 0.0001
SELF ESTEEM	18%	- 0.075	< 0.0001
PSYCHOLOGICAL			
MALADAPTIVE COPING	10%	0.432	< 0.0001
SELF ESTEEM	18%	- 0.075	< 0.0001
BEHAVIOURAL			
MALADAPTIVE COPING	9%	0.610	0.0001

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
SELF ESTEEM	11%	- 0.084	< 0.0001
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
MALADAPTIVE COPING	6%	0.266	0.002 **
SELF ESTEEM	4%	- 0.26	0.01*
OBSESSIVE-COMPULSIVENESS			
MALADAPTIVE COPING	19%	0.426	< 0.0001
SELF ESTEEM	13%	- 0.042	< 0.0001
INTERPERSONAL SENSITIVITY			
MALADAPTIVE COPING	9%	0.180	0.0002 ***
SELF ESTEEM	34%	- 0.052	< 0.0002
DEPRESSION			
MALADAPTIVE COPING	11%	0.319	< 0.0001
SELF ESTEEM	15%	- 0.052	< 0.0001
LIFE ORIENTATION (OPT.)	4%	- 0.123	0.01*
ANXIETY			
MALADAPTIVE COPING	13%	0.354	< 0.0001
SELF ESTEEM	12%	- 0.042	< 0.0001
HOSTILITY			
MALADAPTIVE COPING	14%	0.293	< 0.0001
SELF ESTEEM	8%	- 0.027	0.0003***

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PHOBIC ANXIETY			
MALADAPTIVE COPING	6%	0.163	0.002 **
SELF ESTEEM	10%	- 0.026	< 0.0001
PARANOID IDEATION			
MALADAPTIVE COPING	11%	0.271	< 0.0001
SELF ESTEEM	9%	- 0.029	< 0.0001
PSYCHOTICISM			
MALADAPTIVE COPING	14%	0.309	< 0.0001
SELF ESTEEM	15%	- 0.040	< 0.0001
CLINICAL			
STRESS SYMPTOMS			
PHYSIOLOGICAL REACTIONS			
SELF ESTEEM	8%	- 0.023	0.0007 ***
PSYCHOLOGICAL REACTIONS			
SELF ESTEEM	24%	- 0.074	< 0.0001
BEHAVIOURAL REACTIONS			
SELF ESTEEM	11%	- 0.075	< 0.0001
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
MALADAPTIVE COPING	6%	0.217	0.003 **
SELF ESTEEM	5%	- 0.024	0.005 **

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
OBSESSIVE-COMPULSIVENESS			
MALADAPTIVE COPING	9%	0.284	0.0001***
SELF ESTEEM	14%	- 0.041	< 0.0001
INTERPERSONAL SENSITIVITY			
MALADAPTIVE COPING	8%	0.153	0.0008 ***
SELF ESTEEM	21%	- 0.039	< 0.0001
LIFE ORIENTATION (OPT.)	3%	- 0.064	0.04 *
DEPRESSION			
MALADAPTIVE COPING	22%	0.359	< 0.0001
SELF ESTEEM	6%	- 0.025	0.002 **
LIFE ORIENTATION (OPT.)	11%	- 0.160	<0.0001
ANXIETY			
MALADAPTIVE COPING	6%	0.202	0.004**
LIFE ORIENTATION (OPT.)	4%	- 0.112	0.02 *
HOSTILITY			
MALADAPTIVE COPING	13%	0.279	< 0.0001
LIFE ORIENTATION (OPT.)	10%	- 0.137	< 0.0001
PHOBIC ANXIETY			
MALADAPTIVE COPING	16%	0.312	< 0.0001
LIFE ORIENTATION (OPT.)	8%	- 0.117	0.0006 ***
PARANOID IDEATION			

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
MALADAPTIVE COPING	10%	0.230	< 0.0001
LIFE ORIENTATION (OPT.)	10%	- 0.128	0.0001
PSYCHOTICISM			
MALADAPTIVE COPING	14%	0.246	< 0.0001
SELF ESTEEM	5%	- 0.020	0.007 **
LIFE ORIENTATION (OPT.)	5%	- 0.097	0.006 **

* $p < .05$ ** $p < .01$ *** $p < .0001$

RESEARCH QUESTION 12

What is the role of perceived stressors, mediating and moderating variables on the outcome variables?

A stepwise multiple regression was undertaken to determine if perceived stressors, mediating and moderating variables (such as age, gender, ethnicity, social support, self esteem, optimism) have an impact on the outcome measures (stress symptoms and psychological distress).

The findings which are shown in Table 24 indicate the following:-

For the Pre-clinical group: maladaptive coping strategies ($R^2 = 16\%$, $p < 0.0001$) were positively associated with Obsessive–Compulsiveness while Self esteem ($R^2 = 10\%$, $p < 0.0001$) was negatively associated with the outcome of Obsessive Compulsiveness. Self esteem ($R^2 = 26\%$, $p < 0.0001$) was also negatively associated with Interpersonal Sensitivity.

Self esteem ($R^2 = 15\%$, $p < 0.0001$) was also significantly negatively associated as was Social support ($R^2 = 9\%$, $p < 0.0001$) with the outcome of Depression. Maladaptive coping strategies ($R^2 = 8\%$, $p < 0.0003$) were positively associated with Depression as were perceived stressors (medical school concerns) ($R^2 = 3\%$, $p < 0.03$).

Maladaptive coping strategies ($R^2 = 12\%$, $p < 0.0001$) were also positively associated with the outcome variable of Anxiety. Maladaptive coping strategies ($R^2 = .11\%$, $p < 0.0001$) were also significantly positively associated with the outcome of Hostility. The variable of Self esteem ($R^2 = 10\%$, $p < 0.0001$) was significantly negatively associated with Phobic Anxiety.

The variable of Social support ($R^2 = 11\%$, $p < 0.0001$) was significantly negatively associated with Paranoid Ideation. Similarly, Social support ($R^2 = 18\%$, $p < 0.0001$) was significantly negatively associated with the outcome variable of Psychoticism. Finally, in terms of stress symptoms, the variable of Self esteem ($R^2 = 14\%$, $p < 0.0001$) was significantly negatively associated with Psychological stress symptoms.

Moving onto the Clinical group the findings indicate the following: Maladaptive coping strategies were significantly positively associated with the outcome of Obsessive Compulsiveness ($R^2 = 10\%$, $p < 0.0001$). The outcome variable of Interpersonal Sensitivity, and the variable of Self esteem ($R^2 = 29\%$, $p < 0.0001$) were significantly negatively associated. Maladaptive coping strategies were significantly positively associated with the outcome of Depression ($R^2 = 19\%$, $p < 0.0001$). Maladaptive coping strategies ($R^2 = 13\%$, $p < 0.0001$) were also positively associated with Hostility, whilst Life orientation (Optimism) ($R^2 = 10\%$, $p < 0.0001$) was negatively associated with the outcome of Hostility.

Maladaptive coping strategies ($R^2 = 15\%$, $p < 0.0001$) were significantly positively associated with the outcome of Phobic Anxiety. Similarly, maladaptive coping strategies ($R^2 = 12\%$, $p < 0.0001$) were significantly positively associated with the outcome variable of Psychoticism. Finally, maladaptive coping strategies were significantly positively associated with Psychological stress symptoms ($R^2 = 26\%$, $p < 0.0001$).

TABLE 24: Stepwise multiple regression of perceived stressors, mediating and moderating variables on outcome variables

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PRECLINICAL			
STRESS SYMPTOMS			
PHYSIOLOGICAL			
MALADAPTIVE COPING	5%	0.185	0.006**
SELF ESTEEM	9%	- 0.031	0.0002 ***
PSYCHOLOGICAL			
MALADAPTIVE COPING	7%	0.368	0.0006***
SELF ESTEEM	14%	- 0.066	< 0.0001
PERCEIVED STRESSORS	4%	0.156	0.01*
BEHAVIOURAL			
MALADAPTIVE COPING	6%	0.507	0.001**
SELF ESTEEM	8%	- 0.071	0.0004***
PERCEIVED STRESSORS	4%	0.251	0.009 **
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
MALADAPTIVE COPING	6%	0.266	0.002 **
SELF ESTEEM	4%	- 0.26	0.01*

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
OBSESSIVE-COMPULSIVENESS			
MALADAPTIVE COPING	16%	0.385	< 0.0001
SELF ESTEEM	10%	- 0.037	< 0.0001
PERCEIVED STRESSORS	3%	0.101	0.02 *
INTERPERSONAL SENSITIVITY			
MALADAPTIVE COPING	3%	0.102	0.03*
ADAPTIVE COPING	2%	- 0.061	0.05 *
SELF ESTEEM	26%	- 0.043	< 0.0001
SOCIAL SUPPORT	8%	- 0.084	0.0002***
PERCEIVED STRESSORS	4%	0.073	0.04*
DEPRESSION			
MALADAPTIVE COPING	8%	0.266	0.0003 ***
SELF ESTEEM	15%	- 0.047	< 0.0001
SOCIAL SUPPORT	9%	- 0.135	0.0001***
PERCEIVED STRESSORS	3%	0.096	0.03 *
ANXIETY			
MALADAPTIVE COPING	12%	0.340	< 0.0001
SELF ESTEEM	7%	- 0.033	0.0006***
PERCEIVED STRESSORS	2%	0.088	0.05*
GENDER	2%	1.539	0.05*

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
HOSTILITY			
MALADAPTIVE COPING	11%	0.253	< 0.0001
SELF ESTEEM	5%	- 0.022	0.004**
PERCEIVED STRESSORS	5%	0.098	0.007**
PHOBIC ANXIETY			
MALADAPTIVE COPING	6%	0.163	0.002**
SELF ESTEEM	10%	- 0.026	< 0.0001
PARANOID IDEATION			
MALADAPTIVE COPING	8%	0.217	0.0003***
SELF ESTEEM	4%	- 0.019	0.01*
SOCIAL SUPPORT	11%	- 0.120	< 0.0001
PSYCHOTICISM			
MALADAPTIVE COPING	8%	0.212	0.0002***
SELF ESTEEM	7%	- 0.024	0.001**
SOCIAL SUPPORT	18%	- 0.155	< 0.0001
PERCEIVED STRESSORS	2%	0.068	0.05*
CLINICAL GROUP			
STRESS SYMPTOMS			
PHYSIOLOGICAL			
SELF ESTEEM	6%	- 0.021	0.002**

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
GENDER	5%	1.788	0.008**
PSYCHOLOGICAL			
MALADAPTIVE COPING	26%	0.078	< 0.0001
AGE	5%	-0.770	0.009**
BEHAVIOURAL			
SELF ESTEEM	3%	- 0.079	< 0.0001
AGE	13%	- 1.040	0.03*
PSYCHOLOGICAL DISTRESS			
SOMATIZATION			
MALADAPTIVE COPING	6%	0.217	0.003 **
SELF ESTEEM	5%	- 0.024	0.005 **
OBSESSIVE-COMPULSIVENESS			
MALADAPTIVE COPING	10%	0.283	< 0.0001
SELF ESTEEM	6%	- 0.028	0.002 **
PERCEIVED STRESSORS	6%	0.159	0.002 **
INTERPERSONAL SENSITIVITY			
MALADAPTIVE COPING	8%	0.162	0.0004 **
SELF ESTEEM	29%	- 0.042	< 0.0001
SOCIAL SUPPORT	3%	- 0.054	0.03 *
AGE	5%	- 0.362	0.006 **

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
DEPRESSION			
MALADAPTIVE COPING	19%	0.325	< 0.0001
SELF ESTEEM	5%	- 0.020	0.01*
LIFE ORIENTATION (OPT.)	6%	- 0.120	0.003**
SOCIAL SUPPORT	6%	- 0.103	0.002 **
ANXIETY			
MALADAPTIVE COPING	6%	0.202	0.004 **
SELF ESTEEM	8%	- 0.035	0.0004 **
LIFE ORIENTATION (OPT.)	4%	- 0.112	0.02 *
HOSTILITY			
MALADAPTIVE COPING	13%	0.279	< 0.0001
LIFE ORIENTATION (OPT.)	10%	- 0.137	< 0.0001
PHOBIC ANXIETY			
MALADAPTIVE COPING	15%	0.290	< 0.0001
LIFE ORIENTATION (OPT.)	8%	- 0.119	0.0004***
AGE	4%	0.406	0.02*
PARANOID IDEATION			
MALADAPTIVE COPING	8%	0.200	0.0006***
LIFE ORIENTATION (OPT.)	4%	- 0.089	0.02*
SOCIAL SUPPORT	3%	- 0.077	0.02*

OUTCOME	PARTIAL R SQUARE (%)	BETA	p VALUE
PSYCHOTICISM			
MALADAPTIVE COPING	12%	0.230	< 0.0001
SELF ESTEEM	8%	- 0.022	0.0005***
SOCIAL SUPPORT	7%	- 0.097	0.0008***

* $p < .05$ ** $p < .01$ *** $p < .0001$

3. SUMMARY OF MAIN FINDINGS

RESEARCH QUESTION 1

What are the perceived sources of stress for undergraduate medical students?

All students irrespective of whether they were in the Clinical (Experimental) or Pre-clinical (Control) group listed their primary concern as fear of failing the examinations. Other concerns related to the fact that medical school left little time for social and recreational activities. There were concerns about the financial demands experienced in terms of studying medicine, as well as issues concerning the mastery of large amounts of information. Also of concern was how the vocational changes (that is impending compulsory community internships) would impact on their careers. Two factors

distinguished the Clinical group from the Pre-clinical: the Clinical group had more concerns about the help they received from their lecturers and also felt that the medical school was old and bureaucratised.

RESEARCH QUESTION 2

What are the effects of psychosocial mediating and moderating variables on health outcomes (stress symptoms and psychological distress)?

2.1.1. What are the differences in moderating variables between the pre-clinical and clinical groups?

The findings indicate that the Clinical group had higher scores on the perceived stressors, had lower Self-esteem, were less Optimistic and had lower Social support (were more lonely) than the Pre-clinical group.

2.2. What are the differences in mediating variables between the pre-clinical and clinical groups?

The Clinical group appeared to be using the coping strategies of Denial and Substance Use. The Preclinical group used a variety of coping strategies such as Active Coping, Use of Emotional Support, Use of Instrumental Support, Positive Reframing, Planning, Acceptance, Religion and Self Blame.

2.3. What are the differences in health outcomes for the two groups?

The Pre-clinical group had statistically significant elevated scores on the scale assessing Behavioural stress symptoms and the Psychoticism Scale (indicating social alienation in non-psychiatric samples). There were no statistically significant correlations for the Clinical group.

RESEARCH QUESTION 3

Is there a relationship between the perceived stressors and the outcome variables?

There were positive correlations between the perceived stressors (medical school concerns) and all outcome variables at varying levels of statistical significance for both the Pre-clinical and Clinical groups. For the Pre-clinical group positive correlations were established with Interpersonal Sensitivity, Depression, Obsessive Compulsiveness, Hostility, Anxiety, Psychoticism, Psychological and Behavioural Stress symptoms, Paranoid Ideation, Physiological Stress symptoms, Phobic Anxiety and Somatization. Similarly, for the Clinical group positive correlations were established with all outcome variables.

RESEARCH QUESTION 4

What are the relationships between the moderating variables and the outcome variables?

4.1. What is the relationship between the personal resource variables of self-esteem and optimism and the outcome variables?

For both the Pre-clinical and Clinical groups there were statistically significant negative correlations between the variables of Self esteem and Optimism and all outcome variables. This indicates that these variables served a moderating effect in these groups in terms of the development of stress symptoms and or psychological distress.

4.2. What are the relationships between the environmental variables and the outcome variables?

4.2.1. What are the relationships between the environmental variables of age and social support and outcome variables?

With regards to the relationships between the variables of Age and Social support and outcome variables the following were the findings: For the Preclinical group, all the outcome variables were significantly negatively correlated with Social support. For the Clinical group, there were significant negative correlations for almost all outcome variables and Social support (at varying levels of statistical significance), with the exception of

Physiological stress symptoms (which whilst negatively correlated was not statistically significant).

4.2.2. What are the relationships between the environmental variables of gender and ethnicity and outcome variables?

For the Pre-clinical group there were significant correlations between gender and outcomes, particularly those assessing psychological distress: females had higher scores than males on the sub-scales assessing Physiological stress symptoms, Somatization, Depression and Anxiety. In terms of ethnicity, Indian students in the Pre-clinical group had higher scores on the sub-scales assessing Interpersonal Sensitivity and Depression. For the Clinical group, female students had higher scores on the outcomes of Physiological, Psychological and Behavioural stress symptoms.

RESEARCH QUESTION 5

What are the relationships between the mediating variables and the outcome variables?

The findings indicate that there were positive correlations between certain coping strategies and outcome variables for both the Pre-clinical and Clinical groups. For the Pre-clinical group, the coping strategy of Self Distraction was positively correlated with almost all outcome variables with the exception of Somatization. Denial and Self Blame were positively correlated with all outcome variables.

Behavioural Disengagement was positively correlated with almost all outcome variables (except Phobic Anxiety). The coping strategy of Substance Use was positively correlated with certain outcome variables: Somatization, Obsessive Compulsiveness, Depression, Psychoticism, Physiological and Behavioural stress symptoms. Venting was positively correlated with all the sub-scales assessing psychological distress. The coping strategy of Planning was positively correlated with Obsessive-Compulsiveness. The coping strategy of Acceptance was negatively correlated with certain outcome variables: Depression, Psychoticism, Psychological and Behavioural stress symptoms.

For the Clinical group, the coping of strategies of Active Coping and Humour, Acceptance were negatively correlated with certain outcome variables. The coping strategies of Denial, Substance Use, Use of Emotional Support, Use of Instrumental Support, Behavioural Disengagement, Venting and Self-Blame were positively correlated with certain outcome variables.

RESEARCH QUESTION 6

What are the relationships between the outcome variables?

There were significant positive correlations between all outcome variables for both the Pre-clinical and Clinical groups.

RESEARCH QUESTION 7

What are the relationships between the environmental and moderating variables?

7.1 What are the relationships between the environmental variables of age and social support and the personal variables?

Both Self esteem and Optimism were positively correlated with Social support for both the Pre-clinical and Clinical groups.

7.2. What are the relationships between the environmental variables of gender and ethnicity and the personal variables?

In the Pre-clinical group, Self esteem and Optimism were both positively correlated with Indian ethnicity, that is Indian students had lower Self esteem, and were less optimistic than their African counterparts. This relationship was significantly stronger for Optimism. Regarding gender, females in the Pre-clinical group had lower Self esteem and Optimism than their male colleagues.

In the Clinical group, Indian students were less Optimistic than their African colleagues. Female students in the Clinical group were less Optimistic than their male counterparts.

RESEARCH QUESTION 8

What are the relationships between moderating and mediating variables?

8.1. What are the relationships between the personal resource variables and the mediating variables?

For the Pre-clinical group, Self esteem was negatively correlated with the coping strategies of Denial, Behavioural Disengagement and Self Blame. Optimism was negatively correlated with the coping strategies of Denial, Substance Use, Behavioural Disengagement and Self Blame. Optimism was positively correlated with the following coping strategies: Active Coping, Use of Emotional Support, Use of Instrumental Support, Positive Reframing, Planning and Acceptance.

For the Clinical group, Self esteem was negatively correlated with the coping strategies of Denial, Behavioural Disengagement and Self Blame. It was positively correlated with Active Coping, Positive Reframing, Planning, Humour and Acceptance. Optimism was negatively correlated with the coping strategies Denial, Substance Use, Behavioural Disengagement and Self Blame. It was positively correlated with Active Coping, Positive Reframing, Planning, Acceptance and Religion.

8.2. What are the relationships between the environmental variables and mediating variables?

8.2.1. What are the associations between the variables of age and social support and cope variables?

For the Pre-clinical group, Age (being younger students) was positively correlated with the coping strategy of Planning. In terms of Social support, there were negative correlations with Self Distraction, Denial, Substance Use, Behavioural Disengagement and Self Blame. There were positive correlations with the coping strategies of Use of Emotional Support and Use of Instrumental Support. Regarding the Clinical group, there were positive correlations between increased Age and Substance Use. Age was negatively correlated with the coping strategy of Acceptance. In terms of Social support there were negative correlations with the coping strategies of Denial, Substance Use, Behavioural Disengagement and Self Blame. There were positive correlations between Social support and the coping strategies of Active Coping, Use of Emotional Support, Positive Reframing and Acceptance.

8.2.2. What are the relationships between the variables of gender and ethnicity and cope variables?

Regarding ethnicity, African students in the Pre-clinical group used the coping strategies of Active Coping, Planning, Religion and Positive Reframing more than Indian students did. In terms of gender, male students used Humour more than female students did.

In the Clinical group, African students used the coping strategy of Self Distraction more than Indian students did. Female students used the coping strategy of Use of Emotional Support more than males did.

8.3. What is the relationship between the perceived stressors and cope variables ?

In the Pre-clinical group, perceived stressors were positively correlated with the coping strategies of Denial, Behavioural Disengagement, Self Blame, and Substance Use. In the Clinical group, Behavioural Disengagement was positively correlated with perceived stressors, while Active Coping and Humour were negatively correlated.

RESEARCH QUESTION 9

What are the relationships between the personal moderating variables?

The findings indicate that for both the Pre-clinical and Clinical groups, Self esteem and Optimism were positively correlated suggesting a shared variance.

RESEARCH QUESTION 10

Can psychological distress in medical students be predicted based on a combined data analysis?

10.1. Which coping variables are predictors of outcomes?

The findings indicate that there are a number of varied coping strategies used by both groups which correlate positively with outcomes. These are Self Blame, Self Distraction, Venting, Denial, Behavioural Disengagement, Religion and Substance Use. Of concern is that Religion as a coping strategy has been implicated in Physiological, Psychological and Behavioural stress symptoms for the Pre-clinical group. Coping strategies such as Humour, Active Coping, Acceptance and Use of Emotional Support were negatively correlated with certain outcome variables.

In terms of the Clinical group, coping strategies which could be termed as disengaging or maladaptive (that is Self Blame, Denial, Behavioural Disengagement, Substance Use and Venting) were positively correlated with certain outcome variables. Coping strategies which could be termed engagement or adaptive (that is, Active Coping, Use of Instrumental Support, Planning, Acceptance and Humour) were negatively correlated with certain outcome variables.

RESEARCH QUESTION 11

What are the general predictors of outcome?

The findings indicate that for the Pre-clinical group, maladaptive or disengaging coping strategies were positively correlated with poor health outcomes, whilst Self esteem to a major degree and Optimism (only for the outcome of Depression) were negatively correlated with poor health outcomes.

Similarly for the Clinical group, maladaptive or disengaging coping strategies were positively correlated with various health outcomes. Self esteem and Optimism were negatively correlated with certain health outcomes.

RESEARCH QUESTION 12

What is the role of perceived stressors, mediating, moderating and environmental variables on outcome variables?

The findings indicate that the results were similar to those presented in Research Question 10 for both the Pre-clinical and Clinical groups. For the Pre-clinical group, maladaptive coping, perceived stressors and age were positively correlated with poor health outcomes, whilst high Self esteem and good Social support (less loneliness) were negative correlated with poor outcomes.

Similarly for the Clinical group, maladaptive coping strategies, were positively correlated with all outcomes. Perceived stressors were positively correlated with Obsessive Compulsiveness, while female gender was positively correlated with Physiological stress symptoms. High Self esteem, Social support, Optimism, and age (being older students) were negatively correlated with poor health outcomes distress.

CHAPTER FIVE

DISCUSSION

This multi-factorial study had several aims, namely; to assess perceived sources of stress for undergraduate medical students, to delineate health outcomes (stress symptoms and psychological distress), and to establish the effects of psychosocial mediating variables such as self esteem and optimism and coping behaviour, (including the role of social support) on health outcomes.

This chapter discusses the research findings in terms of identifying perceived sources of stress, delineating health outcomes, identifying the relative coping mechanisms used and the effects of psychosocial mediating variables on psychological health outcomes. The implications of the findings are discussed, particularly with regards to intervention strategies.

1. PERCEIVED SOURCES OF STRESS IN THE MEDICAL SCHOOL ENVIRONMENT

The majority of students in both the Pre-clinical (Control) and Clinical (Experimental) groups ranked their chief concern or perceived source of stress as being that of failing examinations in medical school. This is in keeping with findings of researchers such as Aktekin et al. (2001) who found that Turkish medical students were afraid of educational failure. This finding is contrary to that of Wolf's (1994) research which found that in the

Pre-clinical years academic demands such as preparing for examinations dominate, while in Clinical years there are other major stressors (such as dealing with sick and dying patients, as well as establishing relationships with medical and allied professionals, etc.) In this study, this finding may be due to the emphasis placed by both the students themselves and their lecturers on high academic achievement. Further, students who were previously considered as “top - of -the -class” by themselves and their peers may receive average or below average grades and as such opportunities for losses, failures or perceived failures are frequent throughout medical school. Furthermore, there are few viable exits points once they have entered the medical school programme. Students may feel that they have to achieve or they may be considered academically less able, or fear that they may be asked to withdraw from the course if they have frequent failures (Simpson & Budd, 1996).

The fact that 44% of the Pre-clinical and Clinical groups ranked Item 7 (Medical School controls ones life and leaves too little time for other activities), as their second concern or stressor is also significant. This finding supports research which shows that medical students spend (on an average) 29% more time studying than students in other faculties (Helmers et al. 1997). Often, this is at the expense of personal or social relationships and leaves little or no time for leisure and recreational activities (Wolf, 1994). This often leads to a progressive narrowing of medical students lifestyles as activities such as cultural, familial and spiritual activities are often excluded (Coombs & Virshup, 1994).

The finding that medical students in all years of study are concerned about the financial demands as a result of their studying medicine is also in keeping with that found in the recent literature (Ariyan, 2000; Dangerfield, 2001). This is more prominent in the Pre-

clinical group probably because they have a longer period of study still ahead of them than the Clinical group and this limits their ability to quickly pay off debts accumulated during their years of study.

This also ties up with their fifth ranked stressor which involves concern about their future in terms of how the vocational changes in the South African government health system (an additional year of community service) would affect their careers in medicine. The additional year of service not only delays their entry into courses for specialization but often involves community interns being sent away from their centres of studying or training to practice in rural areas. Research in this area has found the following issues which concerned the medical students: lack of supervision and support from senior doctors, learning experiences and the location of the hospital. Further factors were: lack of facilities, lack of clear role definition of community service doctors, unfair allocation processes, conditions of service including accommodation, and concerns about personal safety, particularly for women (Reid & Conco, 1999; Kale, 1995).

Another important stressor in the literature, which this study also found was that of students concerns about their ability to master the vast amounts of knowledge in the medical curriculum. Researchers such as Coles (1994) and Enns et al. (2001) have reported that medical students are concerned about “information overload” and pressure to learn large quantities of information. Vitaliano et al. (1989) and Stewart et al. (1995) have also reported students concerns about their abilities to endure and successfully complete their medical education.

Whilst this study did not specifically examine abuse or mistreatment of medical students, of concern is that Clinical students have negative perceptions of the medical school environment, for example, that teachers are not helpful and that the environment is cold and bureaucratized. These results support those of Wolf and Kissiling (1983) where the medical school environment was seen as authoritarian and lecturers were seen as unsupportive. It is hypothesized that such perceptions cause what Kay (1990) called “traumatic de-idealization”, which refers to an undercutting of self esteem and a lowering of ideals about teachers and the medical profession by students.

Thus, the stressors that students in this study perceive, (irrespective of the year of study) are no different to those experienced by students from first world or western and other countries (Stewart et al. 1995; Wolf, 1994; Aktekin et al. 2001).

In terms of perceived stressors and coping strategies, this study gives support to the literature (Wolf, 1988; 1994) which suggests that students use a variety of different strategies to cope with stressors. The literature also suggests that emotion focused or disengagement or maladaptive strategies increased and problem focused or engagement or adaptive strategies decreased as students went through medical school (Mosley et al. 1994). This study found that maladaptive coping strategies were positively correlated with stressors and that adaptive coping strategies were negatively correlated with stressors. Furthermore, the finding that perceived stressors were positively correlated with poor health outcomes for both the Pre-clinical and Clinical groups is also in keeping with the research literature (Guthrie et al. 1995; Firth-Cozens, 2001).

2. COPING MECHANISMS

This study examined the role and outcome of certain coping tasks to the perception of medical school stressors. It investigated the effect that these coping strategies and resource variables such as self-esteem, optimism, demographic variables such as gender, age, ethnicity and lack of social support (loneliness) had on outcome.

2.1 COPING STRATEGIES

The research literature shows that there is no one particular coping strategy that is used when dealing with stress and that often multiple strategies are used (Cohen, et al.1986; Thoits, 1995; Wolf et al. 1988). The findings of this study support the literature . Of significance is that there is a preponderance of what Carver and Scheier (1994, p.185) call “dysfunctional” or avoidant or maladaptive coping strategies for both the Pre-clinical and Clinical groups in this study. Learner et al. (1989) state that while any given strategy may not be intrinsically maladaptive, it may become dysfunctional if it is relied on for long periods when other strategies may be useful. Both the groups used various coping strategies, (discussed below). The first five of which have been identified by Folkman and Lazarus (1980) as strategies which attempt to regulate emotional distress and tend to predominate when people feel that the stressor is something that must be endured.

2.1.1 Self Blame

This coping strategy was positively correlated with many health outcomes, for example, Obsessive-Compulsiveness and Interpersonal Sensitivity in this study. Self blame which is characterological in nature (that is blaming the kind of person that one is for negative outcomes) is debilitating. Characterological self blame needs to be distinguished from behavioural self blame (taking responsibility for negative evaluations which have some legitimacy) (Janoff-Bulman, 1988). In this study it is unclear whether this self blame is characterological or reality based, (for example, students do not hand in patients case reports timeously and hence obtain lower marks). An important distinction between the two types concerns the perceived controllability, that is, the modifiability through one's own efforts of the factors blamed. Behavioural self blame may be an adaptive response to stressors as it enables individuals to minimize perceptions of vulnerability by allowing them to believe that altering their behaviours in the future can minimize the likelihood of the recurrence of the stressor. However, generally self blame as a coping strategy has been found to be a predictor of poor adjustment under stress (Carver, 1997).

2.1.2. Denial

Denial was also implicated as a predictor of poor health outcomes in this study for both the Pre-clinical and Clinical groups. Whilst research literature (for example, Carver et al. 1989) suggests that denial may be useful in that it minimizes distress and thereby facilitates coping, in this study the negative role of this coping strategy vis a vis outcomes is clear. Denial only creates additional problems unless the stressor can profitably be

ignored. Denying the reality of the event allows the event to become more serious, thereby making more difficult the coping that eventually must occur (Carver et al. 1989). In this sample, the stressors cannot be ignored as the students have to write exams, undertake oral exams, etc.

2.1.3. Venting

This emotion focused coping strategy was also found to be positively correlated with poor health outcomes for both groups in this study. Whilst venting involves the tendency to focus on whatever distress one is experiencing and to ventilate those feelings, focusing on these emotions for long periods of time can impede adjustment. The phenomenological salience of distress may exacerbate the distress, as well as distract individuals from active coping efforts and movement beyond the expression of the distress (Lerner et al. 1989). It can be hypothesized that the students in this study express their feelings of anger, hostility and helplessness towards their environment through the coping strategy of venting.

2.1.4. Behavioural Disengagement

This coping strategy involves reducing ones efforts to deal with the stressor to the extent that one may even give up the attempt to attain goals with which the stressor is interfering. Lerner et al. (1989) also feel that behavioural disengagement is reflected in phenomena which are identified with terms such as helplessness. In this study, the students cannot give up their goals as there are no viable exit points in the course and may hence feel that

they should do the bare minimum required to pass the courses, as this is their major concern.

2.1.5. Substance Use

This coping strategy was implicated in a small number of outcomes for both the groups. Whilst these findings may not be an accurate reflection of the real extent of the problem (substance use may be more prevalent in this sample), the findings lend support to the literature in that substance use can and does occur. Of concern in this study is that it was the Clinical students who reported substance use. One possible explanation could be that the Clinical students have greater knowledge of and access to medications such as, for example, Anti-depressants, Anxiolytics and use these to assist them with their studies to stay awake, etc. This is contrary to the research literature which reports that senior students use substances as a coping strategy less often than pre-clinical students (Tyssen et al. 1998). One possible explanation for the different findings is that Tyssen et al.'s (1998) sample were students with high self esteem, whilst in this study the Clinical group (senior students) had lower self esteem when compared to their pre-clinical colleagues. Parkerson et al. (1990) found that high self esteem protected against psychological distress. It is this very sample which has easy access to substances (including medication) through their clinical work in hospitals or clinics, etc. The literature also points out that coping strategies involving substance use may be beneficial in the short term, but may have deleterious effects in the long term (Thoits, 1995). It appears that medical students who use substances as a coping strategy continue using them when they qualify and this may account for the high rates of alcohol and drug use among doctors (Johnson et al. 1990).

2.1.6. Self Distraction

This coping strategy which was formerly called Mental Disengagement focuses more on explicitly doing things to take one's mind off the stressor or focusing away from the stress (Carver, 1997). Self distraction was found to be a predictor of poor outcomes in this study and is in keeping with the literature which suggests that this strategy can be considered to be potentially dysfunctional and has been positively correlated with negative outcomes in other student samples (Carver & Scheier, 1994).

2.1.7. Religion

Increased engagement in religious activities in times of stress is an important coping strategy which has been found to be protective of psychological distress (Schlebusch, 2000). In this study, turning to religion was found to be predictive of psychological distress or poor outcomes. This is in keeping with Carver and Scheier's (1994) study among university students where negative emotions (feelings of threat) were positively correlated with religious activity. One possible explanation for this is that while turning to religion may be a familiar and comfortable coping strategy for the students in this study, (the majority identify themselves as coming from strong religious backgrounds such as Christianity, Islam and Traditional beliefs), this might fail to solve the problems that these students experience (passing their examinations, financial problems, etc.). Furthermore, focusing on religious activity may distract these students from active coping efforts.

While the above has focused on coping strategies as predictors of psychological distress, a number of coping strategies have been identified as being negatively correlated with poor outcomes. These are: Active Coping, Acceptance, Humour, Planning and Use of Emotional Support. These can be construed to be adaptive or engagement coping strategies for this sample, in that a person who accepts the reality of a stressful situation is someone who is engaged in an attempt to deal with the situation. Acceptance for example, is important in circumstances in which the stressor is something that has to be accommodated to as opposed to circumstances in which the stressor can easily be changed.

While primary emotion focused strategies are used in this study (this being most likely when individuals make an appraisal that harmful or threatening or challenging environmental conditions cannot be changed or modified), coping flexibility is important. This study indicates that those who rely on one type of coping style only may be more susceptible to negative health outcomes (such as psychological distress). Maladaptive coping has emerged as significant predictors of poor health outcomes in this study and as such need to be considered as important intervention sites for medical students.

2.2. Coping Resources

2.2.1. Personal Resources

2.2.1.1. Self Esteem

The finding that students in the Clinical group had lower self esteem than the Pre-clinical group is significant. These findings are contrary to that of Bramness et al. (1991), who

proposed that male medical students had low self esteem in the pre-clinical years but this improved as they progressed through their years of study. The findings are in keeping with Wolf et al. (1991), that self esteem decreased over the course of the first year of medical school. It is hypothesized that while this may be partly due to the fact that those students selected for entry into medical schools perhaps have an inflated view of the academic ability required for medical studies (Powis, 1994), they may subsequently have difficulty in accepting that others are as equally bright as they are. Another possible explanation is that the traumatic insults that medical students experience over the course of their studies, (for example, abuse by consultants and others) undermines their self confidence and self esteem.

Harter (1993) proposes that change in self esteem are most likely to occur during times of transition such as those from high school to college. She proposes that a re-evaluation of ones self esteem is more likely during such transitions because they bring with them:-

- (i) Changes in perceptions of ones competence given that new developmental tasks have to be mastered and that there are new reference groups with whom one compares oneself.
- (ii) There are alterations in ones self esteem, with an assessment of the hierarchy of aspirations concerning which domains are the most important in the new environment.

- (iii) The need to establish new social networks which will serve as sources of approval or disapproval.

Harter (1993), thus proposes that changes in one's environment set the stage for changes in one's self theory, leading to increases in self esteem for some individuals and decreases for others who are moving into less favourable settings. Harter (1993, p.109) goes on to conclude that "there are factors which militate against self esteem increases in individuals handicapped by the lack of natural abilities or attributes in the face of harsh social comparison standards, by a difficult temperamental style, and or by a social environment composed of neglecting or disapproving significant others. To the extent that the situation remains constant, low self esteem persists".

This can be applied to the Clinical group, in that they go through a transition within the medical school from a lecture based teaching module to a more practical, hospital based module. They have to master new developmental tasks such as interactions with a wide network of multidisciplinary team members in new environments where new skills have to be learnt and new aspirations and new important domains established. If the environment, for example, clinical settings are perceived as harsher, less supportive and aspirations are unrealised then there can be a negative impact on self esteem.

Self esteem emerged as an important predictor variable for a number of outcomes for both the groups in this study. This provides support for the contention that self esteem plays an important role as a buffer for health outcomes. This study showed negative correlations between self esteem and the maladaptive coping strategies (Denial and Self Blame) and

positive correlations between self esteem and the adaptive coping strategies of Active Coping and Acceptance. This study supports the literature which indicates that self esteem influences the coping process: in that people who have positive views of themselves feel less overwhelmed when confronted with stressors than people who do not have positive views. High self esteem individuals perceive themselves as being able to cope with an array of problems (De Longis, Folkman and Lazarus, 1988).

2.2.1.2. Optimism

Also of concern is that while Clinical students in this study were less optimistic than the Pre-clinical group, optimism emerged as an important protective variable in terms of outcome. This finding supports Stewart et al's. (1997) research which found that dispositional optimism provided a protective function.

The findings of this study that optimism was negatively correlated with maladaptive or disengaging coping strategies such as Denial, Self Blame (Pre-clinical group) and Behavioural Disengagement, Self Blame (Clinical group) and positively correlated with adaptive or engagement strategies (such as Positive Reframing, Active Coping and Acceptance) are significant. It supports research which indicates that differences in outcome partly derive from differences between optimists and pessimists in the way in which they cope with the challenges in their lives (Scheier et al. 1994). It was found that optimism correlated positively with adaptive or engagement problem focused coping, acceptance, positive reinterpretation or reframing, whilst it correlated negatively with

maladaptive or disengaging coping strategies such as Denial and Distancing (Behavioural Disengagement) (Scheier et al. 1986).

Regarding the findings that optimism and self esteem were positively correlated suggesting a shared variance is significant. The literature supports this, in that there is an intrinsic tie between feelings of worth or self value and positive outcomes. Someone who has the capacity for high self esteem or self worth would also have positive outcomes to life's contingencies (Scheier et al.1994)

2.2.2. Environmental Resources

2.2.2.1. Gender

The general literature points towards females experiencing high levels of psychological distress (Thoits, 1995).Whilst this view is supported by some researchers in medical student samples (for example, Lloyd & Gartrell,1981), other researchers such as Firth (1986) found that while female students reported that more stressful incidents had occurred than their male colleagues, this did not translate into symptomatology.

This study found that female students in both the groups reported significant levels of stress symptoms. Thus, while these female students did not display psychological distress, and did not readily fit into any diagnostic category, they were experiencing psychological difficulties. This finding is in keeping with research that students do experience stress reactions such as cognitive disturbances, making mistakes (Peterlini, 2000), poor decision

making (Shapiro et al. 2000), and feelings of guilt and uselessness (Guthrie et al.1995). These do not necessarily translate into symptomatology but may be precursors of physical and psychological illnesses and difficulties such as cancer, hypertension, suicide, etc. (Pitts et al. 1961; Thomas, 1975). The findings of this study justify the use of Schlebusch's Stress Symptom Checklist (2004) which was formulated to assist subjects in identifying stress symptoms, before individuals become victims of a specific physiological or psychological disorder related to stress. As such it is a useful assessment instrument for inclusion in stress studies.

Regarding the role of self-esteem, optimism and gender for the Pre-clinical group, female students had lower scores on both self-esteem and optimism than males. However, the female students in the Clinical group had low scores on optimism only. This finding is significant in that researchers such as Thomas (1975), have found that damaged self-esteem may result from the pressures of medical school. This is even more important for younger female students(for example, in the Pre-clinical group) who may have to deal with issues such as harassment or abuse which may exacerbate or result in low self-esteem. It is hypothesised that decreases in self-esteem and or optimism in female students could lead to decreases in life satisfaction and health (Parkerson et al. 1990), reduced empathy in women (Kliszcz & Rembowski, 1998), and increases in cynical attitudes and less idealism (Eron, 1995; Wolf, 1989; Johnson & Scott, 1998). It is a limitation of this study that (due to random sampling methods and issues of confidentiality) these female students cannot be followed up so that their mental or physical health can be assessed 20 or 30 years hence, as long term study would yield valuable information. Thus, there are long term health implications (both physical and emotional or mental) for women medical students and

doctors. Considering the large amounts of money invested in training these women and also that more female medical students are being admitted to medical schools, it is important to consider this group as a possible high risk group.

2.2.2.2. Ethnicity

Regarding the issue of ethnicity, while there were no differences between African and Indian students in the Clinical group in terms of outcome, Indian students in the Pre-clinical showed elevated scores on the outcome of Depression and Interpersonal Sensitivity when compared to African students. The finding that Indian students in the Pre-clinical group had lower optimism and self esteem than their African counterparts and that Indian students in the Clinical group had lower optimism is significant. Both these findings need to be considered within the context of the following:

- (i) Indians are an ethnic minority in South Africa (less than 1 % of the population) and (albeit by not a significant amount/percentage) were also a minority on this campus (44.9%) when compared to African students (46.8%) in the medical school (during the period of the sample collection,1999) (Lehmann & Sanders, 1999). Shervington et al's. (1996) study of African- American students found that between 10-20% of students attributed their stress to issues pertaining to race and or gender. Coburn and Jovaisas' (1975) research also found that first year students from sub-groups differing from the "mainstream" reported more stress than their "mainstream" counterparts. It is hypothesized that Indian students on this medical school campus were in a similar position to Coburn and Jovaisas' (1975) sample.

- (ii) Another possibility is that which should be seen in the light of the current socio-economic and political context of South Africa. Indians in South Africa have traditionally progressed socially and economically through education. If these opportunities are limited or perceived to be limited, (as indicated by the high endorsement of the item assessing concern for the future on the Medical School Concerns Scale), this may manifest itself as psychological distress, lowered self esteem, and optimism. The policies of redressing the inequities of the past Apartheid government by the current government have led to Indians perceiving themselves as being marginalized and discriminated against in the educational and economic spheres. There are now “quotas” for entry into universities, post-graduate programmes and the job market (Meer, 2000). This indicates that there are less positive outcomes for this ethnic group and that they can be considered to be at risk for poor health outcomes or psychological distress.

Furthermore, regarding coping strategies, African students appear to start off using more adaptive or engagement coping strategies in the Pre-clinical group, (for example, Active Coping, Planning and Positive Reframing) than the Indian students. However, in the Clinical group, the African students appeared to be using the maladaptive or disengagement coping strategy of Self Distraction more than Indian students do. While it cannot be stated that the coping strategies of African students undergo changes as they progress through medical school, it is important to note that a maladaptive coping strategy is being used by this group. The coping strategies that this ethnic group use also need to be monitored during the course of medical school.

2.2.2.3. Age

The finding in this study that increasing Age, (that is, the older group which in this sample is the Clinical group) was positively correlated with the outcome of Hostility is significant. The literature shows that dissatisfaction with the medical school is often expressed as hostility and that medical students suppressed anger increases over their course of study (Vitaliano et al. 1989). Hostility is also reflective of dislike and distrust of other people and predisposes people to poor interpersonal relationships (Sutherland & Cooper, 1998). This may also, it is hypothesized, account for the low levels of social support that the older students (Clinical group) report in this study.

2.2.2.4. Social Support

The finding that Social support is lower (students report that they are lonely) in the Clinical group is also significant. It is hypothesized that the demands that the medical school environment makes on them (such as studying for longer periods of time, clinical work, focus on academic achievements) all contributes towards increased feelings of loneliness as there are limited opportunities for social interaction. However, researchers such as Miller (1994) and Wolf (1994) found that costs of social relationships may outweigh the benefit in that in a demanding medical school environment, such as that experienced by the Clinical group who engage in clinical work in hospitals etc. Social ties may place competing demands on the students time and energies. They may then make little effort to develop or maintain social support from significant others in their lives. The literature proposes that single marital status or the lack of a significant close other increases stress levels (Tyssen et

al. 2001). In this sample the majority of the Clinical students reported being single (not in a relationship) and this could account for the low social support (loneliness) that these students perceived or experienced. Another hypothesis supports Poirer et als. (1998) research: as students in the Clinical group progress through medical school training, they are increasingly perceived as doctors by friends and family they have previously depended upon and this limits the support that they get.

3. HEALTH OUTCOMES

A strength of this study is that it has looked at a number of indexes of outcomes including stress symptoms and psychological distress. Other studies in the area have examined one or two aspects of psychological distress only, for example, Zoccolillo et al. (1986) looked at Depression only; Wolf et al. (1991) looked at Hostility only, etc. The findings show that the medical students in this sample (irrespective of the year of study) are not any different to other students worldwide and that there is something about the medical school experience that affects students in a negative manner. There are serious and negative outcomes for these students which can have long term consequences for them as well as the potential patient populations they will serve as doctors.

This study has shown that there are no significant differences in outcomes between the Clinical and Pre-clinical groups. Of significance is the high level of Psychoticism reported among the Pre-clinical group. Elevations on this scale indicate not psychoticism in the psychiatric sense, but may be representative of a mildly alien lifestyle or social alienation. This could be due to the fact that in foregoing their personal interests and interpersonal ties

because of the high workload and large amounts of time spent studying, these students experience feelings of emotional isolation and alienation (Coombs & Fawzy, 1986). Feelings of isolation and alienation could be reinforced at this university by the fact that the medical campus is far away from mainstream campus life and facilities such as a gymnasium. There is also no contact with students at other faculties (who may not be as time pressured as medical students) and who may be able to offer medical students social support which they may not get or want from their medical colleagues.

It is also hypothesized that the Pre-clinical group may be more vulnerable initially because of their relative youth. They may also have difficulty accepting such alienated lifestyles as the norm and adjusting to the socialization process of “becoming a doctor.” Their environment may also not support them, (in that the other students who are also in the same position may not be able to offer the support needed), there may no other peer role models and they may perceive their colleagues (with whom they could socialize) as competitors. However, the possibility that elevations on the Psychoticism scale may indicate a more serious and negative outcome, clinical psychosis among the Pre-clinical group cannot be discounted.

The finding that the Pre-clinical group had higher levels of Behavioural stress symptoms is significant as the literature points towards affective and behavioural reactions preceding clinical manifestations of physical and mental illnesses by up to 20 or 30 years (Thomas and McCabe,1980). In this sample Behavioural stress symptoms may be precursors of mental and physical health problems in later life. All the above mentioned findings point

towards serious, adverse outcomes which could not only impair these students academic functioning but their very ability to practice as doctors in the long term.

The findings also indicate that variables such as perceived stressors, coping strategies, self esteem, optimism, social support , age, gender and ethnicity all have a role to play in terms of outcomes. However, the role that these factors play accounts for a small degree of the variance. It is therefore hypothesized that there may be other factors (which this study has not examined) which could play a role. A possibility could be the personality factors of, for example, perfectionism (Henning et al.1999) and the imposter phenomenon (Humphries and Kaney, 1999). It is recommended that future research in this area examine such personality factors.

4. IMPLICATIONS OF THE STUDY FOR INTERVENTION

Wolf (1994), Stewart et al. (1995) & Peng et al. (1995) have looked at the role of student's personality characteristics and coping behaviour on academic performance and psychosocial functioning at medical school. Research indicates that personality attributes, attitudes and values are better able to forecast how students are likely to perform.

This study indicates that coping strategies and self-esteem play an important role in terms of adaptation and outcome. Therefore, the primary thrust of any intervention measures should be directed towards these variables. This study supports Alexander & Haldane's (1979), Chan (1992), & CMA Policy Summary (1998) findings that learning to cope with stress is an important ingredient in the training of doctors. Coping skills aimed at active

problem solving, appropriate emotional regulation and seeking out and maintaining social support should be systematically taught, rather than be left to the medical students to acquire in a haphazard manner.

As early as 1975, Thomas stated that medical student's psychological stamina was of importance. She quoted Pagit (1869) that the medical students must have personal character and the will to survive the rigours of medical school. Thus, the teaching of positive coping strategies, particularly to medical students who by virtue of best selection into medical school are among the brightest, is important. Their entry into medical school in the face of high levels of competitiveness and then finding others who are equally bright or brighter may offer blows to self-esteem. This may be further exacerbated by traumatic de-idealization during the process of training.

A possible means of addressing this may involve interventions which attempt to restructure core beliefs that medical students have about themselves, their world, (the medical school environment), and their future, their self-esteem, as well as their feelings of loneliness. In terms of addressing this from the university's perspective, health promotion or wellness programs which attempt to address issues such as students perception of faculty members as being "cold, unfriendly, authoritarian, and unhelpful" must be implemented. This must include mentorship programmes which would help faculty staff and students to interact with each other in a more personal manner. This university has also attempted to address this issue by using staff as facilitators for small group learning in the new curriculum. It is hoped that this would serve the purpose of assisting students and staff to establish

relationships with each other as well as to help identify students who may be experiencing academic or personal difficulties.

Wolf (1994) also makes some suggestions regarding the well-being of medical students:

- i) Individuals must have a clear understanding and realistic expectations of what it takes to become a doctor even prior to entering medical school.
- ii) The curriculum must include a didactic grounding and clinical experience in health promotion and disease prevention. A medical school's policy bodies need to acknowledge the need for this and take a more active role in establishing this. These programs can be helpful in developing and maintaining a balanced lifestyle and can enhance medical students' well-being generally. This university has attempted to address this in the new curriculum by formulating a new module entitled the "Lifestyle theme" with the third year medical students (the researcher is involved in the development of this module). However, it is important to note that maladaptive coping strategies, insults to self esteem, etc, all appear to start early and that perhaps this module needs to be scheduled early in the first year.

Other researchers such as Morrison (2001) propose that stress prevention and stress management techniques which focus on all causes of stress (from learning difficulties and dealing with problematic lecturers, to personal or social problems, addressing self-image and self-esteem issues and time management) should be taught.

The CMA Policy Summary (1998), goes as far as making the following recommendations which medical schools must take in consultation with medical students. These include:

- i) Early and ongoing compulsory learning activities for medical students and faculty which deal with stress management and prevention as well as awareness of high risk behaviour and symptoms of impairment.
- ii) Role-modeling and mentorship programs which value adequate rest, diet exercise, leisure and family activities.
- iii) Personal counseling services including psychiatric treatment (which is accessible, confidential, affordable and geographically separate and independent from the school of medicine).
- iv) Clear policies and educational programs on intimidation and harassment, discrimination, and violence and a clear and fair process in dealing with such cases.
- v) A communication strategy to make medical students aware of such programs, policies, and resources.
- vi) Female medical students and faculty be consulted and involved in issues related to their training.

5. STRENGTHS AND LIMITATIONS OF THE STUDY AND IMPLICATIONS FOR FUTURE RESEARCH

The strength of this study is that it has undertaken an investigation of stress, coping and health outcome, using a multi-factorial and unified stress and coping model. Important

factors were identified which contribute to positive or negative outcomes. The findings have helped to indicate the varying associations between perceptive, situational and social variables and psychological health outcomes. Furthermore, when compared to other research in the area, this study used standardized assessment instruments, examined psychological distress along twelve different and specific dimensions such as hostility, depression, and behavioural stress symptoms. Due to the quantitative nature of this study, the findings can also be generalized to the broader population.

A concern is that substance use was not included as an outcome measure, but rather as a coping strategy and therefore an accurate measure of the nature and extent of this problem cannot be established. Further, the issue of suicidality (suicidal ideation, attempts) and sexual harassment have not been included. Including these factors would have resulted in a decrease in the quality of the major findings because the area of focus would have been too broad. However, it is hoped that this study can provide a stimulus for further research into this area. The researcher also felt that the test battery was too long and this accounted for the low return rate. Medical students who are already time constrained or pressured may not have been motivated to complete it. This may also account for the low questionnaire return rate. It is therefore recommended that future research carefully consider the number of items in each psychometric assessment instrument, as overlong tests may prevent time pressured students from participating or completing the questionnaires.

6. CONCLUSION

The primary aim of this study was to investigate the perceived stressors in the medical school environment. Another aim was to delineate health outcomes in this study sample. A

secondary aim was to investigate inter-relationships among the variables and establish what role they play in facilitating positive or negative outcomes.

There are few studies on medical education (to this researchers knowledge) which explore the combination of various variables. This study has attempted to address perceived stressors, health outcomes and the effects or impact of psychosocial mediating and moderating variables including demographic factors within a theoretical framework.

The findings indicate that it is not just the perception of the stressors, but the coping strategies used, as well as variables such as self esteem, optimism, social support and age which all have an impact on health outcomes for the sample in this study. It is hoped that this study has succeeded in providing insight in the area of undergraduate medical education. It is also hoped that it provides valuable points of entry into intervention programmes for these groups, as well as stimulus for further research.

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An Investigation of Perceived Stress and Coping Behaviour among Undergraduate Medical Students

Dear Student

I am currently conducting research aimed at examining undergraduate medical students' experiences at medical school; that is, the stress that you may experience and the source/s of it, as well as the way you deal with it and what impact (if any) this perceived stress may have or has on your mental and physical health.

This research is towards a doctoral degree in clinical psychology and is being carried out under the auspices of Natal Medical School and the Department of Behavioural Medicine. It has been discussed with and has the support of the medical Students Representative Council.

You have been randomly chosen to participate in this research. Please note that your participation in this research is totally voluntary and should you not wish to, or choose to participate, it will not prejudice your current and /or future academic results and medical or psychological care. If you do choose to participate, please note that you do NOT have to provide your name/address or student number. You will remain anonymous and your answers will be confidential.

For the purpose of the research, a battery has been developed which I would ask you to complete. This battery consists of:

- i) a biographical / demographic questionnaire, eg, age, sex, etc.
- ii) a questionnaire on things that concern you at or about the medical school
- iii) a checklist of stress symptoms
- iv) two questionnaires on how you feel about yourself presently
- v) a questionnaire on how you cope with problems/situations
- vi) a questionnaire on the kind of support you have from various people in your life
- vii) a questionnaire on the impact being at medical school has on your health.

These questionnaires follow the format of listing statements which may or may not reflect your opinion. Please read each statement carefully and encircle / write down the number / alphabet that best describes how much you agree / disagree according to a scale provided in each questionnaire. There are no right or wrong answers.

I look forward to your participation in this research as it is aimed at providing valuable insight into the perceived stress and coping behaviour of undergraduate medical students and can assist in the planning of intervention strategies if necessary.

If you require any information pertaining to the study, please feel free to contact me at the Department of Behavioural Medicine, King Edward VIII Hospital. The telephone number is 031-3603122/8 during working hours, or you can write to me c/o the above department at Medical School.

Thank you

Sincerely

Naseema

Miss N Vawda

Clinical Psychologist

Vawda

BIOGRAPHICAL QUESTIONNAIRE

PLEASE FILL IN / TICK ANSWERS

A. SUBJECT NO. : _____

B. AGE : _____

C. SEX: (1) MALE (2) FEMALE

D. RACIAL GROUP (1) AFRICAN (2) INDIAN

E. YEAR OF STUDY (1) 1 ST (2) 2 ND (3) 3 RD

(4) 4 TH (5) 5 TH (6) 6 TH

F. HAVE YOU REPEATED ANY YEARS?

(1) YES (2) NO

IF YES, WHICH YEAR : _____

REASON/S (IF ANY) : _____

FIRST / HOME LANGUAGE?

(1) ZULU : _____ (5) ENGLISH: _____

(2) XHOSA: _____ (6) HINDI: _____

(3) SOTHO: _____ (7) URDU: _____

(4) OTHER (SPECIFY): _____

H. MARITAL STATUS

(1) SINGLE (4) DIVORCED

(2) MARRIED (5) WIDOWED

(3) COHABITING (6) IN A RELATIONSHIP

I. DISTRICT OF ORIGIN / HOME TOWN : _____

J. AREA OF ORIGIN : URBAN AREA RURAL AREA

K. ACCOMMODATION IN DURBAN - LIVING ARRANGEMENTS WHILST IN DURBAN

(1) UNIVERSITY RESIDENCE: _____

(2) WITH PARENTS: _____

(3) WITH OTHER RELATIVES: _____

- L. RELIGION (1) CHRISTIAN: _____
(2) TRADITIONAL PRACTICES: _____
(3) HINDU: _____
(4) MUSLIM: _____
(5) OTHER (SPECIFY): _____

M. PROFESSION OF PARENTS / PRIMARY CAREGIVERS:

- (1) FATHER: _____
(2) MOTHER: _____

N. FAMILY MEMBERS IN THE MEDICAL PROFESSION (MEDICAL DOCTORS)

- (1) YES (2) NO

- SPECIFY RELATIONSHIPS TO YOU: (i) _____
(ii) _____
(iii) _____
(iv) _____

O. ANY OTHER COMMENTS: _____

MEDICAL SCHOOL CONCERNS SCALE

I am interested in Students' Thoughts about Medical School. Please indicate your AGREEMENT / DISAGREEMENT on the scale next to each statement. There are no 'RIGHT' or 'WRONG' answers, and your honest answer would be of great help to me.

Thank you

Read each Statement and then place a tick 0 in the column most applicable to you using the key below..-

- | | |
|---------------------------------|------------------------|
| 1. 1 AGREE A LOT | 4. 1 DISAGREE A LITTLE |
| 2. 1 AGREE A LITTLE | 5. 1 DISAGREE A LOT |
| 3. 1 NEITHER AGREE NOR DISAGREE | |

	QUESTIONS	AGREE A LOT	AGREE A LITTLE	NEITHER AGREE / DISAGREE	DISAGREE A LITTLE	DISAGRE A LOT
1.	MEDICAL SCHOOL MAKES ONE INTO A DOCTOR AT THE EXPENSE OF ONE'S PERSONALITY AND INTERESTS					
2.	MEDICAL SCHOOL FOSTERS A SENSE OF ANONYMITY AND ISOLATION AMONG STUDENTS.					
3.	TEACHERS DO NOT HELP STUDENTS SURVIVE MEDICAL SCHOOL.					
4.	I AM CONCERNED I WILL NOT BE ABLE TO MASTER THE ENTIRE POOL OF MEDICAL KNOWLEDGE.					
5.	I AM CONCERNED THAT IF I DO NOT SUCCEED IN MEDICAL SCHOOL, MY LIFE WILL BE RUINED					
6.	MEDICAL SCHOOL IS MORE OF A THREAT THAN A CHALLENGE.					
7.	MEDICAL SCHOOL CONTROLS ONES LIFE AND LEAVES TOO LITTLE TIME FOR OTHER ACTIVITIES.					
8.	MEDICAL SCHOOL IS COLD AND BUREAUCRATIZED.					
9.	I AM CONCERNED THAT I WILL BE UNABLE TO ENDURE THE LONG HOURS ASSOCIATED WITH CLINICAL TRAINING AND PRACTICE.					
10.	I AM CONCERNED ABOUT FAILING EXAMINATIONS IN MEDICAL SCHOOL.					
11.	I WILL HAVE TO LEARN MATERIAL THAT IS IRRELEVANT.					
12.	I AM CONCERNED ABOUT THE FINANCIAL BURDEN AS A RESULT OF MY STUDYING MEDICINE					
13.	I BELIEVE I AM ADEQUATELY PREPARED TO GO THROUGH MEDICAL SCHOOL					
14.	THE MEDICAL SCHOOL CURRICULUM IS BORING AND UNINTERESTING.					
15.	I AM CONCERNED ABOUT FINDING A JOB AFTER I COMPLETE MY TRAINING.					
16.	I AM CONCERNED ABOUT THE FUTURE AND HOW THE VOCATIONAL CHANGES WILL AFFECT MY CAREER IN MEDICAL PRACTICE.					

SCORING ONLY → 1 = 2 = 3 = 4 = 5 =

THE STRESS SYMPTOM CHECKLIST

Make a ✓ if you experience the symptoms *often* (at least once a week or more), and an ✗ if you experience it *sometimes* (less than weekly, but at least monthly). Do you experience:

PHYSICAL REACTIONS			
- UNUSUAL TIREDNESS	- HIGH BLOOD PRESSURE	- UNEXPLAINED NAUSEA	
- APATHY/LACK OF ENTHUSIASM	- SEXUAL PROBLEMS	- FREQUENT INDIGESTION	
- BREATHLESSNESS FOR NO REASON	- UNEXPLAINED HEADACHES/ PAIN	- ERRATIC BOWEL FUNCTION	
- FEELINGS THAT YOUR APPEARANCE HAS ALTERED FOR THE WORSE	- FEELING FAINT OR UNUSUALLY WEAK FOR NO REASON	- EXCESSIVE PERSPIRATION FOR NO REASON	
- DIFFICULTY IN RELAXING	- MUSCLE TENSION	- DIZZY SPELLS FOR NO REASON	
- DISTURBING DREAMS/ NIGHTMARES	- FEELING PHYSICALLY UNWELL	- FEELING TIGHT-CHESTED FOR NO REASON	

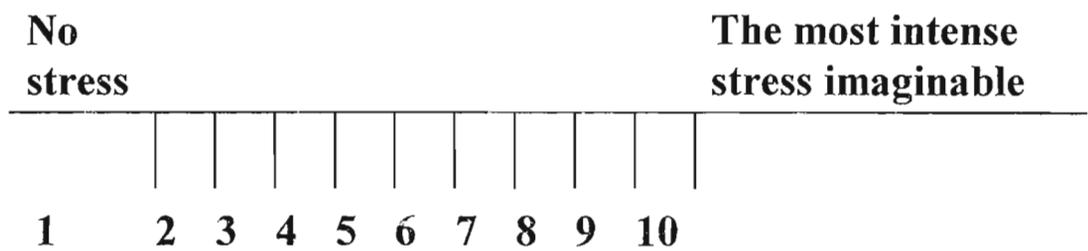
PSYCHOLOGICAL REACTIONS

- FEELINGS OF HELPLESSNESS	- FEELINGS OF DISLIKING YOURSELF	- FEELINGS THAT YOU ARE A FAILURE
- FEELINGS OF DEPRESSION	- BEING AFRAID OF DISEASE	- FEELING YOU CAN'T COPE
- FEELINGS THAT NO ONE UNDERSTANDS YOU	- AN INCREASE IN COMPLAINTS ABOUT WHAT HAPPENS TO YOU	- FEELINGS THAT OTHER PEOPLE DISLIKE YOU
- FEELINGS OF GENERAL ANXIOUSNESS	- LOW SELF-ESTEEM/LOW OPINION OF YOURSELF	- FEELINGS OF CONFUSION
- PHOBIAS (IRRATIONAL FEARS)	- FEELINGS OF BEING GOSSIPED ABOUT	- FEELINGS OF CONCERN MAINLY FOR YOURSELF
- AWKWARD FEELINGS WHEN CLOSE TO OTHERS	- BEING OVER SELF-CRITICAL	- FEELINGS OF FREQUENT CRITICISM
- FEELINGS THAT YOU HAVE FAILED IN YOUR ROLE AS A PARENT, SPOUSE, CHILD EMPLOYEE, EMPLOYER	- FEELINGS THAT NO ONE WANTS TO WORK WITH YOU	- FEELINGS THAT YOU HAVE BEEN NEGLECTED OR LET DOWN
- PANICKY FEELINGS	- FEELING TENSE AND KEYED-UP	- FEELINGS OF LONELINESS AND NO ONE TO TALK TO
- BEING UPSET BY DISEASE IN OTHERS	- PERSISTENT GUILT	- A LACK OF SELF-CONFIDENCE

BEHAVIOURAL REACTIONS

- MEMORY LOSS/ FORGETFULNESS	- DIFFICULTY IN MAKING UP YOUR MIND	- DISINTEREST IN OTHER PEOPLE
- POOR LONG TERM PLANNING	- DIFFICULTY IN SHOWING/EXPRESSIN G YOUR TRUE FEELINGS	- SUPPRESSED OR UNEXPRESSED ANGER
- POOR CONCENTRATION	- WORRYING	- FEARFULNESS
- INCONSISTENCY	- SOCIAL WITHDRAWAL	- POOR DECISION MAKING
- INABILITY TO MEET DEADLINES	- MAKING UNNECESSARY MISTAKES	- UNCO-OPERATIVE RELATIONSHIPS
- POOR TIME MANAGEMENT	- THE NEED TO REGULARLY WORK LATE	- FEELING DISGRUNTLED/ MOODY/ IRRITABLE
- PROCRASTINATION	- POOR WORK QUALITY	- EMOTIONAL OUTBURSTS
- THE NEED TO CONSTANTLY TAKE WORK HOME	- DIFFICULTY IN COMPLETING ONE TASK BEFORE RUSHING ON TO THE NEXT	- GREATER USE OF ALCOHOL, CAFFEINE, NICOTINE, MEDICINES TO COPE
- POOR PROBLEM SOLVING SKILLS	- THE NEED TO CANCEL LEAVE	- FIDGETING/ RESTLESSNESS
- ACCIDENT-PRONENESS	- NAILBITING	- UNPREDICTABILITY
- LOW INTEREST IN WORK	- AN EXCESSIVE APPETITE	- A LOSS O F APPETITE
- A DROP IN PERSONAL STANDARDS	- ENGAGING IN FREQUENT CRITICISM OF OTHERS	- THE NEED TO CRY FOR NO REASON
- INCREASED AGGRESSIVENESS	- FRANTIC BURSTS OF ENERGY	- TICS/NERVOUS HABITS
- LACK OF INTEREST IN LIFE	- LITTLE SENSE OF HUMOUR	- SLEEP DISTURBANCES

Rate the PRESENT INTENSITY of your stress somewhere along the scale below. Choose any number between lowest intensity (1) to highest intensity (10). Circle only one number along the scale below:



SELF ESTEEM INVENTORY

FLEMING & COURTNEY (1984)

LISTED BELOW ARE QUESTIONS THAT FOCUS ON HOW YOU FEEL ABOUT YOURSELF AND OTHER PEOPLE. PLEASE READ EACH OF THE QUESTIONS CAREFULLY. RATE EACH OF THE FOLLOWING STATEMENTS BY CIRCILING ONE OF THE NUMBERS THAT BEST INDICATES HOW APPLICABLE / TRUE IT IS FOR YOU.

SA

SD

	0	1	2	3	4	5	6	7
1. How often do you feel inferior to most of the people you know?								
2. Do you ever think that you are a worthless individual?								
3. How confident do you feel that someday the people you know will look up to you and respect you?								
4. Do you feel so discouraged with yourself that you wonder whether you are a worthwhile person?								
5. How often do you dislike yourself?								
6. In general, how confident do you feel about your abilities?								
7. How often do you have the feeling that there is nothing you can do well?								
8. How much do you worry about how well you get along with other people?								
9. How often do you worry about criticisms that might be made of your work by your teacher or employer?								
10. Do you ever feel afraid or anxious when you are going into a room by yourself where other people have already gathered and are talking?								
11. How often do you feel self-conscious?								
12. How much do you worry about whether other people will regard you as a success or failure in your job or in school?								
13. When in a group of people, do you have trouble thinking of the right things to talk about?								
14. When you make an embarrassing mistake or have done something that makes you look foolish, how long does it take you to get over it?								
15. Do you often feel uncomfortable meeting new people?								
16. How often do you worry about whether other people like to be with you?								
17. How often are you troubled with shyness?								
18. When you think that some of the people you meet might have an unfavourable opinion of you, how concerned or worried do you feel about it?								

19. How often do you feel worried or bothered about what other people think about you?								
20. When you have to read an essay and understand it for a class assignment, how worried or concerned do you feel about it?								
21. When you have to write an argument to convince your teacher who may disagree with your ideas, how concerned or worried do you feel about it?								
22. How often do you have trouble expressing your ideas when you try to put them into writing as an assignment?								
23. How often do you have trouble understanding things you read for class assignments?								
24. How often do you imagine that you have less scholastic ability than your classmates?								
25. In turning in a major assignment such as a term paper, how often do you feel you did an excellent job on it?								
26. Compared with classmates, how often do you feel you must study more than they do to get the same grades?								
27. Have you ever felt ashamed of your physique or figure?								
28. Do you often feel that most of your friends or peers are more physically attractive than yourself?								
29. Do you often wish or fantasize that you were better looking?								
30. Have you ever been concerned or worried about your ability to attract members of the opposite sex?								
31. How confident are you that others see you as being physically appealing?								
32. Have you ever thought of yourself as physically unco-ordinated?								
33. Have you ever felt inferior to most other people in athletic ability?								
34. When involved in sports requiring physical co-ordination, are you often concerned that you will not do well?								
35. Have you ever thought that you lacked the ability to be a good dancer or do well at a recreational activities involving co-ordination?								
36. When trying to do well at a sport and you know other people are watching how rattled or flustered do you get?								

* SA - STRONGLY AGREE

* SD - STRONGLY DISAGREE

LIFE ORIENTATION TEST

(Scheier and Carver, 1985)

Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer. Tick your answer.

QUESTIONS	A	B	C	D	E
In uncertain times, I usually expect the best.					
It's easy for me to relax					
If something CAN go wrong for me, it WILL					
I always look on the bright side of things					
I'm always optimistic about my future					
I enjoy my friends a lot					
It's important for me to keep busy					
I hardly every expect things to go my way					
Things never work out the way I want them to					
I don't get upset too easily					
I'm a believer in the idea that "every cloud has a silver lining"					
I rarely count on good things happening to me					
Overall, I expect more good things to happen to me than bad					

- A = I agree a lot
- B = I agree a little
- C = I neither agree nor disagree
- D = I DISagree a little
- E = I DISagree a lot

COPE INVENTORY - CARVER, SCHEIER & WEINTRAUB (1989)

These items deal with ways you've been coping with the stress in your life since you have come to Medical School. There are many ways to try to deal with problems. These items ask what you've been doing to cope with Medical School. Obviously different people deal with things in different ways, but I'm interested in how you've tried to deal with it. Each item says something about a particular way of coping. I want to know *to what extent* you've been doing what the items says. How *much* or how *frequently*. Don't answer on the basis of whether it seems to be *working* or not - just whether or not you're doing it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers true **FOR YOU** as you can.

QUESTIONS	1	2	3	4
I've been turning to work or other activities to take my mind of things				
I've been concentrating my efforts on doing something about the situation I'm in				
I've been saying to myself "this isn't real"				
I've been using alcohol or other drugs to make myself feel better				
I've been getting emotional support from others				
I've been giving up trying to deal with it				
I've been taking action to try to make the situation better				
I've been refusing to believe that it has happened				
I've been saying things to let my unpleasant feelings escape				
I've been getting help and advice from other people				
I've been using alcohol or other drugs to help me get through it				
I've been trying to see it in a different light, to make it seem more positive				
I've been criticizing myself				
I've been trying to come up with a strategy about what to do				
I've been getting comfort and understanding from someone				
I've been giving up the attempt to cope				
I've been looking for something good in what is happening				
I've been making jokes about it				
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping or shopping				
I've been accepting the reality of the fact that it has happened				
I've been expressing my negative feelings				
I've been trying to find comfort in my religion or spiritual beliefs				
I've been trying to get advice or help from other people about what to do				
I've been learning to live with it				
I've been thinking hard about what steps to take				
I've been blaming myself for things that happened				
I've been praying or meditating				
I've been making fun of the situation				

1 = I haven't been doing this at all.

2 = I've been doing this a little bit.

3 = I've been doing this a medium amount

4 = I've been doing this a lot.

UCLA LONELINESS SCALE

RUSSELL, PEPLAU & CUTRONA (1980)

Directions: Indicate how often you feel the way described in each of the following statements. Circle one number for each.

Statement	Never	Rarely	Sometimes	Often
1. I feel in tune with the people around me ^a	1	2	3	4
2. I lack companionship	1	2	3	4
3. There is no one I can turn to	1	2	3	4
4. I do not feel alone ^a	1	2	3	4
5. I feel part of a group of friends ^a	1	2	3	4
6. I have a lot in common with the people around me ^a	1	2	3	4
7. I am no longer close to anyone	1	2	3	4
8. My interests and ideas are not shared by those around me	1	2	3	4
9. I am an outgoing person ^a	1	2	3	4
10. There are people I feel close to ^a	1	2	3	4
11. I feel left out	1	2	3	4
12. My social relationships are superficial	1	2	3	4
13. No one really knows me well	1	2	3	4
14. I feel isolated from others	1	2	3	4
15. I can find companionship when I want it ^a	1	2	3	4
16. There are people who really understand me ^a	1	2	3	4
17. I am unhappy being so withdrawn	1	2	3	4
18. People are around me but not with me	1	2	3	4
19. There are people I can talk to ^a	1	2	3	4
20. There are people I can turn to ^a	1	2	3	4

BSI

Below is a list of problems and complaints that people sometimes have. Please read each one carefully. After you have done so, please mark one of the boxes to the right that best describes HOW MUCH DISCOMFORT THAT PROBLEM HAS CAUSED YOU DURING THE PAST WEEK INCLUDING TODAY. Mark only one box for each problem and do not skip any items. If you change your mind, erase your first mark carefully.

<u>HOW MUCH WERE YOU DISTRESSED BY:</u>		Not at all	A little bit	Moderately	Quite a bit	Extremely
1.	Nervousness or shakiness inside	<input type="checkbox"/>				
2.	Fainness or dizziness	<input type="checkbox"/>				
3.	The idea that someone else can control your thoughts	<input type="checkbox"/>				
4.	Feeling others are to blame for most of your troubles.	<input type="checkbox"/>				
5.	Trouble remembering things	<input type="checkbox"/>				
6.	Feeling easily annoyed or irritated.	<input type="checkbox"/>				
7.	Pains in heart or chest.	<input type="checkbox"/>				
8.	Feeling afraid in open spaces.	<input type="checkbox"/>				
9.	Thoughts of ending your life.	<input type="checkbox"/>				
10.	Feeling that most people cannot be trusted	<input type="checkbox"/>				
11.	Poor appetite.	<input type="checkbox"/>				
12.	Suddenly scared for no reason.	<input type="checkbox"/>				
13.	Temper outburst that you could not control.	<input type="checkbox"/>				
14.	Feeling lonely even when you are with people.	<input type="checkbox"/>				
15.	Feeling blocked in getting things done . .	<input type="checkbox"/>				
16.	Feeling lonely.	<input type="checkbox"/>				
17.	Feeling blue.	<input type="checkbox"/>				

Not at all A little bit Moderately Quite a bit Extremely

HOW MUCH WERE YOU DISTRESSED BY:

- | | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 18. | Feeling no interest in things | <input type="checkbox"/> |
| 19. | Feeling fearful. | <input type="checkbox"/> |
| 20. | Your feelings being easily hurt. | <input type="checkbox"/> |
| 21. | Feeling that people are unfriendly or dislike you. | <input type="checkbox"/> |
| 22. | Feeling inferior to others. | <input type="checkbox"/> |
| 23. | Nausea or upset stomach. | <input type="checkbox"/> |
| 24. | Feeling that you are watched or talked about
by others. | <input type="checkbox"/> |
| 25. | Trouble falling asleep. | <input type="checkbox"/> |
| 26. | Having to check and double check what you do. | <input type="checkbox"/> |
| 27. | Difficulty making decisions. | <input type="checkbox"/> |
| 28. | Feeling afraid to travel on buses, subways
or trains. | <input type="checkbox"/> |
| 29. | Trouble getting your breath. | <input type="checkbox"/> |
| 30. | Hot or cold spells. | <input type="checkbox"/> |
| 31. | Having to avoid certain things, places, or activities
because they frighten you. | <input type="checkbox"/> |
| 32. | Your mind going blank. | <input type="checkbox"/> |
| 33. | Numbness or tingling in parts of your body. | <input type="checkbox"/> |
| 34. | The idea that you should be punished
for your sins. | <input type="checkbox"/> |
| 35. | Feeling hopeless about the future. | <input type="checkbox"/> |
| 36. | Trouble concentrating. | <input type="checkbox"/> |

BSI

Not at all A little bit Moderately Quite a bit Extremely

HOW MUCH WERE YOU DISTRESSED BY:

- | | | | | | | |
|-----|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 37. | Feeling weak in parts of your body. | <input type="checkbox"/> |
| 38. | Feeling tense or keyed up. | <input type="checkbox"/> |
| 39. | Thoughts of death or dying. | <input type="checkbox"/> |
| 40. | Having urges to beat, injure or harm someone. | <input type="checkbox"/> |
| 41. | Having urges to break or smash things. | <input type="checkbox"/> |
| 42. | Feeling very self-conscious with others. | <input type="checkbox"/> |
| 43. | Feeling uneasy in crowds. | <input type="checkbox"/> |
| 44. | Never feeling close to another person. | <input type="checkbox"/> |
| 45. | Spells of terror or panic. | <input type="checkbox"/> |
| 46. | Getting into frequent arguments. | <input type="checkbox"/> |
| 47. | Feeling nervous when you are left alone. | <input type="checkbox"/> |
| 48. | Others not giving your proper credit for your achievements. | <input type="checkbox"/> |
| 49. | Feeling so restless you couldn't sit still. | <input type="checkbox"/> |
| 50. | Feelings of worthlessness. | <input type="checkbox"/> |
| 51. | Feeling that people will take advantage of you if you let them. | <input type="checkbox"/> |
| 52. | Feelings of guilt. | <input type="checkbox"/> |
| 53. | The idea that something is wrong with your mind. | <input type="checkbox"/> |