UNIVERSITY OF KWAZULU-NATAL

Aslam Goolam Hoosen

Student number 203513764

Supervisor: Jennifer Anne Chipps

Ethical clearance number: HSS/077/2009

Title of study

Exploring the actions of General Practitioners on abnormal findings identified by registered nurses conducting home comprehensive geriatric assessments (CGA).

Acknowledgments

I would like to acknowledge Allah for the entire research. He is the author and the finisher of my faith. I would like to express my sincere thanks and appreciation to my parents who taught me to fear Allah and to my wife Kathija at large for her love and support. I would also like to thank Professor Leana Ria Uys , Professor Bilkish Cassim for granting me permission to utilise their project data.

I would like to acknowledge and thank the following individuals who helped me along the way and whose assistance made me complete this study. This research would not have been successful without their support.

Jennifer Anne Chipps and Professor Liz Macera, whose hard work enabled me to come this far. You were the fore-runners; otherwise I would not have known that this topic can be done academically. You always made kind comments to me concerning my research results.

DECLARATION

I, Aslam Goolam Hoosen declare that:

This dissertation, "Exploring the actions of General Practitioners on abnormal findings identified by registered nurses conducting home comprehensive geriatric assessments (CGA)" is my own work and it has not been submitted to any other university other than the University of KwaZulu-Natal (Durban). All sources of information that have been utilized or quoted have been acknowledged by a complete reference.

_____

Aslam Goolam Hoosen: 30 Nov 2011

Contents

Figures

Tables

Abstract

Background: In South Africa there data is lacking on the health of the older population. This study aims to report on actions taken by general practitioners on abnormal blood pressure, blood glucose and osteoporosis screen identified by registered nurses, conducting home based visits to older clients.

Methods

An agency piloted the Comprehensive geriatric assessment (CGA) tool in an urban affluent population. In this cross sectional secondary study analysis, 465 participants aged 60 years and over had a nurse visit in their homes and a subsequent General Practitioner (GP) visit. The prevalence of specific geriatric problems was assessed as well as the frequency of initiated procedures by the GP. This study will focus on initiated actions by the General Practitioners in response to abnormal blood pressures, blood glucose, and osteoporosis screen.

Results

Frequency tables were utilised to identify prevalence of the abnormal blood pressures, blood glucose and osteoporosis screen. . Abnormal blood pressures were detected (230/465, 49%) of the subjects , the GP initiated actions on only 15/465 (3.2%) of clients. Abnormal blood sugars were detected 106/465 (23%) of the GP initiated actions on 23/465 (5%) of clients. Clinical risk factors for the development of osteoporosis were detected in 252 /465 (54%) subjects GP initiated actions on 11/465 (3%)

Conclusion

This study explored the relationships between comprehensive geriatric assessment and subsequent GP actions and found using the CGA in this population will be successful in identifying abnormal health findings which will enable intervention. However, due to challenges in the communications and marketing of this service, GP's were not well informed of their role and did not act on majority of the abnormal findings detected by nurses

Chapter one: Introduction and Background

1.1 Introduction

In South Africa data is lacking on the health of the older population. This study is located in an agency providing outreach geriatric prevention services using a chronic disease model. The agency piloted the Comprehensive geriatric assessment (CGA) tool in an urban affluent population. The study reports on actions taken by general practitioners on abnormal blood pressure, blood glucose and osteoporosis screen identified by registered nurses, conducting home based visits to older clients. In this cross sectional secondary study analysis, 465 subjects aged 60 years and over had a nurse visit in their homes and a subsequent General Practitioner (GP) visit. The prevalence of specific geriatric problems was assessed as well as the frequency of initiated procedures by the GP. This study focused the relationships between CGA conducted by nurses at clients' homes and subsequent GP actions in response to abnormal blood pressures, blood glucose, and osteoporosis screen. The study also presents the prevalence of abnormal blood pressures, blood glucose and osteoporosis screens in this population.

1.2 Background

The first multidimensional South African survey of older people was conducted by the Centre for gerontology at University of Cape Town. This survey provided the first look at aspects of the health of the older people in South Africa. The most prevalent self-reported conditions found in this survey showed hypertension (high blood pressure) affecting Blacks, Coloureds and Asians (Ferreira et al., 1992). A subsequent survey conducted by (Hirshowitz and Orkin, 1995a)confirmed the importance of hypertension and also found that 70% of the older adult population (aged 65 years and over) had a chronic illness or on-going health problem, with vision problems being the major disability.

In the United States (US) data indicates that 84% of Medicare beneficiaries (aged 65 or older) are chronically ill and 62% have two or more chronic conditions (Hendrix and Wojciechowski, 2005). A strong recommendation from this finding is that a different care model, a disease management model, must be developed to identify high risk older clients, develop their plan of care and co-ordinate their care to eliminate redundant medical costs because of this high rate of illness. The cornerstone of disease management for the older adult is the Comprehensive Geriatric Assessment (CGA). The CGA has demonstrated to have favourable effects on functional status, diagnostic accuracy, identifying high risk clients and client satisfaction. It is a proven means of reducing hospitalisations, and decreasing the number of days spent in hospitals resulting in cost saving benefits for health care providers(Landi and Onder, 2001, Ellis and Langhorne, 2004, Stuck et al., 1993).

The affluent and middle class older adults in South Africa often move into retirement homes because they fear of living on their own, or have concerns about loneliness, independence and health (Ferriera, 2000). The retirement homes are often more expensive than a private residence and they may not be located in proximity to friends and older people. Old age pensions are often not always sufficient to provide for their living needs in old age. This often results in an additional support burden for family caregivers (Mpiana, 2009).

Private Medical Aid insurance companies in South Africa are investigating disease management strategies to address the complications and costs associated with chronic diseases (Active Ageing at Home (A@H) Board, 2007) . In countries such as Germany and Japan the government has addressed this through the provision of state-sponsored long term care insurance (Gledinning and Moran, 2009). In South Africa, health care is focused on alleviating the client's present distress with little attention given to preventing future encounters. South Africa does not have well established disease management systems for older adults.

In addition, people with disabilities or recovering from hospital also prefer to remain in their homes or familiar surroundings rather than in hospitals or institutions. Studies

show that home-based health care costs less than institutional health care, is more satisfying to clients, and often results in fewer and shorter hospital stays (Meinck et al., 2004, Landi and Onder, 2001, Dalby et al., 2000, Stuck and Kane, 2007).

The hallmarks of ageing are changes to the composition of the human body. People age at different rates. Due to these changes, disease can present differently in an older person than it would in a younger adult. The crucial indicators of underlying conditions include the changes in mental status, loss of function, decrease in appetite, dehydration, falls, dizziness, and incontinence. The Baltimore Study on Ageing (National Institute on Ageing, 1993) followed 1000 people from 1958 at age 20 + to over the age of 90. This study has identified normal physiologic human ageing, including the following: gradual thickening of cardiac muscles, stiffening of arteries, diminishing of lung tissue, degeneration of brain and spinal cord, shrinking of the kidneys, and weakening of the bladder muscles. These changes occur in varying rates in different people and organs can age at different rates within each person, e.g. lungs can continue going strong as kidneys begin to fail (National Institute on Ageing, 1993). In addition, physiological reserve declines with age and the homeostatic window narrows and this is termed homeostenosis(Halter et al., 2009).

The above demonstrates that an older adult has the highest co morbidity with the least resources given to them. The pensions are not enough to provide the basic needs of food, water and shelter. Medical insurance premiums are higher for an older adult than that of a young adult due to older adults having a high risk profile for illness. There are no special long term management plans to address the chronic conditions as compared to adults, adolescents and child health (Ferreira, 2005).

According to the Medical Research Council Report (2006) in South Africa, data is lacking around the cognitive, mental, and physical functioning in older persons in South Africa. The surveys conducted by Ferreira et al, (1992) and Hirshowitz and Orkins (1995) provided a descriptive analysis of the population and did not follow up on the abnormal measurements. This study begins to fill that gap by utilising the nurse's abnormal findings from the Comprehensive Geriatric Assessment (CGA) and to

identify actions taken by General Practitioners (GPs) in response to abnormal measurements.

Research on ageing in Africa is lacking due to the continent not having a gerontology journal which provides a vehicle for research dissemination and consolidation, networking and leadership. To add further constraints, there is a lack of resources and a low priority given to gerontology in tertiary education as well as limited training and capacity development in research. The academic training is only offered in handful of institutions (University of Cape Town and University of Kwa-Zulu Natal) which limits research capacity and output. This limits the academics to participate in international conferences and table African issues in Ageing (Ferreira, 2005).

The 2001 South African population census found that 7.3% (3.28 million people) of the total population were 60 years or older (Medical Research Council, 2006). This ranks South Africa as the second highest number of older persons on the African continent, only surpassed by the older population of Nigeria (5.42 million). Despite the demographic impact of HIV/AIDS, the South African proportion is projected to increase over the next two decades, and that by 2025 more than one person in ten will be 60 years or older (Medical research council, 2006). Although the proportion of the older population will increase moderately over the projection period, the absolute size is projected to increase by 112%, from 2.47 million in 1985 to 5.23 million in 2025, i.e. a doubling over the course of 40 years (Medical Research Council, 2006). The projected numbers above correspond well with the census count, and show that the total number of older persons is expected to increase more rapidly over the next two decades than over the past two decades (Medical Research council, 2006). As health typically declines and frailty and disability usually increase with advancing age, the near doubling of the oldest-old age group (80 years or older) is of particular concern. The increase in this group suggests an increase in the demand for long-term care, chronic care, frail care and end-of-life care. These, in turn, suggest an increased demand for appropriately trained health-care staff and informal carers to manage such demand. The study will inform public policy makers to incorporate the comprehensive geriatric assessment into our clinical settings.

1.3 Conclusion

In South Africa there is no disease management model that caters exclusively for the older adults. Older adults physiologic reserves decline with age and specific interventions are required to manage disease states associated with the physiologic decline. This study attempts to describe three conditions associated with ageing (Hypertension, diabetes and osteoporosis) and whether the doctors have taken any actions on the abnormal indicators identified by nurses.

Chapter two: The Study

2. The Study

2.1. Problem statement

The studies in the South African older population (Hirshowitz and Orkin, 1995b, Ferreira et al., 1992) have provided descriptive statistics but no follow up of the health problems in this population. This study aims to fill that gap by identifying abnormal findings in blood pressure, blood sugar and osteoporosis screen as identified by registered nurses, and if the assessment findings prompted any GP actions.

2.2. Purpose of the study

The purpose of the study is to determine whether the abnormal pressure, blood sugar and osteoporosis screen identified by CGA will prompt action by the GP.

2.3. Objectives

- To describe the study sample in terms of the demographic findings of the CGA.
- To explore the relationships between the CGA findings and subsequent GP action.
- To identify GP actions that occurs in relationship to abnormal readings in blood pressure, blood sugar, and osteoporosis risk assessment (ORA)

2.4. Research Questions

- Proportions of participants that have abnormal blood pressure (BP), blood sugar (BS), and Osteoporosis Risk Assessment (ORA) scores on the CGA?
- What are the socio-demographic profile of the participants with abnormal BP, BS and ORA scores as compared with those who have normal readings?
- Does an abnormal blood pressure reading on a person who is not diagnosed with hypertension prompt a new diagnosis of hypertension by the GP?
  - Does an abnormal blood pressure reading on a person who is diagnosed with hypertension prompt a change in hypertension medication by the GP?

- Does an abnormal blood sugar reading on a person who is not diagnosed with diabetes prompt a new diagnosis of diabetes?
- Does an abnormal blood sugar reading on a person who is diagnosed with diabetes prompt   a change in diabetes medication by the GP?
- Does an abnormal Osteoporosis Risk Assessment prompt the GP to:
  - Order a DEXA (dual energy x-ray absorptiometry scan?
  - Order calcium supplementation?
  - Order Vitamin D supplementation?
  - Order a bisphosphonate (a class of drugs that prevent loss of bone mass)

2.5. Significance

Research on ageing in Africa is lacking due to the continent not having a gerontology journal which provides a vehicle for research dissemination and consolidation, networking and leadership. To add further constraints, there is a lack of resources and a low priority given to gerontology in tertiary education as well as limited training and capacity development in research. The academic training is only offered in handful of institutions (University of Cape Town and University of Kwazulu Natal) which limits research capacity and output. In a press statement released on the 09 June 2009 by the South African older persons forum, it stated that the South African Nursing council has sent a circular informing training colleges that new qualifications registered with the National Qualification Framework no longer include courses in gerontological nursing science and gerontology including geriatrics (Turok, 2009). This limits the academics to participate in international conferences and table   African issues in Ageing (Ferreira, 2005)

The 2001 South African population census found that 7.3% (3.28 million people) of the total population were 60 years or older (Medical research council, 2006). This ranks South Africa as the second highest number of older persons on the African continent, only surpassed by the older population of Nigeria (5.42 million). Despite the demographic impact of HIV/AIDS, the South African proportion is projected to

increase over the next two decades, and that by 2025 more than one person in ten will be 60 years or older(Medical research council, 2006). Although the proportion of the older population will increase moderately over the projection period, the absolute size is projected to increase by 112%, from 2.47 million in 1985 to 5.23 million in 2025, i.e. a doubling over the course of 40 years (Medical research council, 2006). The projected numbers above correspond well with the census count, and show that the total number of older persons is expected to increase more rapidly over the next two decades than over the past two decades(Medical Research council, 2006). As health typically declines and frailty and disability usually increase with advancing age, the near doubling of the oldest-old age group (80 years or older) is of particular concern. The increase in this group suggests an increase in the demand for long-term care, chronic care, frail care and end-of-life care. These, in turn, suggest an increased demand for appropriately trained health-care staff and informal carers to manage such demand. The study will inform public policy makers to incorporate the comprehensive geriatric assessment into our clinical settings.

2.6. Definition of terms

- Medicare beneficiaries - a federally administered system of health insurance available to persons aged 65 and over(Centre for Medicare and Medicaid services, 2008)

- Abnormal Osteoporosis Risk Assessment score - numerical score exceeds 13 overall or one positive in category A or 2 positives in category B(National Osteoporosis foundation of South Africa, 2009).

- Abnormal blood pressure: a blood pressure above 135 systolic or 85 diastolic(Joint National Hypertension Guideline Working Group, 2006).

- Abnormal blood sugar - random capillary reading above 8.1 mmol/l and below 3.9mmol/l. Normal targets for glycaemic control are between 4 – 8 mmol/l (Society for Endocrinology Metabolism and Diabetes of South Africa, 2009)

- Comprehensive geriatric assessment (CGA) – Multidimensional assessment outlined in the annexure 1.

- Homeostenosis - is the characteristic, progressive constriction of homeostatic reserve that occurs with aging in every organ system(Taffet, 2001)

- CE marking - The CE marking certifies that a product has met European Union consumer safety, health or environmental requirements.

- FDA - The Food and Drug Administration, an agency within the U.S. Public Health Service, which is a part of the Department of Health and Human Services. Medical devices are regulated by FDA according to their degree of risk to the public. Devices must receive agency approval before they can be marketed.

- Hypertension diagnosed - Hypertension on the diagnosis list by self report of patient or on one of the medications in the classification list of C01 to C09 listed below on the South African medicines formulary(Division of Clinical Pharmacology, 2008)

C01   Cardiac Therapy

C02   Antihypertensives

C03   Diuretic

C07   Alpha and Beta-Blocking Agents

C07   Beta Blockers, Cardioselective

C08   Calcium Channel Blockers

C09   ACE Inhibitors, Combinations

C09   Angiotensin II antagonists,Combinations

C09   Class II / III ACE Inhibitors

- Diabetes diagnosed: Diabetes on the diagnosis list by self report of patient or on one of the medications in the classification list of A10 (Drugs used In diabetes) listed on the South African medicines formulary(Division of Clinical Pharmacology, 2008).

2.7. Conceptual Framework – Comprehensive geriatric assessment
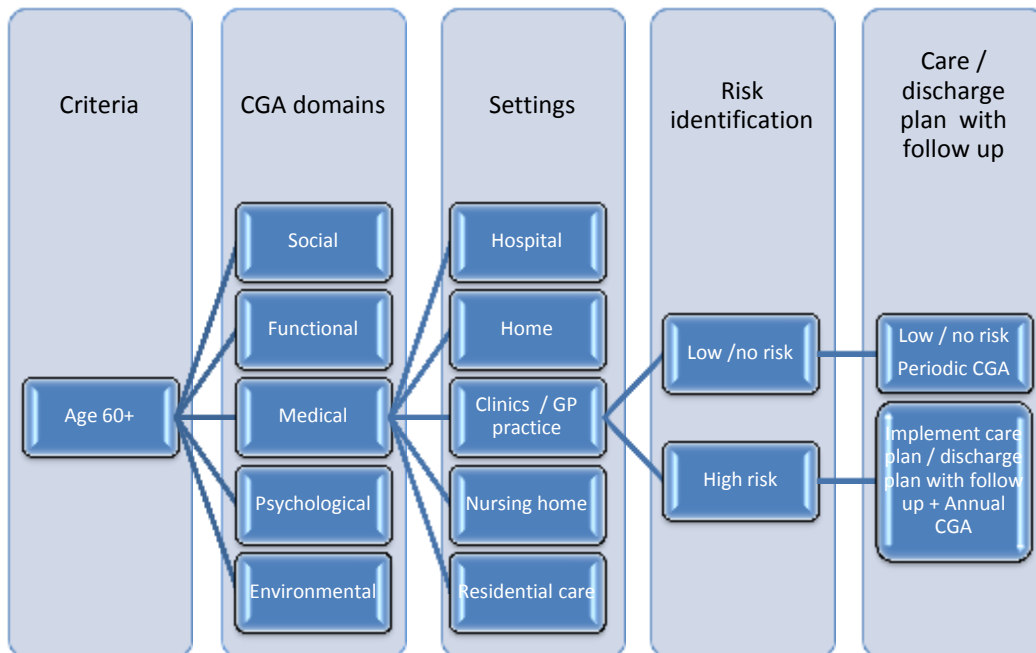
Figure 2: CGA model

Comprehensive Geriatric Assessment (CGA) was first conceived as a theoretic structure for designing examinations for the elderly in the 1970s(Rubenstein, 2004). CGA takes on many forms to suit a specific setting and population.

CGA is an assessment technique developed for use in older adults. Unlike younger people, older adults tend to have diseases with multiple causation called syndromes. CGA assesses multiple domains in order to enact change that will improve health or lower risk for disease or injury.

The hallmarks of ageing are changes to the composition of the human body. Older adults are more different than they are alike, owing to the multitude of opportunities for exposure to environmental influences afforded by a long life(Hayflick, 1998). The interplay between random environmental effects and genetics results in older adults reflecting a variety of manifestations.

Due to a lifetime of physiological adjustments, disease can present differently in a person over than it would in a younger adult. The crucial indicators of underlying pathology include subtle changes in mental status, loss of function, decrease in appetite, dehydration, falls, dizziness, and incontinence.

The basis for designing a comprehensive examination for the elderly is the concept of geriatric syndromes. Geriatric syndrome is "a multiorgan disease specifically suffered by older people "(Sasaki, 2008). The existence of this syndrome requires collecting comprehensive data to identify multiple causes. An example of a geriatric syndrome is falls. An older person may fall because of extrinsic and intrinsic causes. Extrinsic causes include loose rugs, poor lighting, uneven floors, clutter, lack of hand rails etc. Extrinsic causes are assessed in the environmental domain of the CGA. The intrinsic causes are caused by age or disease related changes in the organs or system. In the medical domain foot problems, previous history of falls, postural hypotension and vision can be assessed, the functional domain, the clients balance is assessed for risk of falling. The psychological domain, the client's memory and orientation is assessed to detect signs of neurological conditions, e.g. Alzheimer's and dementia which predisposes the client to a higher risk of falling. The social domain is assessed for alcohol use or they live alone which may be contributing factor to falls. These are potentially reversible and are checked for during a home visit.

In this model the CGA incorporates the complexities of the older adult and simultaneous management of multiple disorders. All clients aged 60 years and over should have a CGA performed (Bouwens, 2004). The CGA in full depth is time consuming, patient fatigue may play an important role and the duration to complete this assessment may cause major reimbursement problems. Most physicians are unable to conduct a true CGA as all the evaluations have to be completed by a team of health care professionals. In this model we have a nurse that conducts the CGA and the findings are sent through to the physician who evaluates the findings and identify whether the client is a high risk or no/low risk client.

The aim of this model is the restoration of healthy function and independence were possible as well as the amelioration of disability and distress. The potential benefits of this model includes improvement in diagnostic accuracy, optimisation of medical treatment, improved prognosis, restoration of maintenance function, support for loss of choice and autonomy and improved quality of life.

2.7.1. Application of conceptual framework
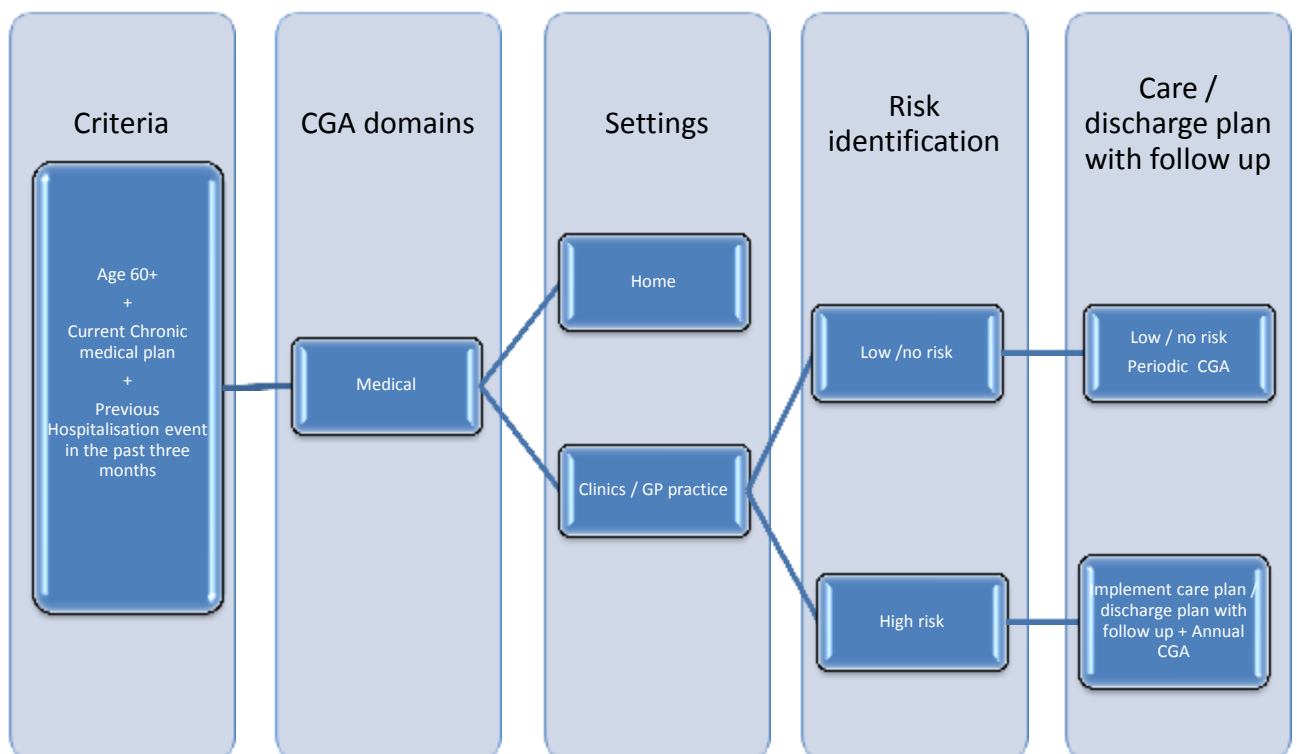
Figure 3: Application of conceptual framework

Figure 3 shows how the current study will be applied. Impact will be measured at risk identification by the GP's and Care / discharge plan with follow up.

a) Criteria

The initial of objective of CGA is to identify elders at high risk and develop programs combining rehabilitation and improved care co-ordination. Geriatrics has focused primarily on the acute and chronic management of chronic diseases with less emphasis on prevention of disease and promotion of health than in

younger populations. Bouwens (2004) suggest age 60 years and over be utilised as a selection criteria for CGA to filter at risk clients for functional decline.

➢ In this study different selection criteria has been utilised by the two medical schemes

o Scheme 1 - Clients aged 60 years and over

o Scheme 2 – Clients 60 years and over & on a chronic medical plan or previous hospitalisation event in the past three months

a) Domains of assessment

The CGA is a multidimensional interdisciplinary diagnostic process, and it is focused on determining elderly person's social, functional, medical, psychological and environmental capabilities in order to develop a co-ordinated and integrated plan for treatment and follow up. The tool utilised in this study comprises all five domains of the comprehensive assessment (Annexure 1).

i. Social assessment

Assessment of social functioning reveals how well the client is functioning within the environment. Adequate housing, the presence of a reliable caregiver, having medical insurance, and being able to pay for treatment and for the necessities of life are factors that are assessed. Problems in any of these areas can adversely affect the client's ability to obtain and comply with treatment, and may therefore compromise the treatment outcome.

➢ In this study, aspects of the assessment tool that make up the social domain are:

- Identifying information
- Social history

ii. The Functional assessment

The functional assessment determines how well the client functions within their environment

The assessment of functioning includes the assessment and review of basic activities of daily living, instrumental activities of daily living, activity / exercise status and gait

and balance. In this study, aspects of the assessment tool that make up the functional domain are:

- Groningen Frailty index
- KATZ activities of daily living
- Lawtons Instrumental activities of daily living
- Berg Balance test
- Six Minute walk test

iii.   The Medical Assessment

The medical assessment addresses medical conditions which include listing of problems, co-morbid conditions and disease severity, medication review and nutritional status. In addition the client will be assessed for risk of developing medical conditions that are common in older persons such as osteoporosis and urinary incontinence, etc.

➢ In this study , aspects of the assessment tool that make up the medical domain are:

- Family History
- Clinical Examination – Blood pressure and Blood sugar utilised
- Current symptoms
- Medication assessment
- Mini Nutritional assessment
- Snellen Vision test
- Hearing handicap test
- Osteoporosis risk test – Utilised in the study
- IPSS – Prostate test
- ICIQ – Incontinence test

iv.   The Psychological Assessment

This includes mental status (cognitive) testing and mood / depression testing.

➢ In this study , aspects of the assessment tool that make up the medical domain are:

- Mini Mental state exam

- Kessler 10 Psychological distress test

v.   The Environmental Assessment

This includes information about the safety of the person in his/her own home

➢ In this study , aspects of the assessment tool that make up the medical domain are:

- Home assessment checklist

a) Settings

Randomised control trials of CGA in multiple settings show it to be a cost effective intervention that improves quality of life, health and social care. It has value when applied in hospitals, clinics, clients' homes and nursing homes (Avlund et al., 2002, Rubenstein, 2004, Stuck and Siu, 1993, Ellis and Langhorne, 2004).

➢ In this study , the tool was utilised in the home setting and the GP's practice.

b) Risk identification

The CGA being a multidisciplinary team intervention requires the services of the physician who will be seen as leader in the management of care of clients. The CGA is time consuming and physicians do not have time to complete a true CGA.

➢ In this study risk identification has been conducted by the physician utilising the findings from the nurse's assessment.

Lipschitz (2007) states that the following markers can classified as high risk clients

- Stroke in the past three months (medical and functional domain)

- Depression (Psychological and social domain)

- Dementia (Psychological and medical domain)

- History of falls (Functional domain)

- One or more unplanned hospital admissions in the past three months (Medical domain)

- Difficulty walking (Environmental and functional domain)

- Malnutrition (Medical domain)

- Prolonged bed rest (Functional domain)

- Incontinence (Medical domain)

2.8   Conclusion

This chapter addresses the purpose of the study and its significant contribution to gerontological research in South Africa. The theoretical framework utilised in this study is the Comprehensive geriatric assessment (CGA). The framework consists of five domains that provide holistic health care to older adults. The focus of the study is on abnormal indicators (blood glucose – mmol/l, systolic blood pressure – mmhg and osteoporosis risk assessment score) which is in the context of the medical domain of the CGA

Chapter three: Literature Review

3. Literature review

3.1. Introduction

To investigate the origin and uses of CGA, the following key terms were searched in several databases including, PubMed, CINAHL, EBSCO, Cochrane reviews, Medline, BioMed central and OVID. Search terms included *comprehensive geriatric assessment, home visits, home assessments, housecalls to elderly, geriatric assessment techniques, hypertension in the elderly, diabetes in the elderly, and osteoporosis in the elderly.*

3.2. Health of the older adult in South Africa

In South Africa the health sector transformation resulted in a shift to primary health care. This transformation has marginalised dedicated geriatric services. Examples of such marginalisation include the preventive, curative and rehabilitative needs of older clients that have for the main part been integrated into general sessions at community clinics at the primary care level. The numerous community nurses that have been redeployed from geriatric services to assist, for example, in child immunisation programmes. Funds allocated to establish luncheon clubs and dietary supplementations for older persons have been withdrawn and redirected to children and pregnant and lactating women (Joubert and Bradshaw, 2003)

There is a scarcity of reliable information about the health status, health risks and causes of mortality in the older population. Equally scarce are sources of information on the use and satisfaction of health services by older persons, and the provision of geriatric health services in our country. Most of the information presented here is from the Census 2001 data.

Males   **Females**
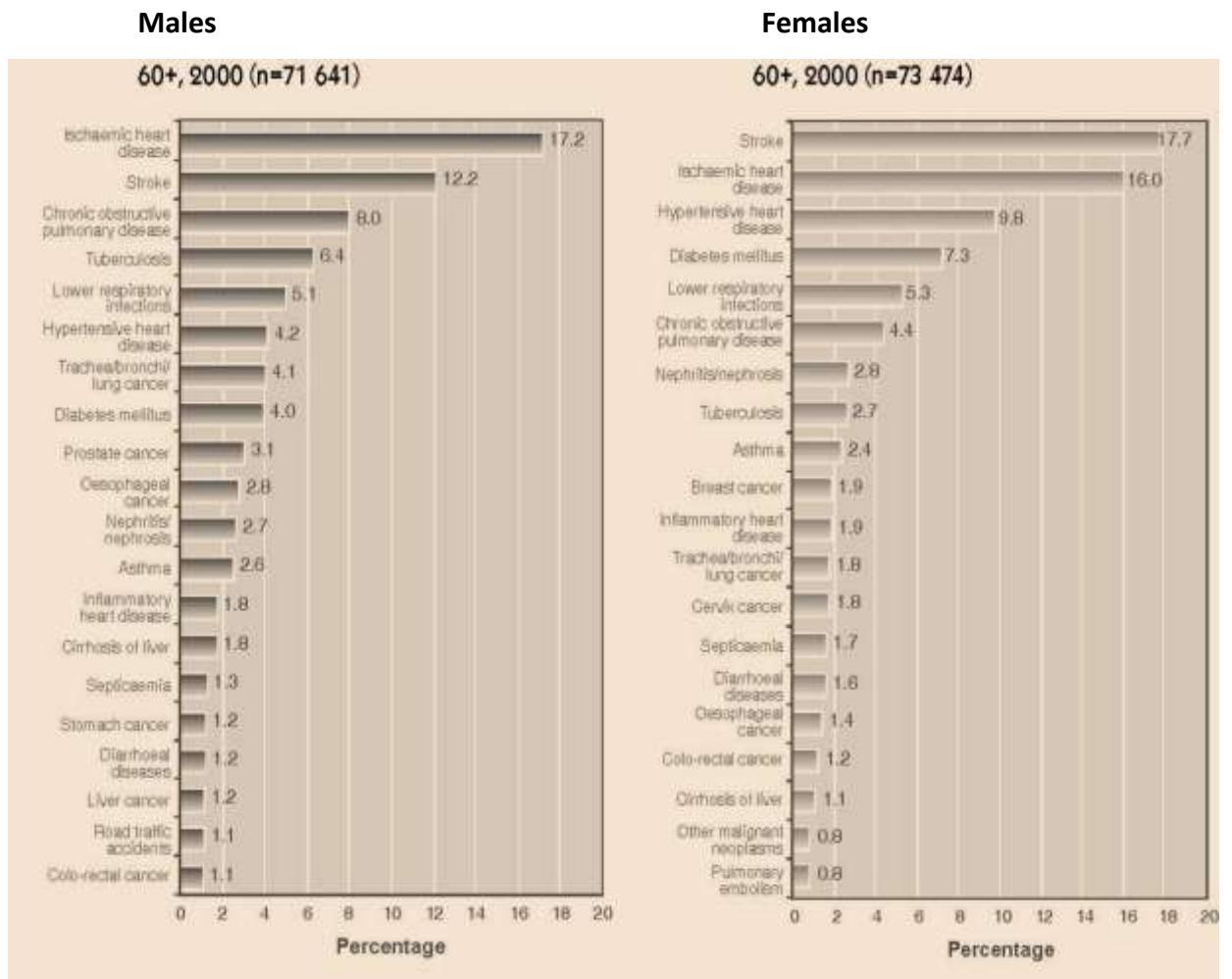
Figure 1: Leading causes of death among older adults (Bradshaw and Joubert, 2004)

Estimates of the causes of death have been extracted from the South African National Burden of Disease study (Bradshaw and Joubert, 2004) , indicating that 145 115 deaths occurred among persons 60+ in 2000. Of these, 71 641 were male, and 73 474 female deaths. Non-communicable diseases (NCDs) are responsible for 84% of deaths in the population 60+; communicable diseases and nutritional deficiencies for 13%; injuries for 3%; and HIV/AIDS for 0.4%

3.2.1. Hypertension in the older adult

After the age of 50 or 60 years, increase in blood pressure occurs primarily in systolic blood pressure. Diastolic blood pressure tends to spontaneously decrease with increasing age while systolic blood pressure increases, mainly as a result of the functional and structural changes in the arterial vessels. In large arteries, aging results in progressive deposition of calcium salts, fraying and fragmentation of elastin, and an increase in the number and cross-linking of collagen fibres that increase the rigidity of the vessel wall (Duprez, 2008).These age-related changes in arterial stiffness and systolic blood pressure are strongly associated with organ damage, cardiac and vascular disease, and an increased risk of morbidity and mortality.

Results from large epidemiologic studies have confirmed the association between increased systolic blood pressure and the increased risk of morbidity and mortality (Duprez, 2008). A meta-analysis of 61 prospective studies of blood pressure and mortality showed that, between the ages of 40 and 69 years, an increase in systolic blood pressure of 20 mm Hg was associated with a more than 2-fold increase in the death rate due to stroke and in the death rates from ischemic heart disease and other vascular causes. Relatively small decreases in mean systolic blood pressure were associated with large absolute reductions in strokes and premature deaths. A 2-mm Hg mean lower systolic blood pressure was equivalent to a 7% lower risk of death from ischemic heart disease and a 10% lower risk of stroke (Duprez, 2008).

According to the South African burden of disease unit high levels of hypertension are evident in the older population which is combined with poor levels of awareness, monitoring, treatment and control of the condition. Only a third of the people with hypertension were controlled, only half had had their blood pressure measured in the last 12 months, and a mere 12% of male and 20% of females with hypertension were aware that their blood pressure was high. This is a serious situation, considering scientific evidence that high blood pressure causes increased risk of ischemic heart disease, stroke, hypertensive heart disease, other cardiovascular and renal disease,

while the former three conditions are the three leading causes of death in older South Africans(Bradshaw and Joubert, 2004).

3.2.2. Diabetes in older adults

Diabetes is prevalent among elders because the physiologic changes that occur with aging can produce glucose intolerance, which in turn can lead to diabetes. Blood glucose levels rise with age. With each decade of life, fasting levels increase about 0.055 mmol/l and postprandial levels jump 0.33 to 0.72 mmol/l (Dankner et al., 2009). The reasons are not clear, but many researchers believe peripheral cell receptor sites become less sensitive to insulin over time. Other possible factors include the decline in the release of glucose regulating hormones (insulin, glucagon, and epinephrine), decreased lean body mass, reduced physical activity, and poor diet associated with getting older (Dankner et al., 2009). The standard goal of treatment for diabetes is tight blood glucose control and this carries more risk with older people. They're more susceptible to severe hypoglycaemia, which can precipitate a stroke, myocardial infarction, angina, or seizures. And hypoglycaemia can be exacerbated by other medical conditions (such as an impaired kidney or liver) or medications that commonly interfere with blood glucose (Society for Endocrinology Metabolism and Diabetes of South Africa, 2009).

On the other hand, age-related changes such as diminished sensation can mask signs and symptoms of hyperglycaemia (excessive thirst, hunger, and urination). Hyperglycaemia blood glucose levels over 11.1 mmol/l can result in fluid and electrolyte imbalances, poor wound healing, functional and mental deterioration, insomnia, incontinence, blurred vision, and hypotension in older patients. It can also cause hyperosmolar syndrome (sometimes called diabetic coma), which is more common in older diabetic patients and associated with a 30% mortality rate (Saxon and Etten, 2002).

3.2.3. Osteoporosis in older adults

Osteoporosis is defined as a progressive, systemic skeletal disorder characterised by low bone mass and micro-architectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture (Natitional institute of Cinical Excellence [NICE], 2005). Bone formation exceeds bone resorption in youth, but between the third and fifth decade of life there is a gradual loss of bone mass. Therefore, age is one of the major risk factors for primary osteoporosis. It can affect both sexes, but postmenopausal women are at the greatest risk, because bone loss is accelerated, to varying degrees, after the menopause because of loss of oestrogen production (Borgstrom et al., 2006).

Risk factors for osteoporosis include low body mass index (< 19 kg/m2), untreated premature menopause, family history of maternal hip fracture before the age of 75 years, conditions affecting bone metabolism (primarily inflammatory conditions, hyperthyroidism or celiac disease), and conditions associated with prolonged immobility (Coxam, 2005). Osteoporosis is most common in white women. The quantitative impact of these individual risk factors on the absolute risk of a primary or secondary osteoporotic fracture is currently being established by the World Health organisation (Natitional institute of Cinical Excellence [NICE], 2005).

People with osteoporosis are at risk of fragility fractures. These are fractures that occur as a result of mechanical forces that would not ordinarily cause fracture. The WHO has quantified this as forces equivalent to a fall from a standing height or less. Osteoporotic fragility fractures occur most commonly in the vertebrae, hips and wrists, and are frequently associated with substantial disability, pain and reduced quality of life(Natitional institute of Cinical Excellence [NICE], 2005). Also, there is a substantial risk of death in the 6 months subsequent to hip fracture.(Givens et al., 2008). In the absence of fracture, the condition is asymptomatic and often remains undiagnosed.

The incidence of fragility fracture is the clinically relevant outcome in evaluating treatments for osteoporosis. Of the estimated 180,000 symptomatic osteoporotic fractures annually in England and Wales, 70,000 are hip fractures, 25,000 are vertebral fractures, and 41,000 are wrist fractures (Natitional institute of Cinical Excellence [NICE], 2005). In 2000, it was estimated that the total cost of treating osteoporotic fractures in postmenopausal women was between $2.24 and $2.68 billion. This is expected to increase to $3.13 billion by 2010. In women older than 50 years of age, the lifetime risk of vertebral fracture is estimated to be about one in three (including asymptomatic vertebral fractures), and approximately one in six for hip fracture. Postmenopausal women with an initial fracture are at much greater risk of subsequent fractures (Natitional institute of Cinical Excellence [NICE], 2005).

3.2.4. Comprehensive Geriatric Assessment

The Comprehensive Geriatric Assessment (CGA) is a multidimensional, interdisciplinary, diagnostic process to identify care needs, plan care, and improve outcomes of older people. The major purposes of CGA are to improve diagnostic accuracy, optimize medical treatment, improve medical outcomes (including functional status and quality of life), optimize living condition minimize unnecessary service use, and assess need for long-term case management (Rubenstein, 2004).

In the UK, Asia, Latin America , CGA's are performed in a number of places (such as hospital, home, and nursing home) and with varying program types and levels of intensity (such as hospital, hospital acute care for older adult units, hospital consultation teams, outpatient brief screening assessment programs, or intensive in-home assessment and case management programs). Rubenstein (2004) states that CGA is at the hub of the geriatric care system, serving as a common language, a set of guideposts, a method of gate-keeping, and, in fact, is the foundation for everything that is done in geriatrics

Rubenstein (2004) notes that CGA was intensively researched 1975 through 1995 and that efforts since that time are directed to refining the model. The value of CGA is no longer disputed; however, the optimum setting, specific tests to use, best outcome indicators, and effectiveness of follow-up remain under discussion. Indicators and the results of follow-up are focuses of current study.

Individual studies and systematic reviews of the CGA literature have identified benefits of CGA including improved cognitive function (Stuck et al., 1993, Caplan et al., 2004, Ellis and Langhorne, 2005), reduced disability (Stott et al., 2006), reduced mortality (Rubenstein, 2004, Stuck et al., 1993), prolongation of time living at home (Caplan et al., 2004, Ellis and Langhorne, 2005, Landi and Onder, 2001, Stuck et al., 1995, Stuck et al., 1993), decreased hospital admission/readmission (Bernabei et al., 2008, Caplan et al., 2004, Landi and Onder, 2001, Stuck et al., 1995, Stuck et al., 1993), reduction in number of hospital days (Harari et al., 2007, Landi and Onder, 2001), reduction in emergency room visits (Caplan et al., 2004); improved physical function (Rubenstein et al., 1997, Caplan et al., 2004, Stuck et al., 1993), improved ability to perform activities of daily living (Stuck et al., 1993); and a decrease in a variety of geriatric syndromes during hospitalization (Harari et al., 2007).

Rubenstein et al. (1997) compared data on CGA programs in several countries and found that common areas of benefit were reduction in use of institutional services, decreased mortality, and increased physical function.

CGA has been used to assess and plan care in the hospital (Ellis and Langhorne, 2005, Harari et al., 2007, Stuck et al., 1993), home (Bernabei et al., 2008, Caplan et al., 2004, Landi and Onder, 2001, Stuck et al., 1995); outpatient clinic and nursing homes (Mann et al., 2004).

In the US, CGA has been institutionalized in the form of the Minimum Data Set (MDS) that is mandated on admission to a skilled nursing facility and periodically thereafter as a condition for government payment for care (Omnibus Budget Reconciliation Act, 1987). Using this as a model, Bernabei, Landi, Onder, Liperoti, and Gambassi (2008)

postulated that wide-scale use of a CGA would create a platform for a scientific basis for geriatric care. Amassing a large, international database on geriatric assessment would facilitate prognostication, outcomes research, and ability to monitor quality of care.

Current efforts are underway to redesign CGA to reduce the cost and time as well to improve physician and patient satisfaction (Landi and Onder, 2001, Mann et al., 2004). Although some authors have been critical of the cost of CGA (Stuck et al., 1995), Landi and Onder (2001) were able to document a savings of $1200 per patient owing to reduced hospital days. Several authors found that an exam length of about 30 minutes was acceptable to both the GP and the patient (Landi and Onder, 2001, Mann et al., 2004).

Recent studies also expand the uses of CGA into the realm of prognostication.(Fukuse et al., 2005)found that CGA administered pre-thoracic surgery predicted post-op complications. They concluded that CGA was essential for the elderly client prior to chest surgery to optimize post-op outcomes.(Pilottoa et al., 2007)found that a CGA consisting of six standardized tests accurately predicted 2-year mortality rate after gastrointestinal bleed.

The effectiveness of any assessment program depends upon the success of follow-up on the problems identified (Gold and Bergman, 2000).(Aminzadeh, 2000)conducted a systematic review of the literature to determine GP and patient adherence rate to CGA recommendations and found a 49-79% adherence rate. Mann, et al. (2004) found that both positive and negative results on the CGA initiated a significant number of GP actions.

3.2.4.1.   Domains of the CGA

CGA has a number of major measurable dimensions, usually grouped into the five domains, the social, medical, functional, psychological, and environmental domains.

In this study the CGA assessment tool has been developed by a panel of experts and is presented in Annexure 1.

a) Social Domain

The social domain reveals how well the client is functioning within the environment. Adequate housing, the presence of a reliable caregiver, transportation, relationship with family members and being able to pay for treatment and for the necessities of life are factors that are assessed. Problems in any of these areas can adversely affect the client's ability to obtain and comply with treatment, and may therefore compromise the treatment outcome.

The social domain is made up of the following:

- *Demographic information*

Demographic information includes: client's personal details (name, surname, date of birth, ID number, medical aid name and scheme number, citizenship, postal and residential address, next of kin, marital status, number of children, race, religion, and General practitioners contact details.
Access to equipment or services such as DVD/CD, Computers, and internet.

- *Social history*

Social history includes: Employment history, source of income, financial responsibilities, living arrangements, habits, level of education, social groups or agencies, frequency and number of social contact, amount of support offered (emotional , financial), relationship with family members.

b) The medical domain

- *Past medical history*

A review of symptoms and medical problems is useful in accounting for co morbidity and for identifying health problems that may not be presented by the client without prompting. Problems need to be asked about with an emphasis on whether they have resolved or remain on-going.

Components of the medical history are

- Allergies or risk factors

- Previous admissions: Date, reason for admission.

- Chronic diseases: Common chronic diseases in the older population listed are hypertension, diabetes, tuberculosis and hyperlipidaemia, other.

- Menstrual history: age at menopause, whether client is on Hormone replacement therapy (HRT) and duration of HRT.

- Family history: Family history of the following illnesses: tuberculosis, cancer, diabetes, hypertension, osteoporosis, gout, kidney stones, gallstones, hip fractures and dementia. Record a brief comment of illnesses in family e.g. maternal history of diabetes

- Falls history: Record number of falls client experienced if a client has had a previous fall, record date, place and injuries if any. Record a brief report of the incident.

- Immunization status: Record whether client has had any vaccinations for tetanus, influenza or pneumonia.

- *Self rated health*

A person's rating of his/her health is a good predictor of functional changes and mortality even when activities of daily living are impaired. The simple self rated health question is "How would you rate your health?" and the choice of answers are poor, fair, good, very good, excellent. Reporting health status as excellent or very good is strongly associated with less disability over the subsequent two years and a lower probability of death or institutionalisation (Ratnaike, 2002).

- *Clinical examination*

The vital signs of temperature, pulse, respiration, blood pressure as well as height and weight, blood glucose, HB, urine dipstick test measurements are routinely screened on every CGA visit.

- *Current symptoms*

In this section each of the systems of the body is reviewed to elicit symptoms not volunteered by the client. Each system has signs & symptoms associated with it. The choices of responses are either "yes" or "no". If response is "yes" the client is requested to give duration of symptom, and if he/she received any treatment. The symptoms in each of the systems are as follows:

- Central nervous system: dizziness, headaches, weakness, speech, vision, and hearing.
- Chest: shortness of breath, cough, and haemoptysis.
- Cardiovascular system: chest pain, palpitations, dyspnoea, orthopnoea, oedema (swelling of legs)
- Gastro intestinal system: appetite, weight, bowels, constipation, and diarrhoea.
- Urogenital system: frequency of micturition, nocturia, burning of micturition, difficulty in initiating micturition.
- Post-menopausal (females): post-menopausal bleeding, vaginal dryness and hot flushes
- Musculoskeletal: joint pain, swelling, morning stiffness, backache.

- *Medication Chart (risk assessment / non adherence screening)*

Many older clients take a variety of medications on a long-term basis. Some may be essential for managing co-morbid disorders, and others may have been prescribed for conditions that are no longer present or relevant. A thorough review of all medications taken, prescription drugs and over-the-counter drugs alike, may find unnecessary drugs that can be discontinued and can also alert the physician to potential drug interactions that could arise when other therapies are initiated. (The risk of interactions increases rapidly with each agent taken.) Clients themselves may not know why they are taking certain drugs.

During the interview client is instructed to collect and bring in every medicine container that he or she is currently using. This is called a Brown Bag Assessment which is the gold standards assessment for the medications that a patient is

taking(Williams et al., 2004). All medication is documented using the medication review chart and assess risks such as multiple providers, possession and the use of over the counter medications, possession of medications from friends/family, and out-dated medications. Based on the list, the nurse will assess poly pharmacy, adverse drug reactions and expired medications, substance abuse (interactions with medications).

A complete list of medications is entered onto the physician's referral form and forwarded to the client's physician. He/she should establish, by questioning the client and by chart review, whether the medication is necessary, and then, one at a time, cautiously withdraw any medication for which no valid clinical purpose can be found or even add any medication.

- *Nutritional Assessment (Guigoz, 2006)*

The Nutritional assessment is an assessment tool used to identify clients at risk of malnutrition. Screening for possible nutritional problems during the CGA can be done with questions that elucidate the types and amounts of food the client eats on an average day and by establishing whether there is any correctable problem that is interfering with nutrition.

Interpretation: There are two sections of the nutritional assessment, the screening section and the assessment section. If the screening total is 12 or more, the client is not at risk of malnutrition. If the screening total is 11or less, the clients is at risk of malnutrition and continue assessment. The total maximum score is 30 (screening and assessment section). If the client scored ≥24, the client is well-nourished .If the client scored between 17 and 23.5, the client is at risk of malnutrition. If the client scored below 17, the client is malnourished.

- *Vision Test(Schwiegerling, 2004)*

Snellen eye chart is used to determine how "normal" vision. It sets a standard for what most people should be able to see when they stand 20 feet away from the

chart. **20/20** vision just means that when you stand 20 feet away from a Snellen eye chart, you see all the symbols on the chart.

Interpretation: Normal vision = 20/20. If result is 20/40, that means that when clients stand 20 feet away from the chart, you see what a normal person sees standing 40 feet away from it.

- *Hearing test(Ventry and Weinstein, 1982)*

The Hearing test is a questionnaire of ten items. This questionnaire is designed to detect perceived social and emotional problems related to hearing loss, for example, "Does a hearing problem cause you to feel frustrated when talking to members of your family?"

Interpretation: 0-9 = no handicap; 10-24 = mild to moderate handicap; 26-40 = severe handicap.

- *Osteoporosis Risk Assessment (National osteoporosis foundation of South Africa)*

This is a questionnaire to determine if a person is at risk for Osteoporosis using specific risk factors and consists of 19 questions separated into 3 categories. Category A consists of 4 questions with 10 points allocated to each. Category B consists of 5 questions with 5 points allocated to each. And category C consists of 10 questions.

Interpretation: Client at risk of osteoporosis if 1 or more box in category A checked or 2 or more boxes in category B or the numerical score exceed 15

- *Frailty Indicator (Schuurmans et al., 2004)*

The frailty indicator is used to determine the level of frailty of the client. This is a simple questionnaire designed to screen older people for early physical, cognitive, and psychosocial problems. An example of a physical item is "Are you able to do your shopping single handed without any help?" An example of a psychosocial item is "Do you sometimes miss people around you?" It consists of 15 items, which are answered

with "yes" or "no". Additionally, the psychosocial items and an item on memory complaints can be answered with "sometimes".

Interpretation: The total score varies from 0 (not frail) to 15 (severely frail). A score of 5 or higher is considered moderately to severely frail.

c) Functional Domain

- *Activities of daily living (ADL)(Katz et al., 1970)*

The Activities of Daily Living assesses the client's ability to perform activities of daily living independently and therefore assists in care planning. The index ranks adequacy of performance in the six functions of *bathing, dressing, toileting, transferring, continence, and feeding.*

Interpretation: A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment.

- *Instrumental Activities of daily living (Lawton and Brody, 1969)*

The Instrumental Activities of Daily Living Scale (IADL) assesses independent living skills, which are considered more complex than the basic activities of daily living as measured by the ADL's above. The instrument is most useful for identifying how a person is functioning at the present time, and to identify improvement or deterioration over time. There are eight domains of function measured with the IADL scale. Women are scored on all 8 areas of function; historically, for men, the areas of food preparation, housekeeping, laundering are excluded. However, if the male client has to take responsibility for these functions, these sections should be included for male clients as well.

Interpretation: A summary score ranges from 0 (low function, dependant) to 8 (high function, independent) for women and 0 to 5 for men.

- *Prostate Symptom test(Bosch et al., 1995)*

The Prostate Symptom test documents the symptoms of the benign prostatic hyperplasia, (BPH), a condition which is common in older males. The test is based on the answers to seven questions concerning urinary symptoms and one question concerning quality of life. Each question concerning urinary symptoms allows the client to choose one out of six answers indicating increasing severity of the particular symptom.

Interpretation: Mild: (symptom score less than or equal to 7); Moderate: (symptom score range 8-19); Severe: (symptom score range 20-35)

- *Incontinence Questionnaire(Avery, 2004)*

It is a questionnaire for evaluating the frequency, severity and impact on quality of life of urinary incontinence in men and women. It is scored on a scale from 0-21.
The client is continent if score is "0" and any value above 1 is a problem that needs intervention.

- *The Balance Test*

This test assesses the ability to maintain balance, either statically or while performing various functional movements, to help make decisions about the patient's mobility and level of care needed.
Interpretation: It comprises 14 observable tasks common to everyday life measured on a 5 point ordinal scale ranging from 0 – 4. "0" indicates the lowest level of function and "4" the highest level of function. The maximum score is 56; a higher score reflects better balance; and a score of 45 is required for independent safe ambulation.

- *The Six-Minute Walk Test (SMWT)(Brooks et al., 2003)*

Walking is an activity performed daily by all but the most severely impaired clients. This test measures the distance that a client can quickly walk on a flat, hard surface in a period of 6 minutes (the 6MWD) and thus assesses the sub maximal level of functional capacity. Most clients do not achieve maximal exercise capacity during the 6MWT; instead, they choose their own intensity of exercise and are allowed to stop and rest during the test. However, because most activities of daily living are

performed at sub maximal levels of exertion, the 6MWD may better reflect the functional exercise level for daily physical activities. The 6MWT is a practical simple test that requires a 100-ft hallway (30 m) or a 20 m hallway.

Interpretation: Baseline distance walked by the individual in six minutes. Client reassessed 6 months later and compared with baseline distance walked.

d) Psychological domain

- *Depression test (South Australian Monitoring and Surveillance System (SAMSS), 2004)*

The Depression test provides a brief measure of anxiety and depressive disorders. It determines the level of psychological distress using a 10-question scale of non-specific psychological distress. The items are based on the level of anxiety and depressive symptoms experienced in the most recent four week period, and allows Clients to report the frequency of each experience from "all of the time" to "none of the time". Analysis of these questions produces four levels of severity of psychological distress. The values of the response categories are reversed so that: 5 are "all of the time", and 1 is "none of the time".

Interpretation: The 10 items are summed up to give scores ranging from 10 to 50, where a sum of 50 indicates a high risk of anxiety or a depressive disorder. A score between 10-19 (Likely to be well) 20-30 (Refer to GP for assessment) 30> (GP to refer to psychiatrist)

- *Mental State Examination (Folstein et al., 1975)*

The Mental State Examination is a tool used to systematically assess mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language.

The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment.

e) Environmental domain

- *Home Assessment Checklist*

The nurse inspects the home environment and assesses for unsafe areas or situations. The client and family are then taught measures to make the environment safer. The home assessment checklist provides ways to make the home environment safer. Areas assessed are general household, kitchen, stairway and bathroom. The checklist assists in identifying hazards and provides corrections to the hazards identified, e.g. under general household, if lighting is too dim, the correction would be provide ample lighting.

Interpretation: Risks identified or No risks identified

3.2.5. Conclusion

The comprehensive geriatric assessment (CGA) is an integral tool that examines factors affecting the course of disease and the outcome of treatment. The principal areas of focus of the CGA include the patient's functional, physical, mental, emotional, pharmacotherapeutic, and socioeconomic status. The CGA is recommended to aid diagnosis, assessment, and outcome measurement and the the team approach to older adult rehabilitation should be interdisciplinary .This study will focus on identification of abnormal findings on blood pressure, blood sugar and Osteoprosis risk by the nurse and weather the GP acted on these abnormalities detected.

Chapter four: Methodology

4. Methodology

4.1. Introduction

This study is located in an agency providing outreach geriatric prevention services using a chronic disease model. The agency piloted the Comprehensive geriatric assessment (CGA) tool in an urban affluent population. The study reports on actions taken by general practitioners on abnormal blood pressure, blood glucose and osteoporosis screen identified by registered nurses, conducting home based visits to older clients. In this cross sectional secondary study analysis, 465 subjects aged 60 years and over had a nurse visit in their homes and a subsequent General Practitioner (GP) visit. The prevalence of specific geriatric problems was assessed as well as the frequency of initiated procedures by the GP. This study focused the relationships between CGA conducted by nurses at clients' homes and subsequent GP actions in response to abnormal blood pressures, blood glucose, and osteoporosis screen. The study also presents the prevalence of abnormal blood pressures, blood glucose and osteoporosis screens in this population.

4.2. Setting: The Active at Home (A@H) service

The vision of A@H is seeing older people being active, happy, and healthy and living with adequate support in their own homes in the community. The mission of A@H is to provide evidence based support services in the homes of clients to prevent illness, promote health, and improve quality of life, using appropriate community based multidisciplinary resources. The values central to this strategy are as follows:

- The client has the right to respect for his/her privacy and his/her choices and opinions

- Persons age most happily in their own familiar environments and communities.

- It is possible for people to age without deterioration of health or quality of life.

- The services offered to clients should be of the highest possible standards.

- Any helper entering the home, does it as a guest and should respect the rights of the host

- The focus is on health, and not on illness

- The adoption of healthy lifestyles and actively participating in one's own care are important at all stages of the life course

The objectives of A@H are:

- to assess and monitor the health, health behaviour, environment and quality of life of clients in order to plan appropriate support and interventions

- promote appropriate utilization of the multidisciplinary healthcare team to promote health, prevent illness and rehabilitate clients with specific medical problems

- Promote healthy ageing through health education, health monitoring, and attention to nutrition, exercise and medication.

- Improve the daily functioning and quality of life of clients as they age.

A@H was started in Durban which is an urban area which is located in the Kwa-Zulu Natal province. The subjects enrolled in the Active at Home program are from an affluent upper middle class population. The subjects belong to two medical health insurance companies which covered the cost of the A@H program.

A@H collects data by sending nurses to the client's home with a documentation pack which consisted of the Comprehensive Geriatric assessment (CGA) and Medical practitioners review report. Data is then collected by the Nurse and the General practitioner (GP) and captured by the A@H staff on the clinical management database. This database is accessed controlled by the A@H management only.

The A@H piloted the comprehensive geriatric assessment on clients aged 60 years and over in 2008 and 2009.

The process of the CGA is as follows:

- A mandatory comprehensive health assessment done by a Registered Nurse (RN) using the specified tool (Annexure 1).

- Clients were required to visit their General practitioners (GP's) with a summary of the nurse's findings   (Annexure 2).

- The GP's were requested to investigate the nurse's findings, re-assess the client, and report on the client's health, including any changes in therapy, utilising the A@H prescribed form (Annexure 3).

The assessment from the Registered Nurse and GP gives a total picture of the client's health status, and allows A@H to identify risk factors and to make appropriate suggestions about the management of the client's health

4.3. Research design

This is a secondary quantitative analysis of a cross sectional sample of data from CGA completed by the nurse , including the GP follow up. This data was obtained from the data system of A@H and seeks to identify the effectiveness of the CGA in prompting appropriate changes in treatment.

The following data was extracted for the analysis:
a) Demographic data – Age , gender, chronic disease profile, Body mass index Living conditions
b) Systolic blood pressure measurement in mmHg (Frequency tables, mean, median, standard deviation)
c) Blood glucose measurements in mmol/l (Frequency tables, mean, median, standard deviation)
d) Osteoporosis risk assessment scores (frequency tables)
e) Chronic disease profile by Nurse and GP (Kappa and Chi-square)
f) Special instructions given by GP (Frequency tables)

4.4. Population and Study Sample

There was no sampling as the entire population was used. The subjects for this study were enrolled in the A@H program in Durban, South Africa, from 2008 to 2009 and were sponsored by two health schemes. The study group was drawn from 666 clients who were part of the CGA program. Each of the health schemes had their own criteria which differed slightly. One scheme stated that all clients over age 60 qualified for a CGA. The other scheme identified clients who had been hospitalized in the previous three months or who had a chronic benefit plan as eligible.
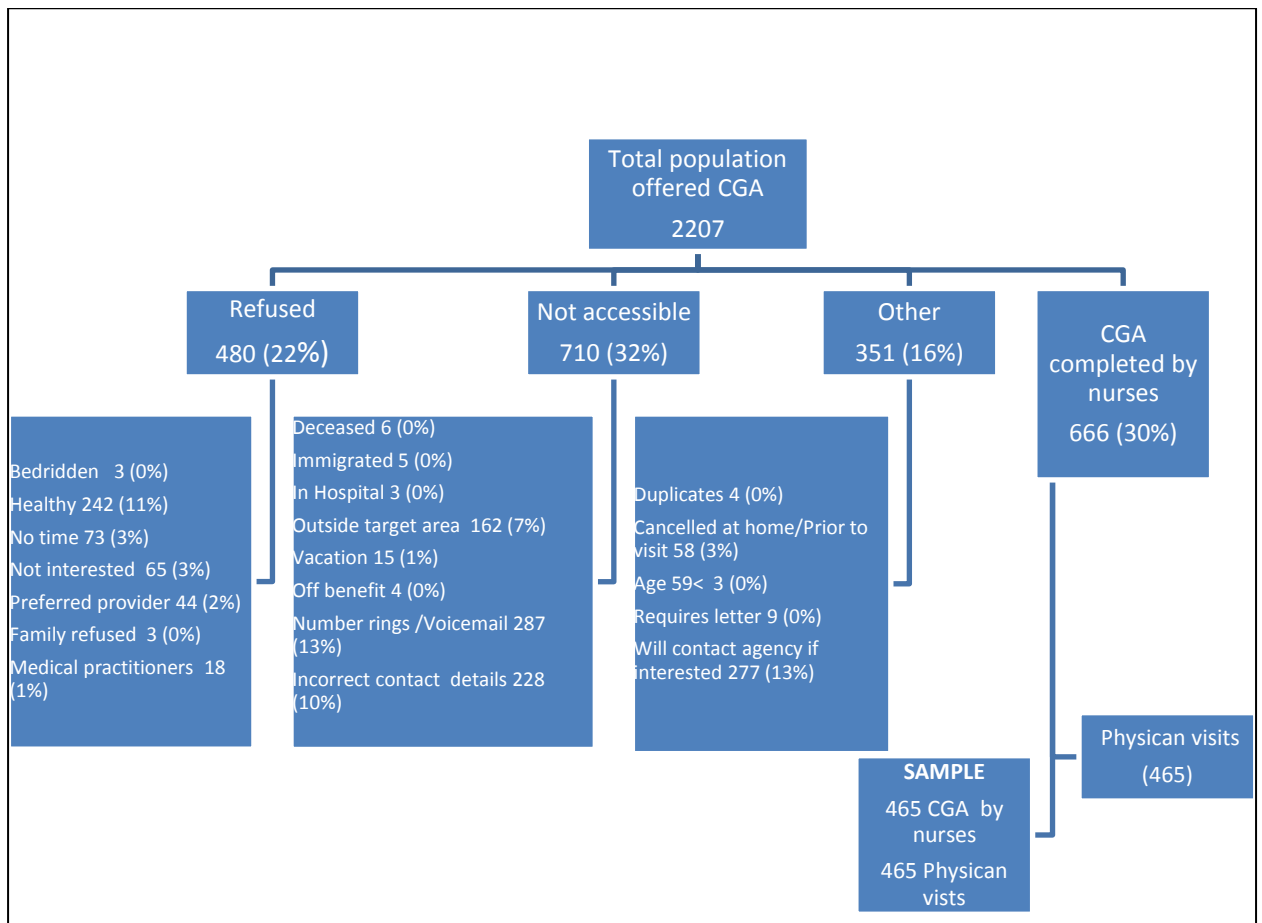
Figure 2: Sample Size and Selection of Sample

Letters were sent out to 2207 clients and their physicians in the Durban and surrounding area explaining the program. These clients were contacted via telephone and 666 (30%) agreed to have the CGA intervention. The remaining 70% either

refused to participate, or were not accessible or due to other specific reasons. Figure 1 below shows the reasons the 70% of the population did not participate in the intervention. CGA's were conducted on 666 clients, and 465 of the 666 subsequently visited their GP for a further assessment. The sample selected for this evaluation study therefore is the 465 clients who received the CGA by a nurse and also have a completed physician report.

4.5. Data Collection

No new data were collected. The data extracted for the study data was originally collected as part of the routine service delivery by the agency between October 2008 and December 2009. Registered Nurses are trained to conduct the Comprehensive geriatric assessment (CGA) and thereafter referred the client to their treating doctors with a summary of the CGA for a further assessment utilising the agency prescribed general practitioners report. Registered nurses are utilised as they have the necessary skills to plan, implement and evaluate a treatment care plan. Data are collected on paper and captured onto the computerised clinical management system by A@H staff. The data are verified by a registered nurse after it was captured on the system for quality assurance purposes.

4.6. Sources of Extracted Data

a) The Comprehensive geriatric assessment (annexure 1)

The CGA assessment tool consists of the social, medical, functional, psychological and environmental domains that are assessed by the registered nurse. This tool is captured onto the agencies database and will be used in this study

b) Nurses referral report (annexure 2)

This form is a summary of the CGA assessment completed by the nurse and given to the client to take to the physician for further evaluation. This form is not used in this study.

c) Medical practitioners report (annexure 3)

These forms were taken by the client for the physician to complete. The purpose of this from is for the physician to evaluate the client and assess the medications, prescribe treatment and diagnose clients. This form is uploaded in its entirety in the agencies database. This form will be utilised in this study.

d) GP satisfaction survey (annexure 4)

The GP satisfaction survey provides insight onto the level of service provided by the agency. This would explore whether the service provided by the agency is within the expectations of the doctors.

4.7. Validity and reliability of data collection tools

- Collection tool

  CGA screening tool developed by expert committee based on evidence. The tool has known face and content validity.

- Training to ensure standard routine data collection

  All nurses attend a two week training course on how to administer the CGA. Doctors were sent letters explaining the procedure and their role in managing the client's health. This ensures standardisation in the administration

- Standardised Equipment

    a) Procare aneroid sphygmomanometers – The machine is certified for use by the CE (*Conformité Européenne)* standards authority in Europe. Nurses were trained utilising the blood pressure meters using the company standard operating procedures. Each meter is calibrated before leaving the agency office to check for defects.

    b) Abbot Glucometers: Abbott Diabetes Care meters are United states FDA (Food and drug administration) approved, and CE certified. Nurses are trained on how to utilise the glucometers using the company standard

operating procedures. Each meter is calibrated before leaving the agency office to check for defects.

- Osteoporosis risk assessment

No studies are available on the reliability and validity of this questionnaire. Face and content validity of the risk assessment questionnaire has been determined by experts at the National osteoporosis foundation of South Africa.

4.8. Data Management

Data is secured on database that requires three passwords and access is restricted to the agency manager. De-identified data will be made available to the researcher.

4.9. Data analysis

4.9.1. The prevalence of hypertension, diabetes and Osteoporosis in the study sample

Data was analysed and described on the prevalence of hypertension, diabetes and Osteoporosis in this study sample. Preliminary data obtained from the database indicates that these three areas listed below are problematic and warrants further investigation in terms of risk factors and prevalence.

Diabetes: Abnormal blood sugars were recorded on 42/562 (7%) clients who were diagnosed as being diabetic and receiving treatment. Abnormal blood sugars were recorded on 83/562 (15%) clients who were not diagnosed as being diabetic.

Hypertension: Abnormal blood pressures were recorded on 183/562 (33%) clients who were diagnosed as being hypertensive and receiving treatment. The findings showed that 69/183 (37%) have stage 1 hypertension (systolic blood pressure 140>) and 29/183 (16%) have stage 2 hypertension (systolic blood pressure of 160>).

Abnormal blood pressures were recorded on 154/562 (27%) clients who were not diagnosed as being hypertensive. The findings showed that 115/154 (74%) clients have stage 1 hypertension (systolic blood pressure 140>) and 29/183 (26%) have stage 2 hypertension (systolic blood pressure of 160>).

Osteoporosis risk assessment (ORA): Abnormal ORA scores were recorded 0n 251/562 (46%) clients.

Congruence with abnormal findings and GP actions: Kappa analysis was done (http://www.graphpad.com/quickcalcs/Kappa2.cfm) to assess the level of agreement between abnormal findings and GP actions.

4.10. Data Extracted

Table 1 : Data collection tools

Annexure	Component	Data
1. Nurses assessment (Comprehensive geriatric assessment)	Demographic data	Age , sex, social history
	Past medical history	Chronic disease profile
	Clinical examination	Blood pressure reading taken by nurse at home in mmHg Capillary blood sugar taken by nurse at home in mmol/l
	Current medical history	Activities of daily living Body mass index Current medications
	Osteoporosis risk screening questionnaire	Risk category description taken by nurse at home
2. Medical practitioners report	Chronic diseases	Chronic disease profile
	Special instructions	Special instruction given by GP

4.10.1. Statistical Analysis

The risk factor for hypertension, diabetes and osteoporosis were taken by the nurse at the subject's home. The hypertension risk was measured using aneroid blood pressure meters in mmHg, the diabetes risk factor was measured by the capillary blood sugar reading in mmol/l and the osteoporosis risk was measured by the risk screening questionnaire

Frequency tables were generated to identify prevalence of abnormal readings in blood pressure, blood sugar and osteoporosis risk.

- The disease management outcome was measured by whether the medical practitioner has initiated change on the abnormal findings detected on the above risk factors.
- The hypertension disease management outcome was measured by whether the medical practitioner initiated a blood pressure initiation or medication change.
- The diabetes disease management outcome is whether the medical practitioner initiated a diabetic medication change or by GP.
- The osteoporosis disease management outcome is measured by whether the DEXA scan, Vitamin D, calcium supplement or bisphosphonate has been prescribed following and abnormal osteoporosis risk assessment score.

4.11.   Detailed Analysis Plan

Hypertension

Hypertension data is obtained from the Nurses assessment and the medical practitioners report.

a) Blood pressure reading taken by nurse

- Blood pressure risk profile by gender
- Systolic blood pressure distribution
- Systolic blood pressure risk stratification and application

b) Hypertension diagnosis

- Cross tabulation of Hypertension diagnosis by GP and blood pressure risk stratification
- Cross tabulation of Hypertension diagnosis by Client self report and Blood pressure risk stratification
- Cross tabulation of Hypertension diagnosis by GP and blood pressure medication by client
- Hypertension diagnosis by client self report / blood pressure medications VS hypertension diagnosis by GP

c) GP Actions following abnormal blood pressures
- Blood pressure investigation requested by GP
- Blood pressure medication initiation requested by GP
- Follow up visit requested by GP
- Monitoring of client requested by GP
- Lifestyle modification requested by GP

The following data were utilised for the analysis of the hypertension risk factors and disease management outcomes.

- **The nurses assessment report**
- Systolic blood pressure in mmhg: Systolic blood pressure was taken by the registered nurse at the client's home utilising Procare aneroid sphygmomanometers which is certified by the CE standards authority in Europe. Each meter is calibrated before leaving the agency office to check for defects. The protocol of the agency requires the nurse to test blood pressure three times and average the last two blood pressure readings. Data is grouped according to the SA hypertension guidelines as normal blood pressure (<120 - 129mmHg), hi normal (130-139mmHg). Stage 1 hypertension (140-159mmhg), Stage two hypertension (160-179mmhg) and Stage three hypertension (>180 mmhg)
- Chronic disease profile: Hypertension on the diagnosis listed by self report of patient.
- Medication name and dosage: Medications are assessed by utilising the brown bag assessment. Clients are required to bring all their medications

during the nurse's assessment and the nurse records all the medications and dosage. Medications are grouped according to the South African medicines formulary (Division of Clinical Pharmacology, 2008). The following medication codes would be utilised for the analysis of the hypertension medication as recommended by the South African Hypertension society (Joint National Hypertension Guideline Working Group, 2006).

C01   Cardiac Therapy

C02   Antihypertensive

C03   Diuretic

C07   Alpha and Beta-Blocking Agents

C07   Beta Blockers, Cardio selective

C08   Calcium Channel Blockers

C09   ACE Inhibitors, Combinations

C09   Angiotensin II antagonists,Combinations

C09   Class II / III ACE Inhibitors

- **The medical practitioners report**

➢ Hypertension medication change or initiation: The medications are grouped according to the South African medical formulary and similar codes as listed above would be utilised to medication change or initiation. Medications or dosage are listed under new medications in the medical practitioners report

➢ Hypertension diagnosis listed by the medical practitioner under the heading chronic conditions

➢ Special instructions as listed in the South African Hypertension guidelines (2006) regarding the management of the hypertension. The following disease management outcomes

      I.   Lifestyle Modification for Hypertension care

          a) Diet Modification

          b) Medication compliance

          c) Physical activity

          d) Stop all tobacco

Level of agreement between the GP and nurse would be tested using kappa analysis. A score of .5 or more is considered reasonable level of agreement. SPSS-15 would be utilised to analyse data. Because this is a cross sectional secondary analysis, causation cannot be examined.

Diabetes

Diabetes data is obtained from the Nurses assessment and the medical practitioners report. The following analysis will be done for diabetes

- a) Capillary Blood glucose reading taken by nurse
    - Blood glucose distribution
    - Blood glucose risk profile by gender
    - Blood glucose risk stratification and application
- b) Diabetes diagnosis
    - Cross tabulation of diabetes diagnosis by Client self report and Blood glucose risk stratification
- c) GP Actions following abnormal blood glucose
    - Blood glucose investigation requested by GP
    - Blood glucose medication initiation requested by GP
    - Follow up visit requested by GP
    - Monitoring of client requested by GP
    - Lifestyle modification (Diet or physical exercise)

Osteoporosis

Osteoporosis data is obtained from the Nurses assessment and the medical practitioners report. The following analysis will be done for Osteoporosis

- a) Osteoporosis risk assessment score self report (Annexure 4)
    - Osteoporosis risk profile by gender
- b) Osteoporosis diagnosis
    - Cross tabulation of Osteoporosis diagnosis by GP and Osteoporosis diagnosis by self report

- Cross tabulation of Osteoporosis diagnosis by GP and Osteoporosis risk assessment score

c) GP Actions following abnormal ORA score

- Dexa scan ordered by GP

- Medication change initiated by GP

4.12. Ethics and Human Subjects Issues

This is an evaluative study; non identifiable data is being used for analysis. Ethical clearance has been obtained from the board of directors of the A@H and from the Institution (Annexures 6). A@H and the medical insurance companies have a signed agreement that non identifiable data will be utilised for research purposes. Clients provide consent to utilise the data for research purposes (Annexure 7). Permission to utilise the OSA test has been given by the National osteoporosis foundation of South Africa (Annexure 5). Ethical clearance has been given by the University of Kwa-Zulu Natal (Annexure 9).

Chapter Five: Results

5. Findings

This secondary data analysis consists of 465 subjects with data obtained from the nurse's comprehensive geriatric assessment and the subject's general medical practitioners report. 158 General practitioners and 24 registered nurses obtained data for this analysis.

5.1. Demographic data

Table 2 below shows the mean age of the sample is 72 years (SD 7.7), comprises of 48% males and 52% females. The majority of the sample is white (371/465 79.8%) with only 3 black people in the sample. More than a third (320/465, 68.8%) of the sample have one or more chronic diseases, with nearly a quarter (109/465, 23.4%) living alone. Only 31% (146 /465) were in the normal BMI range, with more than two thirds (319/465, 69%) were underweight, overweight or obese. None of the subjects had any limitation in the activities of daily living as they were independent in bathing, dressing, toileting, and feeding, transferring, continence. Ethics form attached.

Table 2: Baseline characteristics as recorded in the CGA

Description	Profile	Number	%
Age years (mean, SD)		72 yrs SD 7.7	
Gender (No, %)	Male	223	48%
	Female	242	52%
Race (No, %)	Black	3	0.60%
	Indian	91	19.60%
	White	371	79.80%
Chronic disease (CD) profile (No, %)	None	145	31.20%
	1 CD	200	43%
	=>2 CD	120	25.80%
Social Circumstances (No, %)	Living alone	109	23.40%
	Marital status	327	70.30%
Body Mass Index (BMI) (Mean, SD)		26.46 SD 6.0	
Weight (No, %)	Underweight BMI <=18	18	3.90%
	Normal weight BMI 19-24	146	31%
	Overweight BMI 25-29	193	41.50%
	Obese BMI>30	108	23.20%
Activities of daily living	No limitations noted in activities of daily living		

5.2. Hypertension

Hypertension data is obtained from the Nurses assessment and the medical practitioners report. Hypertension risk factor is measured by the systolic blood pressure reading in mmhg taken by nurse at home.

5.2.1. Blood pressure reading taken by nurse at home in mmHg.

Using the normal systolic blood pressure ranges from 100-139 mmhg and abnormal systolic blood pressure is >=140mmHg, the BP readings were normally distributed with an average BP is 136.83 mmhg, ±18.3 (median 138mmhg, mode 140mmHg. 122/465 (26.2%) of females and 113/465 (24.3%) of males reporting were within normal ranges of systolic blood pressure (Figure 3) with an average of 121.89mmhg ±8.928 and 122.96mmHg ±8.297 respectively.
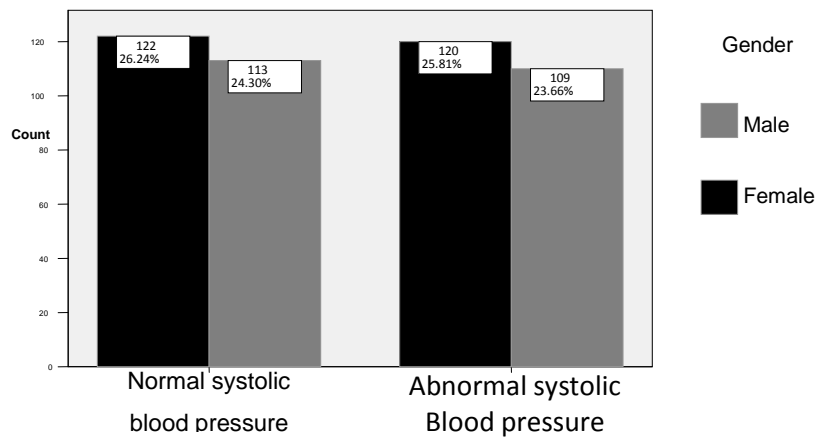
Figure 3: Blood pressure risk profile by Gender

About half of the sample (229/465. 49.5%) of the total sample do not adequately control their blood pressure. 120/465 (25.8%) of the female population and 109/465 (23.7%) of the male population had an abnormal systolic blood pressures with 151.0mmHg ±10.9 for females 152.4, SD±14.8 for males respectively (*NS*).

5.2.2. Systolic blood pressure risk stratification

Figure 4 shows the number of clients systolic blood pressure classified into normal blood pressure (<120-129 mmHg), hi-normal (130-139 mmHg), stage 1 hypertension (140-159 mmHg) , stage two hypertension (160-169mmHg) and stage three hypertension (>180 mmHg) . Major concern with this finding shows that 159/465 (34.19%) have stage one hypertension, 59/465 (12.69%) have stage two hypertension and 12/465 (2.58%) have stage three hypertension.
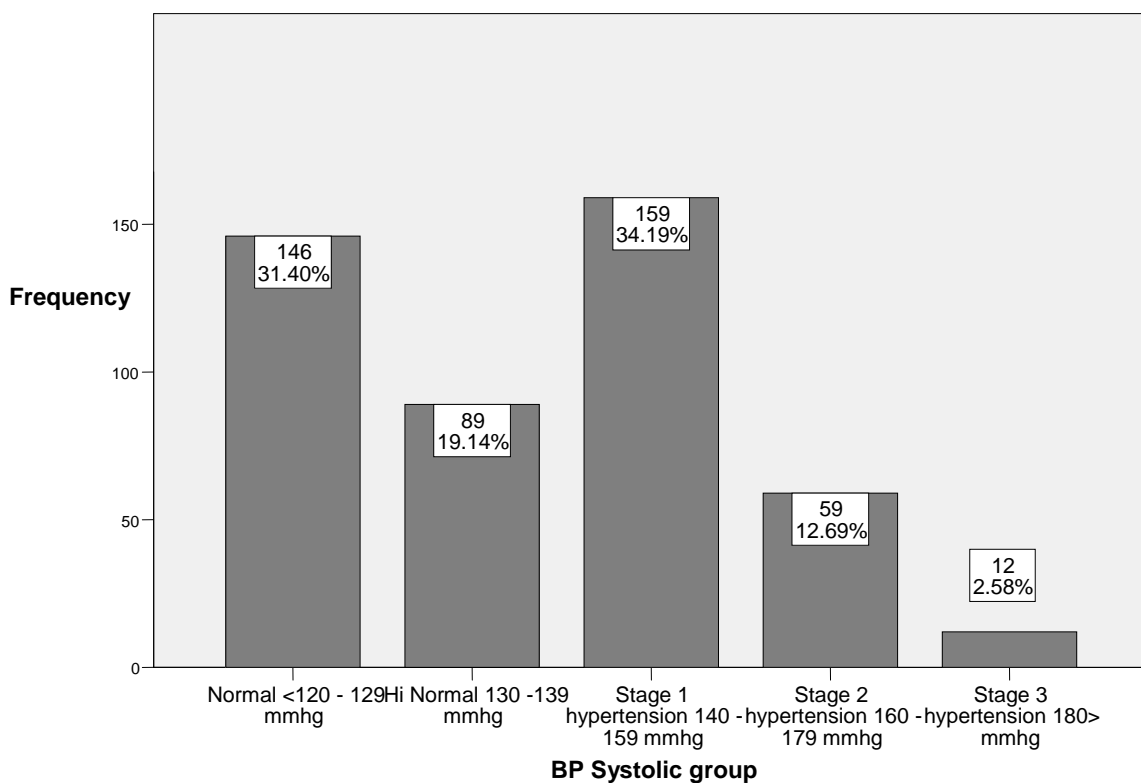
Figure 4: Blood pressure risk profile

5.2.3. Stratification of risk to quantify prognosis

Table 3 stratifies the risk to quantify the prognosis of the subject's systolic blood pressure. The Cardiovascular disease model is developed by the European Hypertension Society and European Society of Cardiology and utilised in the South African Hypertension Guidelines (2006). This model reflects absolute risk and continuous risk associated with blood pressure.

Table 4 lists the major risk factors, target organ damage and associated clinical conditions. Due to the lack of data of for certain major risk factors and no data available for target organ damage, this model has been modified and applied to the sample of subjects.

- Major risk factors acquired from the sample secondary analysis are:
    - Levels of systolic BP
    - Smoking
    - Hyperlipidaemia diagnosis (modified[1])
    - Diabetes diagnosis
    - Family history of cardiovascular diseases (Ischaemic heart disease , diabetes, Stroke, hypertension)[2]
    - Body Mass index (modified[3])

- Associated clinical conditions acquired from the secondary analysis are:
    - Coronary heart disease diagnosis
    - Kidney failure diagnosis
    - Congestive heart failure diagnosis
    - Stroke or Transient ischaemic attack diagnosis
    - Retinopathy diagnosis
    - Peripheral artery disease diagnosis

---

[1] No results available actual cholesterol test

[2] No data available for age of onset of cardiovascular diseases in family

[3] No results available for waist circumference

Table 3: Stratification of risk to quantify prognosis*

Other risk factors and disease history	BP (mmHg)				
	Normal SBP 120 - 129 or DBP 80 - 84	High-normal SBP 130 - 139 or DBP 85 - 89	Stage 1 Mild hypertension SBP 140 - 159 or DBP 90 - 99	Stage 2 Moderate hypertension SBP 160 - 179 or DBP 100 - 109	Stage 3 Severe hypertension SBP > 180 or DBP > 110
No other major risk factors	Average risk	Average risk	Low added risk	Moderate added risk	High added risk
1 - 2 major risk factors	Low added risk	Low added risk	Moderate added risk	Moderate added risk	Very high added risk
≥ 3 major risk factors or target-organ damage or diabetes mellitus	Moderate added risk	High added risk	High added risk	High added risk	Very high added risk
Associated clinical conditions	High added risk	Very high added risk	Very high added risk	Very high added risk	Very high added risk

Table 4: Major risk factors, target organ damage and associated clinical conditions*

Major risk factors	Target-organ damage	Associated clinical conditions
Levels of systolic and diastolic BP	Left ventricular hypertrophy: based on ECG See Table IV	Coronary heart disease
Smoking		Heart failure
Dyslipidaemia Total cholesterol > 6.5 mmol/l, OR LDL > 4 mmol/l, OR HDL men < 1 and women < 1.2 mmol/l	Microalbuminuria: albumin/creatinine ratio 3 - 30 mg/mmol Slightly elevated creatinine Men 115 - 133 µmol/l Women 107 - 124 µmol/l	Chronic kidney disease: albumin creatinine ratio > 30 mg/mmol Stroke or transient ischaemic attack
Diabetes mellitus Men > 55 years Women > 65 years		Peripheral arterial disease Advanced retinopathy Haemorrhages OR Exudates Papilloedema
Family history of early onset of cardiovascular disease Men aged < 55 years Women aged < 65 years		
Waist circumference – abdominal obesity Men ≥ 102 cm Women ≥ 88 cm The exceptions are South Asians and Chinese: men > 90 cm and women > 80 cm.[20]		

*Based on the European Society of Hypertension/European Society of Cardiology guidelines.[7]
LDL – low-density lipoprotein; HDL – high-density lipoprotein.

*Source: (Joint National Hypertension Guideline Working Group, 2006)

5.2.4. Subjects risk stratification to quantify prognosis

The cardiovascular model has been applied to the subject's systolic blood pressure readings and the findings as follows (table 5):

- Low added risk   = 127/465   (27%) subjects
- Average risk   = 19/465   (4%) subjects
- Moderate added risk   = 83/465   (20%) subjects
- High added risk   = 175/465   (38%) subjects
- Very high added risk   = 51/465   (11%) subjects

Table 5: Stratification of risk profile to quantify subject's prognosis

	Normal <120 - 129 mmhg	Hi Normal 130 - 139 mmhg	Stage 1 hypertension 140 - 159 mmhg	Stage 2 hypertension 160 - 179 mmhg	Stage 3 hypertension 180> mmhg	Total
No major risk factors	13 **Average risk**	6 **Average Risk**	0 **Low added risk**	0 **Moderate added risk**	0 **High added risk**	19
1-2 Major risk factors	82 **Low added risk**	45 **Low added risk**	43 **Moderate added risk**	11 **Moderate added risk**	0 **Very High added risk**	181
>3 major risk factors or diabetes	39 **Moderate added risk**	27 **High added risk**	97 **High added risk**	39 **High added risk**	12 **Very High added risk**	214
Associated clinical conditions	12 **High added risk**	11 **Very High added risk**	19 **Very High added risk**	9 **Very High added risk**	0 **Very High added risk**	51
Total	**146**	**89**	**159**	**59**	**12**	**465**

5.3. Hypertension diagnosis

Hypertension diagnosis data collected two streams and they are via self report by client and listing of chronic conditions by the GP on the medical practitioners report. Level of agreement will be testes using kappa score on the diagnosis by self report and diagnosis by GP. The hypertension diagnosis by the GP was cross referenced with blood pressure risk profile to determine potential hypertensive clients and determine whether GP acted on these clients abnormal findings.

5.3.1. Hypertension diagnosis - GP vs. Client self-report

Table 6 below reflects how well the GP and the client agree on the hypertension diagnosis. Level of agreement was measured using the kappa score. Hypertension diagnosis was based on self report by the client during the nurse assessment. The Medical practitioner was required to list the chronic conditions of the client in the prescribed general medical practitioners report. The level agreement between nurse and GP was (k=0.505) on the hypertension diagnosis. A kappa score of 0.5 or more is considered a reasonable agreement.

The Sensitivity analysis also shows that there is a 77% chance the screening tool by self report will pick up hypertension in a subject with a hypertension diagnosis. There is 66% likelihood that the subject has the hypertensive diagnosis (PPV).

The specificity analysis shows that there is a 75% chance the screening tool by self report will pick up non diagnosed hypertension in subjects with no hypertension diagnosis. There is 83% likelihood that the subject does not have hypertensive diagnosis (NPV).

Table 6: Hypertension diagnosis by self report * Hypertension diagnosis by GP Cross tabulation

		Hypertension diagnosis by GP		Total
		No	Yes	
Hypertension by self report	No	210	42	252
	Yes	71	142	213
Total		281	184	465

5.3.2. Hypertension diagnosis by GP vs. blood pressure risk profile

Figure 5 shows the blood pressure risk profile of diagnosed and non-diagnosed hypertension clients by the GP. According to the SA hypertension guidelines (2006) normal systolic blood pressure ranges from (<120mmhg – 139 mmhg) and abnormal blood pressure ranges from (≥140mmhg) The major finding here shows that 128/465 (27.53%) of clients with abnormal systolic blood pressures do not have a diagnosis of hypertension and 102/465 (21.94%) of clients diagnosed with hypertension are not adequately controlling their blood pressure.

5.3.3. Actions taken by GP following abnormal systolic blood pressure

Data analyzed from the medical practitioners report is consolidated and presented in Table 7. The actions taken were new anti-hypertensive drug prescribed, follow-up requested by the GP and blood pressure investigation. Table 7 shows that GPs' actions concurred with the normal BP reading (229, 49.25%), with actions taken by the GP on 21/235 (8.9%) subjects with normal BP recorded by the nurse and 15/230 (6.5%) subjects with abnormal BPs recorded by the nurse. This resulted in no association (p=0.33) between GPs action and abnormal BPs and a Kappa agreement of- 0.024 (95% CI -0.073 to 0.025). The strength of agreement is worse than what you expect to see by chance alone.
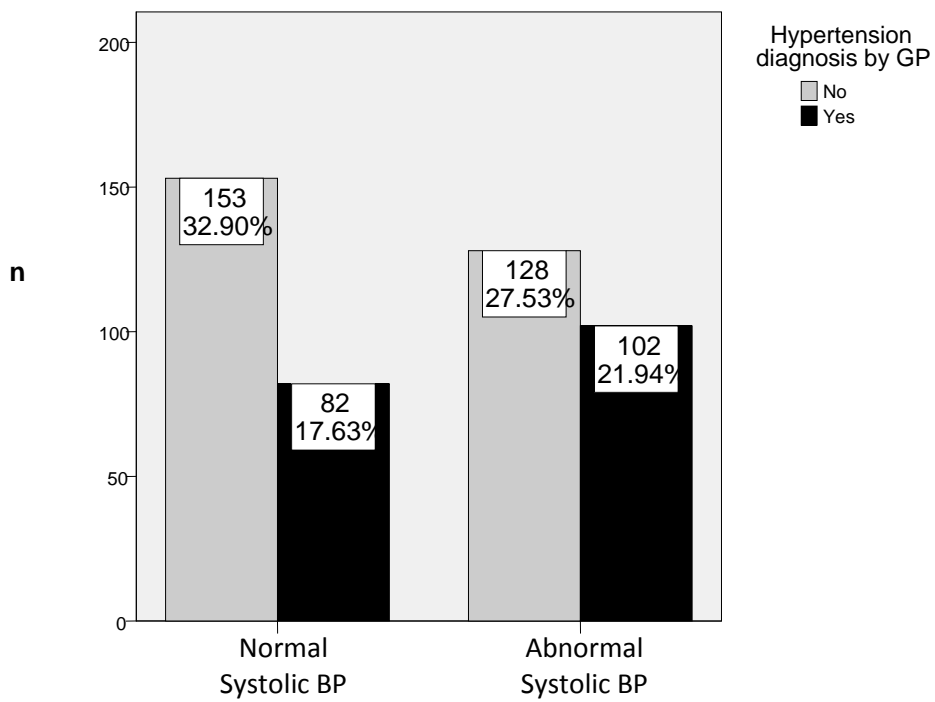
Figure 5: Hypertension diagnosis by GP vs blood pressure risk profile

Table 7: Actions taken by GP

		Abnormal BP		
		Yes	**No**	**Total**
GP Action	**Yes**	15	21	**36**
	No	215	214	**429**
	Total	**230**	**235**	**465**

5.4. Diabetes

5.4.1. Blood glucose distribution

Statistics		
Baseline Blood Glucose		
N	Valid	463
	Missing	2
Mean		6.90
Median		6.30
Mode		6
Std. Deviation		2.349
Minimum		2
Maximum		20
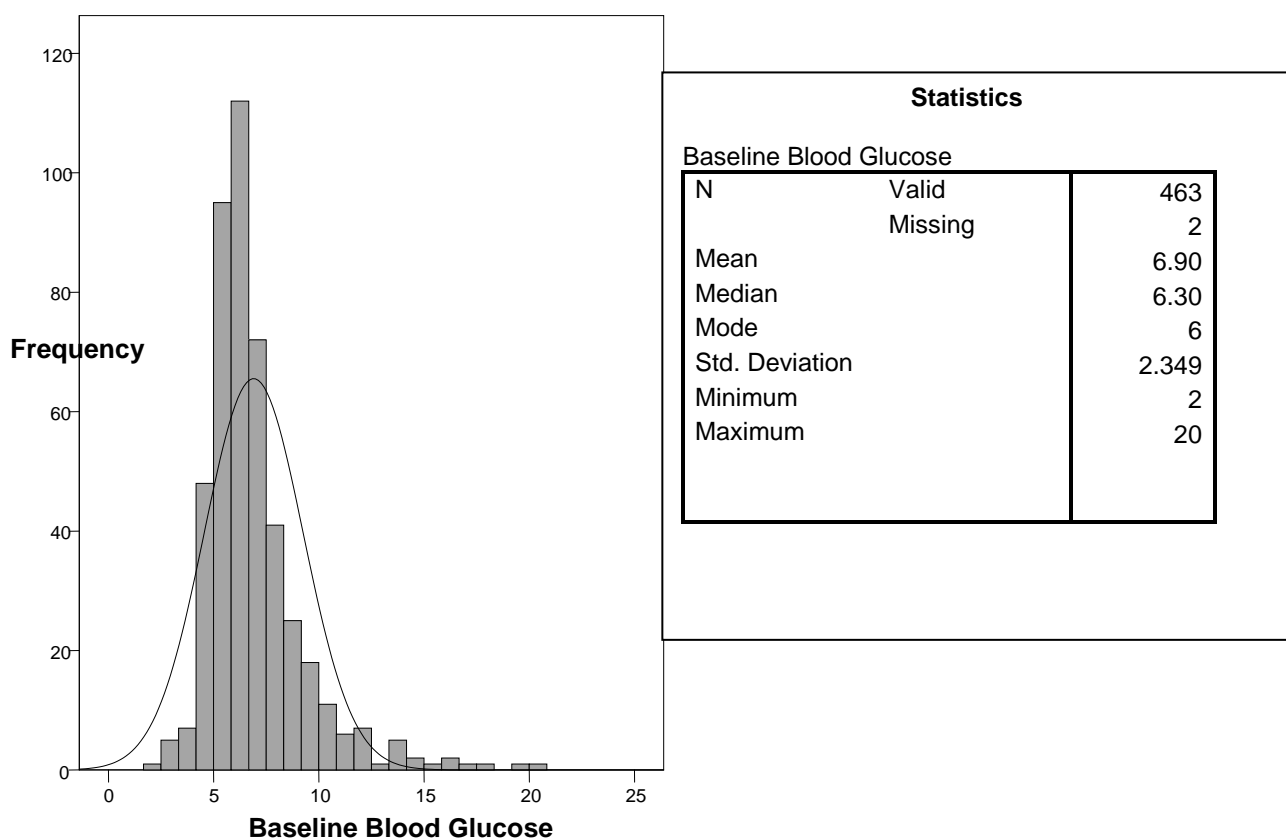
Figure 6: Blood glucose distribution

Figure 6 shows the blood glucose distribution of the sample. The mean blood glucose is 6.9 mmol/l (SD 2.349). The median is 6.3 mmol/l. The most frequently occurring reading is 6 mmol/l. Overall, the mean blood glucose of the total sample is within the normal range of 4-8 mmol/l.

5.4.2. Blood glucose risk profile by gender

Figure 7 shows the blood glucose risk profile of the sample by gender. Normal blood glucose ranges from 4 – 8 mmol/l as defined by the Society of endocrinology,

Metabolism and Diabetes of South Africa (SEMSDA). The results show that 4/465 (0.88%) of the female population and 7/465 (1.51%) of the male population are below the normal reading of 4 mmol /l and they are at risk of hypoglycaemia. The majority of the sample is within normal range, females (190/465, 40.86%) and males (169/465, 36.34%).
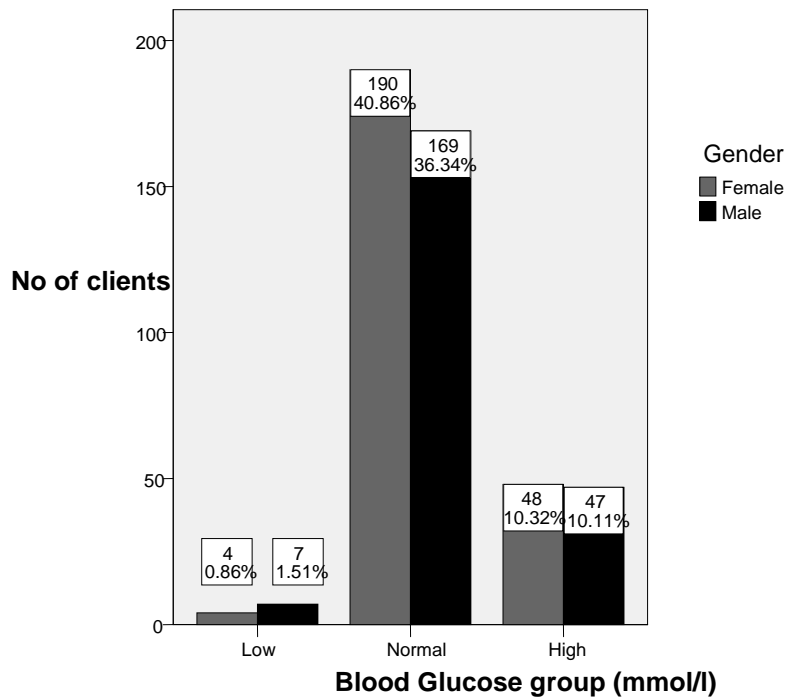
Figure 7: Blood glucose risk profile by gender

High blood sugar readings are defined as greater than 8.0 mmol/l as defined by SEMSDA. The major finding shows that 48/465 (10.32%) of the female population and 47/465 (10.11%) of the male population have abnormal blood glucose values. The normal blood glucose profile by gender, females (mean = 6.05 mmol/l, SD 0.968) and males (mean = 6.11, SD 0.891). The abnormal blood glucose profile by genders, females (mean = 10.07, SD 3.130) and males (mean= 9.43, SD 3.554). In essence 104/465 (22%) of the total sample do not adequately control their blood glucose. Levenes' test shows no significant difference in blood sugar between genders (P=>0.05)

5.4.3. Diabetes diagnosis

Diabetes diagnosis data collected via self report by client and listing of chronic conditions by the GP on the medical practitioners report. Level of agreement was tested using kappa score on the diagnosis by self report and diagnosis by GP. The diabetes diagnosis by the GP was cross referenced with diabetes risk profile to determine potential diabetic clients and determine whether GP acted on these clients abnormal findings. Clients with abnormal blood glucose values with no diagnosis of diabetes were analysed as potential diabetic clients.

a) Diabetes diagnosis by GP versus Self Report

Table 8 below reflects how well the GP and the client agree on the diabetes diagnosis. Level of agreement was measured using the kappa score.

Diabetes diagnosis was based on self report by the client during the nurse assessment. The GP was required to list the chronic conditions of the client in the prescribed general practitioners report. Table 10 below shows the level agreement (k=0.591) on the hypertension diagnosis. A kappa score of 0.5 or more is considered a good agreement.

The Sensitivity analysis also shows that there is a 63% chance the screening tool by self report will pick up diabetes in a subject with a diabetes diagnosis. There is 66% likelihood that the subject has the hypertensive diagnosis (PPV).
The specificity analysis shows that there is a 95% chance the screening tool by self report will pick up non diagnosed diabetes in subjects with no diabetes diagnosis. There is 94% likelihood that the subject does not have diabetes diagnosis (NPV).

Table 8: Diabetes diagnosis – GP / self report Cross tabulation

		Diabetes diagnosis by GP		Total
		No	Yes	
Diabetes diagnosis by self report	No	381	23	404
	Yes	21	40	61
Total		402	63	465

5.4.4. GP actions following abnormal blood glucose findings

Data analyzed from the medical practitioners report is consolidated and presented in Table 9.   The actions taken diet modification, follow up requested, new diabetic drug prescribed, Investigation by GP, Monitoring of client at home, Table 9 shows that GPs' actions concurred with the normal blood sugar reading (333, 71.6%), with actions taken by the GP on 50/359 (13.9%) subjects with normal blood sugar recorded by the nurse and 24/106 (23%) subjects with abnormal BPs recorded by the nurse. This resulted in a Kappa agreement of 0.098 (95% CI 0.004 to 0.196). The strength of agreement is worse than what you expect to see by chance alone.

Table 9: Blood glucose status vs. GP treatment actions

		Glucose Abnormal		Total
		Yes	No	
GP Actions	Yes	24	50	74
	No	82	309	391
Total		106	359	465

5.5. Osteoporosis

5.5.1. Osteoporosis risk profile

The screening questionnaire utilised for the ORA score is provided by the National Osteoporosis Foundation of South Africa. A risk score of thirteen or more is declared a risk for Osteoporosis. Results analysed showed females having the highest proportion (180/465, 38.71%) of osteoporosis followed by males with (72/465, 15.48%). Overall, 252/465 (54%) of the sample analysed have risk factors associated with developing osteoporosis.

5.5.2. Osteoporosis diagnosis

3.1.1.1 Osteoporosis diagnosis by GP vs. self report

Table 11 below reflects how well the GP and the client agree on the Osteoporosis diagnosis. Level of agreement was measured using the kappa score.

Osteoporosis diagnosis was based on self report by the client during the nurse assessment. The Medical practitioner was required to list the chronic conditions of the client in the prescribed general medical practitioners report. Table 11 below shows the level agreement (k=0.144) on the osteoporosis diagnosis. A kappa score of 0.5 or more is considered a reasonable agreement and in this case it below 0.5 which indicate disagreements between GP and client.

The Sensitivity analysis also shows that there is a 9% chance the screening tool by self-report will pick up osteoporosis in a subject with an osteoporosis diagnosis. There is 50% likelihood that the subject has an osteoporosis diagnosis (PPV).

The specificity analysis shows that there is a 99% chance the screening tool by self-report will pick up non diagnosed osteoporosis in subjects with no osteoporosis diagnosis. There is 94% likelihood that the subject does not have an osteoporosis diagnosis (NPV).

Table 10: Osteoporosis diagnosis by self-report vs. Osteoporosis diagnosis by GP

		Osteoporosis Diagnosis by GP		
		No	Yes	Total
Osteoporosis by self report	No	431	28	459
	Yes	3	3	6
Total		434	31	465

5.5.3. Osteoporosis diagnosis by GP vs. ORA risk

Osteoporosis risk was based on an osteoporosis risk assessment (ORA) questionnaire by the client during the nurse assessment. The Medical practitioner was required to list the chronic conditions of the client in the prescribed general medical practitioners report. Table 12 shows that there is a significant finding of the Osteoporosis risk assessment questionnaire and the GP diagnosis of Osteoporosis (p=>0.05) with a low level agreement (k=0.07) on the osteoporosis risk assessment score diagnosis by the medical practitioner. A kappa score of 0.5 or more is considered a reasonable agreement and in this case it below 5 which indicate disagreements between GP and the questionnaire.

The Sensitivity analysis also shows that there is an 84% chance the screening tool by self report will pick up osteoporosis in a subject with an osteoporosis diagnosis. There is 10% likelihood that the subject has an osteoporosis diagnosis (PPV).

The specificity analysis shows that there is a 48% chance the screening tool by self report will pick up non diagnosed osteoporosis in subjects with no osteoporosis diagnosis. There is 98% likelihood that the subject does not have an osteoporosis diagnosis (NPV)

Table 11 :   ORA Risk vs. Osteoporosis Diagnosis **by GP Cross tabulation**

		Osteoporosis Diagnosis by GP		
		No	Yes	Total
ORA Risk	No	208	5	213
	Yes	226	26	252
Total		434	31	465

5.5.4. GP actions following abnormal ORA score

Data analyzed from the medical practitioners report is consolidated and presented in Table 12.   The actions taken by GP are DEXA scan ordered and progesterone / estrogen medication prescribed by the GP. Table 9 shows that GPs' actions concurred with the normal ORA risk (211, 47.3%), with actions taken by the GP on 2/213 (0.009%) subjects with no ORA risk recorded by the nurse and 9/252 (3.6 %%) subjects with abnormal ORA risk recorded by the nurse. This resulted in no association (p=0.06) between GPs action and abnormal ORA risk and a Kappa agreement of 0.024 (95% CI 0.002 to 0.050). The strength of agreement is worse than what you expect to see by chance alone.

Table 12 GP actions following abnormal ORA risk

		ORA Risk		
		Yes	No	Total
GP Actions	Yes	9	2	11
	No	243	211	454
Total		252	213	465

Chapter Six: Discussion

6. Discussion

This study of home environments is a research domain within the field of environmental gerontology that address the issues related to ageing in place. Despite the importance of ageing at home, there are no studies in this area in South Africa were majority of our older clients live at home. Statistics South Africa estimates that there were approximately 3.8 million older people in South Africa (excluding institutionalised older adults) living at home. This comprises 7.6% of the total population making it one of the countries with largest proportion of older population in the African continent(Statistics South Africa, 2010). This study is the first to document at home studies which will contribute to the field of environmental gerontology and also inform public policy decisions regarding implementing home based health care.

The following key findings from this study are discussed below.

6.1. Preliminary evidence that the CGA works in identifying preventable health problems

In this research report preliminary data showed the benefits of the CGA by identifying risk factors and prevalence. Abnormal blood sugars were recorded on 42/562 (7%) clients who were diagnosed as being diabetic and receiving treatment. Abnormal blood sugars were recorded on 83/562 (15%) clients who were not diagnosed as being diabetic. Abnormal blood pressures were recorded on 183/562 (33%) clients who were diagnosed as being hypertensive and receiving treatment. Abnormal blood pressures were recorded on 154/562 (27%) clients who were not diagnosed as being hypertensive. Abnormal ORA scores were recorded 0n 251/562 (46%) clients.

These finding were congruent with individual studies and systematic reviews of the CGA in the literature which have identified benefits of CGA including improved cognitive function (Stuck et al., 1993, Caplan et al., 2004, Ellis and Langhorne, 2005), reduced disability (Stott et al., 2006), reduced mortality (Rubenstein, 2004, Stuck et al., 1993), prolongation of time living at home (Caplan et al., 2004, Ellis and Langhorne, 2005, Landi and Onder, 2001, Stuck et al., 1995, Stuck et al., 1993), decreased hospital admission/readmission (Bernabei et al., 2008, Caplan et al., 2004, Landi and Onder, 2001, Stuck et al., 1995, Stuck et al., 1993), reduction in number of hospital days (Harari et al., 2007, Landi and Onder, 2001), reduction in emergency room visits (Caplan et al., 2004); improved physical function (Rubenstein et al., 1997, Caplan et al., 2004, Stuck et al., 1993), improved ability to perform ADLs (Stuck et al., 1993); and a decrease in a variety of geriatric syndromes during hospitalization (Harari et al., 2007).

6.2. Hypertension

After the age of 50 or 60 years, increase in blood pressure occurs primarily in systolic blood pressure. Diastolic blood pressure tends to spontaneously decrease with increasing age while systolic blood pressure increases, mainly as a result of the functional and structural changes in the arterial vessels. In large arteries, aging results in progressive deposition of calcium salts, fraying and fragmentation of elastin, and an increase in the number and cross-linking of collagen fibres that increase the rigidity of the vessel wall(Duprez, 2008).These age-related changes in arterial stiffness and systolic blood pressure are strongly associated with organ damage, cardiac and vascular disease, and an increased risk of morbidity and mortality .

Results from large epidemiologic studies have confirmed the association between increased systolic blood pressure and the increased risk of morbidity and mortality(Duprez, 2008). A meta-analysis of 61 prospective studies of blood pressure and mortality showed that, between the ages of 40 and 69 years, an increase in systolic blood pressure of 20 mm Hg was associated with

a more than 2-fold increase in the death rate due to stroke and in the death rates from ischemic heart disease and other vascular causes. Relatively small decreases in mean systolic blood pressure were associated with large absolute reductions in strokes and premature deaths. A 2-mm Hg mean lower systolic blood pressure was equivalent to a 7% lower risk of death from ischemic heart disease and a 10% lower risk of stroke(Duprez, 2008).

According to the South African burden of disease unit high levels of hypertension are evident in the older population which is combined with poor levels of awareness, monitoring, treatment and control of the condition. Only a third of the hypertensive were controlled, only half had had their blood pressure measured in the last 12 months, and a mere 12% of male and 20% of female hypertensive were aware that their blood pressure was high. This is a serious situation, considering scientific evidence that high blood pressure causes increased risk of ischaemic heart disease stroke, hypertensive heart disease, other cardiovascular and renal disease, while the former three conditions are the three leading causes of death in older South Africans.

This study supports the above statement as the initial measurements on blood pressure control conducted by nurses showed that approximately half the sample (229/465, 49.5%) does not adequately control their blood pressure at home.   These clients were further categorised and shows that 159/465(34.19%) falls into stage one hypertension (140-159mmHg), 59/465(12.69%) fall into stage two hypertension (160-179mmHg), 12/465(2.58%) are categorised in stage three hypertension (180> mmHg).

This sample was further stratified into the cardiovascular disease model utilised in the Hypertension guidelines of South Africa (2006) in table 3 and table 4. This model is adaptable for use in multiple settings including those low-resource settings where some of the measures are unavailable and beyond the resources of budgets. This model determines the risk of developing complications based on blood pressure measurements and

associated clinical conditions. Consensus has been reached on the necessity of immediate drug treatment for those with known associated clinical conditions and/or target-organ damage and/or a systolic blood pressure of 180 mmHg. Table 4 lists the major risk factors, target-organ damage and associated clinical conditions. Risk factors that are modifiable (e.g. smoking and dyslipidaemia) should be the target of lifestyle intervention and other treatment as appropriate. In addition to controlling hypertension, target-organ damage and associated clinical conditions must be managed appropriately and referred if necessary to a higher level of care.

Based on the above model the risk of developing complications as reflected in table 5 showed that 19/465 (4%) of clients were average risk and they did not require treatment or their blood pressure was well controlled within the norms. There was 127/465(27%) of clients categorised into low added risk and should be targeted with lifestyle interventions or other treatment as appropriate. There was 83/465(20%) categorised as moderate added risk and treatment should have been initiated, There was 175/465(38%) were high added risk and 51/465(11%) very high added risk should have been managed appropriately or referred to a higher level of care. In totality the GP should have initiated actions on Moderate added risk, High added risk and very high added risk. This means that the GP should have initiated actions on 309/465(68%) of the sample, instead the GP initiated actions on only 36/465(7.7%).

There has been a good level of agreement for hypertension diagnosis by self report taken by the nurse and hypertension diagnosis by the GP (k=0.505). The blood pressure measurements were correlated with clients with / without a hypertension diagnosis by the GP. Major finding showed that 128/465 (27.53%) of clients with no diagnosis of hypertension and 102/465 (21.94%) of clients with a diagnosis of hypertension were in the abnormal range. Of this total of abnormal blood pressure detected (230/465, 49%), the GP initiated actions on only 15/465 (3.2%) of clients. However, the GP also initiated actions

on 21/465 (4.5%) clients with normal blood pressures possibly due to other risk factors detected.

6.3. Diabetes

Guidelines for treating diabetes mellitus are mostly based on clinical studies in middle-aged people, and recommendations tend to be the same for everyone, whether young and strong or elderly and frail. But diabetes management should be individualized, especially in the elderly, taking into account each patient's medical history, functional ability, home care situation, and life expectancy. Aggressive glycemic control is less important than avoiding hypoglycemia and achieving a good quality of life.

The elderly" is a heterogeneous group with widely varying physiologic profiles, functional capabilities, and life expectancy (on average, about 88 years for men and 90 years for women in the United States). Although the elderly are sometimes classified as "young-old" (age 65–80) and "old-old" (80+), this distinction is too simplistic for clinical decision-making. Diabetes mellitus in the elderly also is heterogeneous. One distinction is the age at which the disease developed. Aging is associated with declining betacell function and lower blood insulin levels independent of insulin resistance, and with insulin resistance itself. The risk of developing type 2 diabetes mellitus increases with obesity, lack of physical activity, and loss of muscle mass, all of which often develop with aging (Hornick, 2008).

Middle-aged patients with diabetes have increased fasting hepatic glucose production, increased insulin resistance, and an abnormal insulin response to a glucose load. On the other hand, patients who develop diabetes at an older age tend to have normal hepatic glucose production. Older patients who are lean secrete markedly less insulin in response to a glucose load but have relatively less insulin resistance. Patients who develop type 2 diabetes in old age are more likely to have near normal fasting blood glucose levels but

significant postprandial hyperglycemia(Rizvi, 2007). Elderly patients who developed diabetes during middle age have metabolic abnormalities more typical of middle-aged patients with type 2 diabetes(Hornick, 2008).

Unfortunately, diabetes is underdiagnosed and frequently undertreated, resulting in even more disease and death. Diabetes is often missed in the elderly because its presenting symptoms may be nonspecific, e.g., failure to thrive, low energy, falls, dizziness, confusion, nocturia (with or without incontinence), and urinary tract infection. The classic symptoms of frequent urination (often leading to worsening incontinence), thirst, and increased hunger usually occur only when plasma glucose levels are above 11mmol/l.(Hornick, 2008) Weight loss, blurred vision, and dehydration may also be present with high blood glucose levels. With lesser degrees of hyperglycemia, patients may have no symptoms or present with weight loss or signs and symptoms of chronic infection, especially of the genitourinary tract, skin, or mouth. Hyperglycemia in elderly patients is also associated with reduced cognitive function (which may improve with blood glucose control)(Treton, 2005).

The American Diabetes Association recommends screening by measuring the fasting plasma glucose level every 3 years beginning at 45 years. However, some experts believe that this method is inadequate for the elderly(Hornick, 2008). The South African Diabetes guidelines(Society for Endocrinology Metabolism and Diabetes of South Africa, 2009) states that that glycaemic targets for control should be between 4-8 mmol/l post prandial from the age of 40 years old. Based on the above elderly treatment should be individualised based on the clients present condition and history

In this report results showed that 4/465 (0.88%) of the female population and 7/465 (1.51%) of the male population are below the normal reading of 4 mmol /l and they are at risk of hypoglycaemia. High blood sugar readings are defined as greater than 8.0 mmol/l as defined by SEMSDA. The major finding

shows that 48/465 (10.32%) of the female population and 47/465 (10.11%) of the male population have abnormal blood glucose values. In essence 106/465 (23%) of the population had abnormal blood sugars and the GP initiated actions on 23/465 (5%) of clients. There was a good agreement (k=0.591) of diabetes diagnosis by self report and GP. Reasons for this incongruent findings maybe the result that diabetes treatment is only met if the criterion for diagnosis is met as listed in the table below. Future research should target obtaining these criteria listed in the table below.

Table 13: Criteria for the diagnosis of Diabetes mellitus

Source: (Society for Endocrinology Metabolism and Diabetes of South Africa, 2009).

Challenges exist for health care workers responsible for the health of elderly patients to facilitate successful ageing in the growing diabetic population. Diabetes and its chronic complications impact negatively on successful ageing and every effort should be made to prevent the development of diabetes and frailty in the ageing population. Those who are already frail and subject to the burden of multiple chronic diseases and disability require special and skilled attention that is unfortunately not widely available in South Africa.

6.4. Osteoporosis

Osteoporosis is defined as a reduction of bone in the skeleton, associated with skeletal fragility and an increased risk of fracture after minimal trauma. The three major osteoporotic fractures are those of the forearm, vertebral body, and hip, although fractures of the humerus, tibia, pelvis, and ribs are also common (Roger M, 1997). Osteoporotic fractures are a major cause of morbidity and mortality, and lead to increased health and long term care expenditures in both males and females. The main objective in treating patients with osteoporosis is to reduce the risk of fractures.

According to the National Osteoporosis foundation of South Africa ,one in three women and one in five men will get this disease (potentially 4-6million South Africans) (National osteoporosis Foundation of South Africa, 2010).

Osteoporosis is referred to as the "Silent Epidemic" because there are usually no symptoms until it a fracture has occurred. . It is considered a normal part of ageing and it is a serious disease and the cause of much pain and suffering. According to the Foundation up to 20% of people die after a hip fracture and more than 50% of the rest will never live independently again. This disease can be prevented and if an individual has osteoporosis, it can be treated with a variety of available medications. Unfortunately in South Africa only a small percentage of patients have access to the effective diagnosis and treatment of osteoporosis(National osteoporosis Foundation of South Africa, 2010).

In South Africa, where HIV/AIDS, tuberculosis and malnutrition are rife, osteoporosis is not considered a priority, despite the devastating consequences it may have on the economy and quality of life of the older population.

In this report 252 /465 (54%) clients were identified has having clinical risk factors for the development of osteoporosis via the ORA questionnaire and the GP initiated actions on 11/465 (3%). Possibly one of the major concerns is the validity of the screening questionnaire. This questionnaire has not been

validated and has been developed by experts at the National Osteoporosis foundation of South Africa which has only face and content validity.

A study was done to determine cost effectiveness of fracture risk utilising clinical risk factors instead of measurement of bone density measurement by dual x-ray (DXA) scan(Bessette et al., 2008). Because measurement of bone density by dual x-ray absorptiometry (DXA) is quite expensive, there has been increasing interest to estimate fracture risk by clinical risk factors. The result of this study stated that we must be careful in adopting a strategy based on clinical risk factors alone instead of DXA scan (Bessette et al., 2008). Only if DXA scan is not available, assessing clinical risk factors is an acceptable option in predicting a woman's risk of fracture. In this report 7 clients were referred for a DXA scan, and these clients have access to DXA scan, however it is an expensive scan and requires a co-payment from clients if this is done out of hospital. Future research should focus on validating the screening questionnaire for predicting risk of osteoporosis.

6.5. Integration of CGA with GP follow up

A major challenge that has emerged from this data is the incongruence in the level of agreement between abnormal findings from the CGA and GP actions. The agreement on abnormal Blood pressure and GP actions (k=-0.024), Abnormal blood glucose vs. GP actions (k= 0.0098) and ORA risk vs. GP Actions (k=0.025). A kappa score of 0.5 or more is considered a reasonable agreement. The reasons for this needs to be further explored. Possible explanations are discussed below:

6.6. Inefficiency of current referral and record keeping processes:

The nurse's referral report (Annexure 2) is given to the client to take to the GP. The GP is required to view this report and report his actions the prescribed

medical practitioners report (Annexure 3). Subsequent to this study, the A@H service did conduct a survey on GP satisfactions and these survey questionnaires (Annexure 8) were sent out to 75 GP's that have participated in the AAH program. AAH received 19/75 (25%) of the surveys from the GP's. Overall 16/19 (86%) of GP's had a positive response in support of A@H Program, In terms of reading the nurses referral report , the survey reflected 79% of the GP's always read the forms carefully before they sign, 16% did not receive the referral report and 5% do not read the forms.

Apart from this GP's have their own record keeping of clients and possibly do not see the need to complete the A@H prescribed medical forms and therefore did not complete them in full.

6.7. Acceptance of the nurse driven CGA chronic disease model

The major challenge with this service is that little is known of the private healthcare doctors in South Africa. The A@H service maybe perceived as a replacement of the GP's services by nurses and not seen as a complimentary treatment program to assist the GP's.   Nurses can potentially provide a more cost effective service and this could result in a loss of income for GP's.
Private healthcare practitioners retrieve consultation income via an electronic service between medical insurance schemes and their practice. With the introduction of the A@H service, GP's were forced to send their consultation cost to the A@H and not the schemes and this created confusion. This program created added costs for GP's as they were required to fax the medical reports and consultation invoices to A@H in order to be reimbursed. This may have resulted in GP's reluctance to accept the A@H program as a complimentary treatment program to their clients.

6.8. Marketing of CGA and engagement of GPS in this model of care

The findings may reflect the current poor engagement of GPs in the nurse driven chronic disease prevention model. This service was not properly marketed to the GP's in the area. Communication to all stakeholders is key to success of any program.

According to the A@H, doctors were notified by postal mail about the service and a meeting with the Independent practitioners association (IPA) took place explaining the A@H program. The IPA communicated the program to all GP's via email. There is a possibility that GP's did not receive the postal and email or did not read the mail therefore were unaware of the program and processes.

In addition, the agency should have canvassed to the GP's in the area. The medical schemes did not want to advertise this program as it was still in the pilot phases.

Other challenges were the marketing of this A@H service to the GP's and clients. Being pilot medical insurance companies did not want to market the program to its clients. This created challenges as GP's did not know about this program. This may have resulted in GP's reluctance to accept the A@H program as a complimentary treatment program to their clients. The program was also not advertised in other mediums such as television, radio and magazines. This could have attracted a high risk population and may impact on the cost saving benefits of the medical insurance companies.

6.9. Recommendation for the wider adoption of a nurse driven chronic disease prevention model such as the A@H program in the management of people with chronic disease in health insurance companies.

The A@H program is an essential component of the chronic disease prevention model and can bridge an important gap between the GP and the client as the nurse monitors the client regularly and reports abnormalities to the GP.

Care integrated across multiple settings, is essential for the care of older patients. The prevalence of multiple chronic conditions and the transitions of care between settings distinguish the health care of older adults and complicate the integration of their care. The office of a GP is the major platform of health care delivery and a natural location from which agreed-upon goals and management plans can be sustained in a continuous healing relationship with a trusted clinician. Increasing age is associated with greater use of a variety of other care settings, requiring a more sophisticated role for primary care. As new models of primary care are elaborated they must incorporate systems that integrate the care of older patients, many of whom will not be seen in the office setting. Older people and their families need a healthcare worker who sticks with them and whom they can trust to ensure safe health care transitions that are faithful to their needs and goals.

South Africa is facing the complex challenge of shifting from an acute care model to a chronic care model that is better suited to managing the growing burden of non-communicable diseases and demands an extraordinary response that is within the capacity of South Africa to achieve.

The A@H Innovative home care model for chronic conditions was developed by the experts at University of Kwa-Zulu Natal. Several factors were crucial when this model was applied to difficult local circumstances. Foremost is the shift from a provider-centred to a patient-centred approach and efforts to strengthen self-management. This approach needs a sustained partnership with the patient, efforts to support behaviour change and adherence to long-term medication, and the need to harness family and community resources. Reliable systems of clinical support, referral, and record-keeping are essential. Such

systems are uncommon features of present care and delivery in South Africa but yet they are central to building effective chronic care.

6.10.   Weaknesses of the Study

- The data is obtained for this study is from an affluent middle class population of South Africa and cannot be generalised to the rest of the population. However, a multidimensional survey found that in developing countries, the family is the single most important safety net and source of care and support to older persons. Living arrangements therefore largely determine the extent and nature of kin support that individuals may enjoy in old age. As is the pattern in other developing countries, the vast majority of older South Africans live in multigenerational households. The multidimensional survey of Ferreira et al. (1992) (n=4400) found that 92 percent of blacks, 83 percent of coloureds, and 90 percent of Indians, but only 17 percent of whites lived in such households. The remaining 83% of older white South Africans apparently prefer to live alone (or with a spouse) and to maintain their independence- as is the Western lifestyle pattern of the developed countries (Ferreira et al., 1992). This strengthens the need to have a home health risk management program for older adults living at home and alone. Previously, up to 11 percent of whites resided in homes for the aged. Over the decades, government resources were inequitably allocated to fund these facilities, and very few homes existed for persons in other racial groups. On the other hand, past evidence showed that few black older individuals were not willing to live in such facilities— nor would their families let them do so. Traditionally, a family would face social tension if it did not care for its elders at home. However, these norms also appear to be changing, as black couples increasingly have dual jobs outside the home and there is no one at home during the day to care for a frail elder(Ferreira et al., 1992) thus the need for home visits by healthcare professionals.

- A second limitation is the lack of information on why all the GP's did not return the reports. Future research should focus on the GP's participation in home health care initiatives.

Chapter 7: Conclusion

7. Conclusion

This study is the first to document the use of CGA in a South African population and its first of its kind involving private health care practitioners and medical insurance providers. This is also the first time that many stakeholders were involved in rolling out this service. Experts from the University of Kwa-Zulu Natal developed the A@H service and the Medical scheme industry saw value in this service and allowed their clients and GP's to participate. Due it being a pilot, this service was not marketed on a large scale as a benefit to medical scheme members and GP's therefore communication problems existed between GP's, clients and medical schemes.

However, the CGA did identify clinical problems in these clients and if managed well this A@H service has the potential to improve health, quality of life, and to save money for healthcare funders and clients in the long run.

The findings from this study therefore shows that there is preliminary evidence that using the CGA in this population will be successful in identifying abnormal health findings which will enable intervention. This is a key component of any successful chronic disease prevention model which can go a long way to improving the health status of older people and potentially reduce the cost of services to these group of patients in a health insurance company.

Abbreviations

CGA   :   Comprehensive geriatric assessment

GP   :   General practitioner

RN   :   Registered nurse0

A@H   :   Active at Home

NICE   :   National Institute for Health and Clinical excellence

SEMDSA   :   Society for Endocrinology, Metabolism and Diabetes of South Africa

ADL's   :   Activities of daily living

References

ACTIVE AGEING AT HOME (A@H) BOARD. 2007. *RE: Minutes of meeting - 09 March 2007.*

AMINZADEH, F. 2000. Adherence to recommendations of community-based comprehensive geriatric assessment programmes. *Health Source:Nursing / Academic Edition,* Vol. 29**,** p401.

AVERY, K. 2004. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. *Neurourology and urodynamics [0733-2467],* 23**,** 322.

AVLUND, K., JEPSEN, E., VASS, M. & LUNDEMARK, H. 2002. Effects of comprehensive follow-up home visits after hospitalization on functional ability and readmissions among old patients. A randomized controlled study. *Scandinavian Journal of Occupational Therapy,* 9**,** 17-22.

BERNABEI, R., LANDI, F., ONDER, G., LIPEROTI, R. & GAMBASSI, G. 2008. Second and Third Generation Assessment Instruments: The Birth of Standardization in Geriatric Care. *Journals of Gerontology Series A: Biological Sciences & Medical Sciences,* Vol. 63A**,** p308-313.

BESSETTE, L., STE-MARIE, L.-G., JEAN, S., SHAWN DAVISON, K., BEAULIEU, M., BARANCI, M., BESSANT, J. & BROWN, J. P. 2008. Recognizing osteoporosis and its consequences in Quebec (ROCQ): Background, rationale, and methods of an anti-fracture patient health-management programme. *Contemporary Clinical Trials,* 29**,** 194-210.

BORGSTROM, F., CARLSSON, A., SINTONEN, H., BOONEN, S., HAENTJENS, P., BURGE, R., JOHNELL, O., JONSSON, B. & KANIS, J. A. 2006. The cost-effectiveness of risedronate in the treatment of osteoporosis: an international perspective. *Osteoporosis International,* 17**,** 996-1007.

BOSCH, J., HOP, W., KIRKELS, W. & SCHRÖDER, F. 1995. The International Prostate Symptom Score in a community-based sample of men between 55 and 74 years of age: prevalence and correlation of symptoms with age, prostate volume, flow rate and residual urine volume. *British journal of urology,* 75**,** 622-630.

BOUWENS, C. 2004. Geriatric assessment. *CME,* 22**,** 614-618.

BRADSHAW, D. & JOUBERT, J. 2004. Health of older persons. *South African Health review,* South African Medical research council**,** 147-162.

BROOKS, D., SOLWAY, S. & GIBBONS, W. J. 2003. ATS statement on six-minute walk test. *American journal of respiratory and critical care medicine,* 167**,** 1287.

CAPLAN, G. A., WILLIAMS, A. J., DALY, B. & ABRAHAM, K. 2004. A Randomized, Controlled Trial of Comprehensive Geriatric Assessment and Multidisciplinary Intervention After Discharge of Elderly from the Emergency Department - The DEED II Study. *Journal of the American Geriatrics Society* 52**,** 1417–1423.

CENTRE FOR MEDICARE AND MEDICAID SERVICES. 2008. *What is medicare* [Online]. Daprtment of Health and Human services - USA. Available: www.medicare.gov/Publications/Pubs/pdf/11306.pdf [Accessed 15 August 2009.

COXAM, W. 2005. New advances in osteoporosis nutritional prevention. *M S-Medecine Sciences,* 21**,** 297-301.

DALBY, D. M., SELLORS, J. W., FRASER, F. D., FRASER, C., VAN INEVELD, C. & HOWARD, M. 2000. Effect of preventive home visits by a nurse on the outcomes of frail elderly people in the community: a randomized controlled trial. *CMAJ,* 162**,** 497 - 500.

DANKNER, R., GEULAYOV, G., OLMER, L. & KAPLAN, G. 2009. Undetected type 2 diabetes in older adults. *Age and Ageing,* 38**,** 56-62.

DIVISION OF CLINICAL PHARMACOLOGY 2008. *South African Medicines formulary,* Cape town, Health and Medical Publishing Group.

DUPREZ, A. D. 2008. Systolic Hypertension in the Elderly: Addressing an Unmet Need. *The American Journal of Medicine,* 121**,** 179-184.

ELLIS, G. & LANGHORNE, P. 2004. Comprehensive geriatric assessment for older hospital patients. [Article]. *British Medical Bulletin, 2004,* 71 (1): 45-59 British Medical Bulletin . 71 (1): 45-59 , 2004.

ELLIS, G. & LANGHORNE, P. 2005. Comprehensive geriatric assessment for older hospital patients. [Article]. *British Medical Bulletin, 2004,* 71 (1): 45-59 British Medical Bulletin . 71 (1): 45-59 , 2004.

FERREIRA, M. 2005. Research on Ageing in Africa: what do we have, not have and should we have. *Generations review,* 15**,** 32-35.

FERREIRA, M., LUND, F. & MOLLER, V. 1992. Multidimensional survey of elderly South Africans. *In:* GERONTOLOGY, C. F. (ed.). Cape town: University of Cape town.

FERRIERA, M. 2000. Growing old in the New South Africa. *Ageing International,* Spring 2000**,** 32-46.

FOLSTEIN, M. F., FOLSTEIN, S. E. & MCHUGH, P. R. 1975. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of psychiatric research*.

FUKUSE, T., SATODA, N., HIJIYA, K. & FUJINAGA, T. 2005. Importance of a Comprehensive Geriatric Assessment in Prediction of Complications Following Thoracic Surgery in Elderly Patients*. *Chest,* 127**,** 886.

GIVENS, J. L., SANFT, T. B. & MARCANTONIO, E. R. 2008. Functional recovery after hip fracture: the combined effects of depressive symptoms, cognitive impairment, and delirium. *Journal of the American Geriatrics Society,* 56**,** 1075-1079.

GLEDINNING, C. & MORAN, N. 2009. Reforming long term care - Lessons from other countries. Available: http://www.york.ac.uk/inst/spru/pubs/rworks/july2009-06.pdf.

GOLD, S. & BERGMAN, H. 2000. Comprehensive geraitric assessment revisited again. *Age & Ageing,* 29**,** 387-388.

GUIGOZ, Y. 2006. The Mini Nutritional Assessment (MNA®) Review of the Literature-What Does It Tell Us? *Journal of Nutrition Health and Aging,* 10**,** 466.

HALTER, J. B., OUSLANDER, J. G., TINETTI, M. E., STUDENSKI, S., HIGH, K. P. & ASTHANA, S. 2009. Principles of Aging Biology Pertinent to the Cardiovascular System. McGraw-Hill.

HARARI, D., MARTIN, F. C., BUTTERY, A., O'NEILL, S. & HOPPER, A. 2007. The older persons' assessment and liaison team `OPAL': evaluation of comprehensive geriatric assessment in acute medical inpatients. *Age & Ageing,* Vol. 36 p670-675.

HAYFLICK, L. 1998. How and why we age. *Experimental Gerontology,* 33**,** 639-653.

HENDRIX, C. C. & WOJCIECHOWSKI, C. W. 2005. Chronic care management for the elderly: an opportunity for gerontological nurse practitioners. *Journal Of The American Academy Of Nurse Practitioners,* 17**,** 263-267.

HIRSHOWITZ, R. & ORKIN, M. 1995a. A national Household survey of health inequalities in South Africa. South Africa: Henry J Kaiser family foundation, Washington DC.

HIRSHOWITZ, R. & ORKIN, M. 1995b. A national Household survey of health inequalities in South Africa. South Africa: Henry J Kaiser family foundation, Washington DC.

HORNICK, T. 2008. Managing diabetes in the elderly: Go easy, individualize. *Cleveland clinic journal of medicine* 75**,** 70-78.

JOINT NATIONAL HYPERTENSION GUIDELINE WORKING GROUP 2006. South African Hypertension guidelines 2006. Cape Town: South African Medical Journal.

JOUBERT, J. & BRADSHAW, D. 2003. Causes of Death among Older Persons in SouthAfrica. *Keryx (Journal of Age-in-Action),* 5(1): 7-10.

KATZ, S., DOWNS, T. D., CASH, H. R. & GROTZ, R. C. 1970. Progress in Development of the Index of ADL. *The Gerontologist,* 10**,** 20-30.

LANDI, F. & ONDER, G. 2001. A new model of integrated home care for the elderly: Impact on hospital use. *Journal of Clinical Epidemiology,* 54**,** 968-970.

LAWTON, M. P. & BRODY, E. M. 1969. Assessment of older people: self-maintaining and instrumental activities of daily living. *The Gerontologist,* 9**,** 179.

MANN, E., KOLLER, M., MANN, C., CAMMEN, T. V. D. & STEURER, J. 2004. Comprehensive Geriatric Assessment (CGA) in general practice: Results from a pilot study in Vorarlberg, Austria. *BMC Geriatrics,* 4.

MEDICAL RESEARCH COUNCIL 2006. Chronic disease lifestyle in South Africa (1995-2005). Technical report. *In:* STEYN, K., FOURIE, J. & TEMPLE, N. (eds.). Cape Town: South African Medical research Council.

MEINCK, M., LUBKE, N., LAUTERBERG, J. & ROBRA, B. P. 2004. Preventive home visits to the elderly: systematic review of available evidence. *Gesundheitswesen,* 66**,** 732 - 738.

MPIANA, K. 2009. *Investigating the socio-economic impact of the old age pension in the pensioner household within selected areas of the Eastern Cape.*

. DOCTOR TECHNOLOGIAE IN PUBLIC MANAGEMENT, Cape Peninsula University of Technology.

NATIONAL INSTITUTE ON AGEING. 1993. *Research for a new age*
 [Online]. Available: http://www.niapublications.org/ pubs/research/index.asp.

NATIONAL OSTEOPOROSIS FOUNDATION OF SOUTH AFRICA. 2009. *Osteporosis risk assessment* [Online]. NOFSA. Available: www.osteoporosis.org.za [Accessed 10 January 2009 2009].

NATIONAL OSTEOPOROSIS FOUNDATION OF SOUTH AFRICA. 2010. *Osteoporsis* [Online]. [Accessed 12 December 2010 2010].

NATITIONAL INSTITUTE OF CINICAL EXCELLENCE [NICE] 2005. Bisphosphonates (alendronate, etidronate, risedronate), selective oestrogen receptor modulators (raloxifene) and parathyroid hormone (teriparatide) for the secondary prevention of osteoporotic fragility fractures in postmenopausal women. *Technology appraisal no 87.* London: Technology appraisal no 87.

OMNIBUS BUDGET RECONCILIATION ACT 1987. SSAct Titles IX, XI Part B, XVI (SSI), XVIII, and §§218, 1819, 1876, 1883, 1886, 1919 headings, 1819(h), 1834(a), 1842(i) and (j), 1862(a), 1866(c), 1869(b), 1886(d), 1902(e), 1903(f), and 1919(e. *In:* ADMINISTRATION, U. S. S. (ed.) *P.L. 100-203.* Unites Sates: US Social security administration.

PILOTTOA, A., FERRUCCIE, L., SCARCELLIA, C., NIROA, V., MARIOC, F. D., SERIPAA, D., ANDRIULLIB, A., LEANDROD, G. & FRANCESCHIA, M. 2007. Usefulness of the comprehensive geriatric assessment in older Patients with upper gastrointestinal bleeding: A two-year

follow-up study. 25**,** 124–128.

RATNAIKE, R. 2002. *Practical guide to geriatric medicine,* Sydney, McGraw Hill Companies Inc.

RIZVI, A. A. 2007. Management of diabetes in older adults. *American Journal of the Medical Sciences,* 333**,** 35-47.

ROGER M, F. 1997. Bisphosphonates in the treatment of osteoporosis in 1997: a review. *Current Therapeutic Research,* 58**,** 656-678.

RUBENSTEIN, L., BERNABEI, R., BULA, C. J., JONES, D., SCHROLL, M. & STEWART, S. 1997. In-Home Programs of Prevention and Comprehensive Geriatric Assessment: International Perspectives. *World Congress of gerontology.* Adelaide, Australia.

RUBENSTEIN, L. Z. 2004. Comprehensive geriatric assessment: from miracle to reality. *Joseph T Freeman award lecture.* Journal of Gerontology: Medical sciences.

SASAKI, H. 2008. Single pathogenesis of geriatric syndrome. *Geriatrics and Gerontology International* 8.

SAXON, S. V. & ETTEN, M. J. 2002. *Physical change and ageing - a guide for the helping professions,* New York, Tiresias Press.

SCHUURMANS, H., STEVERINK, N., LINDENBERG, S., FRIESWIJK, N. & SLAETS, J. P. J. 2004. Old or frail: What tells us more? *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences,* 59**,** M962.

SCHWIEGERLING, J. Field guide to visual and ophthalmic optics. 2004. SPIE.

SOCIETY FOR ENDOCRINOLOGY METABOLISM AND DIABETES OF SOUTH AFRICA 2009. SEMDSA Guidelines for Diagnosis and Management of Type 2 Diabetes

Mellitus for Primary Health Care - 2009. Society for Endocrinology, Metabolism and Diabetes of South Africa.

SOUTH AUSTRALIAN MONITORING AND SURVEILLANCE SYSTEM (SAMSS) 2004. Which South Australians Experience

Psychological Distress? Kessler Psychological Distress 10-item Scale. *In:* HEALTH, S. A. D. O. (ed.). South Australia: Population Research and Outcome Studies.

STATISTICS SOUTH AFRICA 2010. Social profile of South Africa, 2002–2009

Pretoria: Stats SA Library Cataloguing-in-Publication (CIP) Data.

STOTT, D. J., BUTTERY, A. K., BOWMAN, A., AGNEW, R., BURROW, K., MITCHELL, S. L., RAMSAY, S. & KNIGHT, P. V. 2006. Comprehensive geriatric assessment and home-based rehabilitation for elderly people with a history of recurrent non-elective hospital admissions. *Health Source: Nursing / Academic Edition,* Vol 35**,** p487-491.

STUCK, A. & KANE, R. L. 2007. Whom Do Preventive Home Visits Help? *J Am Geriatr Soc,* 56**,** 561 - 563.

STUCK, A. E., ARONOW, H. U., STEINER, A., ALESSI, C. A., BULA, C. J., GOLD, M. N., YUHAS, K. E., NISENBAUM, R., RUBENSTEIN, L. Z. & BECK, J. C. 1995. A trial of annual in-home comprehensive geriatric assessments for elderly people living in the community.[comment]. *New England Journal of Medicine,* 333**,** 1184 - 1189.

STUCK, A. E. & SIU, A. L. 1993. Comprehensive geriatric assessment: A meta-analysis of controlled trials. *Health Source: Nursing / Academic Edition*

Vol. 342 1032.

STUCK, A. E., SIU, A. L., WIELAND, G. D., ADAMS, J. & RUBENSTEIN, L. Z. 1993. Comprehensive geriatric assessment : a meta-analysis of controlled trials. . *Lancet,* 342 1032-1036.

TAFFET, G. 2001. *Homeostenosis* [Online]. Oklahoma city: Donald W. Reynolds Department of Geriatric Medicine Available: http://www.ouhsc.edu/geriatricmedicine/Education/Homeostenosis/Homeostenosis.htm#HomeostenosisDefinition_of_Homeostenosis.htm.

TRETON, J. 2005. A new challenge for diabetologists and geriatricians! *Diabetes & Metabolism,* 31**,** S9-S12.

TUROK, M. 2009. *Gerontolgical nursing science* [Online]. Cape Town: South African older persons forum. Available: S.A. Nursing Council circular informing training colleges that new qualifications registered with the National Qualification Framework no longer include courses in gerontological nursing science and gerontology (including geriatrics [Accessed 10 Septemeber 2009.

VENTRY, I. M. & WEINSTEIN, B. E. 1982. The hearing handicap inventory for the elderly: a new tool. *Ear and hearing,* 3**,** 128.

WILLIAMS, M. E., PULLIAM, C. C., HUNTER, R., JOHNSON, T. M., OWENS, J. E., KINCAID, J., PORTER, C. & KOCH, G. 2004. The Short-Term Effect of Interdisciplinary Medication Review on Function and Cost in Ambulatory Elderly People. *Journal of the American Geriatrics Society,* 52**,** 93-98.

Annexures 1: Comprehensive Geriatric assessment

Comprehensive Geriatric assessment

Comments

1.1 Family doctor

Surname	
Name	
Telephone number	
Address	
	Tel: Cell
	Tel: Home

1.2 Contacts

Name	Relationship	Telephone (day)	Telephone (night)

1.3 Allergies

		Yes	No

Allergy (specify)	Type of reaction

1.4 Do you own the following equipment or have access to them

Television	Yes	No	DVD / CD player	Yes	No
Computer	Yes	No	Internet	Yes	No

1.5 Risk factors identified *(fill at end of assessment)*

1.6 Habits

Smoking	Current	Past	Never	No of cigarettes / cigars/ pipes per day:
Alcohol	Current	Past	Never	No of drinks per week:
Other habits				

2

2. Social history (complete at end of assessment)

Employment (✓ appropriate box)		Name of company	Occupation		Year started	Year ended
Self Employed Y N	Current					
	Past (chronological order)					
Employed Y N						

Source of income	Government pension		**Financial responsibility**	Self		
	Private pension		**If others, no & relationship**	Others		
	Other					

Housing	Single storey House		**Housing** Continued	Flat	Bath and toilet	
	Double storey House			Kitchen	Open plan lounge kitchen	
	No of rooms (total)			Lounge	Other:	

Level of education

Living arrangements	Alone		**Transportation**			Own vehicle		Family/Friend
	With family					Bus	Taxi	Minibus
	Alone with part time carer					Distance Bus / taxi stop:		
	Other (Specify):		**Exercise**	Regular	Sometimes	Nil		

2.1 Clients Relationship with family members

How would you rate your relationship?	Poor	Fair	Good	Very good		Excellent
Do you have regular contact with family members?				Yes		No
What type of contact do you have	Face	Telephone	Post	E-mail		Other

Names of family members that you keep in contact with: (if same as contacts above leave blank)

Can you rely on the above people in case of an emergency		Yes		No

3. Self rated health

How would you rate your health?	Poor	Fair	Good	Very Good		Excellent

4. Past Medical history

Previous admissions

Date	Reason

3

Past Medical history...continued				
Chronic disease	**Y**	**N**	**Date**	**Treatment**
Hypertension				
Diabetes				
Tuberculosis				
Hyperlipidaemia				
Other				
Other				

Menstrual History	Age at menopause			Use of HRT	Yes	No	Duration of use	

5. Family history (Tick appropriate box)

TB	Cancer	Diabetes	Gout	Gallstones	Dementia	Osteoporosis
Ischemic heart disease			Hypertension		Stroke	

Other:

Comments:

Falls History: Have you had a fall		Yes	No	Number of falls:	Date of last fall		Time	
Injuries : Yes / No	Type of injury:							

Fall incident/s :

5.1 Immunizations status

Vaccine name	Yes ✓	No ✓	Date administered	Complications	Next dose due
Tetanus					
Influenza					
Pneumococcal					
Other: Specify					

5.2 Prosthetic devices

6. Clinical examination

Temperature				Oral			Axilla				
Pulse rate			per minute	Blood glucose			Mmol/l				
Respiration rate			per minute	HB			g/dl				
Blood pressure		mm Hg	Left arm	Right arm			Supine		Standing		Sitting
Weight			Kg	Height			m			BMI=	

Urine dipstick	Appearance		Odor		Leukocytes	
	Nitrites		PH		Specific Gravity	
	Protein		Glucose		Ketones	
	Urobilinogen		Bilirubin		Blood	
	Haemoglobin					

6.1 Main complaint:

4

7. Current symptoms

System	Symptoms	Y	N	Treatment / comments
CNS	Dizziness			
	Weakness			
	Speech			
	Headaches			
	Vision			
	Hearing			
Chest	Shortness of breath			
	Cough			
	Haemoptysis			
CVS	Chest pain			
	Palpitations			
	Dyspnoea			
	Orthopnoea			
	Paroxismal nocturnal dyspnoea			
	Swelling of legs			
GIT	Appetite			
	Weight			
	Change in bowel habits			
	Constipation			
	Diarrhoea			
UGS	Frequency			
	Nocturia			
	Burning of micturition			
	Difficulty initiating micturition			
Post menopausal Women	Post menopausal bleeding			
	Vaginal problems (dryness)			
	Hot flushes			
Musculo-Skeletal	Joint pains			
	Joint swelling			
	Morning stiffness			
	Backache			
Skin	Bruises			
	Rashes / ulcers/ boils			
	Eczema			
	Wound healing problems			
	Other			

5

8. Medication non adherence / risk assessment

Medication name and strength*	Provider (Drs name/OTC/ Clinic)	Reason for use**	Directions on label	How patient taking medication	Duration (MM/YYYY)	Perceived efficacy 1.2.3.4***	Perceived problems (Yes/NO)	Do you think this medicine is necessary (Y/N)

- * If the patient could not recall the name of the medicine without seeing the label place "X" in the interior box.
- ** If the patient could not recall appropriate reason for use, Place "X" in interior box
- *** 1 – Very helpful, 2 – helpful, 3 – Not sure, 4 Don't think its helping

6

Comments:	Medication Risk assessment	Yes	No
	Poly-pharmacy		
	Adverse drug reaction		
	Multiple providers		
	Possession and the use of over the counter meds		
	Possession of medications from friends/family		
	Outdated medications		
	Alcohol use/abuse (Alcohol-drug interaction)		

DEMONSTRATIONS:

Ability to Read Label   YES   NO
If no, what were the issues.

Ability to open bottles/packages.etc.   YES NO
If no, what were the issues.

Ability to Simulate Dosing Interval Safely   YES   NO
If no, what were the issues.

PATIENT SPECIFIC DEMONSTRATIONS: WHEN APPLICABLE

Uses inhalers correctly   YES   NO
If no, what were the issues.

Uses nebulizer correctly.   YES NO
If no, what were the issues.

Uses eyedrops correctly.   YES   NO
If no, what were the issues.

Uses topical agents correctly.   YES   NO
If no, what were the issues.

ACCESS: In the past 3 months
Have you had to miss getting a new prescription or a refill on time because you could not afford your medicine?   YES   NO

Have you had to miss getting refills on time because you did not have a way to the drug store?   YES   NO

ASSESSMENTS:
Cognitive Test: _____

Literacy level _____

Non-Adherence Screening (Problem Areas Detected)

7

98

9. Mini nutritional Assessment

Weight: Height:

Screening

a) Has the patient food intake declined over the past 3 months due to a loss of appetite, digestive problems, chewing or swallowing difficulties?
     0 = severe loss of appetite
     1 = moderate loss of appetite
     2 = no loss of appetite

b) Weight loss during last 3 months
     0 = weight loss > 3 kg
     1 = does not know
     2 = weight loss between 1 and 3 kg
     3 = no weight loss

c) Mobility
     0 = bed or chair bound
     1 = able to get out of bed / chair but does not go out.
     2 = goes out

d) In the past 3 months, has the patient suffered From psychological stress or acute disease?
     0 = yes   1 = no

e) Neuropsychological problems
     0 = severe dementia or depression
     1 = mild dementia
     2 = no psychological problems

f) B.M.I. (Weight/ (height^{12} in kg/m^2)
     0 = BMI < 21
     1 = 19 ≤ BMI < 21
     2 = 21 ≤ BMI < 23
     3 = BMI ≥ 23

Screening Total   =
12 > - Not at risk of malnutrition
11< - At risk and continue assessment

Assessment

g) Does the patient live independently in contrast to a nursing home?
     0 = no   1 = yes

h) Does the patient take more than 3 prescription drugs per day?
     0 = no   1 = yes

i) Pressure sore or skin ulcers
     0 = yes   1 = no

j) How many full meals does the patient eat daily?
     0 = 1 meal   1 = 2 meals   1 = 3 meals

k) Does he consume:
At least one serving of dairy products (milk, cheese, yogurt) per day?   [Yes]   [No]

Two or more servings of beans or eggs per week?   [Yes]   [No]

Meat, fish or poultry every day?   [Yes]   [No]

     0.0 = if 0 or 1 yes
     0.5 = if 2 yes
     1.0 = if 3 yes

l) Does he consume two or more servings of fruits fruits or vegetables per day
     0 = no   1 = yes

m) How many cups / glasses of beverages (water, juice, coffee, tea, milk, wine, beer,) does the patient consume per day?
     0.0 = less than 3 glasses
     0.5 = 3 to 5 glasses
     1.0 = more than 5 glasses

n) Mode of feeding
     0 = fed requires assistance
     1 = self-fed with some difficulties
     2 = self-fed without any problem

o) Does the patient consider to have any nutritional problems?
     0 = major malnutrition
     1 = does not know or moderate malnutrition
     2 = no nutritional problems

p) In comparison with other people of the same age, how would the patient consider his health status?
     0 = not as good   1.0 = as good
     0.5 = does not know   2.0 = better

q) Mid Arm Circumference (MAC in cm.)
     0.0 = MAC < 21
     0.5 = 21 ≤ MAC ≤ 22
     1.0 = MAC > 22

r) Calf Circumference (CC in cm)
     0 = CC < 31   1 = CC ≥ 31

Assessment Total =
Maximum 16 points

Final Score: Add assessment and screening scores (maximum 30 points)

Final score =

Indicators
≥ 24 points: well nourished
17 to 23.5 points: at risk of malnutrition
< 17 points: under nutrition

8

10. Snellen Vision test

Right eye:	
Left eye:	
Combined:	

11. Hearing handicap inventory for elderly

INSTRUCTIONS: The purpose of this scale is to identify the problems your hearing loss may be causing you. Please select YES, SOMETIMES, or NO for each question. Do not skip a question if you avoid a situation because of your hearing problem. If you use a hearing aid, please answer the way you hear without a hearing aid.

Questions	Yes	No	Sometimes
1. Does a hearing problem cause you to feel embarrassed when you meet new people?	4	0	2
2. Does a hearing problem cause you to feel frustrated when talking to members of your family?	4	0	2
3. Do you have difficulty when someone speaks in a whisper?	4	0	2
4. Do you feel handicapped by a hearing problem?	4	0	2
5. Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	4	0	2
6. Does a hearing problem cause you to attend religious services less often than you would like?	4	0	2
7. Does a hearing problem cause you to have arguments with family members?	4	0	2
8. Does a hearing problem cause you difficulty when listening to TV or radio?	4	0	2
9. Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	4	0	2
10. Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	4	0	2
Total scores			

Clients score

Interpretation of Total Scores:
0-9 = no handicap
10-24 = mild to moderate handicap
26-40 = severe handicap.

9

100

12. Osteoporosis risk assessment

To assess whether you are at risk, check each applicable box in
Category A, B or C. Also add up your numerical score.

Category	Male	Female
Category A		
1. Previous fracture after minor injury	[10]	[10]
2. Hormonal, gut, malignant or eating disorders	[10]	[10]
3. Recent or progressive loss o f height	[10]	[10]
4. Regular steroid (cortisone) use	[10]	[10]
Category B		
5. Over 70 years old	[5]	[5]
6. Family history of osteoporosis	[5]	[5]
7. Regular, heavy alcohol use	[5]	[5]
8. Menopause before age 45 or other causes of low sex hormones	[5]	[5]
9. Regular use of anti-seizure medicine	[5]	[5]
Category C		
10. Over 50 years old	[3]	[3]
11. Female	N/A	[3]
12. Small body frame (weight below 55kg)	[3]	[3]
13. No regular exercise	[2]	[2]
14. Poor calcium intake	[2]	[2]
15. Smoker/ex- smoker	[2]	[2]
16. White, Asian Mixed race	[2]	[2]
17. Childless	N/A	[1]
18. No breastfeeding	N/A	[1]
19. Fair complexion	[1]	[1]
Total		

At risk	
Not at risk	

RISK ASSESSMENT
If you have checked one or more boxes in Category A
Two or more boxes in category B   **or**
If your numerical score exceeds 13 you may be at risk and should consult your doctor

10

13. International prostate symptom score (Males only)

Over the past month.....	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always	Your Score
1. How often have you had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5	
2. How often have you had to urinate again less than two hours after you finished urinating?	0	1	2	3	4	5	
3. How often have you had stopped and started again several times when you urinated?	0	1	2	3	4	5	
4. How often have you had found it difficult to postpone urination?	0	1	2	3	4	5	
5. How often have you had a weak urinary stream?	0	1	2	3	4	5	
6. How often have you had to push or strain to begin urination?	0	1	2	3	4	5	

And finally.	None	Once	Twice	3 times	4 times	5 times or more	
7. Over the past month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?	0	1	2	3	4	5	
Add up your total score and write it in the box.							

Score
0-7 indicates mild symptoms
8-19 indicates moderate symptoms
20-35 indicates severe symptoms.

11

14. The international consultation on incontinence questionnaire short form

Many people leak urine some of the time. We are trying to find out how many people leak urine, and how much this bothers them. We would be grateful if you could answer the following questions, thinking how you have been, on average over the PAST 4 WEEKS

1. How often do you leak urine
(Tick one box)

Never	0	☐
About once a week or less often	1	☐
Two or three times a week	2	☐
About once a day	3	☐
Several times a day	4	☐
All the time	5	☐

We would like to know how much you think leaks
2. How much urine do you usually leak (Whether you wear protection or not)
(Tick one box)

None	0	☐
A small amount	1	☐
A moderate amount	2	☐
A large amount	3	☐

3. Overall, how much does leaking urine interfere with your everyday life?
Please ring a number between 0 (not at all) and 10 (a great deal).

```
←  0    1    2    3    4    5    6    7    8    9    10  →
   Not                                              A
   at                                               great
   all                                              deal
```

ICIQ SCORE: sum scores 1 + 2 + 3 ☐

4. When does Urine leak?
(Please tick all that apply to you)

Never – Urine does not leak	
Leaks before you can get to the toilet	☐
Leaks when you cough or sneeze	☐
Leaks when you are asleep	☐
Leaks when you are physically active or exercising	☐
Leaks when you are finished urinating and are dressed	☐
Leaks for no obvious reason	☐
Leaks all the time	☐
	☐

Evaluation criteria : Score of an individual patient has no absolute meaning but it is useful in measuring change. If a Client scores "0" → Continent above 1 is problem.
Change is measured when evaluating the care plan.

12

15. Katz – Index of independence in Activities of daily living

Activities Points (1 or 0)	Independence (1 Point) No supervision direction or personal assistance	Dependence (0 points) With supervision, direction, personal assistance or totals care
BATHING Points: _____	(1 POINT) Bathes self completely or needs help in bathing a single part of the body such as the back, genital area or disabled extremity.	(0 POINTS) Needs help with bathing more than one part of the body, getting in and out of the tub or shower. Requires total bathing.
DRESSING Points: _____	(1 POINT) Gets clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	(0 POINTS) Needs help with dressing self or needs to be completely dressed.
TOILETING Points: _____	(1 POINT) Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	(0 POINTS) Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING Points: _____	(1 POINT) Moves in and out of bed or chair unassisted. Mechanical transfer aides are acceptable	(0 POINTS) Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE Points: _____	(1 POINT) Exercises complete self control over urination and defecation	(0 POINTS) Is partially or totally incontinent of bowel and bladder.
FEEDING Points: _____	(1 POINT) Gets food from plate into mouth without help. Preparation of food may be done by another person	(0 POINTS) Needs partial or total help with feeding or requires parentaral feeding

---

TOTAL POINTS = _____ A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment.

13

16. Lawtons Instrumental activities of daily living

Please tick the box that most applies for each activity

Activity	No assistance	Need some assistance	Unable to do at all
1. Using the Telephone	2	1	0
2. Getting to places beyond walking distance	2	1	0
3. Grocery shopping	2	1	0
4. Preparing meals	2	1	0
5. Doing housework or Handyman	2	1	0
6. Doing laundry	2	1	0
7. Taking medications	2	1	0
8. Managing money	2	1	0
Totals			

Scores : Male   Score : Female

Score ranges :   Male   0 – Low function (dependant)
                                     5 – High Function (independent)
                      Female   0 – Low function (dependant)
                                     8 – High Function (independent)

14

17. Mini mental state examination (modified)

Maximum score	Patients score	Description
		Orientation
5		What is the (year) (season) (date) (day) (month)?
5		Where are we (province) (country) (town or city) (suburb) (street)?
		Registration
3		Name 3 common objects (eg, "apple", "table", "cat"). Take 1 second to say each. Then ask the patient to repeat all 3. Give 1 point for each correct answer. The repeat them until she/he learns all 3. Count trials and record. Trials: _____
		Attention and calculation
5		Serial 7's backwards. Stop after five answers Alternatively, repeat the months of the year backwards (D___ N___ O___ S___ A___)
		Recall
3		Please list for me the three objects we talked about earlier?
		Language
2		Name a "pen" and "watch."
1		Repeat the following: "No Ifs, ands or buts."
3		Follow a three stage command: "Take a piece of pare in your right hand, fold it in half, and put it on the floor."
1		Read and obey the following: **CLOSE YOUR EYES** *(use instruction sheet provided)*
1		Write a sentence.
1		Copy the following design.
30	←——— patients score	

Severity of Cognitive impairment:

Mild   ↔ MMSE ≥ 21
Moderate   ↔ MMSE 10-20
Severe   ↔ MMSE ≤ 9

15

18. Psychological distress test – K10

Ring the appropriate box *(Use instruction sheet provided for clients response)*

Questions	All of the time	Most of the time	Some of the time	A little of the time	None of the time
1. In the past 4 weeks, about how often did you feel tired out for no good reason?	5	4	3	2	1
2. In the past 4 weeks, about how often did you feel nervous?	5	4	3	2	1
3. In the past 4 weeks, about how often did you feel so nervous that nothing could calm you down?	5	4	3	2	1
4. In the past 4 weeks, about how often did you feel hopeless?	5	4	3	2	1
5. In the past 4 weeks, about how often did you feel restless or fidgety	5	4	3	2	1
6. In the past 4 weeks, about how often did you feel so restless you could not sit still?	5	4	3	2	1
7. In the past 4 weeks, about how often did you feel depressed?	5	4	3	2	1
8. In the past 4 weeks, about how often did you feel that everything was an effort	5	4	3	2	1
9. In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?	5	4	3	2	1
10. In the past 4 weeks, about how often did you feel worthless	5	4	3	2	1
Total					

Score range   **Patient score:** _____
10 - 19 – Likely to be well
20 - 30 Refer to GP for assessment
30 > Referral to GP for referral to psychiatrist

16

19. Berg Balance Scale

Location:_____

ITEM DESCRIPTION	SCORE (0-4)
Sitting to standing	_____
Standing unsupported	_____
Sitting unsupported	_____
Standing to sitting	_____
Transfers	_____
Standing with eyes closed	_____
Standing with feet together	_____
Reaching forward with outstretched arm	_____
Retrieving object from floor	_____
Turning to look behind	_____
Turning 360 degrees	_____
Placing alternate foot on stool	_____
Standing with one foot in front	_____
Standing on one foot	_____
Total	_____

Instructions
Please document each task and/or give instructions as written. When scoring, please *record the lowest response category that applies* for each item.

In most items, the Client is asked to maintain a given position for a specific time. Progressively more points are deducted if:
- the time or distance requirements are not met
- the Client's performance warrants supervision
- the Client touches an external support or receives assistance from the examiner

Client should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the Client. Poor judgment will adversely influence the performance and the scoring.

Equipment required for testing is a stopwatch or watch with a second hand, and a ruler or other indicator of 2, 5, and 10 inches. Chairs used during testing should be a reasonable height. Either a step or a stool of average step height may be used for item # 12.

---
1. Sitting to standing

INSTRUCTIONS: Please stand up. Try not to use your hand for support.
( ) 4   able to stand without using hands and stabilize independently
( ) 3   able to stand independently using hands
( ) 2   able to stand using hands after several tries
( ) 1   needs minimal aid to stand or stabilize
( ) 0   needs moderate or maximal assist to stand

---
2. Standing unsupported

INSTRUCTIONS: Please stand for two minutes without holding on.
( ) 4   able to stand safely for 2 minutes
( ) 3   able to stand 2 minutes with supervision
( ) 2   able to stand 30 seconds unsupported
( ) 1   needs several tries to stand 30 seconds unsupported
( ) 0   unable to stand 30 seconds unsupported

If a Client is able to stand 2 minutes unsupported, score full points for sitting unsupported. Proceed to item #4

17

3. Sitting with back unsupported but feet supported on floor or on a stool

INSTRUCTIONS: Please sit with arms folded for 2 minutes.

( ) 4 able to sit safely and securely for 2 minutes
( ) 3 able to sit 2 minutes under supervision
( ) 2 able to able to sit 30 seconds
( ) 1 able to sit 10 seconds
( ) 0 unable to sit without support 10 seconds

4. Standing to sitting

INSTRUCTIONS: Please sit down.

( ) 4 sits safely with minimal use of hands
( ) 3 controls descent by using hands
( ) 2 uses back of legs against chair to control descent
( ) 1 sits independently but has uncontrolled descent
( ) 0 needs assist to sit

5. Transfers

INSTRUCTIONS: Arrange chair(s) for pivot transfer. Ask Client to transfer one way toward a seat with armrests and one way toward a seat without armrests. You may use two chairs (one with and one without armrests) or a bed and a chair.

( ) 4 able to transfer safely with minor use of hands
( ) 3 able to transfer safely definite need of hands
( ) 2 able to transfer with verbal cuing and/or supervision
( ) 1 needs one person to assist
( ) 0 needs two people to assist or supervise to be safe

6. Standing unsupported with eyes closed

INSTRUCTIONS: Please close your eyes and stand still for 10 seconds.

( ) 4 able to stand 10 seconds safely
( ) 3 able to stand 10 seconds with supervision
( ) 2 able to stand 3 seconds
( ) 1 unable to keep eyes closed 3 seconds but stays safely
( ) 0 needs help to keep from falling

7. Standing unsupported with feet together

INSTRUCTIONS: Place your feet together and stand without holding on.

( ) 4 able to place feet together independently and stand 1 minute safely
( ) 3 able to place feet together independently and stand 1 minute with supervision
( ) 2 able to place feet together independently but unable to hold for 30 seconds
( ) 1 needs help to attain position but able to stand 15 seconds feet together
( ) 0 needs help to attain position and unable to hold for 15 seconds

8. Reaching forward with outstretched arm while standing

INSTRUCTIONS: Lift arm to 90 degrees. Stretch out your fingers and reach forward as far as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the Client is in the most forward lean position. When possible, ask Client to use both arms when reaching to avoid rotation of the trunk.)

( ) 4 can reach forward confidently 25 cm (10 inches)
( ) 3 can reach forward 12 cm (5 inches)
( ) 2 can reach forward 5 cm (2 inches)
( ) 1 reaches forward but needs supervision
( ) 0 loses balance while trying/requires external support

18

9. Pick up object from the floor from a standing position

INSTRUCTIONS: Pick up the shoe/slipper, which is place in front of your feet.

( ) 4 able to pick up slipper safely and easily
( ) 3 able to pick up slipper but needs supervision
( ) 2 unable to pick up but reaches 2-5 cm (1-2 inches) from slipper and keeps balance independently
( ) 1 unable to pick up and needs supervision while trying
( ) 0 unable to try/needs assist to keep from losing balance or falling

10. Turning to look behind over left and right shoulders while standing

INSTRUCTIONS: Turn to look directly behind you over toward the left shoulder. Repeat to the right. Examiner may pick an object to look at directly behind the Client to encourage a better twist turn.

( ) 4 looks behind from both sides and weight shifts well
( ) 3 looks behind one side only other side shows less weight shift
( ) 2 turns sideways only but maintains balance
( ) 1 needs supervision when turning
( ) 0 needs assist to keep from losing balance or falling

11. Turn 360 degrees

INSTRUCTIONS: Turn completely around in a full circle. Pause. Then turn a full circle in the other direction.

( ) 4 able to turn 360 degrees safely in 4 seconds or less
( ) 3 able to turn 360 degrees safely one side only 4 seconds or less
( ) 2 able to turn 360 degrees safely but slowly
( ) 1 needs close supervision or verbal cuing
( ) 0 needs assistance while turning

12. Place alternate foot on step or stool while standing unsupported

INSTRUCTIONS: Place each foot alternately on the step/stool. Continue until each foot has touch the step/stool four times.

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds
( ) 3 able to stand independently and complete 8 steps in > 20 seconds
( ) 2 able to complete 4 steps without aid with supervision
( ) 1 able to complete > 2 steps needs minimal assist
( ) 0 needs assistance to keep from falling/unable to try

13. Standing unsupported one foot in front

INSTRUCTIONS: (DEMONSTRATE TO CLIENT) Place one foot directly in front of the other. If you feel that you cannot place your foot directly in front, try to step far enough ahead that the heel of your forward foot is ahead of the toes of the other foot. (To score 3 points, the length of the step should exceed the length of the other foot and the width of the stance should approximate the Client's normal stride width.)

( ) 4 able to place foot tandem independently and hold 30 seconds
( ) 3 able to place foot ahead independently and hold 30 seconds
( ) 2 able to take small step independently and hold 30 seconds
( ) 1 needs help to step but can hold 15 seconds
( ) 0 loses balance while stepping or standing

14. Standing on one leg

INSTRUCTIONS: Stand on one leg as long as you can without holding on.

( ) 4 able to lift leg independently and hold > 10 seconds
( ) 3 able to lift leg independently and hold 5-10 seconds
( ) 2 able to lift leg independently and hold ≥ 3 seconds
( ) 1 tries to lift leg unable to hold 3 seconds but remains standing independently.
( ) 0 unable to try of needs assist to prevent fall

Interpretation	41-56	= low fall risk
	21-40	= medium fall risk
	0-20	= high fall risk

19

110

20. Home Assessment checklist

Location	Hazard	Response Y	Response N	Correction
General Household		Y	N	
Lighting	Too Dim			Provide ample lighting in all areas
	Too direct, create glare			Reduce glare with evenly distributed light, indirect lighting or translucent shades
	Inaccessible light switches			Provide night lights / touch activated lights. Install switches that are immediately accessible when entering room.
Carpets Rugs Linoleum	Torn			Repair or replace torn carpet
	Slippery			Provide rugs with nonskid backs
	Curled edges			Tack or tape down rugs or linoleum / replace
Chairs, Tables & other furnishings	Unstable			Provide furniture stable enough to support weight of the person. Do not use chairs that have wheels or swivel. Repair loose furniture
	Chairs without armrests			Provide chairs with armrests that extend forward enough to provide leverage for getting up or sitting down
	Obstructed pathways			Arrange furnishings so that pathways are clear. Remove clutter from hallways
Heating	Too cool			Maintain temperature at 22.2°c
Wires & cords	Exposed in pathways			Tack cords above floor or run beneath floor coverings
KITCHEN				
Cabinets :& Shelves	Too high			Keep frequently used items at waist level. Install shelves and cupboards at an accessible height
Floors	Wet or waxed			Place rubber mat on floor in sink area. Wear rubber-soled shows in kitchen Use nonslip wax or buff paste wax thoroughly
Gas range	Dial difficult to see			Clearly mask "on" and "off" positions on dials
Table	Wobbly unstable			Provide table with sturdy legs of even length Do not use tripod or pedestal tables
BATHROOM				
Bathtub	Slippery tub / floor. Need to use the side of the bathtub for support			Install skid-resistant / rubber mat. Use shower shoes or bath seat. Use a portable grab bar on the side of the tub. Take grab bar on trips
Towel racks Sink tops	Unstable for use as support while transferring from the toilet			Fasten grip pans to wall studs next to the toilet
Toilet seat	Too low			Use elevated toilet seat
Medicine cabinet	Inadequate lighting. Drugs inadequately labeled			Install brighter lighting. Label all drugs according to need for internal or external use. Keep magnifying glass in or near cabinet
Door	Locks			Remove locks from bathroom doors or use locks that can be opened from both sides of door
STAIRWAYS				
Height	Height of steps too high			Correct step height to < 15 cm
Handrails	Missing. Too short and end of rail unclear			Install and anchor rails well on both sides of stairway. Use cylindrical rails. Place 2.5 – 5 cm from wall.
Configuration	Too steep or too long			Install landings on stairways
Condition	Slippery			Place nonskid treads securely on all steps
Lighting	Inadequate			Install adequate lighting at both top and bottom of stairway Provide night-lights o bright-colored adhesive strip to clearly mark steps

20

21. Frailty indicator

(Ask question on physical fitness only as you would have already assessed other components of this questionnaire)

	Dependant	Independent
Mobility (ring the appropriate box) Is the patient able to carry out these tasks without any help? (The use of help resources, such as walking stick, walking frame, wheelchair is considered as independent)		
1. Shopping	1	0
2. Walking around outside(around the house or to the neighbors)	1	0
3. Dressing or undressing	1	0
4. Going to the toilet	1	0

Physical Fitness

5. What mark does the patient give him/herself for physical fitness?
   (Scale 0-10 – ring the appropriate score)

Not fit At all	0	1 2	3	4	5	6	7	8	9	10	Very fit

	Yes	No
Vision 6. Does the patient experience problems in daily life as a result of poor vision?	1	0
Hearing 7. Does the patient experience problems in daily life because of difficulty in hearing?	1	0
Nourishment 8. During the last 6 months has the patient lost a lot of weight unwillingly?	1	0
Morbidity 9. Does the patient take four or more different types medicine?	1	0

	Yes	No & Sometimes
Cognition (perception) 10. Does the patient have any complaints about his/ her memory or is the patient known to have a dementia syndrome.	1	0

	Sometimes & Yes	No
Psychosocial		
11. Does the patient sometimes experience an emptiness around him/her?	1	0
12. Does the patient sometimes miss people around him/her?	1	0
13. Does the patient sometimes feel abandoned?	1	0
14. Has the patient recently felt down hearted or sad?	1	0
15. Has the patient recently felt nervous or anxious	1	0

Questions 1 – 4: Independent = 0; Dependant = 1   Patients Score =
Questions 5 : 0-6= 1 ; 7-10=0   Patients Score =
Questions 6-9 : No=0 ; Yes = 1   Patients Score =
Questions 10 : No & sometimes = 0 ; Yes = 1   Patients Score =
Questions 11-15 : No = 0 ; Sometimes & yes = 1   Patients Score =

5 or more - moderately to severely frail

21

22. Six Minute walk test

Identify location that is safe and free from obstructions.
Follow clinical safety instructions from you manual

Equipment required

1. 30 m measuring tape
2. Stopwatch or watch with seconds hand
3. Chair from clients house (if client needs to rest)
4. Dyspnoea Borg scale instruction sheet
5. Glass of water for client

Pre test

Blood pressure: _____/_____

Heart rate   _____

Dyspnoea (Borg Scale 10) _____

Medications taken before the test (dose and time):_____

Location: _____

Time started: ___:___ ___:___   Time ended ___:___ ___:___

Lap counter:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Post test

Time   ___:___ ___:___

Heart Rate _____

Dyspnea _____ (Borg scale)

Stopped or paused before 6 minutes? Yes / No

Reason: _____

Other symptoms at end of exercise:

Angina   Yes / No

Dizziness   Yes / No

hip, leg, or calf pain   Yes / No

Number of laps: _____ (_____ meters) Final partial lap: _____ meters Total distance
walked in 6 minutes: _____ meters

22

Notes : Advise client that you would need ten minutes to complete your reports for the GP. Once reports are complete explain the results of the assessment to the client and hand over reports. **Mandatory reports** to be handed to the client are the Nurses referral report, Medical practitioners report.

Other documents that may be given to the client to take to the GP
- Summary of instruments (Client to give to GP)
- GP brochure (Client to give to GP)

Other documents that may be given to the client
- Client satisfaction survey (Client to complete)
- AAH Pamphlet (Information for the client)

Please check your client file for the above documents

Registered Nurses Name : _____

Date: : _____

Signature : _____

Clients Name : _____

Date : _____

Signature : _____

If Client unable to sign:
Caregiver / family member/ relative
Name : _____

Identity number : _____

Date : _____

Signature : _____

For office use only:

Gerontological nurse : _____

Date : _____

Signature : _____

SCP Criteria (any one of the following)	Yes	No
Chronic condition improved by diet or exercise		
Chronic medication with poor adherence		
Fall in the last three months		
Limitation in any of the activities of daily living		

23

114

Annexure 2: Nurses referral report

Comprehensive Geriatric Assessment summary – Nurses Referral report

Client's personal details	Client code:
Client Name : _____ Surname : _____ Address : _____ _____	**ALLERGY / RISK FACTORS**

Referred To Doctor (Name)   Tel:

Past medical History:

_____

_____

_____

_____

Current symptoms:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Vital signs:					
Temperature		Pulse		Respiration	
Weight		Height		BMI	
Blood pressure		Glucose		HB	

Urine dispstick test: | Normal | | Abnormal |

Specify
abnormalities: _____

Comprehensive Geriatric assessment results			
Assessment	At risk No risk Normal Abnormal	**Intervention indicated**		**Score/result & comment**
		Yes	No	
Medication risk assessment				
Medication non adherence risk				
Mini Nutritional assessment				
Vision assessment				
Hearing assessment				
Osteoporosis assessment				
Prostate symptom assessment (IPSS)				
Incontinence (ICIQ)				
Katz – Activities of daily living				
Lawtons Instrumental ADL's				
Mini mental state exam				
K10 psychological distress test				
Berg balance test				
Home assessment				
Frailty indicator				
Six minute walk test				

Please refer summary of instruments for description of tests

Nurses Recommendation
Will the patient benefit from the structured annual care plan | Yes | | No |

Registered Nurses Name _____   Date

Signature _____

Instruction for client
Please hand completed report to your medical practitioner for a further assessment

Annexure 3: Medical practitioners report

Medical practitioners report
(Please fax to Active Ageing at Home (Pty) Ltd when complete)
indicates medical practitioner to complete

Clients personal details		**Medical practitioner's details**
Client Name : _____		Name: _____
AAH client code : _____		Contact no: _____
Address : _____		

Current medication chart* *(Tick appropriate box if client must continue with medication)*

Medication name and strength	Frequency	Disease/ condition	Provider	Duration of use	Continue this medication*	
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No
					Yes	No

Medication Notes					
Multiple providers	Yes	No	OTC medications	Yes	No
Expired medications	Yes	No	Alcohol use / abuse	Yes	No
Families medication	Yes	No	Adverse reactions	Yes	No
Inappropriate prescribing*				Yes	No

New medication prescription*

No	Medication name and strength	Frequency	Disease/ condition	Duration
1				
2				
3				
4				
5				

Recommended packages (*Tick appropriate box*)*

	Yes	No
1. Will the Client benefit from an annual structured care program?	Yes	No
2. Are you willing to be the preferred GP to report any abnormalities regarding the client's health?	Yes	No
3. Is there a contraindication for the structured exercise program?	Yes	No

Acute problems*

Chronic problems*

Special investigations*

Special instructions*

Registered Nurses details

Name		3
Date CGA completed		
RN Signature		

General practitioners details*

Name of practice:	
Practice number:	
Telephone number:	
Emergency telephone number:	
Fax no:	
Email address:	

General practitioners Physical address

General practitioners Postal address

General practitioners Banking details

Account name	
Branch name	
Branch code	
Account number	

General practitioners signature :_____

Date :_____

Please fax report to 031-2604832

Annexure 4 Osteoporosis risk assessment questionnaire (ORA)

SELF TEST : ARE YOU AT RISK OF DEVELOPING OSTEOPOROSIS

To assess whether you are at risk, check each box in category [A], [B] and [C]. Also add up your numerical score [ ].

A

❑ (1) Previous low-trauma fracture [10]

❑ (2) Hormonal, Gut, Malignant or Eating Disorders associated with osteoporosis [10]*

❑ (3) Regular steroid (cortisone) use [10]

(* e.g. Overactive thyroid; Rheumatoid arthritis; Myeloma; Anorexia; Malabsorption syndrome)

B

❑ (4) Over 70 years old [5]

❑ (5) Women whose mother or sisters have osteoporosis [5]

❑ (6) Regular, daily alcohol use in pre menopausal women / males [5]

❑ (7) Menopause before age 40yr, or other causes of low sex hormones before the menopause[5]

❑ (8) Regular antiseizure medicine [5]

C

❑ (9) Over 50 years old [3]

❑ (10) Female [3]

❑ (11) Thin, with small bones [3]

❑ (12) No regular exercise [2]

❑ (13) Poor calcium intake [2]

❑ (14) Smoker/ex-smoker [2]

❑ (15) White, Asian, Mixed race [2]

❑ (16) Childless [1]

❑ (17) No breastfeeding [1]

❑ (18) Fair complexion [1]

RISK ASSESSMENT

- If you have checked 1 or more box in category A
- 2 or more boxes in category B, [OR]
- If your numerical score exceeds (15) you may be at risk and should consult your doctor

Annexure 5: Permission to use the ORA questionnaire

From: <tereza@iafrica.com>
To: <aslam@ukzn.ac.za>
Date: 8/1/2007 2:09 PM
Subject: Re: Website Request Form
Attachments: SELF TEST.doc

Dear Aslam
I have attached a more printer friendly version of the risk test.
Please just make sure that our Foundation is recognised in all material.
Good luck with the project.
Regards
Tereza Hough
CEO
NOFSA
---- Original Message ----
From: <aslam@ukzn.ac.za>
To: <tereza@iafrica.com>
Sent: Wednesday, August 01, 2007 12:13 PM
Subject: Website Request Form

> Below is the result of your feedback
> (aslam@ukzn.ac.za) on Wednesday, August 1, 2007 at 05:13:33
> ---
>
>
> name: Aslam Goolam Hoosen
>
> name2:
> develo
> The Department of Geriatrics is undertaking service and research projects
> in the care of the older persons at home. These projects will entail the
> assessment of older persons in several domains, including function,
> cognition, frailty etc.
> We request permission to use Osteoporosis self test questionnaire for the
> assessment of our patients.   The source of the documents will be
> acknowledged in any publication arising from the above.
> We would be happy to provide additional information as required.
> Yours sincerely
>
> Bilkish Cassim
> Associate Professor/Chief Specialist
> Head: Department of Geriatrics
> School of Clinical Medicine
> Nelson R Mandela School of Medicine
> University of KwaZulu-Natal
>
> Aslam Goolam Hoosen
> Project Co-coordinator
> Active Aging at Home
> aslam@ukzn.ac.za
>
> Submit: Send
>
> ---
>
> REMOTE_ADDR: 155.232.128.10

Annexure 6: Permission for database usage

AAH

Active Aging at Home (Pty) Ltd
Reg no 2007/026850/07
JV Smith House, 69 Rick Turner Road, Congella, Durban
PO Box 18859, Dalbridge, 4014
Tel: 031-2604830   Fax: 031-2604829

25 September 2009

To: University of Kwa-Zulu Natal
Ethics committee / School of Nursing

RE: Permission to use data for research purposes

As Director, I have given Mr. Aslam Goolam Hoosen permission to review and use archival data on the Active Ageing at home clinical database. I have spoken with Mr. Goolam Hoosen and understand the scope of his research, and how he will be using our data. All information to be gathered will be done in a confidential and appropriate manner.

Should you have any questions, please feel free to contact me.

Sincerely,

Professor Leana Uys
Director
Active Ageing at Home

40

Annexure 7: Clients contract

CLIENT AGREEMENT

between

ACTIVE AGEING AT HOME (PTY) LTD

and

THE CLIENT

Client Name: _____

Client ID number: _____

Dear Client,

Thank you for using the services of Active Ageing at Home (Pty) Ltd. Before we can provide you with services, we require your agreement on the following points:

1. **Client Services**
    We will provide you with the services as listed and explained in our Standard Care Package.

2. **Authorisation to pay benefits**
    Active Ageing at Home (Pty) Ltd will charge your Medical Aid Scheme for all the services rendered to you. Active Ageing at Home (Ptd) Ltd has an agreement with your Medical Aid Scheme and will charge your Scheme for these services. Please note that that these charges will not affect your medical savings account.

3. **Consent to use of information**

    Active Ageing at Home (Pty) Ltd keeps records of information relating to its services, which information it uses for the care of Clients, for the conduct of research, and for the continual improvement of its services.

    You agree that the information about you can be used in an anonymous fashion to improve the services that Active Ageing at Home (Pty) Ltd provides to you, and to conduct research into the improvement of care to the older person.

    You also agree that Active Ageing at Home (Pty) Ltd may obtain information about your medical history from your Medical Aid Scheme, and other parties, for the purposes of rendering services to you.

    In return for this permission, Active Ageing at Home (Pty) Ltd agrees that it shall hold your information in the strictest confidence, and it shall not disclose such information to any third party, save as permitted above.

5. **Consent to use Client's resources**

    Permission will be requested by the Active Ageing at Home (Pty) Ltd healthcare worker to use your telephone in order to make appointments for you or to effectively manage your health.

6. **Scheduled Visits**

    Active Ageing at Home (Pty) Ltd employees schedule visits in advance to Clients' homes. If the Client cancels a visit, it is his/her duty to inform the Health Promoter, Biokinetist or Registered Nurse (depending on who has been scheduled to visit the Client) of the cancellation. This visit must be rescheduled directly with the relevant healthcare care worker.

7. **Indemnity**

While Active Ageing at Home (Pty) Ltd will exercise reasonable care in the provision of its services to you, it cannot be held responsible for any harm suffered by you, or anyone else, as a result of the provision of these services to you, and you understand that you accept the provision of these services entirely at your own risk.

Contractual obligation. By signing this agreement you will be entitled to the services and benefits of the Standard Care Package for one year. Our agreement will be automatically renewed thereafter, subject to the approval of your medical scheme, until terminated by you.

By signing, and returning this letter to us, you agree to the provision of services to yourself by Active Ageing at Home (Pty) Ltd, on the terms and conditions outlined in this letter.

Client   signature: _____   Date: _____

Address   :_____

                               :_____

                               :_____

Witness   :_____

Specify relationship   :_____

Company representative   :_____

If Client cannot sign:

Reason Client did not sign or used "X": ☐ Physically unable ☐ Mentally unable

Responsible party signature : _____

Full names : _____

Address : _____

_____

_____

Relationship to Client : _____

Telephone number : _____

Annexure 8: GP satisfaction

Section B: GP satisfaction survey

Letters were sent out to 75 GP's that have participated in the AAH program. AAH received 19/75 (25%) of the surveys from the GP's.
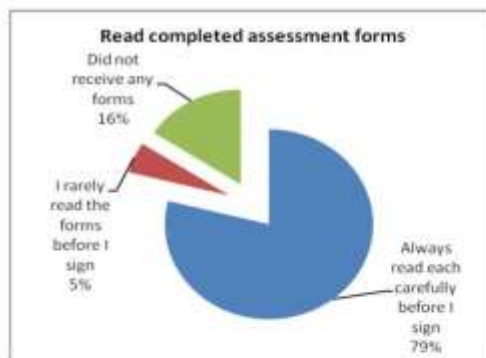
1. Overall good response to support of AAH Program. Reasons given for no support include the following:
a) Never heard of AAH (5.3%) 1
b) AAH stressed patient – U/weight based on BMI (5.3%) 1
c) AAH caused more problems to client when they got active (5.3%) 1

No 16%
Yes 84%
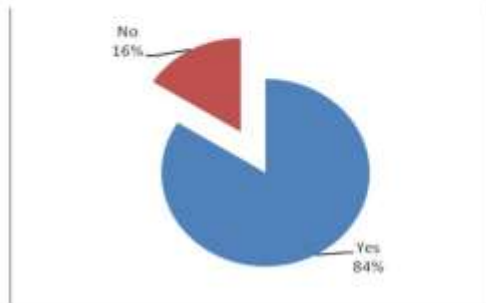
2. Nurses were sending assessment findings to the GP's. GP's were required to send the reports to A@H.

This process has now changed as GP's will conduct the first consult and send the information to AAH.

AAH will communicate with GP via the Clients health record.

Read completed assessment forms

Did not receive any forms 16%

I rarely read the forms before I sign 5%

Always read each carefully before I sign 79%

3. Positive experience by GP's

AAH found Client anaemic - further investigation found Chronic lymphocytic lymphoma	1	5%
Optimised care for elderly	2	11%
Client well cared for	1	5%
Complements service GP's are providing	1	5%
Enjoyed by more frail people	1	5%
Good review	1	5%
Health promoters have a good way of keeping a check on patients health	1	5%
Helpful	1	5%
Medication review and other assessments are excellent	1	5%
Nil Comment	9	47%

4. Negative experience by GP

Negative experience	No of clients	%
Client injured back during exercise	1	5%
No follow up	1	5%
No Proof of payment to GP's	1	5%
Some clients are inappropriate for the program	1	5%
Lack of information	2	11%
Nil comments	13	68%

5. Suggestions to improve service

Suggestion	No of clients	%
Get pharmacist on board	1	5%
Joint consultation with GP via phone	1	5%
Pay GP decent house call fee	1	5%
Regular follow up reports	1	5%
Nil comments	15	79%

6. What services would you like to be provided by home care agencies?

Wound dressing
Diabetes education ✔
Occupational therapy
Making home safer (physically) ✔
Dietary advice ✔
HIV Screening
Regular follow up of chronic patients ✔

✔ A@H offers these services

Annexure 9: Ethical clearance - UKZN

UNIVERSITY OF
KWAZULU-NATAL

University of KwaZulu-Natal
Research Office
Govan Mbeki Centre
Westville Campus
University Road
Chiltern Hills
Westville
3629
South Africa
Tel No: +27 31 260 3587
Fax No: +27 31 260 2384
E-mail :naidoos4@ukzn.ac.za
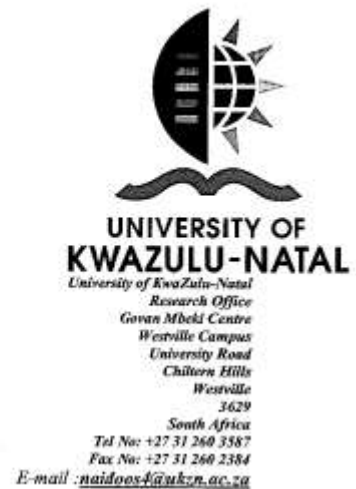
28 October 2009

Mr A G Hoosen
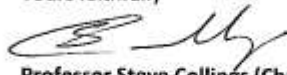7 Earlbridge Grove
Stonebridge
PHOENIX
4068

Dear Mr Hoosen

PROTOCOL: Exploring the actions of General Practitioners on abnormal findings identified by registered nurses conducting Home Comprehensive Geriatric Assessments (CGA)
ETHICAL APPROVAL NUMBER: HSS/0771/2009:   Faculty of Health Sciences

In response to your application dated 02 October 2009, Student Number: **203513764** the Humanities & Social Sciences Ethics Committee has considered the abovementioned application and the protocol has been given **FULL APPROVAL.**

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steve Collings (Chair)
HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE

SC/sn

cc: Prof. E Macera
cc: Mr S Reddy

Founding Campuses: ▪ Edgewood   ▪ Howard College   ▪ Medical School   ▪ Pietermaritzburg   ▪ Westville