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Uwumagbe, Iyare Brain

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FUNCTIONAL STATUS AND HEALTH-RELATED QUALITY OF LIFE OF THE INSTITUTIONALISED ELDERLY IN SELECTED JOHANNESBURG AREAS

Iyare Brain Uwumagbe



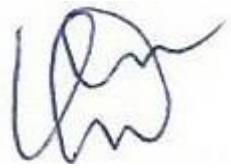
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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy

Johannesburg 2017

I. DECLARATION

I, Iyare Brain Uwumagbe, declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Science in Physiotherapy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



.....

20th day of November, 2017

DEDICATION

To my beloved mother and grandmother

ABSTRACT

BACKGROUND: Global life expectancy is on the rise and it is contributing to the growth of the population proportion of the elderly. More and more elderly are getting institutionalised. Functional status decline has been found to influence institutionalisation in the elderly while health-related quality of life seems to be better among the community dwelling elderly compared to the institutionalised elderly. As a result, there is increased interest on the functional status and health-related quality of life (QoL) of the institutionalised elderly.

OBJECTIVES: The objectives of the study were:

- to determine the demographic profile of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.
- to determine the health-related quality of life and functional status of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.
- to determine the relationship between functional status and health-related QoL of the institutionalised elderly in selected Johannesburg areas.
- to determine the predictors of functional status and health-related QoL of the institutionalised elderly in selected Johannesburg areas.

METHOD: The study utilised a cross-sectional, quantitative descriptive design. Functional status was assessed using the Physical Self Maintenance Scale (PSMS) and the Instrumental Activities of Daily Living (IADL) scale while health-related QoL was assessed using the EQ-5D-5L. The functional status and health-related QoL of the participants were assessed as a onetime event over 11 weeks. The calculated sample size was 137 participants but only 116 residents met the inclusion criteria. Questionnaires were administered individually on participants who met the study inclusion criteria after obtaining consent to get activities of daily living (ADL), IADL and health-related QoL scores. Stata version 13 was used for data analysis.

RESULTS: There were 105 participants, 66 (62.86%) female and 39 (37.14%) male. The mean age was 75.2 (±8.56) years and age range being 61-98 years. The median ADL score was 5. The median IADL score for female participants was 2 while the mean IADL score for male participants was 1.95±1.70. The median EQ-5D-5L index value was 0.69. Activities of daily living (**r**=0.685, **p**<0.001) and IADL (**r**=0.434, **p**<0.006 (male); **r**=0.369, **p**<0.003 (female)) were positively correlated with health-related QoL. The correlation between health-related QoL and ADL and that between QoL and IADL were *strong* and *moderate*

respectively. Independent predictors of health-related QoL were race and religion. Religion was the only independent predictor of functional status (basic ADL) for both male and all participants. There was no independent predictor of functional status (IADL) for female participants.

CONCLUSION: The age range of participants was a span of four decades of life beginning from the sixth decade. Females outnumbered male participants in the ratio 1.69:1. The functional status of **participants** was *poor* (IADL) to *moderate* (ADL). The health-related quality of life of **participants** was *moderate.* Functional status and health-related quality of life were *positively associated* with *strong strength*. Religion and race independently predicted functional status and health-related QoL. Although the data gotten from participants' responses were sufficient for analyses, the findings from this study cannot be generalised to all the institutionalised elderly in the selected areas in Johannesburg because the number of residents who met the study inclusion criteria and participated in the study fell short of the calculated sample size. In essence, there is the need for more studies on the functional status and health-related quality of life of the institutionalised elderly.

ACKNOWLEDEMENTS

Great thanks to:

- Mr Author Nehizena Uwumagbe for the immense moral, material and financial support towards the success of this postgraduate programme, part of which is this research report.
- My ever-loving family members for their massive moral, material and spiritual support that contributed to the successful completion of this research report
- Mr Kazeem Olajide Alao, a long time bosom friend like my brother for the financial and unique style of moral support towards the successful completion of this programme.
- Mr Adeolu Salawu and Mr Oluwaseun Daniel Olopade for the very active roles they played in ensuring that I never lost hope when the road to the successful completion of this programme seemed to have become bleak at some point.
- Mr Akintunde Adedayo Ajidahun, for his contribution to the success of the Protocol for this research report and this research report through editing, recommendation, advice, printing and submission.
- The University College Hospital, Ibadan Nigeria for giving me the opportunity to work as a physiotherapist in West Africa's first Geriatric centre which motivated me to carry out this study.
- Mrs Sonti Pilusa, for her personal efforts through her various advices at ensuring that the processes of approval at various levels for this study were smooth.
- Professor Witness Mudzi for his very humbling effort in ensuring that I met the deadline for the submission of this research report without having to register for a new session because of this report.
- My supervisors Mrs Sonti Pilusa and Professor Witness Mudzi for their very efficient guide through the process of developing the protocol for this study and the eventual success of this research report. Their painstaking efforts through time and energy spent on ensuring that I had requirements needed for the approval of this study are well appreciated.
- The managements of Joseph Gerald Home of Peace for the Aged, Itlhokomeleng Association for the Care of the Aged and Disabled, Queen Alexandra Retirement Home and Nazareth House for giving me the approval to involve their institutions in this study.

- The Gauteng Social Development department for giving me the approval to carry out this study in the selected Johannesburg areas.
- My research assistant Mr. Sithole for his valuable effort and time contributed to the success of this study.
- Ms Phumla Mngomeni for her assistance as a research assistant at Joseph Gerald Home of Peace for the Abandoned Aged.
- Mrs Eunice Mompati for her assistance with regards the socio-demographic data of participants at Joseph Gerald Home of Peace for the Abandoned Aged.
- Mr Ken Mwai, Dr. Engelbert Nonterah and Dr. Gbenga Olorunfemi for their efforts towards the data analysis and presentation success of this research report.
- Professor Douglas Maleka for his advice towards the success of this study.
- Dr (Mrs) Oladunni Caroline Oshudiya who from the very beginning gave immense advice and believed till the very end that I had no option of giving up even with the challenges that came my way during this MSc.
- All the participants in this study for the selfless service rendered.

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CHAPTER 1: INTRODUCTION

In less than a decade, the population of the elderly aged 60 years and above will reach 1.2 billion –double that of the population 25 years before (Chodzko-Zajko, 2000). There is an unprecedented surge in the percentage population of the elderly due to the increase in global life expectancy which has caused more people to grow old and live longer at old age (Crimmins, 2015). Africa on its own has been observed to have an eerie rate of population explosion which does not exclude the elderly population. The sub-Saharan Africa fertility rate has relatively been high (United Nations, 2011). This high fertility rate results in the number of younger ones reaching old age to be on a continuous increase. This high fertility rate has contributed to an increase in the elderly population. An increased global life expectancy is believed to contribute to the ever-growing population portion made up of the elderly in Africa (Pillay and Maharaj, 2013). More people are growing old to join the population of the old while the old are living longer thus increasing the overall population of the elderly.

South Africa has even more attention-seeking statistics because of its contradiction to the average African fertility rate. South Africa has the lowest fertility rate not just in Southern Africa but also in sub-Saharan Africa (Moultrie and Timaeus, 2002). Fewer babies being given birth to in South Africa means that a lesser number of younger people are being added to the current population which is experiencing an increased life expectancy, thus increasing the proportion of the elderly in the population (Beard et al., 2015). Therefore, the population of the elderly in South African is also growing despite the relatively low fertility rate being experienced.

As old age beckons, anatomic and physiologic changes take place affecting the musculoskeletal (Fielding et al., 2011), cardio-respiratory (Anschütz, 1991), neurological (Decker, 1987), the gastrointestinal (Russell, 1992) and other systems. The deformation of the thorax results in increased work of breathing and posture changes. The structure of the heart itself changes resulting in the weakening of the nodular systemic control of the heart and cardiac output decreases. Advancing age bring along loss of muscle strength (Ebner et al., 2015) and narrowing of joint space due to osteoarthritis (Loeser and Lotz, 2016) and rheumatoid arthritis (Mangnus et al., 2015). The age-related changes in the skeletal joints contribute to a decline in movement effectiveness in the elderly (Prince et al., 1997). These

physiologic and anatomic changes that occur in the elderly affect both mental, physical activity levels and functional status.

As one becomes elderly, the ageing process causes a decrease in physical activity level and functional fitness (Hyatt et al., 1990, Milanović et al., 2013). Functional status is defined with respect to activities of daily living and, is generally affected by the physical, mental and social state of individuals (the elderly inclusive) (Leidy, 1994, Stuck et al., 1999). Health status which may affect the physical, mental and social status of an individual is generally considered to be relevant with regard to functional status. However, functional status may remain unaffected even with a negative change in health status regardless of the old age factor (Hurria et al., 2006). Muscle strength decline which is expected due to increasing age in the elderly is positively correlated with functional status which in turn affects the quality of life of the elderly especially in the presence of physically disabling medical conditions (Kim et al., 2014).

World over, socioeconomic factors, decreasing communal living, loneliness have been associated with functional decline, dependence and death in the elderly (Perissinotto et al., 2012). Decreasing physical ability has also continued to make an increasing number of the elderly more dependent (Prince et al., 2015, Hacihasanoğlu et al., 2012, Santos et al., 2012). These factors have led to an increased demand for institutional care for the affected elderly (Broad et al., 2013). Increasing demand for care of the elderly is resulting in the emergence of newer institutions (Shutes and Chiatti, 2012).

As the elderly move from the community to institutions, adaptation is sacrosanct. This is because some had homes and families but now have to be cared for by people that could best be described as strangers (Weicht, 2011) in a different environment. The likelihood is that as the world population keeps growing, the elderly will become increasingly less competitive and more society-dependent. This will make the institutionalisation of the elderly that need help not only acceptable but also important as the pressure on available resources in the community increases (Greene and Ondrich, 1990). The situation where the institutionalised elderly have no choice but adapt to the institutional environment based on available resources will likely become non-negotiable. Therefore, the functional status and health-related quality of life of the hitherto community-dwelling elderly may be affected by the adaption to the institutional environment.

Quality of life is an important discus in today's world regardless of age category. However, the concept and perception (Bowling et al., 2003) does not seem to be the same even in similar prevailing circumstances (Carr et al., 2001). The concept of quality of life has so much evolved that context is now a basis for discussion on quality of life (Walker, 2004). These contexts range from the general or specific health state of the individual; the environment of the individual; the factors affecting the quality of life of the individual; the perspective of observers or that of the individual involved and a number of others depending on need and reason for the evaluation of quality of life. Multiple factors which are mainly physical, mental and social have been identified as affecting the quality of life of an individual in old age (Netuveli and Blane, 2008). Discussions on the quality of life in the elderly have now shifted to whether it is community based or institution based (Noro and Aro, 1996).

Obvious declines in the quality of life amongst the elderly and the globally changing economic environment have no doubt contributed, directly or indirectly, to the increasing need for institutionalisation amongst the elderly (Luppa et al., 2009). The focus on the quality of life amongst the institutionalised elderly is not a recent development (Oleson et al., 1994). The importance of the quality of life amongst the institutionalised elderly is however, increasingly gaining momentum as available institutions for the elderly surges. It has become imperative that these institutions should not just be places of last resort but places to maintain, if not improve, the present quality of life (QoL) of the elderly that become part of these institutions. The QoL of the elderly in institutions for the elderly has become very important and is being compared to that of community-dwelling elderly (Tomas-Carus et al., 2015, Borowiak and Kostka, 2004). The quality of life of the institutionalised elderly like that of the general population is dependent on various factors predicting or determining it.

Problem Statement

The percentage of the elderly in the South African population has already topped 7% five years ago and is rising. As the elderly population keeps rising, so will the need for institutions for the elderly. Despite functional status being an important factor in determining quality of in the elderly, the functional status and quality of life among the elderly in institutions in Alexandra, Orange Grove and Yeoville areas are not known. No data was found on quality of life and/or functional status of the institutionalised elderly in Gauteng in general and

Johannesburg in particular. The data on the institutionalised elderly in Gauteng as officially available from the Gauteng Department of Social Services website is at least eight years old.

The socio-economic and political trends in the world today make the elderly population an integral part of the general population that plays a key role in shaping the society. South Africa has a socio-political past that is making a huge reflection on the quality of life of the elderly today, especially with regard to institutionalisation. The studies that have been done on the quality of life of the institutionalised elderly in South Africa are very few regarding available literature. Studies on functional status and quality of life of the institutionalised elderly in any selected areas of South Africa are virtually non-existent in available literature. This study will help shade light on the functional status and quality of life of the institutionalised elderly in the selected Johannesburg areas.

Research questions

- What is the relationship between functional status and health-related quality of life among the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg?
- What are the predictors of the functional status and health-related quality of life of the institutionalised elderly in the aforementioned areas?

Aim of the Study

The aim of the study was to determine the functional status and the health-related quality of life of the institutionalised elderly in Alexandra (Region E), Orange Grove (Region E) and Yeoville (Region F) areas of Johannesburg.

Objectives of the study

- To determine the demographic profile of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.
- To determine the health-related quality of life and functional status of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.

- To determine the relationship between the functional status and health-related quality of life of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.
- To determine the predictors of functional status and health-related quality of life among the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg.

Significance of the study

It is envisaged that this study will:

- Act as a baseline for establishing the functional status and quality of life among the institutionalised elderly in this cohort of elderly.
- This knowledge will assist us to recommend what needs to be put in place to ensure good quality of life for the elderly in terms of their functional status. The information gathered from the study may also assist with policy making in terms of protocols that should be in place in institutions that house the elderly.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review critically examines the literature on the quality of life of the elderly, its classification, factors that affect it and its assessment. Functional status in the elderly, factors that affect it and the assessment of functional status in the elderly are also examined in the literature review. Both quality of life and functional status in the elderly with focus on institutionalisation context and factors that predict institutionalisation in the elderly will be discussed are also critically examined.

Resources used to source literature included PubMed, Google Scholar, CINAHL, Pedro, ProQuest, SAGE, SCOPUS, Wiley online library, BioMed Central, Oxford journals online, ScienceDirect Medline and Research Gate. Emphasis was laid on articles dating from 2006 but articles from earlier dates were used when they were deemed relevant and important. Keywords that guided the literature search were elderly, functional status, quality of life, functional status and elderly, quality of life and elderly; health related quality of life and elderly, institutionalisation and elderly, quality of life of life and institutionalised elderly, functional status among institutionalised elderly, ageing and elderly, quality of life and ageing, assessment and elderly quality of life, function assessment and elderly, elderly population, elderly population and Africa, elderly population and South Africa, elderly quality of life and South Africa, South Africa and elderly functional status, functional status and quality of life of the elderly in Gauteng.

2.2 Population and Ageing

Ageing is a lifelong process where accumulation of molecular and cellular damage in the body resulting from multiple mechanisms which are regulated by a complex maintenance and repair network (Kirkwood, 2005). The result of this process is in the transformation from childhood to becoming an elderly individual. The growth and developmental process during ageing also involves both mental and social aspects of life (Cornwell and Waite, 2009, Wurm and Benyamini, 2014).

The world's population is growing so fast that it is expected to reach 10.9 billion by the year 2100 (Gerland et al., 2014). However, this population growth rate has not been globally uniform. Developing countries like those in Africa have been experiencing relatively higher

growth rate (Gerland et al., 2014). This has mainly been attributed to higher birth rates in the poorer and/or developing countries (Gerland et al., 2014). On the other hand, the population growth rates of the developed countries have been slowing down mainly due to decreasing/low fertility rate. The estimate is that of the world's population, 48% live in countries where birth rate cannot replenish the population (Lee and Mason, 2014). In a year, from 2012 to 2013, the fertility rate in the United States dropped by 1% (Martin et al., 2015). One socio-economic factor that has been markedly attributed to this drop in fertility rate in America is unemployment amongst women (Currie and Schwandt, 2014). A similar low fertility trend has been reported for Japan (Muramatsu and Akiyama, 2011). Sub-Saharan Africa has a fertility rate that is opposite of the current trend in the developed world (Bongaarts and Casterline, 2013). This is evident in countries like Nigeria which has a relatively high birth rate (Schiermeier, 2014).

The pressure on the world population is also being heightened by increasing global life expectancy. This increasing life expectancy has been the main factor responsible for the marked increase in the population of the elderly (Gerland et al., 2014). This is also resulting in the continued swayed proportional population increase that is favouring the elderly population. The population of the elderly is growing so fast that the 20th century might be the last century when the population of the young exceeds that of the elderly (Cohen, 2003).

Health plays an important part in ageing. Today, better health status as a result of improved healthcare is observably contributing to longer living in some parts of the world and hence causing an increase in the population proportion of the elderly (Ikeda et al., 2011). The developed countries which have better healthcare have been experiencing higher healthy life expectancy compared to the developing countries which still have major challenges with regard to healthcare (Mathers et al., 2001). A global improvement in healthcare has contributed to increased global life expectancy which is an important factor in the increasing population of the elderly (Mathers et al., 2001). The most developed nations of the world which include Japan, America, United Kingdom, and Australia where healthcare is at a high standard are among the countries with the highest healthy and longer life expectancies which has vastly resulted in a marked continuous increase in the population of the elderly (Mathers et al., 2001).

Sub-Saharan Africa, even with the massive healthcare challenges, especially with regard to HIV/AIDS, is not left out in the global trend of increasing life expectancy which is causing

the increase in the population of the elderly (Mills et al., 2011). Although Sub-Saharan Africa has a lower life expectancy compared to the developed world, it has also been experiencing increased life expectancy over the years (Mathers et al., 2001) which has contributed to the increasing population of the elderly.

Health, especially with regard to HIV/AIDS prevalence, is no doubt a major national issue in South Africa. The fight against HIV/AIDS by the government has played an important role in increasing the population of the elderly in South Africa. Adult life expectancy increased from 49.2 years to 60.5 years in just eight years after the government made anti-retroviral therapy available in public hospitals which is contrary to the marked decline observed less than two decades earlier due to the HIV/AIDS epidemic in Southern Africa (Bor et al., 2013). Improvement in access to Anti-Retroviral Therapy (ART) for adult (including the elderly) South Africans has the ability to give a near normal life expectancy to HIV-positive individuals who start receiving their ART before their CD4 count drops below 200 cells/μl (Johnson et al., 2013).

2.2.1 Physiological changes in the elderly

The process of transformation from birth to becoming elderly involves ageing. Ageing involves complex processes which begin at very fundamental levels (Vina et al., 2007). This involves all the various bodily systems that work as connected units to result in human functioning.

In the endocrine system, beta cells which produce insulin deteriorates in both number and function which in turn affects glucose regulation (Liu et al., 2014). Osteoporosis is experienced as part of the ageing process in the elderly. Decreasing bone mineral density (BMD) affects both male and female elderly. Hormonal changes which occur in both male and female elderly but with higher levels in postmenopausal female result in a relatively higher decrease in BMD in women (Nguyen et al., 2015).

One of the presentations of ageing in the elderly with regard to the cardiovascular system is decreased cardiac output (Strandell, 1976). This results from decreased myocardial pump as myocardial conduction capacity diminishes due to ageing cardiac muscle (Cheitlin, 2003). A progressive elevation of blood pressure (hypertension) is a common feature of the ageing process in the elderly (Wei, 1992). The ageing process causes an increase in the rate of deposition of cholesterol in the arterial lumen (atherosclerosis) and the arterial walls

progressively harden (arteriosclerosis). These occurrences contribute to the incidence of hypertension in the elderly. The decrease in cardiac function has a resultant implication on the overall functioning of the other systems in the body of the elderly. The prevalent cardiovascular diseases among the elderly (Prince et al., 2015) can be attributed to these age-related changes in the elderly.

In the respiratory system, ageing causes increased rigidity of the thoracic wall (Sharma and Goodwin, 2006) which affects gaseous exchange due to decreased elastic recoil of the lungs (Janssens et al., 1999). An increased functional residual capacity is a result of these changes. Ageing result in changes in lung volumes due to decreased elastic recoil of the lung and an increased rigidity of the thoracic wall (Sharma and Goodwin, 2006). The higher tendency of lower airway closure in the elderly due to decreased elastic tissues that hold the airway causes higher occurrence of ventilation-perfusion mismatch (Zaugg and Lucchinetti, 2000).

The genitourinary system is also markedly affected by ageing. Ageing causes a decrease in the size and weight of the kidneys (Epstein, 1996). There is a decline in the number of glomeruli in the kidney which negatively affects creatinine clearance. Tubular function decline due to ageing causes a steady decrease in the amount of glucose reabsorbed which increases the tendency for glycosuria (Samiy, 1983). In most advanced men, prostrate hypertrophy could result in urinary bladder neck obstruction which results in urinary retention (Oelke et al., 2008).

The gastrointestinal system also experience changes in the elderly due to ageing. The peristaltic activities in the oesophagus may be decreased and the non-peristaltic activities may be increased (Tracy et al., 1989). The transit time in the oesophagus may be delayed and the relaxation of the lower sphincter may be decreased (Khan et al., 1977). In the stomach, atrophic gastritis can occur due to ageing (Katelaris et al., 1993). In the colon, motility is decreased due to ageing. Ageing in many cases results in external and internal sphincter control loss which causes incontinence in the elderly (Boss and Seegmiller, 1981).

In the musculoskeletal system, age-related changes that are observable with the muscle mass results from the decrease and atrophy of muscle cells (Aagaard et al., 2010). Ageing also causes degenerative changes in the joints (Buckwalter and Mankin, 1997). There is the degeneration of the joint cartilages; there is eburnation and subchondrial bone thickening (Loeser, 2010). The effect of weight bearing and the ongoing degenerative process

contributes to a resultant bone remodelling with the formation of marginal bony spurs and cysts in the subarticular surfaces (Parizel et al., 2015). These musculoskeletal changes contribute much to the locomotive changes that occur in the elderly (Lauretani et al., 2003).

A very important system because of its coordinative function that is markedly affected due to ageing is the neurological system. The neurological system decreases or loses its integrative function due to ageing (Mattay et al., 2002). Precise functioning is also lost, especially in the brain. A breakdown in the higher order system of the brain that is observed due to ageing may not be unconnected to disruption of the myelinated fibres that connects neurons in the different parts of the brain cortex (Andrews-Hanna et al., 2007). A common sign of neurological ageing in the elderly is cognition deficit (Bishop et al., 2010) and muscular control decline (Trounce et al., 1989). Age-related neurological decline takes its toll on the functional status in the elderly.

It is the combinations of these changes that take place in the process of ageing that culminate in one becoming elderly. A resultant physical effect of ageing is continued decrease in physical work capacity that is attributable to declining aerobic and musculoskeletal capacity (Kenny et al., 2008). The physiological changes that take place in the ageing process takes their toll on certain areas of memory, processing speed, reasoning and executive functions which result in diminished cognition in the elderly (Deary et al., 2009). A decline in one aspect of mental functioning increases the likelihood of decreased physical functional ability (Wilson et al., 2002). The combination of the physical and mental effects of ageing in the elderly increases the chances of dependence which in turn could affect the social life of the elderly and that of society. Consequently, ageing takes its toll on one's ability to lead a fulfilled life and increases the chances of developing other medical conditions.

2.3 Medical Conditions in the elderly

A good number of medical conditions are age-specific and some of those medical conditions are old-age related. The process of ageing experienced in the elderly aids the setting in of some medical conditions (Parizel et al., 2016). Part of ageing in the elderly is a general degenerative process which precipitates conditions such as osteoporosis and atherosclerosis. Osteoporosis has become a very important disease in the elderly as population of the elderly keeps growing (Diaz-Redondo et al., 2014).

One of the systemic diseases with higher risk of occurrence due to increasing age is hypertension. In most elderly people aged 65years and above, hypertension is a common disease (Sakellaris and Baladima, 2012). Several other diseases including atherosclerosis in the elderly have been linked to hypertension. Consequently, some studies have focused on identifying ways of increasing longevity in the elderly by preventing or treating hypertension (Krakoff et al., 2014, Mathers et al., 2015).

The incidence of diabetes in the elderly is on the rise and is widely reported as an important cause of morbidity and mortality (Botts and Munshi, 2008, Chentli et al., 2014, Huang et al., 2014). In the elderly, diabetes is also known to precipitate other conditions such as kidney disease and pancreatic cancer (Barsoum, 2006, Gregg et al., 2014, Silverman et al., 1999). This has been partly attributed to increasing life expectancy in today's global population (Abdelhafiz and Sinclair, 2015). The prevalence of diabetes amongst the elderly is so high that it affects one third of those aged 65 and above in America (Cowie et al., 2009). Even though Africa accounts for the region with the lowest mortality rate in the elderly attributed to diabetes, it still accounts for not less than 5% of death in the elderly (Roglic and Unwin, 2010).

Some other common diseases associated with old age are dementia, Parkinson and Alzheimer. Today, dementia is a global phenomenon with its impact being felt in the health, social and economic facades of everyday living (WorldHealthOrganization, 2012). The non-motor and motor features of Parkinson's disease that impacts on function (Jankovic, 2008) in the elderly makes the disease a significant challenge to deal with while the mortal effect of Alzheimer's disease on the elderly population cannot be underestimated (Alzheimer'sAssociation, 2011). These diseases are at times inter-related in their prevalence and incidence (Bonanni et al., 2008, Hely et al., 2008, Kalaria et al., 2008) and hence seemingly create a common challenge in the elderly.

2.3.1 Co-morbidity in the elderly

In the elderly, the presence of two or more chronic conditions (co-morbidity) is not an unlikely experience. The tendency of a comorbid state is higher with increasing age (Abizanda et al., 2009). Co-morbidity is a contributing factor to the complexity of growing old. It plays a role in the overall functional state of the elderly, can predict mortality (Gagne et al., 2011), and influences remission (Etienne et al., 2007) in the elderly. Co-morbidity

which varies in severity amongst individuals can undergo transient or permanent changes. Factors such as change of environment (institutionalisation), change in socio-economic status, stress, and trauma can result in changes in the comorbid state in the elderly (Karlamangla et al., 2007).

There are various health conditions that contribute to the comorbid state in the elderly. Diabetes, heart failure and visual impairment are some of the conditions that have significant comorbid occurrences in the elderly (Marengoni et al., 2009). Insomnia has been found to be highly comorbid with chronic physical conditions and depression in the elderly (Gureje et al., 2009). Other diseases such as cerebrovascular accident, hepatitis, coronary artery diseases, left ventricular hypertrophy, and congestive heart diseases are some of the very prevalent comorbid diseases across different races and continents (Goodkin et al., 2003).

More than 65% of Americans older than 65years suffer from two or more of coronary artery disease, hypertension, diabetes mellitus and osteoarthritis (Wolff et al., 2002). In the elderly Chinese, co-morbidity is a common challenge and the probability of the presence of comorbidities increases with increasing BMI (Ho et al., 2008). Co-morbidities such as obesity and diabetes are also a common experience amongst elderly Africans (Kengne et al., 2013). The HIV/AIDS epidemic in Africa has been found to increase the risk and prevalence of comorbidities among the elderly especially in Sub-Saharan Africa (Negin et al., 2012). In Nigeria, co-morbidity in the elderly plays a significant role in that it is a major determinant of the dependency level (Uwakwe et al., 2009). Co-morbidity amongst diabetic elderly South Africans is relatively common (Westaway, 2010). Although there were significant effects of age, race and gender on comorbidities amongst elderly South Africans, the relatively high prevalence of comorbidities (25% with hypertension combined with one or more other chronic disease; 23% with other chronic diseases including but not limited to asthma, renal failure, arthritis, epilepsy and diabetes mellitus without hypertension & 25% with hypertension alone) among these elderly South Africans is worth noting (Westaway, 2010). Amongst the institutionalised elderly diabetic Americans, co-morbidity was also found to be higher compared to among non-diabetic institutionalised Americans (Dybicz et al., 2011).

2.4 Functional status in the elderly

Function in the elderly is generally affected by varying factors. Function in the elderly, just as in the younger population, is limited to basic and instrumental activities of daily living

(Millán-Calenti et al., 2010). One of the characteristics that are affected by becoming an elderly individual is the level of independent living. Activities such as toileting, feeding, dressing, grooming, physical ambulation and bathing which are basic in nature are important for daily survival in the elderly (Rajan et al., 2012). The level of independence in these activities would directly impact on more complex activities such as the ability to use facilities such as the telephone or cell phone, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own health through the use of medications and the ability to handle finances which are instrumental to daily survival (Millán-Calenti et al., 2010).

Inability or the decreased ability to independently carry out the basic and/or instrumental activities in the elderly is viewed as functional status decline in the elderly (Pereira et al., 2008). This decline in functional status is attributed to various factors that have physical (Tanimoto et al., 2012) and mental (Rajan et al., 2012) effects. These factors, however, are mainly linked to increasing age which has marked impact on physical and mental abilities in the elderly. The functional decline is viewed in different contexts that include but are not limited to social (Perissinotto et al., 2012) and health (Kortebein et al., 2008) perspectives . This may be the reason why there are various available multidimensional assessment instruments of function in the elderly.

2.4.1 Physical activity effect on functional status among the elderly

Physical activity among the elderly is an area which receives much emphasis in previous studies (Sun et al., 2013). This reflects that there is much to know about physical activity in the elderly. Physical activity level in the elderly is age-related in some instances and this affects functional fitness (Milanović et al., 2013) which is important in growing old. Physical activity through structured exercise is reported to have positive effects on the sequelae of ageing in the elderly (Chou et al., 2012). Increasing age in the elderly is likely to cause a decrease in physical activity level and hence functional status (Clegg et al., 2013).

A relationship between physical activity and health status in the elderly has been reported (Warburton et al., 2006). This means that there is a relationship between functional status and health-related QoL. The benefits of physical activity in the elderly on quality of life (Motl and McAuley, 2010) and the prevention of diseases (Rolland et al., 2008, Sofi et al., 2008) that are reported in literature also indicates an existing relationship between functional status and health-related QoL. Literature reveals that physical activity in the elderly has both mental

and physical effects which affect functional status. The specific effects of physical activity on cognition (a mental factor) are still being researched (Angevaren et al., 2008, Bherer et al., 2013, Lautenschlager et al., 2008).

Muscle power in the elderly may well predict functional status in the elderly (Foldvari et al., 2000). The focus on muscle power as a predictor of functional status has actually been on the lower extremities. This can be related to sarcopenia which is an essential aspect of growing old (Cruz-Jentoft et al., 2010). Many other medical states including obesity and diabetes have also been associated with functional disability in the elderly (Kalyani et al., 2010).

2.4.2 Assessment of functional status in the elderly

There are various assessment tools for functional status in the elderly. Mainly, these tools assess functions at the basic and instrumental activities of daily living levels (Fillenbaum, 2013, Graf, 2008). The assessment of functional status in the elderly is sometimes done with respect to the presence of medical/surgical condition(s) in the individual(s) involved (Lawrence et al., 2004, Lee et al., 2009). The choice of scale depends on various factors such as the state of health, whether general function or specific functions related to health and the environment are being assessed and, whether the focus is on rehabilitation outcomes or if the focus is on the stable health condition (Applegate et al., 1990).

There seem to be unison in the concept of both basic and instrumental activities of daily living and the definition of basic activities of daily living in literature in the attempt to measure function (Applegate et al., 1990, Katz, 1983, Sonn and Asberg, 1990, Spector et al., 1987, Won et al., 2002). However, the variability in the approach to measuring instrumental activities of daily living indicates that there are divergent views with regard to its definition (Buurman et al., 2011). This is apparent in the level of variability of available general assessment tools for function in the elderly with regard to instrumental activities of daily living.

The basic activities of daily living could be carried out by an elderly individual and still not possess the required skills to live independently in the society (Ward et al., 1998). However, the ability to perform the instrumental activities of daily living such as the use of telephone, shopping, preparation of food, housekeeping, laundry, transportation, taking responsibility for own medications and the ability to handle personal finance will have impact on the level of independent living of the elderly in the society (Applegate et al., 1990, Won et al., 2002).

This is buttressed by the fact that as health status declines in the elderly, the need for assistance in performing the more complex instrumental activities significantly increases (Whittle and Goldenberg, 1996).

The Physical Self Maintenance Scale (Lawton and Brody, 1969) assesses basic activities of daily living as functions in the elderly whether in the community setting or within institutions. The Functional Independent Measure assesses function in rehabilitative state (Keith et al., 1987) and the emphasis is on basic activities. The Frenchay Activities Index is a condition specific scale that can be used to assess function in the elderly who have suffered stroke (Schuling et al., 1993). A functional assessment scale that is popularly used in the elderly population is the Katz Index (Katz et al., 1963). The Physical Self Maintenance Scale has various attributes that makes it preferred to the Katz Index. The Physical Self Maintenance Scale has a broader assessment with regard to its items on toileting and ambulation which the Katz Index assesses as continence and transfer. The Katz Index requires professional training unlike the Physical Self Maintenance Scale. The simplicity of this scale compared to many other scales is evident in the correlation of its use among different health professionals (Hokoishi et al., 2001). The instruments used in this study are expounded on in Chapter 3: Methodology.

The assessment of instrumental activities of daily living could help with goal setting in rehabilitation and recurrent assessment of instrumental activities of daily living contributes to measurement of improvement with intervention (Rubenstein et al., 1984). The Instrumental Activities of Daily Living scale (Lawton and Brody, 1969) assesses instrumental activities of daily living in the elderly. This scale, which is simple to use, has been tried in various settings and conditions. The scale can also be used in condition-specific elderly population (Tariot et al., 1998).

2.5 Quality of Life among the Elderly

There is no commonly accepted definition of quality of life in the literature. The debate on the definition of quality of life stems from how quality of life should be approached (Theofilou, 2013). The concept of quality of life has been differently viewed from both general and specific perspectives (Suurmeijer et al., 2001). The general perspective looks at quality of life with regard to life perception in general while the specific perspective looks at quality of life with respect to specified areas of life (Lima et al., 2009). One of such specified

perspective on quality of life is health-related quality of life. Health-related quality of life represents health-related challenges in the various life domains (Lima et al., 2009).

The aggregate of life conditions that can be measured objectively as experienced by an individual is defined as the quality of life of that individual (Felce and Perry, 1995). Quality of life can also be expressed as an individual's perception of wellbeing resulting from satisfaction or dissatisfaction with areas that are important to the individual involved (Becker et al., 1993). These definitions of quality of life imply that the concept is both subjective and objective (Hagerty et al., 2001). The experience of the individual having an input in expressing quality of life makes it subjective (Brajša-Žganec et al., 2011). Income, health, marital status, gender, and age make up objective factors (Butler and Ciarrochi, 2007). The efforts that have been made to define quality of life in different contexts have resulted in the domains of quality of life. There have been multiple domains identified but the emotional/mental, physical, functional and social domains have become dominant (Cella, 1991).

2.5.1 Domains of health-related quality of life

Domains of quality of life are broadly classified into physical, social and psychological. These broad domains could be affected as a whole, partially or each in isolation (Lima et al., 2009). Physical function which includes activities of daily living is what constitutes the physical domain of quality of life (Applegate et al., 1990). Role limitation due to physical health and bodily pain are also considered under the physical domain of health-related quality of life (Acree et al., 2006). In general, any form of physical activity as it relates to health is considered under the physical domain of health-related quality of life.

The social domain of health-related quality of life constitutes social activities that impact on health (Eiser and Morse, 2001, Pinhas-Hamiel et al., 2006). Activities such family participation which includes marriage and/or children, religious indulgence, visitation of friends and socialisation in the community such as community meetings and solidarity with community members are activities that could be considered in this domain (Gralnek et al., 2000). Gender and education are dealt with under the social domain. Literature reveals that these factors, individually or in combination, have some correlations with health-related quality of life (Katz and McHorney, 2002). Social functioning affects quality of life in conditions such as back pain, rheumatoid arthritis and migraine (Arnold et al., 2004).

Mood states including but not limited to anxiety and depression define the emotional/mental domain of health-related quality of life (Welch et al., 2002). Mood in the form of depression or anxiety in different disease states has direct impact on health-related quality of life. Lower depressive states have higher correlation to quality of life and vice versa (Tracy et al., 2007). Perception about body appearance, weight and the evaluations of how others view one affects mood and hence quality of life (Pope et al., 2007). Evaluation of how others view one, if negative, could result to anxiety in an individual (Baumeister and Tice, 1990, Clark and Wells, 1995). The unknown outcome of a medical test or prognostic outcome of a disease could create anxiety (King et al., 2008). In essence, various occurrences in life have different levels of mental/emotional implications which in turn define the quality of life of individuals or people involved in those circumstances.

2.5.2 Factors that affect quality of life in the elderly

Ageing can affect quality of life (Netuveli and Blane, 2008). However, multiple factors are associated with the quality of life in the elderly (Alexandre et al., 2009).

2.5.2.1 Physical activity

Elderly people who are more physically active tend to have higher quality of life (Acree et al., 2006). Physical activity has been indirectly linked to better quality of life in the elderly with multiple sclerosis through lesser fatigue, depression and pain (Motl et al., 2009). Exercise improves the quality of life in the elderly (Chou et al., 2012). Physical activity through moderate aerobic exercise improves self-reported quality of life in the elderly suffering from chronic insomnia (Reid et al., 2010). A three-month structured exercise intervention programme improved cognition and quality of life in frail elderly (Langlois et al., 2013).

2.5.2.2 Family support

The relationship with family members is a potentially important measure of quality of life in the elderly (Grewal et al., 2006). Elderly people who live with family members have a higher chance of receiving family support with a lower chance of being institutionalised and participation within the family impacts positively on the quality of life of the elderly (Kim and Kim, 2003). Affective solidarity amongst family members could predict the quality of life in the elderly (Lowenstein, 2007). It has been shown that activities such as family style

meal times could take its toll on the quality of life of the elderly (de Graaf et al., 2006). There is evidence that living with children improves the quality of life in the elderly in some communities (Yi and George, 2015). Family care givers play an integral role with regard to the quality of life of the elderly (Brodaty and Donkin, 2009). In a population-based study of the quality of life of both cancer survivors and their family caregivers, the quality of life of both groups independently contributed to the other's quality of life (Mellon et al., 2006).

2.5.2.3 Social support

Social support predicts the perception of quality of life in the elderly (Bowling et al., 2003). Social support services in the community could affect the daily living experience of the elderly. Access to community facilities such as water and physical infrastructures like roads and drainages will have impact on the daily experience of the community dwelling elderly (Lui et al., 2009). Other support services such as subsidised institutions for the elderly will affect the access of the elderly who are socio-economically disadvantaged to those institutions (Inal et al., 2007). A social support facility such as grant assuages the economic challenges of the elderly who rely on the grant and hence, the quality of life of the elderly is affected by social support received from/in the community (Fernández–Ballesteros, 2002).

2.5.2.4 Spirituality

Spirituality and religion/faith are aspects of daily life that affect the elderly population (Agli et al., 2015). Religious participation has been found to be related to better quality of life in the elderly (Agli et al., 2015). Religious beliefs have an effect on the social environment where people dwell. In health, religion sometimes is made to play the role of source of comfort during difficult times (Koenig et al., 1998, Oxman et al., 1995). Studies have shown that religious belief/participation has an impact on the quality of life of sufferers in conditions such as cardiac surgery (Oxman et al., 1995) and cancer (Balboni et al., 2007, Tarakeshwar et al., 2006). Many older adults resort to religion/faith and seek divine intervention or divine explanation for medical occurrences (Mackenzie et al., 2000).

2.5.2.5 Loneliness

The need for assistance with activities of daily living or the loss of a spouse in old age increases the risk of loneliness which negatively affects quality of life in the elderly (Jakobsson and Hallberg, 2005). Loneliness has been found to be associated with impairment

in the physical and psychosocial domains of quality of life in the elderly (Liu and Guo, 2007). One of the effects of hearing loss in the elderly is loneliness which decreases the quality of life in the elderly (Ciorba et al., 2012). Loneliness is more likely amongst elderly women compared to elderly men due to their higher chances of becoming widows compared to men becoming widowers (Pinquart, 2003) and hence a relatively higher chances of decreased quality of life amongst elderly widows. The severity of loneliness amongst the elderly who lost their spouses is likely to increase if the relationship they had was relatively happier (Grimby, 1993) which could affect the quality of life more.

2.5.2.6 Health status

Health is defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WorldHealthOrganization, 2013). Health is important to quality of life (Gabriel and Bowling, 2004). Dementia is one of the most common causes of ill-health in the elderly (Prince et al., 2013). The occurrence of dementia in the elderly is well reported in the literature to increase with age and it has been found to impact negatively on the quality of life (Banerjee et al., 2009). Dementia plays a major role among factors that affect health-related quality of life in the elderly in institutions (Barca et al., 2011). In the elderly with background dementia, various factors have been identified to influence their quality of life. It has been found that age, behavioural and psychological disturbance are more associated with quality of life than cognition or functional limitation in the elderly with dementia (Banerjee et al., 2006).

Health-related quality of life is gender-sensitive in the elderly (Orfila et al., 2006). The sensitivity is evident in the physical and mental components of health-related quality of life (Tajvar et al., 2008b). Higher level of prevalence of chronic diseases and disabilities is the main factor in women who report worst levels of health-related quality of life (Orfila et al., 2006). Females have been found to have lower symptom-related quality of life in chronic obstructive pulmonary disease (Di Marco et al., 2006). Gender-based difference in quality of life after stroke in the elderly has been reported; post-stroke, elderly women experience lower quality of life compared to elderly males (Gray et al., 2007). Elderly women have exhibited lower quality of life relative to elderly males' in a year pre and one year post-surgery for lumbar spinal stenosis (Jansson et al., 2009). Quality of life difference with regard to gender is also exhibited in health promotion behaviours (Lee et al., 2006).

2.5.3 Instrumentation in health-related quality of life in the elderly

As the proportion of elderly population is continuously growing, the attention on the health-related quality of life is also involving assessment. Few of the available instruments for assessing health-related quality of life have actually been verified for the elderly population (Osborne et al., 2003). Of the generic tools used in assessing quality of life in the elderly, SF-36, COOP Charts, SIP, Nottingham Health Profile (NHP) and EQ-5D have very comprehensive evidence with regard to pre-defined criteria relating to responsiveness, reliability and validity (Haywood et al., 2005).

The comparison of the SF-36 and the EQ-5D reveals that each has its edge over the other but the need to modify the SF-36 to make it more suitable for use in the elderly population appears to give an overall edge to the EQ-5D (Brazier et al., 1996). The SF-36 seems to be the most popularly used but there is no consistency on which is best or poorest amongst these tools that have supportive evidence of their usage. The decision to use any is based on factors such as age, culture, language, clinical setting or routine physician check-up etcetera (Coons et al., 2000). It is not all measuring tools of quality of life that are made generic. There are some that are made for the measurement of quality of life in specific individuals or conditions (Brown et al., 2004).

The EQ-5D is a standardised health status measure that was developed with the intension of providing a simple, generic measure of health for both clinical and economic benefits (Group, 1990). The EQ-5D is a two-part questionnaire. It has a descriptive system part and an EQ Visual Analogue Scale. The EQ-5D-5L health questionnaire, is a generic version of the EQ-5D. The EQ-5D has been found to be valid and reliable when used to assess the quality of life (QOL) in disease-specific institutionalised elderly (Diaz-Redondo et al., 2014). It has also been shown to be valid, responsive and sensitive when used in multi-disease health states in the elderly (Rabin and Charro, 2001). The EQ-5D is simpler to use compared to many other health-related QOL measures (Sitoh et al., 2005). The EQ-5D-5L is a newer version of EQ-5D-3L which has been translated into many different languages. It has been in existence for decades and the newer version was created to minimise the complaints that arose from using the older version. The questionnaire has a comprehensive guide on its usage (EQ-5D, 2017).

2.6 Institutionalisation of the Elderly

The reality that institutionalisation of the elderly has come to stay in the society is no longer debatable. Today, institutions for the elderly are options to home care for the elderly.

2.6.1 Factors that predict institutionalisation of the elderly

Over time, the various factors that determined (predicted) institutionalisation in the elderly were modified and/or increased. Poverty, societal/family isolation and physical dependence were the main predictors of institutionalisation for the elderly in the days of almshouses (Leivers, 2009, Tobriner, 1985). Today, various factors other than the afore-mentioned three play important roles in predicting or determining institutionalisation in the elderly (Luppa et al., 2009, Pollak and Perlick, 1991). When some elderly persons are institutionalised, such institutions become a home. However, there has been continuing debate on how well such institutions play the role of a home because of the factors that resulted in the elderly being institutionalised (Kasl, 1972, Smith and Bengtson, 1979). The control of the elderly over the factors that determine how they end up being institutionalised is part of an ongoing debate.

There have been various studies to determine the potent predictors of institutionalisation in the elderly. It is common to find that a background decrease in cognitive and/or functional impairment that is associated with inadequate or lack of support with regard to daily living is generally the basis for elderly institutionalisation prediction (Luppa et al., 2009). This can be understood from the perspective that a decrease in cognition or the presence of functional impairment is relatively more common in the elderly population (Graham et al., 1997, Pinholt et al., 1987, Plassman et al., 2008). Cognitive ability or decline predicts mortality in the elderly (Connors et al., 2015) and a decline in cognitive ability is an indication of decreasing individual capability –functional impairment (Brown et al., 2011).

The predictors of institutionalisation in the elderly could be discussed on the basis of being predisposing factors or need-based factors. Increasing age, as a predisposing factor, is consistently a strong predictor of institutionalisation in the elderly (Miller and Weissert, 2000). The percentage of the elderly living in institutions is likely to increase with increasing age (Woo et al., 1994). It is not in all cases that cognitive deficit predisposes or creates the need for institutionalisation. There are situations where voluntarily decisions are made, in the absence of cognitive deficits, with regard to the need for institutionalisation as a result of

increasing age (Dubois et al., 2008). The actual effect of age can be better shown when there is differentiation in age groups in research (Luppa et al., 2012).

Shelter is one of the three basic needs of life. Shelter in the form of housing or accommodation is important to everyone including the elderly. A home environment which is impossible in the absence of housing or accommodation is important to healthy ageing amongst the elderly (Sixsmith et al., 2014). House ownership, type of house and better housing play important roles in predicting institutionalisation in the elderly (Böckerman et al., 2012). The elderly who are at the risk of becoming homeless due to inability to afford housing costs and without the option of friends/family providing housing support would result to opting for institutions if the required resources and services are available (Ryser and Halseth, 2011, Zhan et al., 2008). Shelter in the form of housing/accommodation is a predictive factor for elderly institutionalisation for the elderly who are without housing or at the risk of losing one.

As elderly life beckons, one of the expected experiences is functional limitation. Limitation in function in the elderly can be physically experienced through challenges faced in the performance of activities of daily living (Millán-Calenti et al., 2010). Difficulty with activities of daily living (basic and instrumental activities) in the elderly is an indication of the need for assistance. As age increases in the elderly, the need and degree of assistance required is expected to also increase (increased level of dependence) (Millán-Calenti et al., 2010). The need for assistance with activities of daily living in the elderly increases the risk for institutionalisation (Gaugler et al., 2007a). Limitation in activities such as mobility is a risk factor for elderly institutionalisation and the risk is even higher when present with cognitive deficits (von Bonsdorff et al., 2006). Speech impairment and incontinence in the elderly which are associated with dependence in the elderly are predictors of elderly institutionalisation (Matsumoto and Inoue, 2007).

Dementia in the elderly is a very strong predictor of institutionalisation among different conditions commonly associated with the elderly (Nihtilä et al., 2008). Independently of functional and social status in the elderly, dementia is still a major predictor of institutionalisation. The severity of dementia in demented elderly who have been discharged from rehabilitation units is a major predictor of institutionalisation (Rozzini et al., 2006). The complex nature of the effects of dementia on the elderly does not exclude the caregivers when decision taking in relation to institutionalisation needs to be made (Caron et al., 2006).

Decision taking with regard to the institutionalisation of the elderly might be affected by cultural values (Mausbach et al., 2004) and race (Hinrichsen and Ramirez, 1992).

Loneliness is usually associated with old age (Singh and Kiran, 2013). Loneliness is a factor that cannot be underestimated as a predictor of institutionalisation in the elderly (Honigh-de Vlaming et al., 2013). Multiple factors can be attributed to loneliness in the elderly which increases the risk of institutionalisation. Widowhood is one factor that increases the probability of loneliness in the elderly (Golden et al., 2009). It has been shown that elderly women living with their partners are generally less lonely compared to those without partners (Singh and Kiran, 2013). Children leaving the home contributes to loneliness in the elderly (Liu and Guo, 2007).

There are other isolated conditions that have been reported to predict institutionalisation in the elderly. Incontinence in elderly men is a predictor for institutionalisation (Nuotio et al., 2003). Factors such as burden of caring for the elderly, limited knowledge of disease in the elderly, health concerns etcetera influences caregiver prediction factor of institutionalisation of the elderly (Spitznagel et al., 2006). Social isolation that could result from living alone at old age could predict institutionalisation.

Cultural heritage has been linked to varying attitude towards institutionalisation of the elderly. The probability of African-Americans being institutionalised due to cultural reasons is low (Anderson and Turner, 2010). This is much different amongst people of white race as the institution is seen as a probable solution to becoming old if need be (Luppa et al., 2008). The Latina and the Caucasians also have cultural differences with regard to caring for the elderly and institutionalisation of the elderly (Gaugler et al., 2007a, Gaugler et al., 2006). It is viewed as a dishonour in Chinese culture to send away an elderly to the institution due to old age (Caldwell et al., 2014). Children are expected to look after their parents in the Chinese culture.

2.7 Quality of life of the institutionalised versus the community-dwelling elderly

There have been various studies carried out with the aim of comparing the quality of life or factors relating to quality of life between residents of institutions for the elderly and the community-dwelling elderly (Borowiak and Kostka, 2004, Salguero et al., 2011). The differences in the assessed quality of life or factors relating to quality of life have been attributed to different factors such as the presence of concomitant diseases, functional status

and weight-related challenges as found by Borowiak and Kostka (2004). There are also studies that found similarities between community-dwelling and institutionalised elderly with regard to factors relating to quality of life (Borowiak and Kostka, 2004, Peters et al., 2012). In both community-dwelling and institutionalised elderly, apart from being related to the physical and mental domains of health-related quality of life, physical activity reduces depressive symptoms (Salguero et al., 2011). Hence, physical activity is beneficial to the elderly both in the community setting and in the institution regarding health-related quality of life. Lower level of depression, lower quality of life but higher functional mobility and independence have been found in institutionalised elderly compared to the community-dwelling elderly (Karakaya et al., 2009). Although factors that improve health-related quality of life may positively affect quality of life in both community-dwelling and institutionalised elderly, they seem to result in better quality of life in the community-dwelling elderly (Borowiak and Kostka, 2004).

2.8 Conclusion

The review of literature has made it obvious that functional status and quality of life among the elderly still has a huge space for exploration. The institutionalisation of the elderly creates further need for the understanding of functional status and quality of life among the elderly. It has been revealed that the functional status of the elderly is a result of an accumulated process of ageing and the experiences accumulated during the ageing process. The review also identified the quality of life among the elderly as being dependent on various factors, one of which is institutionalisation which makes a major difference in defining the quality of life of the elderly. Institutionalisation among the elderly as revealed is a phenomenon that seems to have come to stay due to the continuous global transformational changes especially as it affects population ageing.

CHAPTER THREE: METHODOLOGY

The study method that was used in this study is presented in this chapter. The aim of the study was to determine the functional status and the health-related quality of life of the institutionalised elderly in Alexandra (Region E), Orange Grove (Region E) and Yeoville (Region F) areas of Johannesburg. The study design, setting, sample, inclusion and exclusion criteria, instrumentation and data collection procedure which were tailored towards the aim of this study are discussed with descriptive details in this chapter. Ethical considerations for this study are also discussed.

3.1 Study Design

The study was cross-sectional, quantitative and descriptive in nature.

3.2 Study Setting

The study was carried out in institutional homes for the elderly in Alexandra Township, Orange Grove and Yeoville areas in the city of Johannesburg, South Africa. The Institutions involved in this study were Joseph Gerald Home of Peace for the Aged in Alexandra township, Itlhokomeleng Association for the Care of the Aged and Disabled in Alexandra, Queen Alexandra Retirement Home in Orange Grove and the Nazareth House in Yeoville.

The aforementioned institutions were four of the five institutions for the elderly approached in the selected areas that gave permission for this study to be carried out in their institutions.

A total of 233 permanent residents were in the institutions as at the time the institutions gave permission to carry out this study.

All the institutions involved in the study cater for elderly residents. They all had no gender, race or ethnic restrictions with regard to admitting residents. Joseph Gerald Home of Peace for the Aged and Nazareth House are both Catholic institutions while Queen Alexandra Retirement Home and Itlhokomeleng Association for the Care of the Aged and Disabled are both non-profit organisations. All the institutions except Joseph Gerald Home of Peace for the Aged which does not accept bed-bound elderly people have frail care units.

The Joseph Gerald Home of Peace for the Aged and the Itlhokomeleng Association for the Care of the Aged and Disabled are located in mainly Black populated areas (Frith, 2017a) and

have a predominantly black dominant population with just 2% being White residents. The Queen Alexandra Retirement Home is located in an area that is mainly populated by a mixture of Whites and Blacks (Frith, 2017b) but the residents at the institution are mostly Whites with less than 10% being Black residents. Nazareth Home is located in an area that is vastly dominated by Black people (Frith, 2017c) but the residents are vastly dominated by White people. The seeming irony in the White-dominant residents ' population of both the Nazareth Home and the Queen Alexandra Retirement Home could be explained based on the socio-political transition from Apartheid to multiracial democracy in South Africa which resulted in the immigration of the non-White population to these areas.

3.3 Study Population

The study population were the residents of the institutions for the elderly in the above described areas in Johannesburg. Elderly people with regard to this study were those individuals who met the legal criterion for being referred to as old people in South Africa. The elderly people that were the focus of this study were those admitted to institutions based on old age as the first criterion.

The elderly people were admitted to the various institutions involved in this study with some differences in the criteria for admission. At Nazareth home, Queen Alexandra Retirement Home and Itlhokomeleng Association for the Care of the Aged and Disabled, residents are admitted based on age and affordability of living and nursing costs. At Joseph Gerald Home of Peace for the Aged, residents were admitted mainly based on age and compassionate grounds. In this home, people who are elderly and are in need of accommodation are admitted. Those who meet the admission criteria but are bedbound are not admitted in this particular home while they are admitted in the other homes.

The majority of the residents were retirees and those who did not retire but became dependent on others as a result of health, social, family or financial reasons. Some residents acquired physical disabilities and impairments, dementia, Parkinson's disease, Alzheimer's disease and other old-age related diseases that made them to require special care they could not get in their own homes or places of abode and thus resulted to the use of the institutions. In some cases, family members decided to take their loved ones to the institutions for convenience. Some of the residents lived alone and when they became increasingly physically dependent, they went to the institutions. The financial burdens of some residents were borne by their

family members while some residents were responsible for their own financial obligations through pensions and/or the older person's grants.

3.3.1 Inclusion Criteria

Participants were included in the study if they met the following criteria:

- Had spent at least 3months as a resident in the institution
- Was able to speak one of English, Afrikaans or Zulu language
- Was 60 years or older

3.3.2 Exclusion Criteria

Participants were excluded from the study if they:

- Were bedridden
- Were not well oriented in time, place and person
- Were unable to independently give consent to participate in the study
- Did not understand the purpose of the study

3.3.3 Study sample

A total of 137 participants were needed for this study. The sample size was calculate using the below formula.

$n=Z^2 \frac{P(1-P)}{d2}$ (Naing et al., 2006)

Where n= sample size

Z= statistic for a level of confidence

P=expected proportion (69%)

d=precision (5%)

n=137

3.4 Instrumentation

3.4.1 Demographic questionnaire

A demographic questionnaire (Appendix A) was designed from literature on the health-related quality of life of the institutionalised elderly. The items on the demographic questionnaire were age, gender, race, educational qualification, religion, comorbidity, length of stay in institution, marital status and family support. Age was grouped on a decade basis starting from 60-69. The minimum age was set at 60 years because the South African law stipulates 60 years as the age to become an elderly person. Racial groups considered on the questionnaire were limited to Black, White, Coloured, and Indian because these are the four dominant racial groups in South Africa (Mwabu and Schultz, 1996, Nauright, 1997). Items on religion were limited to Christianity, Islam, Judaism, and Hinduism because these are the dominant religions in the world and South Africa. Items on co-morbidity were visual problems, hypertension, musculoskeletal problems, diabetes and hearing problems because from literature and based on exclusion criteria, these were the most common comorbid conditions in the elderly (Campbell and Crews, 2001, Crews et al., 2006, Marengoni et al., 2009). Family support was included because family support whether in the community or institution affects the quality of life in the elderly.

3.4.2 EQ-5D-5L

The EQ-5D (Group, 1990) was used to assess the quality of life. The EQ-5D-5L (Appendices B, C & D) has five domains: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. There are five levels under each domain: no problems, slight problems, moderate problems, severe problems and extreme problems. These five levels are *nominally* represented as 1, 2, 3, 4&5 respectively. The nominal health state of an individual using the EQ-5D-5L is converted to a sole summary index using a predetermined value set depending on the country of research (EQ-5D, 2016, Rabin et al., 2011, Tran et al., 2012). The summary index values range from negative to positive values and the higher the index value, the better the respondent's health state (e.g an EQ-5D-5L response of 1-1-1-1-1 which represents the best health state is equivalent to 1.000 and 0.900 on the German and Zimbabwean summary index values for health state respectively using the EQ-5D crosswalk value set while an EQ-5D-5L response of 5-5-5-5-5 which represents the worst state of health is equivalent to -0.205 and -0.145 on the German and Zimbabwean summary index values respectively). If the

country where the study is being carried out does not have a predetermined value set, the value set for the country that most closely approximates that of the resident country of the study among the countries that have value sets is selected. (e.g. South Africa does not have a summary index value set for EQ-5D-5L and the country that most closely approximates South Africa among the countries that have is Zimbabwe. In essence, the summary index value set of Zimbabwe is most suitable for use in the evaluation of EQ-5D-5L using South African population.) The EQ Visual Analogue Scale is a 20cm vertical scale where the upper end point is labelled as "the best health you can imagine" while the lower endpoint is labelled as the "the worst health you can imagine". There is an instruction on the scale that reads "mark an X on the scale to indicate how your health is TODAY" and there is another instruction that reads "write the number you marked on the scale in the box below". The validated English (Appendix B), Afrikaans (Appendix C) and Zulu (Appendix D) versions were used for this study. An inter-observer reliability and test-retest reliability of 0.57 and 0.69 (Janssen et al., 2008) have been reported. A convergent validity of the EQ-5D-5L index score with Visual Analogue Scale (VAS) of 0.73, a global rating of health-related QoL of 0.36 and internal consistency of reliability of 0.85 (using Cronbach's alpha) has also been reported (Tran et al., 2012). These reports indicate that this instrument is valid and reliable.

3.4.3 The Physical Self Maintenance scale

The Physical Self Maintenance scale (Appendix E) was one of two scales used to assess functional status. The Physical Self Maintenance scale assesses basic activities of daily living (Lawton and Brody, 1969). The scale has in a descending order toilet, feeding, dressing, grooming, physical ambulation and bathing as items. There are five levels of ability under each item. Only the third level of item five has two sublevels. The first level under each item represents highest level of functioning while the fifth level represents the lowest level of functioning. Only the highest level of functioning is given a score of one (which indicates full independent performance of that activity) while all other levels are given a score of zero. A maximum total score of six which indicates complete functional independence and a minimum total score of zero which indicates complete functional dependence is obtainable with the Physical Self Maintenance scale. The inter-observer test-retest reliabilities of this scale with hospitalised (institutionalised) elderly have been reported as r=0.96 and r=0.59 respectively (Edwards, 1990). Thus, this instrument was deemed adequate for this study purposes.

3.4.4 The Instrumental Activities of Daily Living scale

The Instrumental Activities of Daily Living scale (Appendix F) which is designed to assess more complex activities of daily living (Lawton and Brody, 1969) was used for the assessment of instrumental activities of daily living. The Instrumental Activities of Daily Living scale has in descending order, ability to use telephone, shopping, food preparation, housekeeping, laundry, mode of transportation, responsibility for own medications and ability to handle finances as items. The levels of functioning under each item on this scale vary. The first three items have four levels each; the fourth and sixth have five levels each while others have three levels each. All the highest levels of functioning in the first, fourth, fifth and eight items are assigned a score of one except the least levels of functioning which are assigned a score of zero each. A maximum total score of eight which indicates a complete level of functional independence and a minimum total score of zero which indicates a complete level of functional dependence is obtainable with the standard scale. The method of application differs between males and females. The standard scale is applied when administering it on females while the domains of food preparation, housekeeping and laundry are excluded when administering it on males because these domains are deemed peculiar to females (Graf, 2009, Lawton and Brody, 1970, Maione et al., 2005) . Hence, the total maximum score (i.e functional independence level) possible for both female and male participants in the Instrumental Activities of Daily Living (IADL) score was different: the highest for male participants was 5 while that for females was 8. The inter-observer test-retest reliabilities of this scale with hospitalised (institutionalised) elderly have been reported as r=0.99 and r=0.93 respectively (Edwards, 1990). When developed, the inter-rater reliability was established at 0.85 (Graf, 2009).

3.5 Pilot study

A pilot study was conducted. Ten residents with at least two from each institution were randomly selected as participants. All the participants met the study inclusion criteria. Informed consent was obtained from each participant. The pilot study was used to train the research assistants on the administration of the questionnaires, test the understanding of the questions on the questionnaires by study participants and the likely challenges (acceptability of researcher's/assistant's approach method by different participants, what kind of questions to be expected from participants and what kind of responses to be given, what to do if a participant felt his/her privacy was being invaded by a particular question(s) etc) to be

experienced during the main study. All concerns (were addressed before the commencement of the main study.

3.6 Procedure

In general, *all residents* were screened based on the inclusion criteria. Convenient sampling was done. All those who met the inclusion criteria and had none of the exclusion criteria were deemed potential participants and were approached to participate in the study. The information document was then given or read to the potential participant in the preferred language (*all potential* participants understood at least one of the three languages used for this study). Those who indicated interest were given the consent form to complete (consent form was read to the understanding of the uneducated potential participants). Participants either appended their signature or thumb printed on the consent form in the presence of a witness. The questionnaires were then given to the participants who were formally educated to complete and those who could not read and write, the questionnaires were completed by the researcher/assistant based on participants' responses.

At Itlhokomeleng Association for the Care of the Aged and Disabled and Queen Alexandra Retirement Home, the matrons identified residents who met the inclusion criteria for this study while the social workers identified residents who met the inclusion criteria at Nazareth House and Joseph Gerald Home of Peace for the Aged. At Itlhokomeleng Association for the Care of the Aged and Disabled, Queen Alexandra Retirement Home and Joseph Gerald Home of Peace for the Aged, the principal investigator identified those who met the inclusion criteria while the social worker identified those who met the inclusion criteria at Nazareth House.

The information document was given to those who met the inclusion criteria to read. It was read to all those who met the inclusion criteria for this study and were not excluded but could not read by themselves due to visual impairment or lack of formal education.

The social worker with the assistance of two social work students took written consent and administered the questionnaires on residents after duly informing the participants about this study at Nazareth House. The social worker and the students had been properly informed about this study and trained on proper administration of the questionnaires. The participants in this institution spoke either Zulu or English. The participants who spoke Afrikaans (who also spoke and understood English) completed the EQ-5D-5L by themselves.

At Queen Alexandra Retirement Home, the principal investigator administered the questionnaires on residents who gave consent after being duly informed about this study. All the residents in this institution participated with English as the medium of communication.

The principal investigator was assisted by the social worker at Joseph Gerald Home of Peace for the Aged to identify eligible participants and also introduce the principal investigator to all eligible participants. In this institution, voluntary written consent was sought and obtained from each participant in the presence of the social worker. Questionnaires were researcher administered.

At Itlhokomeleng Association for the Care of the Aged and Disabled, the principal investigator recruited a research assistant to assist with the administration of the questionnaires. All participants who spoke English preferred the questionnaires to be researcher-administered. Stipulated procedure for residents to participate in this study was duly followed.

The collection of data using the questionnaires for this study took ten weeks with two weeks break during the period due to examinations written by the principal investigator.

3.7 Ethical considerations

Ethical approval for this study was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand with certificate clearance number **M160767** (Appendix G).

Permission to carry out this study was obtained from individual institutions. Permission to carry out this study in the selected areas for this study was obtained from the Gauteng provincial government (Appendix H).

Permission to use the English, Zulu and Afrikaans versions of the EQ-5D questionnaire was sought and obtained from the copyright owners.

All participants in this study were duly informed about the study using the information document (Appendix I) and they all gave voluntary consent using the consent form designed for this study (Appendix J) before participating in this study.

Participants were free to opt out of the study at any time during the data collection process.

3.8 Data Analyses

Stata version 13 was used to analyse data obtained for this study.

Nominal and ordinal data were collected in this study. An excel spreadsheet was used in tabulating the collected data before importing it to STATA 13.

Frequencies and percentages were used to summarise the collected socio-demographic data. Continuous variables were presented as mean (±standard deviation) or median (inter-quarter range) after testing for normality of the variables. Capability in the various domains of Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) were summarised to dependent and independent levels. Responses obtained from the five domains of EQ-5D-5L for each participant was converted to a single summary index using the EQ-5D crosswalk value set for Zimbabwe based on guideline by the EQ-5D copyright owners for countries without EQ-5D value set. The percentiles and mean (with standard deviation) or median of the total individual Visual Analogue Scale (VAS) scores and EQ-5D-5L index scores were calculated and presented based on whether they were skewed or not. Although the VAS scores was not used as the primary health status scores of participants in all the data analyses to investigate the relationship between functional status and health related QoL and the predictors of health related QoL, it was, however, presented in the results section because data was collected from participants on it and it would be readily available if need be. Also, the EQ VAS is a constituent of the EQ-5D tool. The index values for the EQ-5D-5L responses from participants were used as the primary health status scores in the data analyses to determine the relationship between functional status and health-related QOL. The use of EQ-5D index values is *one of various ways* to present EQ-5D-5L responses. The raw scores of participants on the Physical Self Maintenance Scale (ADL) and IADL scale were used in analyses involving functional status. The relationship (Correlation) between functional status (IADL and ADL) and health-related QoL (EQ-5D-5L index values) was determined using Pearson's correlation coefficient. The EQ-5D index values was preferred because it takes into consideration the five domains of EQ-5D-5L and the index values have mathematical values that could be used in statistical analysis, unlike the EQ VAS score that does not take the five domains of EQ-5D-5L into consideration and the EQ VAS score is valid for only the assessment day. The predictors of functional status and health related QoL were determined using logistic regression. The strength (poor or good) of the predictors of functional status and health-related QoL were also determined using logistic regression. Four logistic

regression models were then built for each of the outcomes (QOL, self-rated health, ADL and IADL). Univariate logistic regression was conducted for each of the outcome variables (QOL, self-rated health, ADL and IADL) and the explanatory variables (age, ethnicity, education, religion, co-morbidity, duration, marital status and family support). Variables with P-value ≤ 0.2 were included in the multiple analyses to build a model of the predictors of each of the outcome variable (QOL, self-rated health, ADL, IADL). Statistical significance was set at $p \leq 0.05$. The analysis of IADL was done separately for males and females because the scoring for males and females are different using the IADL scale. However, there was no comparison of male and female participants in the analysis because of the difference in the number of males compared to females. All participants' raw scores with regards to QoL, ADL and IADL were categorised to *poor, moderate and good.*

The same scoring method was used for both female and male participants with the Activities of Daily Living (ADL) scale while there were different Instrumental Activities of Daily Living (IADL) domains for male and female participants with regard to scoring. Female participants were scored on eight domains using the complete IADL scale while male participants were scored using the same scale but with the domains of food preparation, housekeeping and laundry excluded as these domains are deemed as not particularly relevant to males. Scores for both male and female participants were summarised to dependent and independent in the various domains in both Activities of Daily Living and Instrumental Activities of Daily Living. The ADL scores were grouped into three categories: six, five and four and three to zero which represented *good, moderate and poor* functional status (ADL) respectively. The IADL (female) scores were grouped into three categories: eight and seven, six to four and three to zero which were represented by *good, moderate and poor* functional status (IADL for females) respectively. The IADL (male) scores were grouped into three categories: five, four and three, and two to zero which were represented by *good, moderate and poor* functional status (IADL for males) respectively.

The EQ-5D-5L index scores for the same levels of response i.e same level of difficulty in each of the five domains were recorded. These five different index scores were then grouped into three categories: *poor*, *moderate* and *good* that described the health-related QoL of participants. The levels five and four, three and two and lastly level one sets of responses represented *poor*, *moderate* and *good* health-related QoL respectively. ***It is worthy of note that the EQ-5D-5L index (utility) scores indicate health-related quality of life. The higher***

the index (utility) scores, the better the quality of life. For the VAS responses, the created categories were 0-49 (*poor),* 50-69 (*moderate***)** and 70-100 (*good*).

The Participants' raw scores were preferred to the categorised scores during data analyses for reasons of mathematical importance and because categorised scores were the investigator's own creation.

The response rate for this study was calculated using the total number of participants that duly completed the questionnaires (numerator) and the total number of eligible participants that were approached to participate in this study (denominator). The results for this study are presented in the following chapter 4.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the results of the study. Tables and figures are used to present the results from the study for ease of interpretation and understanding of study outcomes. The mean, median, standard deviation, p-values and values for variables were rounded off to a minimum of two decimal places.

4.2 Socio-demographic profile of study participants

A total of 116 residents met the inclusion criteria of which 106 gave consent to participate. Of the 106 participants, one did not complete the demographic questionnaire and had to be excluded. Only 105 participants completed the study procedure.

When normality test was done for age and duration, age was normally distributed while duration was not normally distributed and hence the mean age was recorded while the median duration was recorded. The same method was adopted in recording the mean/median for all other variables.

The age categories, gender distribution and other characteristics of participants are shown in the following table.

Table 4.1(a) Socio-demographic characteristics of study participants (n=105)

Characteristics	
Age in years, Mean ± SD	75.20±8.56
Age in category, n (%)	
60 – 69	36(34.29)
70 – 79	38(36.19)
80 – 89	25(23.81)
90 – 99	6(5.71)
Gender, n (%)	
Female	66(62.86)
Male	39(37.14)
Marital status, n (%)	
Married	21(20.00)
Divorced	21(20.00)
Widow(er)	31(29.52)
Never married	32(30.48)
Race, n (%)	
Black	54(51.43)
White	41(39.05)
Coloured	6(5.71)
Indian	2(1.90)
Others	2(1.90)
Educational qualification, n (%)	
Primary	40(38.10)
High school	34(32.38)
Diploma	12(11.43)
Degree	6(5.71)
None	13(12.38)

SD: Standard deviation

The mean age was 75.2 years with a standard deviation of 8.56 years while the age range in years was 61 – 98. The number of participants with primary education (38.10%) was the highest while participants with at least a university degree (5.71%) were the lowest.

Table 4.1(b) Socio-demographic characteristics of study participants (n=105)

Characteristics	
Religion, n (%)	
Christian	42(40.00)
Islam	1(0.95)
Judaism	2(1.90)
Hinduism	1(0.95)
Others	25(23.81)
No religion/not stated	34(32.38)
Co-morbidity, n (%)	
None	15(14.29)
Visual	16(15.24)
Hypertension	20(19.05)
Musculoskeletal	13(12.38)
Diabetes	9(8.57)
Auditory	8(7.62)
Multiple	24(22.86)
Family support (finance), n (%)	
No	50(47.62)
Yes	55(52.38)
Length of stay, Median (IQR)	3(4.25)
Length of stay (category)	
0.25 – 2	48(45.71)
2 – 5	30(28.57)
5 +	27(25.71)

IQR: Inter-Quartile Range

The median length of home stay was 3 years with an inter-quarter range of 4.25 years. The number of participants that reported that they had no co-morbidity was 14.29% while those that reported multiple co-morbidities were 22.86%. Hypertension (19.05%) was the most common individual co-morbidity.

The figure below shows the age distribution of participants with regard to gender.

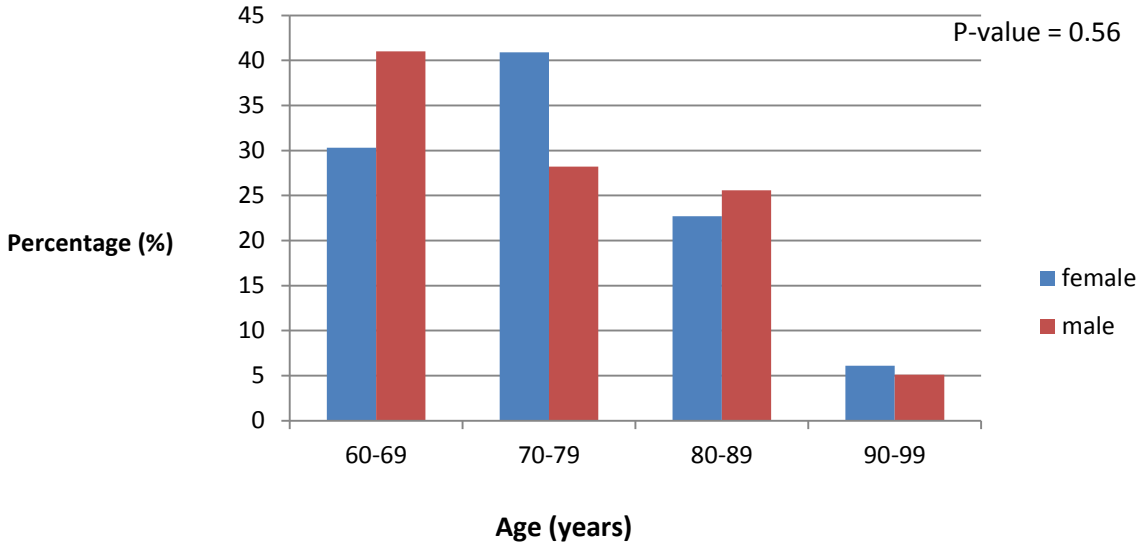


Figure 4.1 Age distribution by gender (n=105)

Figure 4.1 reveals that most participants were below age 80 years for both males and females. There was no specific pattern with regard to which gender had more participants in the age groups.

4.3 Participants' response rate

$$\textbf{Response rate} = \frac{\text{number of duly completed questionnaires}}{\text{number of disseminated questionnaires}}$$

$$= \frac{105}{116}$$

$$= 90.51\%$$

4.4 Functional status of the study participants

4.4.1 Activities of Daily Living (ADL)

The highest level of dependence was recorded in the physical ambulation domain with 78.10% of participants (Table 4.2) while the highest level of independence was in the feeding domain with 70.48% of participants (Table 4.2). Most participants scored 5 out of 6 in the Physical Self Assessment Scale while a score of 2 out of 6 on the Physical Self Assessment Scale was the least common score amongst participants (Figure 4.2).

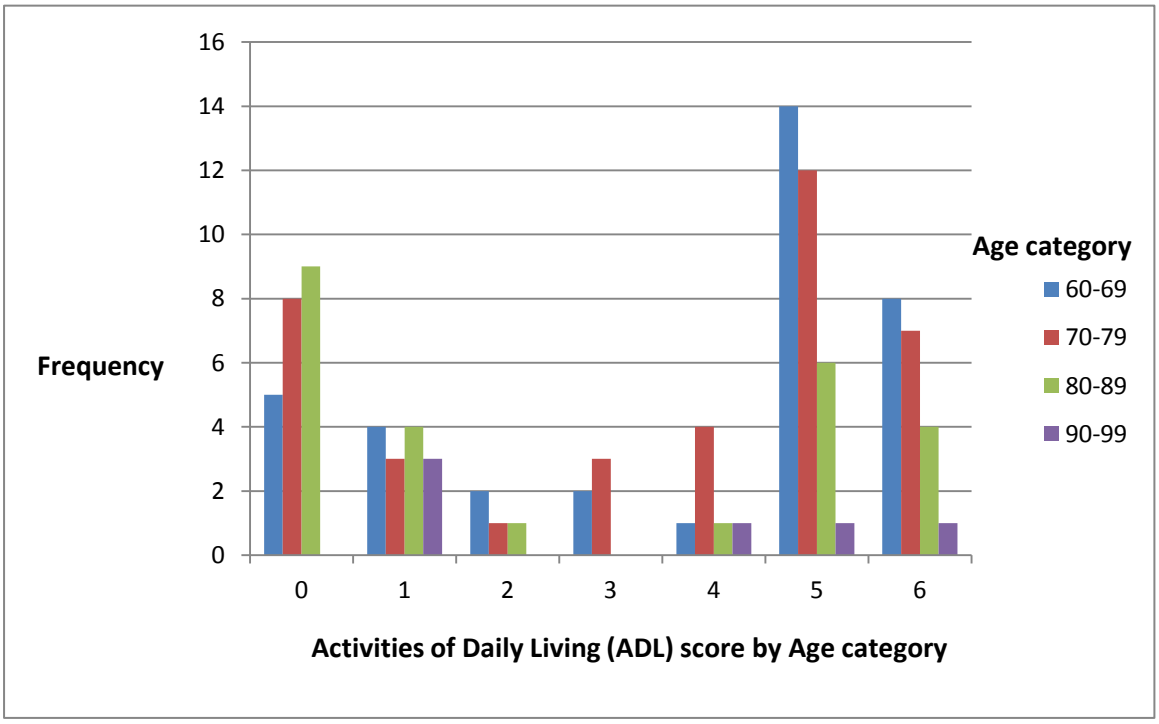


Figure 4.2 Activities of Daily Living (ADL) scores by Age category (n=105)

Figure 4.2 reveals that no participant aged 80 years and above (oldest old) scored 3 out of 6 on the Physical Self Maintenance Scale.

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The dependent and independent levels of participants in activities of daily living are shown in the table below.

Table 4.2 Domains of Activities of Daily Living (ADL) among participants (n=105)

Activity	n	%
Toilet		
Dependent	33	31.43
Independent	72	68.57
Feeding		
Dependent	31	29.52
Independent	74	70.48
Dressing		
Dependent	43	40.95
Independent	62	59.05
Grooming		
Dependent	49	46.67
Independent	56	53.33
Physical ambulation		
Dependent	82	78.10
Independent	23	21.90
Bathing		
Dependent	49	46.67
Independent	56	53.33

In every activity of daily living, independent participants were more than the dependent participants except in physical ambulation where the reverse was the case.

4.4.2 Instrumental Activities of Daily Living (IADL)

Female participants' functional status (IADL) is presented in the table below.

Table 4.3 Domains of Instrumental Activities of Daily Living (IADL) of Female participants (n=66)

	n	%
Ability to use telephone		
Dependent	31	46.96
Independent	35	53.04
Shopping		
Dependent	58	87.88
Independent	8	12.12
Food preparation		
Dependent	61	92.42
Independent	5	07.58
Housekeeping		
Dependent	36	54.55
Independent	30	45.45
Laundry		
Dependent	50	75.76
Independent	16	24.24
Mode of transportation		
Dependent	44	66.67
Independent	22	33.33
Responsibility for own medications		
Dependent	60	90.91
Independent	6	09.09
Ability to handle finances		
Dependent	33	50.00
Independent	33	50.00

Dependent female participants were more compared to independent participants in all the instrumental activities of daily living with the exception of the use of telephone where independent female participants were more and in the ability to handle finances where dependent and independent female participants were equal in number.

The figure below reveals the distribution of IADL scores of female participants with respect to age categories.

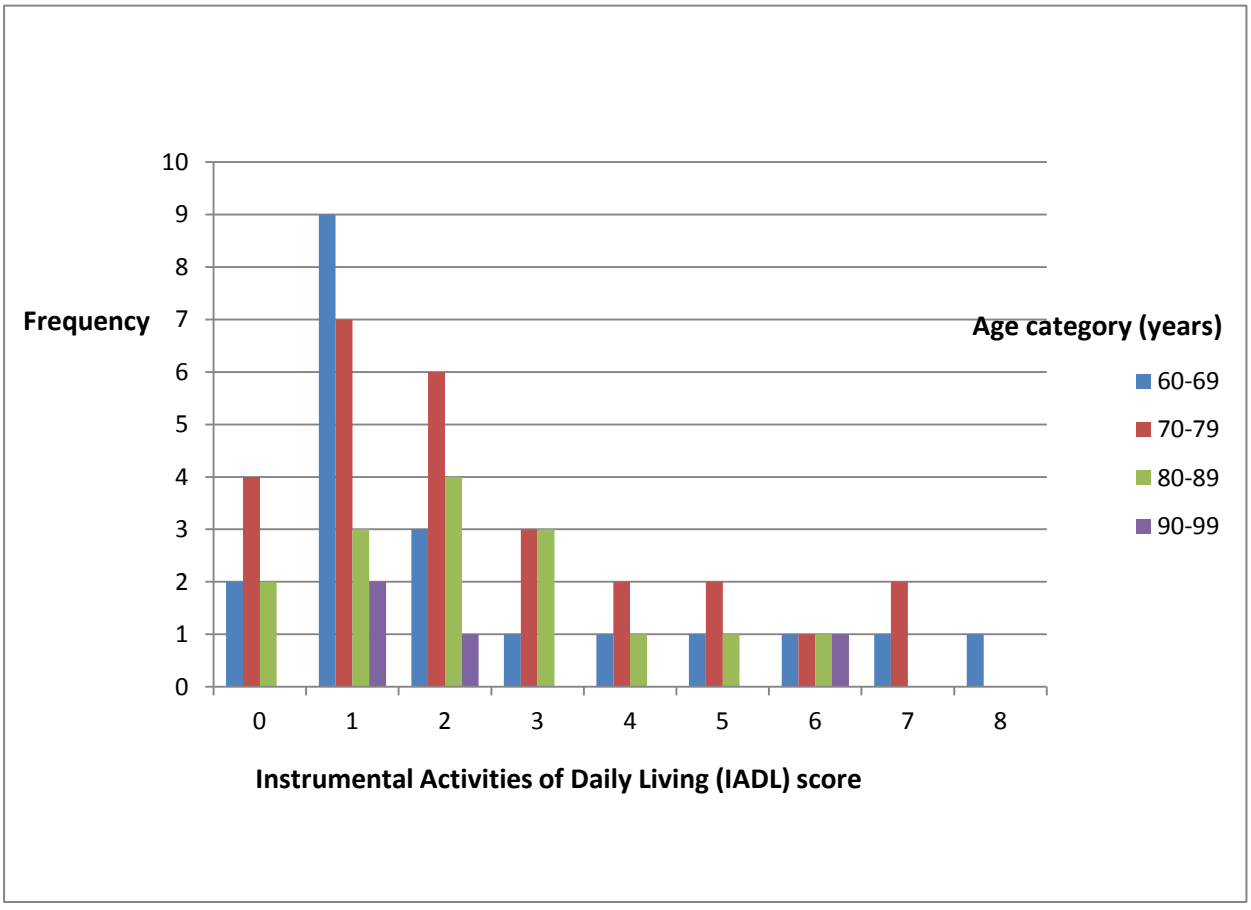


Figure 4.3 Instrumental Activities of Daily Living (IADL) scores for Female participants (n=66)

The most recurrent IADL score across the different age groups of female participants was 1 while the maximum score of 8 was recorded only among the 60-69 years age category.

The table below shows the distribution of male participants with respect to dependence or independence in instrumental activities of daily living.

Table 4.4 Domains of Instrumental Activities of Daily Living (IADL) for male participants (n=39)

	n	%
Ability to use telephone		
Dependent	22	56.41
Independent	17	43.59
Shopping		
Dependent	32	82.05
Independent	7	17.95
Mode of transportation		
Dependent	30	76.92
Independent	9	23.08
Responsibility for own medications		
Dependent	35	89.74
Independent	4	10.26
Ability to handle finances		
Dependent	17	43.59
Independent	22	56.41

Most male participants were dependent in all their instrumental activities of daily except in the ability to handle finances were most were independent. Male participants were most dependent at the responsibility for own medication domain with 89.74%.

The figure below depicts the scores of male participants on the IADL scale based on age categories

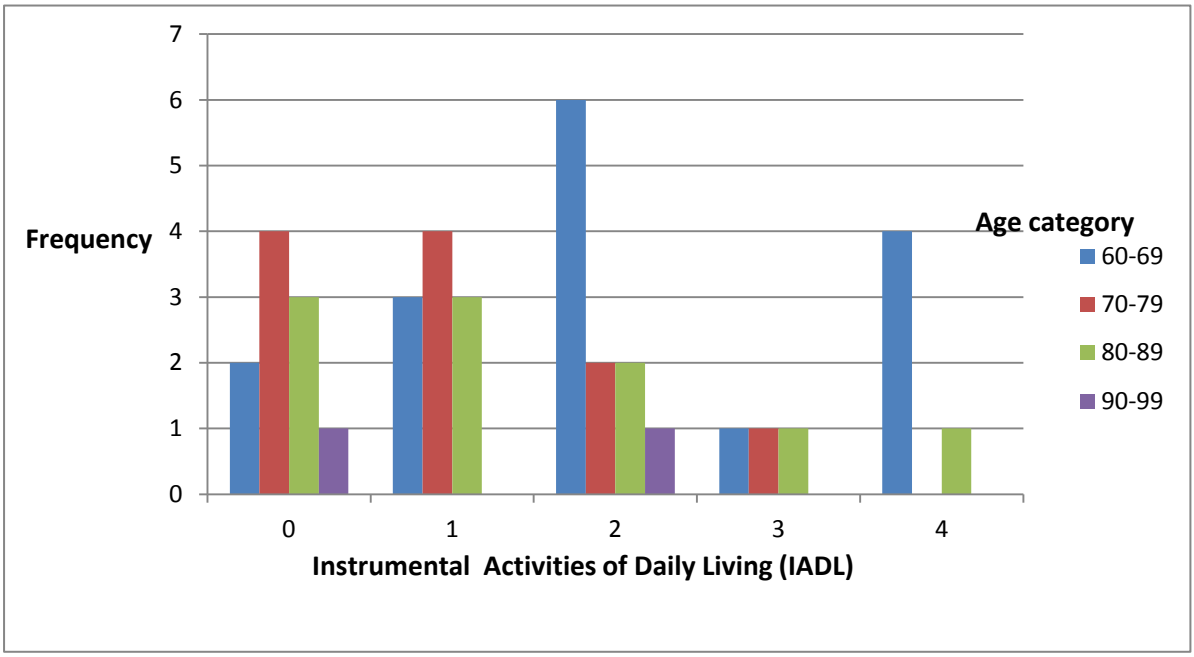


Figure 4.4 Instrumental Activities of Daily Living (IADL) scores for male participants (n=39)

No male participant was completely independent in instrumental activities of daily living.

4.5 Health-related quality of life of study participants

Quality of life utility scores (EQ-5D-5L index values) ranged from negative to positive values.

Table 4.5 Summary of index values for dependent variables (n=105(female=66, male=39))

Variable	Percentiles			median	Mean(±SD)
	25^{th}	50^{th}	75^{th}		
QOL	0.50	0.69	0.82	0.69	
QOL(female)	0.55	0.67	0.81	0.67	
QOL(male)	0.44	0.71	0.87		0.64±0.25
VAS	60	70	80		69.09±17.41
VAS(female)	60	70	80		69.24±17.27
VAS(male)	60	70	80		68.82±17.20
ADL	1	5	5	5	
ADL(female)	1	5	5	5	
ADL(male)	1	4	5	4	
IADL(female)	1	2	3	2	
IADL(male)	0	1	2		1.95±1.70

The median quality of life utility score (EQ-5D-5L index value) for all participants were 0.69 with IQR of 0.32 while the mean with standard deviation of VAS scores was 69.09±17.41. The median ADL score was 5 while the mean/median IADL score varied with regard to gender.

4.6 The relationship between participants' functional status and health-related quality of life

This subsection focuses on the relationship between functional status and health-related quality of life

The relationship of the outcome variables without gender bias is presented in the following table

Table 4.6 The relationship of outcome variables

	QOL	**VAS**	**ADL**
QOL	**1.000**	**r=**0.515 **P-value** <0.001	**r=**0.685 **P-value** <0.001
VAS	**r=**0.515 **P-value** <0.001	**1.000**	**r=**0.405 **P-value**<0.001
ADL	**r=**0.685 **P-value** <0.001	**r=**0.405 **P-value**<0.001	**1.000**
IADL(male)	**r=**0.434 **P-value** <0.006	**r=**0.321 **P-value** <0.047	**r=**0.475 **P-value** <0.003
IADL(female)	**r=**0.369 **P-value**<0.003	**r=**0.285 **P-value**<0.020	**r=**0.546 **P-value**<0.003

Among the study participants, there was a statistically significant relationship (association) between functional status and QoL. The association was positive. However, the association between QoL and each of ADL and IADL were strong and weak to moderate respectively.

Table 4.7 The relationship of outcome variables with regard to female participants.

	QOL	**VAS**	**ADL**	**IADL(female)**
QOL	**1.000**	**r**=0.448 **P-value** <0.001	**r**=0.579 **P-value** <0.001	**r**=0.369 **P-value** <0.002
VAS	**r**=0.448 **P-value** <0.001	**1.000**	**r**=0.323 **P-value**<0.009	**r**=0.285 **P-value** <0.021
ADL	**r**=0.579 **P-value** <0.001	**r**=0.323 **P-value**<0.009	**1.000**	**r**=0.546 **P-value** <0.001
IADL(female)	**r**=0.369 **P-value** <0.003	**r**=0.285 **P-value** <0.021	**r**=0.546 **P-value** <0.001	**1.000**

There was a statistically significant relationship (association) between functional status and QoL. The association was positive. The association of QoL with each of ADL and IADL were moderate and weak respectively among female participants.

Table 4.8 The relationship of outcome variables with regards to male participants

	QOL	**VAS**	**ADL**	**IADL(male)**
QOL	**1.000**	**r**=0.620 **P-value** <0.001	**r**=0.861 **P-value** <0.001	**r**=0.434 **P-value** <0.006
VAS	**r**=0.620 **P-value** <0.001	**1.000**	**r**=0.462 **P-value**<0.001	**r**=0.321 **P-value** <0.046
ADL	**r**=0.861 **P-value** <0.001	**r**=0.562 **P-value**<0.001	**1.000**	**r**=0.475 **P-value** <0.003
IADL(male)	**r**=0.434 **P-value** <0.006	**r**=0.321 **P-value** <0.046	**r**=0.475 **P-value** <0.003	**1.000**

There was a statistically significant relationship (association) between functional status and QoL among male participants. The association was positive. The association was very strong and moderate between QoL and each of ADL and IADL respectively.

4.7. The predictors of functional status and health-related quality of life of study participants.

The following table presents the results of the univariate analysis of the socio-demographic characteristics of participants with respect to QoL and the multiple analysis results of the entire individual socio-demographic characteristics that had the p-values of their univariate analysis < 0.2 with respect to QoL

Table 4.9(a) Predictors of Health-Related Quality of Life

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.22**
Age			**0.38**			
60 – 69	Reference					
70 – 79	0.79	0.32-1.99	0.62			
80 – 89	0.40	0.14-1.15	0.09			
90 – 99	0.71	0.13-4.04	0.70			
Gender			**0.35**			
Female	Reference					
Male	1.46	0.66-3.24	0.35			
Race			**0.01***			
Black	Reference			Reference		
White	0.38	0.17-0.89	0.03*	0.46	0.12-1-75	0.26
coloured	0.11	0.01-0.10	0.05*	0.16	0.01-2.14	0.17
Indian	1.00	****	****	1.00	****	****
Others	1.00	****	****	1.00	****	****
Education			**0.10****			
Primary	0.60	0.16-2.28	0.46	0.89	0.22-3.57	0.87
High school	0.21	0.05-0.84	0.03*	1.67	0.32-8.69	0.54
Diploma	0.44	0.09-2.28	0.33	3.24	0.29-35.86	0.34
Degree	0.89	0.11-7.02	0.91	1.24	0.23-6.81	0.81
None	Reference			Reference		

Table 4.9(b) Predictors of Health-Related Quality of Life

	Univariate analysis			Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.22**
Religion			**0.05***			
Christian	Reference			Reference		
Islam	1.00	****	****	1.00	****	****
Judaism	0.50	0.03-8.60	0.63	0.47	0.01-21.53	0.70
Hinduism	1.00	****	****	1.00	****	****
Others	0.28	0.10-0.79	0.02*	0.45	0.12-1.75	0.25
No/Un stated religion	0.35	0.14-0.89	0.03*	0.67	0.19-2.38	0.54
Comorbidity			**0.07****			
None	Reference			Reference		
Visual	0.25	0.05-1.24	0.09	0.43	0.07-2.55	0.35
Hypertension	0.25	0.05-1.17	0.08	0.31	0.06-1.61	0.16
Musculoskeletal	0.16	0.03-0.85	0.03*	0.35	0.05-2.46	0.29
Diabetes	0.31	0.05-1.94	0.21	0.93	0.11-7.88	0.95
Auditory	0.04	0.00-0.41	0.01*	0.11	0.01-1.60	0.11
Multiple	0.25	0.06-1.12	0.07	0.23	0.04-1.18	0.08
Length of stay in institution (years)			**0.07****			
0.25 – 2	Reference			Reference		
2 – 5	0.58	0.23-1.47	0.25	0.69	0.21-2.21	0.53
>5	2.00	0.75-5.33	0.17	1.24	0.39-3.93	0.72

Table 4.9(c) Predictors of Health-Related Quality of Life

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.22**
Marital status			**0.65**			
Married	Reference					
Divorced	0.56	0.17-1.91	0.36			
Widow(er)	0.62	0.20-1.89	0.40			
Never married	0.96	0.32-2.93	0.95			
Family support			**0.63**			
No	Reference					
Yes	1.21	0.56-2.60	0.63			

: statistically significant; **: p-value <0.2 (univariate); *: no data**

Race and religion predicted quality of life independently. However, race and religion when adjusted for educational qualification, co-morbidity and length of stay in institution did not predict QoL. Whites were 62% less likely to have a better health-related QoL than Blacks.

The following table presents the results of the univariate analysis of the socio-demographic characteristics of participants with respect to self-rated health and the multiple analysis results of the entire individual socio-demographic characteristics that had the p-values of their univariate analysis < 0.2 with respect to self-rated health

Table 4.10(a) Predictors of self-rated health

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.06**
Age			**0.80**			
60 – 69	Reference					
70 – 79	0.70	0.27-1.78	0.45			
80 – 89	1.00	0.35-2.91	0.99			
90 – 99	0.57	0.10-3.21	0.52			
Gender			**0.51**			
Female	Reference					
Male	1.32	0.58-2.98	0.51			
Race			**0.25**			
Black	Reference					
White	0.44	0.18-1.03	0.06			
coloured	0.42	0.08-2.31	0.32			
Indian	1.00	****	****			
Others	0.42	0.02-7.15	0.55			

Table 4.10(b) Predictors of self-rated health

	Univariate analysis			Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.06**
Education			**0.03***			
Primary	1.03	0.27-4.03	0.96	0.24	0.06-0.98	0.05*
High school	0.28	0.07-1.08	0.06	1.74	0.31-9.89	0.53
Diploma	0.89	0.17-4.78	0.89	1.28	0.10-16.56	0.85
Degree	2.22	0.19-25.72	0.52	0.53	0.09-3.28	0.50
None	Reference			Reference		
Religion			**0.17****			
Christian	Reference			Reference		
Islam	1.00	****	****	1.00	****	****
Judaism	0.40	0.02-6.93	0.53	0.79	0.01-110.79	0.92
Hinduism	1.00	****	****	1.00	****	****
Others	0.31	0.11-0.88	0.03*	0.73	0.19-2.77	0.64
No/Unstated religion	0.57	0.22-1.49	0.25	1.25	0.33-4.70	0.75
Comorbidity			**0.03***			
None	Reference			Reference		
Visual	0.20	0.03-1.18	0.08	0.34	0.04-2.82	0.31
Hypertension	0.29	0.05-1.64	0.16	0.38	0.05-2.79	0.34
Musculoskeletal	0.25	0.04-1.58	0.14	0.52	0.06-4.30	0.55
Diabetes	0.12	0.02-0.90	0.04*	0.22	0.02-2.08	0.19
Auditory	0.02	0.00-0.29	0.00*	0.03	0.00-0.51	0.02*
Multiple	0.25	0.05-1.41	0.11	0.17	0.02-1.33	0.09

Table 4.10(c) Predictors of self-rated health

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.06**
Length of stay (years)			**0.08****			
0.25 – 2	Reference			Reference		
2 – 5	0.96	0.39-2.41	0.94	1.36	0.43-4.27	0.60
>5	2.96	1.02-8.64	0.05	2.54	0.63-10.19	0.19
Marital status			**0.14****			
Married	Reference			Reference		
Divorced	0.68	0.20-2.31	0.53	1.05	0.23-4.69	0.95
Widow(er)	0.58	0.19-1.78	0.34	0.43	0.11-1.74	0.24
Never married	1.84	0.56-6.07	0.31	1.02	0.23-4.46	0.98
Family support			**0.23**			
No	Reference					
Yes	0.62	0.28-1.36	0.23			

: statistically significant; **: p-value <0.2 (univariate); *= no data**

Co-morbidity and educational qualification independently and significantly predicted self-rated health. Co-morbidity and educational qualification when adjusted for religion, length of stay in institution and marital status were not statistically significant in predicting self-rated health. The presence of multiple co-morbidities was 75% less likely to produce a better outcome with self-rated health compared to the absence of any comorbidity among participants. The presence of auditory comorbidity had a 98% lesser chance of producing a better self-rated health outcome compared to the absence of any comorbidity.

The following table presents the results of the univariate analysis of the socio-demographic characteristics of participants with respect to IADL (female) and the multiple analysis results of all the individual socio-demographic characteristics that had the p-values of their univariate analysis < 0.2 with respect to IADL (female)

Table 4.11(a) Predictors of Instrumental Activities of Daily Living (IADL) for female participants

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.17**
Age			**0.41**			
60 – 69	Reference					
70 – 79	2.18	0.67-7.09	0.20			
80 – 89	3.00	0.74-12.13	0.12			
90 – 99	1.50	0.17-12.94	0.71			
Race			**0.98**			
Black	Reference					
White	1.09	0.38-3.15	0.87			
coloured	1.00	****	****			
Indian	0.71	0.04-12.43	0.81			
Others	0.71	0.40-12.43	0.81			
Education			**0.19****			
Primary	0.90	0.17-4.64	0.90	0.43	0.12-1.55	0.20
High school	0.39	0.07-2.03	0.26	2.24	0.36-14.06	0.39
Diploma	2.10	0.25-17.59	0.49	1.00	****	****
Degree	1.00	****	****	0.94	0.16-5.49	0.94
None	Reference			Reference		

Table 4.11(b) Predictors of Instrumental Activities of Daily Living (IADL) for female participants

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.17**
Religion			**0.32**			
Christian	Reference					
Islam	1.00	****	****			
Judaism	**No female**					
Hinduism	1.00	****	****			
Others	1.02	0.30-3.57	0.97			
No/Unstated religion	0.45	0.14-1.49	0.19			
Comorbidity			**0.68**			
None	Reference			Reference		
Visual	0.60	0.76-4.76	0.63			
Hypertension	1.17	0.13-10.22	0.89			
Musculoskeletal	0.50	0.06-4.09	0.52			
Diabetes	0.63	0.07-5.35	0.67			
Auditory	0.13	0.01-1.20	0.14			
Multiple	0.57	0.08-4.13	0.56			
Length of stay (years)			**0.37**			
0.25 – 2	Reference			Reference		
2 – 5	0.45	0.14-1.47	0.19			
>5	0.56	0.17-1.85	0.34			

Table 4.11(c) Predictors of Instrumental Activities of Daily Living (IADL) for female participants

	Univariate analysis			Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value =0.17**
Marital status			**0.09****			
Married	Reference			Reference		
Divorced	0.25	0.05-1.23	0.09	0.40	0.07-2.30	0.30
Widow(er)	1.27	0.31-5.19	0.74	1.14	0.25-5.12	0.87
Never married	0.43	0.10-1.89	0.26	0.34	0.07-1.65	0.18
Family support			**0.34**			
No	Reference					
Yes	1.60	0.60-4.25	0.35			

***=statistically significant; -=no data**

NB: predictors of IADL were analysed separately for male and female participants because the IADL scoring was different for male and female gender.

The following table presents the results of the univariate analysis of the socio-demographic characteristics of participants with respect to IADL (male) and the multiple analysis results of the entire individual socio-demographic characteristics that had the p-values of their univariate analysis < 0.2 with respect to IADL (male)

Table 4.12(a) Predictors of Instrumental Activities of Daily Living (IADL) for male participants

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.00***
Age			**0.17****			
60 – 69	Reference			Reference		
70 – 79	0.17	0.03-0.93	0.04*	0.15	0.01-2.09	0.16
80 – 89	0.30	0.06-1.58	0.15	0.05	0.00-0.97	0.05*
90 – 99	0.45	0.02-8.82	0.60	2.50	0.07-91.57	0.62
Race			**0.21**			
Black	Reference					
White	2.40	0.61-9.49	0.21			
coloured	1.00	****	****			
Indian	**No male**	----	----			
Others	**No male**	----	----			

Table 4.12(b) Predictors of Instrumental Activities of Daily Living (IADL) for male participants

	Univariate analysis			Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.00***
Education			**0.39**			
Primary	2.00	0.17-22.95	0.58			
High school	4.80	0.40-58.01	0.22			
Diploma	8.00	0.31-206.37	0.21			
Degree	1.00	****	****			
None	Reference					
Religion			**0.04***			
Christian	Reference			Reference		
Islam	**No male**	----	----	----	----	----
Judaism	1.00	****	****	1.00	****	****
Hinduism	**No male**	----	----	----	----	----
Others	0.25	0.04	0.17	0.06	0.00-1.40	0.08
No/Unstated religion	0.15	0.03	0.02*	0.02	0.00-0.55	0.02*

Table 4.12(c) Predictors of Instrumental Activities of Daily Living (IADL) for male participants

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.00***
Comorbidity			**0.90**			
None	Reference					
Visual	1.88	0.20-17.26	0.58			
Hypertension	1.88	0.30-11.63	0.50			
Musculoskeletal	2.50	0.16-38.60	0.51			
Diabetes	**No male**	----	----			
Auditory	1.00	****	****			
Multiple	1.00	0.16-6.42	1.00			
Length of stay (years)			**0.16****			
0.25 – 2	Reference			Reference		
2 – 5	0.67	0.14-3.07	0.60	2.68	0.25-28.48	0.42
>5	0.19	0.03-1.16	0.07	0.01	0.00-0.33	0.01*
Marital status			**0.70**			
Married	Reference					
Divorced	0.75	0.10-5.77	0.78			
Widow(er)	0.75	0.10-5.77	0.78			
Never married	0.58	0.10-3.51	0.56			
Family support (finance)						
No	Reference		**0.26**			
Yes	0.48	0.14-1.74	0.27			

=statistically significant; *=empty; ----=no data**

Religion independently predicted the functional status (IADL) for male participants. Although age, religion and length of stay in the institution when combined did not predict IADL among males, being in the 80-89 years' age category, being institutionalised for longer than 5 years and without or preferring not to state one's religion was significant in predicting functional status (IADL) among male participants.

The following table presents the results of the univariate analysis of the socio-demographic characteristics of participants with respect to ADL and the multiple analysis results of the entire individual socio-demographic characteristics that had the p-values of their univariate analysis < 0.2 with respect to ADL

Table 4.13(a) Predictors of Activities of Daily Living (ADL)

	Univariate analysis			**Multiple analysis**		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.07**
Age			**0.32**			
60 – 69	Reference					
70 – 79	0.64	0.25-1.60	0.34			
80 – 89	0.42	0.15-1.20	0.11			
90 – 99	0.32	0.05-1.97	0.22			
Gender			**0.50**			
Female	Reference					
Male	0.76	0.34-1.67	0.50			
Race			**0.10****			
Black	Reference			Reference		
White	0.38	0.16-0.87	0.02*	0.71	0.25-1.98	0.51
coloured	0.29	0.05-1.75	0.18	0.42	0.06-3.21	0.41
Indian	0.59	0.03-9.93	0.71	1.00	****	****
Others	1.00	****	****	1.00	****	****

Table 4.13(b) Predictors of Activities of Daily Living (ADL)

		Univariate analysis		Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.07**
Education			**0.37**			
Primary	0.54	0.14-2.05	0.37			
High school	0.28	0.07-1.08	0.06			
Diploma	0.44	0.09-2.28	0.33			
Degree	0.44	0.06-3.24	0.42			
None	Reference					
Religion			**0.01***			
Christian	Reference			Reference		
Islam	1.00	****	****	1.00	****	****
Judaism	1.00	****	****	1.00	****	****
Hinduism	1.00	****	****	1.00	****	****
Others	0.25	0.09-0.72	0.01*	0.29	0.09-0.99	0.05*
No/Unstated religion	0.31	0.12-0.81	0.02*	0.37	0.12-1.12	0.08
Comorbidity			**0.18****			
None	Reference			Reference		
Visual	0.36	0.08-1.64	0.19	0.39	0.71-2.09	0.27
Hypertension	0.36	0.09-1.54	0.17	0.32	0.06-1.64	0.17
Musculoskeletal	0.42	0.09-2.06	0.29	0.39	0.06-2.46	0.32
Diabetes	0.45	0.08-2.60	0.38	0.69	0.10-5.03	0.72
Auditory	0.05	0.00-0.57	0.02*	0.09	0.01-1.21	0.07
Multiple	0.31	0.08-1.25	0.10	0.20	0.04-1.02	0.05*

Table 4.13(c) Predictors of Activities of Daily Living (ADL)

	Univariate analysis			Multiple analysis		
Characteristics	**COR**	**95% CI**	**P- value**	**AdjOR**	**95% CI**	**P- value= 0.07**
Length of stay (years)			**0.41**			
0.25 – 2	Reference					
2 – 5	1.47	0.59-3.67	0.41			
>5	1.87	0.72-4.87	0.20			
Marital status						
Married	Reference		**0.65**			
Divorced	0.56	0.17-1.91	0.36			
Widow(er)	0.62	0.20-1.89	0.40			
Never married	0.96	0.32-2.93	0.95			
Family support (finance)			**0.38**			
No	Reference					
Yes	1.40	0.65-3.04	0.38			

=statistically significant; **=p-value<0.2; *=empty**

Religion was a significant independent predictor of functional status (basic ADL). When religion was adjusted for race and co-morbidity, the combination was not significant in predicting ADL. However, identifying with any other religion that did not include the 4 identified religions and living with multiple comorbidities were significant in predicting ADL

Table 4.14 Categories of qol based on EQ-5D index values of participants' EQ-5D-5L responses

EQ-5D-5L response	Response remark	EQ-5D-5L Index values	Class of values	QoL remarks	Percentage of participants (%)
11111	Nil abnormality	0.900	0.900	Good	11.43
22222	Slight difficulty/challenge	0.653	> 0.365 < 0.900	Moderate	55.24
33333	Moderate difficulty/challenge	0.596			
44444	Severe difficulty/challenge	0.365	≥ -0.145 ≤ 0.365	Poor	33.33
55555	Inability	-0.145			

Only 11.43% of participants had all EQ-5D-5L responses without any form of abnormality. Majority (55.24%) of participants had total EQ-5D-5L responses that were classified as moderate health-related QoL.

Table 4.15 Categories of participants' functional status with regards to ADL

ADL score	Functional status	Remark	Percentage of participants (%)
6	Independent	***Good***	19.05
4 – 5	Dependent	***Moderate***	38.10
0 – 3	Dependent	***Poor***	42.85

The number of participants that were functionally independent and had good functional status with regards to ADL was 19.05%.

Table 4.16 Categories of participants' functional status with regards to IADL

IADL score (female)	Female (%)	Functional level	Remark	IADL score (male)	Male (%)	Functional level	Remark
7 – 8	6.07	Dependent to Independent	***Good***	5	0.00	Independent	***Good***
4 – 6	18.18	Dependent	***Moderate***	3 – 4	20.51	Dependent	***Moderate***
0 – 3	75.76	Dependent	***Poor***	0 - 2	79.49	Dependent	***Poor***

The numbers of female participants that had a minimum score of 7 on the IADL scale and had good functional status with regards to IADL were a minority. No male participant was independent in the performance of IADL and hence none had good functional status with regards to IADL.

Table 4.17 Categories of self-rated health based on participants' VAS scores

VAS score (%)	Category of score	Percentage of participants (%)
70– 100	*Good*	60.00
50– 69	*Moderate*	29.52
<49	*Poor*	10.48

Majority of participants rated their health as either *moderate or good.*

Table 4.18 Summary of functional status, self-rated health and health-related quality of life of participants

Variable			Reference score	Category of score	Remark
VAS			Mean score = 69.09±17.41	Moderate score	*Moderate self-rated health*
QoL			Median EQ-5D-5L index score = 0.69	Moderate sore	*Moderate health-related QoL.*
Functional status	**ADL**		Median score = 5	Moderate score	*Moderate functional status*
	IADL	**Female**	Median score = 2	Poor score	*Poor functional status*
		Male	Mean score = 1.95±1.75	Poor score	*Poor functional status*

On the average, participants' health-related QoL and basic ADL was each *moderate.*

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter will focus on discussing the results of this study presented in the previous chapter. The discussion will be done in comparison to previous related studies with emphasis on the objectives of this study. This study involved 106 participants from four institutions for the elderly with the study objectives centred on functional status and health-related quality of life.

5.2 Study participants' response rate

Response rate is important in evaluating the results of a study. There is generally no agreed upon standard required response rate for studies that involve questionnaires. There have been various suggestions on the minimal acceptable response rates for studies (Draugalis et al., 2008). A recommended minimum response rate of 60% is, however, the most common in available literature (Draugalis et al., 2008, Fincham, 2008). The response rate for this study was 90.52%. This particular study is relatively novel in Gauteng province with regards to available literature and hence, direct comparison based on response rate could not be made between this study and any other in South Africa. In a study "does a functional activity programme improve function, quality of life, and falls for residents in long term care? Cluster randomised controlled trial" (Kerse et al., 2008) the response rate was 93%. In a community-based study on self-reported health and functional limitations among older people (Debpuur, 2010) where quality of life (QOL) and Activities of Daily Living/Instrumental Activities of Daily Living (ADL/IADL) were relevant, the response rate was 84.4%. The response rate for this study implies that this study has a non-response bias rate of 9.48% and hence falls within all available recommended acceptable ranges for study response rates.

5.3 Socio-demographic profile of the study participants

The distribution of participants in the 10-year categorised age groups was fair between the sixth and seventh decade and then a marked drop in the eighth decade with a steep decline in the ninth decade. This appears usual as the population of the elderly that are in their ninth and tenth decades of life are lower than that of the younger elderly population as the population of

the elderly in their eighth decade and above appears as the fastest growing group (Timiras, 2007). The mean age of participants in this study which was 75.2±8.56 years (range of 61-98 years) is in the same decade of life with that of nursing home residents in a study that compared the effect of functional mobility and balance on the health-related quality of life of among elderly between community-dwelling and institutionalised elderly (Yümin et al., 2011).

The mean age of this study participants is similar to findings from another study which found the mean age of elderly people in homes to be 76.88±6.68 years (Karakaya et al., 2009). The mean age does not seem to be in agreement with the assertion that population growth rate is positively correlated with age, especially among the oldest old population where the population growth rate is highest (Rosenwaike, 1985, Seeman et al., 2010, Taeuber and Rosenwaike, 1992). The mean ages of female and male participants in this study were 76.0±8.4 years and 73.8±8.7 years. This agrees with findings elsewhere where the mean age of female participants (82.6 years) was higher than that of the males (81.2 years) (Garrido-Abejar et al., 2011). This means that female participants were on average older than male participants. This is supported by common findings that women live longer than men (Ginter and Simko, 2012).

Female participants (62.86%) were more compared to male participants (37.14%). Although there are no unified opinion in literature on the specific effects of gender on institutionalisation among the elderly, gender differences does play a role in predicting institutionalisation among the elderly (Luppa et al., 2011). The higher number of female participants in this study is supported by some studies with regard to gender (being female) which predicts institutionalisation in the elderly (Martikainen et al., 2009). There is a report of contrary finding to that of this study (Gaugler et al., 2007b). Gaugler et al (2007b) found that being female decreases the chances of institutionalisation. One possible reason for this higher number of female participants is that the age criterion for admission to institutions for the elderly in South Africa favours women who are allowed to be admitted to institutions from 60 years of age while men get admitted from age 65 years. A different possible reason is the higher chances for women to be socio-economically dependent and hence, the higher chances of being institutionalised due to socio-economic reasons. Women live longer than men and hence have higher chances of losing their spouses to death which increases their

chances of being institutionalised. This might also account for the reason why there were more female participants in the study.

This study was dominated by white and black participants (90.45%). Participants from all other races were relatively very small in number (9.55%). This may be due to the areas where this study was carried out which were White/Black dominated. It has been found that being White can predict institutionalisation (Gaugler et al., 2007a). That seems to support the result from this study as the total population of the areas where this study was carried out was markedly dominated by the Black population (Frith, 2017a, b & c) yet the population of white participants was more than a third (39.05%). A further support to the relatively high number of white participants in black dominated areas is the African cultural belief that taking loved ones away from home to live in institutions could be disrespectful and hence there is usually the need to provide informal family support to loved ones who are elderly (Mindel and Wright, 1982).

The result of this study did not indicate any particular pattern with regard to educational status of participants. This is in agreement with previous studies that found that there is inconclusive evidence with regard to the effect of education on institutionalisation of the elderly (Luppa et al., 2009, Nihtilä and Martikainen, 2008b). The majority of participants, who had some form of formal education, had primary school qualification. This is similar to what was found in a study on religiosity and subjective wellbeing among institutionalised elderly in Pakistan where the effect of religiosity on life satisfaction and mood were determined (Gull and Dawood, 2013).

The majority of participants (40%) belonged to the Christian religion. This can be explained by the fact that three quarters of the institutions were run by Christian organisations. A further possible reason why Christianity was the dominant religion could be that some participants who were not Christians did not state their religion as they were in institutions that had Christianity-oriented creeds where practising their religions might not be viewed in a positive light. This reason seems important because of the relatively high population (32.38%) of participants who indicated that they either had no religion or preferred not state it.

Ageing is often associated with comorbidity. This was reflected in the high prevalence of comorbidities (85.71%) among the participants in this study. The high prevalence of

comorbidities among the participants seems to be in agreement with the assertion that institutionalised elderly usually have more comorbidities compared to community-dwelling elderly (Haasum et al., 2012). This can be further substantiated by the findings that functional impairments, which could result from comorbidities, can predict institutionalisation in the elderly (Agüero-Torres et al., 2001, Luppa et al., 2008).

The population of participants who had spent less than two years in the institutions being in marked majority (45.71%) indicates that there is a higher rate of resident admission to the institutions compared to exit from the institutions. This could be due to the increased life expectancy which is contributing to the increasing population proportion of the elderly that is having a direct effect on the use of institutions for the elderly. It could also be due to the increasing awareness of the existence of institutions for the elderly.

A noteworthy finding from this study is the considerable proportion of participants that were still married while being institutionalised compared to divorcees, the widowed and those who have never married. This does not seem to be in agreement with the finding of the study on the risk of institutionalisation of the elderly living with a spouse that living with a spouse reduces the risk of institutionalisation among the elderly (Nihtilä and Martikainen, 2008b). A possible reason for this picture could be the high level of functional dependence due to old age among the married residents which necessitated the need for help from outside the home. Although widowhood could increase the risk of institutionalisation among the elderly (Nihtilä and Martikainen, 2008a), the finding from this study does not explicitly support that finding. This may be attributable to the presence of support for the bereaved spouses or that the functional states of the widowed in the reach of these institutions do not require the services of the institutions.

Findings from this study did not indicate if financial family support had any impact on the institutionalisation of participants as the difference in number between the populations of participants who received financial family support and those who didn't was small. Family support which can predict institutionalisation among the elderly could come in different forms including finance (Gaugler et al., 2007b) that could affect elderly life both in the community and in the institution (Luppa et al., 2009). Although slight in the difference in number advantage, the majority of participants in this study received no financial support from family members. The finding from this study with regard to family support is not supported by findings from another study (Gaugler et al., 2007b). This finding seems to

indicate that financial family support did not play a predominant role, if it played any role, in the institutionalisation of study participants. This finding also seems to indicate that majority of study participants were either self-financed, relied on older person's grants from the government or lived on charity.

5.4 Functional status of participants

The finding from this study was that in each activity except for one, the majority of participants were independent. Physical ambulation was the only basic activity of daily living where the majority (78.10%) of the participants were dependent. The finding of this study with regard to dependence in physical ambulation is seemingly in agreement with some of the findings of some other studies where ambulation decline was marked among the institutionalised elderly and difficulty with ambulation predicted institutionalisation (Jerez-Roig et al., 2017, Wang et al., 2001). This finding seems logical as some important features of aging are sarcopenia and a decrease in balance which take their toll on physical ambulation. Contrary to the findings of Jerez-Roig et al. (2017), the majority (70.48%) of the participants were most independent in feeding. A possible explanation for this finding is that the majority of participants were independent in feeding before institutionalisation and there had been no marked decline in their feeding ability after institutionalisation.

An important finding from this study was that only a minority (19.05%) of the participants were independent in performing all the basic activities of daily living. This finding is in agreement with the findings from previous studies with regards to basic activities of daily living (Jerez-Roig et al., 2017, Jette et al., 1992, Wang et al., 2001). Jette et al (1992) found that dependence in basic activities of daily living increased the risk of institutionalisation. This could increase the chances of having a relatively higher percentage of the number of institutionalised elderly who are dependent in basic activities of daily living such as reflected in this study. The high percentage (80.95%) of participants that were dependent in basic activities of daily living is also in agreement with the assertion that aging is associated with dependence in physical function. This finding seems to indicate that the percentage of total residents who are dependent will be higher considering the fact that participants in this study were largely among the least dependent residents.

The results of this study revealed that a very small minority (1.52%) of female participants were independent in performing all instrumental activities of daily living while all male participants were dependent in the performance of instrumental activities of daily living as it

applies to them. This finding reflects the known fact that instrumental activities of daily living are more complex than basic activities of daily living (Lorenzo et al., 2010). Another likely explanation to this finding is that institutionalisation, which could be a formal set up that seems to "restrict" the "freedom" of residents, as found in this study could place a direct restriction on the performance of some of the instrumental activities of daily living such as shopping, food preparation and responsibility for own medications. This could be because these functions are partially if not completely taken care of by the institution. This seems to explain the high numbers of dependent participants in shopping (female-87.88%; male-82.05%), food preparation (female-92.42%) and responsibility for own medications (female-90.91%; male-89.74%) as against relatively lower numbers of dependent participants in some other activities such as ability to use telephone (female 46.96%; male-56.41%) and ability to handle finances (females-50.00%; males-43.59%) where residents could exert higher levels of control if they understand/are familiar with these functions. The high level of dependence in instrumental activities of daily living among participants seems to be in agreement with a previous study finding that dependence in instrumental activities of daily living could predict institutionalisation in the elderly (Andel et al., 2007, Banaszak-Holl et al., 2004).

The ADL and IADL (female) scores of participants in this study were not normally distributed and hence; the median scores were used. The IADL (male) scores were normally distributed and hence; the mean IADL (male) scores were used for reference. The median ADL score was five which lies in the *moderate* category of participants'ADL scores. The median IADL (female) and mean IADL (male) scores (2 & 1.95±1.75 respectively) lie in the *poo*r category of participants' IADL scores.

The findings of this study with regards to functional status of participants revealed that it was better to make reference to participants ADL scores while making a general statement because ADL scores were more reliable compared to IADL scores. This could be said to have resulted from the significant differences in the number of participants with respect to gender coupled with the fact that the IADL measurement tool used in this study is gender-sensitive.

5.5 Health-related quality of life of participants

This study's findings revealed that QoL among participants varied. This finding is logical as participants could not have been said to be equal in their respective daily lives, which must have been reflected in the outcome of this study. This finding could also have been as a result of varying factors that could influence or predict the health-related QoL of the institutionalised elderly as found by Borowiak and Kostka (2004) that depression and cardiovascular diseases have direct and indirect effects respectively.

The low number (11.46%) of participants having the best possible health-related QoL seems to indicate that a large majority of residents are not experiencing the best of health-related QoL. A number of factors including but not limited to environmental, economic, social and health states may be responsible for this as a host of the predictors of QoL may be categorised under these factors (Borowiak and Kostka, 2004). Institutionalisation (environment) could take its toll on the health-related QoL of the elderly who had little or no choice but to be institutionalised. This may result from the challenges of adaptation to the institutional environment impacting on the mental health and in turn the QoL of an inmate. This occurrence could be expected among people of Black African heritage where it is commonly seen as a form of cultural disrespect to institutionalise the elderly. Health-related QoL of a resident may also be affected if institutionalisation resulted in economic restriction. This may be the case for inmates who have to rely solely on charity or other forms of aid such as the old age grant which places the resident economically at the mercy of donors or the government, compared to being a community-dwelling elderly which may provide opportunities for access to more streams of income and possibly less economic cost of living (Hébert et al., 2001). The decline/changes in social relations due to institutionalisation could negatively impact the health-related QoL of the elderly. Declining health state is an important factor that could result in institutionalisation in the elderly and this could in turn result in the decline of health-related QoL (Borowiak and Kostka, 2004). This finding is seemingly in agreement with the findings of Noro and Aro (1996) that institutionalisation associated with higher functional dependence among the elderly results in relative lower health-related QoL.

This study's finding revealed that more than half (58.10%) of participants had responses of minimum of "slight" challenge/difficulty in each of the five domains of EQ-5D-5L. In essence, the majority of the participants had health-related QoL that could be described as higher than moderate. This seems to be a reflection of the fact that participants in this study were selected mainly from the independent and least dependent residents. This could indicate that the majority of these participants still had significant control of daily lives.

5.6 Relationship between functional status and health-related quality of life

This study's findings revealed that functional status is positively correlated with health-related quality of life among the institutionalised elderly (QoL & ADL: $r=0.685$; $p<0.001$). A similar pattern of correlation was observed when gender-based analyses were done (Female: QoL & ADL: $r=0.579$; $p<0.001$ and QoL & IADL: $r=0.369$; $p<0.002$. Male: QoL & ADL: $r=0.861$; $p<0.001$ and QoL & IADL: $r=0.434$; $p<0.006$). This finding from this study is in agreement with the already established relationship between functional status and health-related quality of life amongst community-dwelling elderly (Shin et al., 2008). The finding on

the relationship between health-related QoL and functional status indicate that a decreased health-related QoL is correlated with a decreased functional status. This is also in agreement with a previous finding among institutionalised Finnish elderly (Noro and Aro, 1996). In essence, the functional activities that take place in these institutions that the elderly residents could partake in tend to have an effect on the health-related quality of life. This seems to indicate that the health-related QoL of the institutionalised elderly may be influenced by external factors. Hence, the health-related QoL of a community-dwelling elderly may be maintained when the same elderly becomes institutionalised if some external factors that may influence the health-related QoL of that elder (in the community) are maintained in the institution.

There were different levels of relationships between basic Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) with the health-related quality of life (QoL) of participants. The correlation of health-related QoL with basic ADL (significant, strong and positive) was higher in strength when compared with the correlation of health-related QoL with IADL (significant, moderate and positive) among the elderly and on the basis of gender. This might be because institutionalisation could result in the placement of more emphasis on ADL than IADL. Activities such as shopping, cooking or transportation would be of lesser importance to the institutionalised elderly as these activities could be the responsibility of the institutional management. It can therefore be said that a change in functional status with regard to ADL in the elderly in institution affects the health-related QoL more than a similar change in functional status with regard to IADL would among this study's participants.

Despite the difference in the strengths of the correlation between basic ADL and health-related QoL when compared with IADL and health-related QoL, both ADL and IADL were positively correlated with health-related QoL amongst the study participants. This study's finding is in agreement with a previous finding that established that improving the capacity of the institutionalised elderly with regard to activities of daily living is good for their health-related quality of life (Yümin et al., 2011). The correlation between IADL and health-related QoL in this study is underscored by another previous finding that among the community-dwelling and institutionalised elderly, IADL could predict health-related QoL (Borowiak and Kostka, 2004). This finding could be due to the importance of independence in performing

both basic and instrumental activities of daily living to the elderly in an environment where their freedom is "restricted".

The correlation between functional status and participants' self-rated health was significant and positive from the results (ADL: $r=0.405$, $p<0.001$; IADL: $r=0.321$, $p<0.047$ (male) & $r=0.285$, $p<0.020$) of this study. This finding is in agreement with the finding of another study on the institutionalised elderly (Damián et al., 2008). Damian et al (2008) found that any degree of functional dependence increased the odds of worse health perception.

5.7 Predictors of participants' health-related quality of life

Race was the strongest ($p<0.01$) independent predictor of health-related quality of life of study participants. This is in agreement with the findings from other studies (Jiang and Hesser, 2006, Zahran et al., 2005). Being Indian or belonging to "other" races that excluded White and Coloured races 0% less likely to have a better health-related quality of life compared to being Black. White and Coloured had 62% and 89% respective lesser chances of having a better health-related QoL compared to Black participants. Hence, being Black increased the chances of having a better health-related QoL among the study participants. Being White or Coloured in race had a negative interaction with their health-related QoL (95% CI: 0.17-0.89(white) and 0.01-0.10(Coloured)). A likely reason for being White or Coloured interacting negatively with the health-related QoL of participants may be due to socio-economic reasons. These particular participants may have had a significant decline in their socio-economic status sequel to changing from community-dwelling to institutionalised elderly which affected their health-related QoL. However, race as an independent factor was a poor predictor of the participants' health-related QoL. This indicates that race had a weak interaction with the health-related QoL of participants despite the variation of its strength of prediction of the health-related QoL between the various racial groups. The 0% chances of Indian participants having a lesser health-related QoL than Black participants might be due to the cultural beliefs among people of both races (Bhat and Dhruvarajan, 2001, Shaibu and Wallhagen, 2002). These same cultural beliefs might also be responsible for the same occurrence with participants of "other" races compared to the Blacks. These "other" races are more likely to have cultural beliefs similar to those of African, Latin/Hispanic or Asian origins that have some similarities to that of Blacks and Indians with respect to the institutionalisation of the elderly. The reason being that other races that could be found in South Africa that are non-White or Coloured like the Chinese could only possibly have had

cultural roots that are non-White related. The 0% chances of Indians or participants from "other" races having a lesser health-related QoL than White or Coloured participants with respect to Black participants could also be attributed to cultural beliefs. The findings of this study with regard to the strengths of predictors of health-related QoL seems to have been given further credence with respect to White race being a predictor of institutionalisation in the elderly (Luppa et al., 2009). This is because if White race predicts institutionalisation, the sensitivity of being White to changes in the health-related QoL in the institution might be lower when compared to being Black, Indian or from "other" races.

Religion was a significant ($p<0.05$) predictor of the health-related QoL of participants. However, it is noteworthy that religion was a poor independent predictor of the health-related QoL of participants. Hence, the interaction of religion with the health-related QoL of participants was weak. It is likely that religion predicted the health-related QoL of participants because religious engagement may predict quality of life in the elderly while in the institution due to relatively increased indulgence sequel to institutionalisation (Idler et al., 2009). With reference to Christianity, study-participating Hindu and Muslim were 0% less likely to have a better health-related quality of life. Although the participating Judaists were 50% less likely to have a better health-related QoL than the participating Christians, it was not a significant predictor. In essence, Islam and Hinduism when compared to Christianity were seemingly not poorer with regard to participants' health-related QoL. This may be due to the identification with or practise of the religion participants were most comfortable with. However, identification with or the practise of one of these dominant religions was seemingly better compared to the non-identification with or practise of any religion in terms of the health-related QoL of participants using Christianity as a reference. This underscores one of the findings of Idler et al (2009) that deeper religious indulgence makes life more exciting when compared to relatively lower level of religious indulgence. This is may be due to the increased chances of social interaction and functional engagement with religious indulgence which could decrease the feelings of loneliness or isolation among participants.

Education was not a statistically significant independent predictor of the health-related QoL of participants. However, the possession of a high school qualification was statistically significant in predicting the health-related QoL of study participants and it was 79% less likely to have a better health-related QoL compared to the absence of any formal educational qualification. An important finding in this study with respect to education was that the

possession of a high school qualification negatively interacted (95% CI: 0.05-0.84) with the health-related QoL of participants. This study's finding is not in agreement with the findings of some previous studies that higher education is associated with higher health-related QoL (Noro and Aro, 1996, Tajvar et al., 2008a). The trend of the chances of having any form of educational qualification among participants having a lesser health-related QoL compared to the absence of any formal education is also not in agreement with the studies of Noro and Aro (1996) and that of Tajvar et al (2008) where increasing levels of education positively interacted positively with health-related QoL. This may be that increasing levels of education altered and improved the level of awareness of health-improving lifestyle that positively interacts with health-related QoL in these other studies. This study's finding indicates that the possession of a high school qualification was the only educational qualification that had a significant interaction with the health-related QoL of participants in this study. This finding might be due to the kind of activities that participants of this study got involved in while in the institutions that had the attainment of a high school qualification as a baseline in other to have any significant interaction with their respective health-related QoL.

Comorbidity as an independent factor was not a significant predictor of health-related QoL of participants. However, musculoskeletal and auditory comorbidities were statistically significant in predicting the health-related QoL of participants and the presence of any of musculoskeletal (95% CI: 0.03-0.85) or auditory (95% CI: 0.00-0.41) comorbidities decreased the health-related quality of life of participants. This finding is not in agreement with the finding that complaints that are musculoskeletal in nature are more prominent in their interaction with the health-related quality of life of the home dwelling elderly while cardiovascular comorbidities play more important roles in the health-related QoL of the institutionalised elderly (Borowiak and Kostka, 2004). A possible reason for this difference in finding may be the relative higher need for the musculoskeletal system to the participants in this study. However, this study's findings with regard to the interaction of musculoskeletal and auditory impairment comorbidities with the health-related QoL of the elderly is in agreement with the findings of previous studies (Borowiak and Kostka, 2004, Noro and Aro, 1996). This finding highlights the burden musculoskeletal and auditory impairments create in the life of the elderly. Diabetes, hypertension, visual impairment and the presence of multiple comorbidities were not significant predictors of the health-related QoL of the study participants. This finding is not in agreement with some previous findings (Borowiak and Kostka, 2004, Noro and Aro, 1996). A possible reason for visual impairment, diabetes,

hypertension and the presence of multiple comorbidities not predicting the health-related QoL of study participants might be that their levels of severities among participants were low.

5.8 Predictors of participants' functional status

Religion was statistically significant ($p<0.01$) in independently predicting the basic ADL of the participants of this study. It was also a poor predictor of basic ADL and its general level of interaction with basic ADL was inconclusive. However, the direction of interaction of religions that excluded Christianity, Islam, Hinduism and Judaism with ADL were negative (95% CI: 0.09-0.72). A possible reason for this occurrence is that these "other" religions did not encourage physical functioning such as religious attendance which could enhance functional performance among participants. Another possible explanation is that these religions encouraged salience. Salience in religion negatively affects functional status (Benjamins, 2004). However, religion was statistically significant in predicting IADL for male participants only in this study. This finding is in partial agreement with some other findings where religious participation positively interacted with the health-related QoL of both male and female elderly (Benjamins, 2004, Hybels et al., 2012). Religious participation such as experienced in Christianity, Islam, Hinduism and Judaism among the institutionalised elderly could influence their functional status because of the mental and physical demands of these religions. Contrary to the finding of this study, it may be logical to expect that religion would have more interaction with IADL (all participants) compared to basic ADL due to the degree of complexity of religious practice or involvement, at least with the four predominant religions. This particular finding from this study may be partly due to the effect of institutionalisation which tends to create some limit or restriction on the "freedom" of participation among residents. The negative interaction of not having or preferring not to state religious inclination (95% CI: 0.03-0.76) on IADL (male) as reflected in the results of this study seems to be in agreement with previous findings that religious participation enhances functional status (Benjamins, 2004, Hybels et al., 2012). This finding also highlights the positive interaction religious participation could have with functional status in the elderly.

The prediction of IADL by religion among male participants with respect to age and length of stay in the institution was statistically significant in the 80-89 years' age category and among those who had been in the institutions for longer than five years. The interaction between IADL (male) and religious status with respect to this age category was negative (95% CI:

0.00-0.97). This is finding with respect to age category is contrary to a previous finding where age did not have a defined interaction with functional status with respect to religion (Benjamins, 2004). The difference between this finding and that of Benjamins (2004) may be due to the difference in location of the participants in this study i.e community dwelling versus institutionalised living. Longer period of stay in the institution may interact with religious participation and hence functional status due to the effect of adaption and increasing age.

Religion was not statistically significant in predicting basic ADL of participants when adjusted for race and comorbidity. It, however, was statistically significant in predicting basic ADL among participants who identified with "other" religions in the presence of multiple comorbidities. Identifying with "other" religions had a negative interaction (95% CI: 0.09-0.99) with the functional status (ADL) of participants in the presence of multiple comorbidities. These findings indicate that participants who identified with any religion other than Christianity, Islam, Hinduism and Judaism and had at least two comorbidities had their functional status (basic ADL) interacted with by their religion. This finding is not likely to be due to the similarity in some aspects of practice, especially physical mode, among the four major religions. The physical modes of practise of the major religions involve activities such as genuflection, clapping, squatting; dancing etc. That could interact with functional status (basic ADL).

Auditory impairment as a comorbidity was statistically significant in predicting the basic ADL of participants. It also had a negative interaction with functional status (basic ADL) (95% CI: 0.00-0.57). These findings are in agreement with the finding of some other study that increasing severity of auditory impairment negatively interacts with function in the elderly (Gopinath et al., 2012). Auditory impairment as a comorbidity was not statistically significant in predicting the IADL of participants. It also had no definitive interaction with function, especially among female participants (95% CI: 0.01-1.20). This finding is not in agreement with the finding of some other study where auditory impairment negatively interacted with function among elderly women (Nourhashémi et al., 2001). This contrary finding may be due to the low level of prevalence of this comorbidity among male (7.58%) and female participants (7.69%). Although auditory impairment was not statistically significant in predicting function (IADL) for study participants, the impact of auditory impairment on functional status in the elderly cannot be underestimated.

CHAPTER 6: CONCLUSION, LIMITATIONS OF STUDY AND RECOMMENDATIONS

6.1 Introduction

This chapter will give a summary of the study findings. It will contain the opinion of the researcher based on findings from this study. The factors that limited the impact of this study will be discussed. Actions that could help make studies of this nature better in the future would be recommended while also elucidating on the benefits of implementing the findings from this study.

6.2 Conclusion

This study set out to investigate the functional status and health-related quality of life of the institutionalised elderly in two regions in Johannesburg.

The age of participants ranged from the sixth to the ninth decades of life. There were more female than male participants in the ratio 1.69:1. All the four major races as recognised by the constitution of South Africa as well as the four major religions globally were represented among the participants. Almost half of the participants had no financial family support as the marital statuses ranged from being never married to widowhood. The majority of participants had at least a basic level of education while comorbidities were common. Although participants in this study were socio-demographically profiled, the socio-demographic profile of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg can hardly be inferred from the results of this study. This results from the fact that the number of residents who met the study inclusion criteria and participated fell short of the required sample size.

The basic ADL and IADL scores revealed that the majority of participants and by extension the residents were functionally dependent. Although the functional status of participants was investigated using basic ADL and IADL, the basic ADL proved to be the better option with respect to gender sensitivity and the scoring of participants' responses. *The functional status of **participants** with regards to ADL was **moderate** while the functional status of **participants** with regards to IADL (females and males) was **poor***. Despite the fact that the functional status of ***participants*** was determined, the functional status of the institutionalised elderly in

Alexandra, Orange Grove and Yeoville areas of Johannesburg could not be inferred from that of the participants because the number of residents who met the study inclusion criteria and were also participants fell short of the required sample size.

The health-related QoL of participants had the maximum possible spread –from the worst to the best. The use of the crosswalk index values for EQ-5D ensured that all the domains of the EQ-5D-5L were taken into cognisance while analysing the EQ-5D-5L responses during the investigation of the health-related QoL of participants. *The health-related QoL of* ***participants*** *was determined to be* ***moderate***. However, the health-related QoL of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg could not be inferred from that of participants because the number of residents who met the study inclusion criteria and participated fell short of the required sample size.

There was a correlation between each of ADL and IADL and health-related QoL of the study **participants**. *The correlation was positive in direction but weak (IADL, female), moderate (IADL, male) and strong (ADL) in strength*. On the other hand, the relationship between functional status and health-related QoL of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg could not be inferred from that of participants because the number of residents who met the study inclusion criteria and were participants fell short of the required sample size.

The health-related QoL of the study participants were predicted independently by each of race, religion, musculoskeletal and auditory impairments. Race and religion were poor predictors of the health-related QoL of study participants. The health-related QoL of participants is likely to be negatively interacted with by virtue of being White or Coloured.

Religion independently predicted the functional status (basic ADL and IADL) of the study participants. Religion was a poor predictor of functional status with respect to basic ADL of study participants. Religion with respect to age and length of stay in institution predicted the functional status (IADL) of the study participants who were male. Musculoskeletal and auditory impairments had negative interactions with the functional status of participants.

Although race, religion, musculoskeletal and auditory impairments independently predicted the health-related QoL while religion independently the functional status of participants, *none of them could be said to have predicted either the functional status or the health-related QoL of life of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of*

Johannesburg. This is as a result of the number of residents who met the study inclusion criteria and were participants not reaching the required sample size.

All in all, the socio-demographic profile, the functional status and the health-related quality of life of participants in this study seemingly indicates that the socio-demographic profile, the functional status and the health-related quality of life of the institutionalised elderly in Alexandra, Orange Grove and Yeoville areas of Johannesburg might possess characteristics worth exploring.

6.3 Limitations of this study

Although the study involved 106 (91.38%) of the 116 residents who met the participants inclusion criteria, the number of eventual participants was lesser than the calculated sample size. Hence the reason why the results of this study cannot being generalised to all the institutionalised elderly in Regions E and F of Johannesburg.

6.4 Recommendations

In line with the significantly growing population of the elderly in South Africa and the increasing level of importance of institutions for the elderly, there should be intensified efforts with regard to research on the institutionalised elderly in South Africa. More detailed and expanded studies should be carried out on the functional status and quality of life of the institutionalised elderly in Johannesburg in particular.

It is recommended that residents of the institutions where this study was carried out should be encouraged to indulge in regular structured physical activity programmes in other to enhance the functional status of residents which would in turn enhance the health-related quality of life of these residents.

APPENDIX A

Demographic questionnaire

FUNCTIONAL STATUS AND QUALITY OF LIFE OF THE INSTITUTIONALISED ELDERLY IN SELECTED JOHANNESBURG AREAS
(Demographic questionnaire)

Age:

Gender: Male ☐ **Female** ☐

Race: **Black** ☐ **White** ☐ **Coloured** ☐ **Indian** ☐ **Others** ☐

Level of Education: Primary ☐ **Matric** ☐ **Diploma** ☐ **Degree** ☐ **None** ☐

Religion: Christianity ☐ **Islam** ☐ **Judaism** ☐ **Hinduism** ☐ **Others** ☐
No religion or prefers not to sta ☐

Co-morbidity: Visual problems ☐ **Hypertension** ☐ **Musculoskeletal** ☐
Diabetes ☐ **Hearing problems** ☐ **None** ☐

Duration in Institution:

Marital status **Married** ☐ **Divorced** ☐ **Widow(er)** ☐ **Never Married** ☐

Family support (finance) ☐ ☐

Appendix B

EQ-5D-5L (English version for South Africa)

Under each heading, please tick the ONE box that best describes your health TODAY.

MOBILITY

I have no problems in walking about ❑

I have slight problems in walking about ❑

I have moderate problems in walking about ❑

I have severe problems in walking about ❑

I am unable to walk about ❑

SELF-CARE

I have no problems washing or dressing myself ❑

I have slight problems washing or dressing myself ❑

I have moderate problems washing or dressing myself ❑

I have severe problems washing or dressing myself ❑

I am unable to wash or dress myself ❑

USUAL ACTIVITIES *(e.g. work, study, housework, family or leisure activities)*

I have no problems doing my usual activities ❑

I have slight problems doing my usual activities ❑

I have moderate problems doing my usual activities ❑

I have severe problems doing my usual activities ❑

I am unable to do my usual activities ❑

PAIN / DISCOMFORT

I have no pain or discomfort ❑

I have slight pain or discomfort ❑

I have moderate pain or discomfort ❑

I have severe pain or discomfort ❑

I have extreme pain or discomfort ❑

ANXIETY / DEPRESSION

I am not anxious or depressed ❑

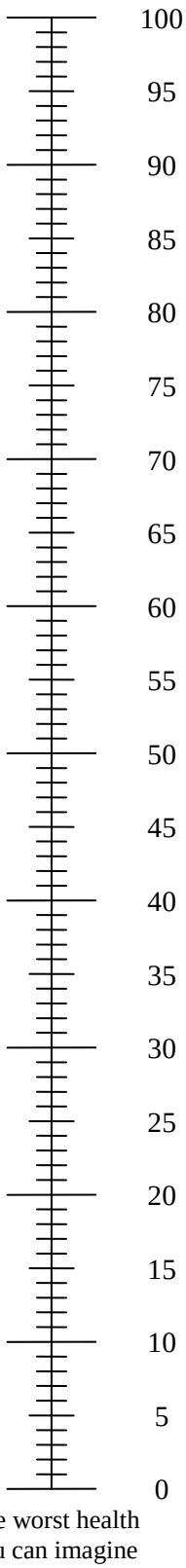
I am slightly anxious or depressed ❑

I am moderately anxious or depressed ❑

I am severely anxious or depressed ❑

I am extremely anxious or depressed ❑

- We would like to know how good or bad your health is TODAY.
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine.
  0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is TODAY.
- Now, please write the number you marked on the scale in the box below.



YOUR HEALTH TODAY =

YOUR HEALTH TODAY = ☐

Appendix C

EQ-5D-5L (Afrikaans version for South Africa)

Merk asseblief onder elk van die opskrifte die EEN blokkie wat u gesondheid VANDAG die beste beskryf.

BEWEEGLIKHEID

Ek het geen probleme om rond te loop nie ❑

Ek het effens probleme om rond te loop ❑

Ek het taamlik probleme om rond te loop ❑

Ek het erge probleme om rond te loop ❑

Ek is nie in staat om rond te loop nie ❑

SELFVERSORGING

Ek het geen probleme om myself te was of aan te trek nie ❑

Ek het effens probleme om myself te was of aan te trek ❑

Ek het taamlik probleme om myself te was of aan te trek ❑

Ek het erge probleme om myself te was of aan te trek ❑

Ek is nie in staat om myself te was of aan te trek nie ❑

GEWONE AKTIWITEITE *(bv. werk, studeer, huiswerk, familie- of ontspanningsaktiwiteite)*

Ek het geen probleme om my gewone aktiwiteite uit te voer nie ❑

Ek het effens probleme om my gewone aktiwiteite uit te voer ❑

Ek het taamlik probleme om my gewone aktiwiteite uit te voer ❑

Ek het erge probleme om my gewone aktiwiteite uit te voer ❑

Ek is nie in staat om my gewone aktiwiteite uit te voer nie ❑

PYN / ONGEMAK

Ek het geen pyn of ongemak nie ❑

Ek het effense pyn of ongemak ❑

Ek het matige pyn of ongemak ❑

Ek het erge pyn of ongemak ❑

Ek het uiterste pyn of ongemak ❑

ANGSTIGHEID / NEERSLAGTIGHEID

Ek is nie angstig of neerslagtig nie ❑

Ek is effens angstig of neerslagtig ❑

Ek is taamlik angstig of neerslagtig ❑

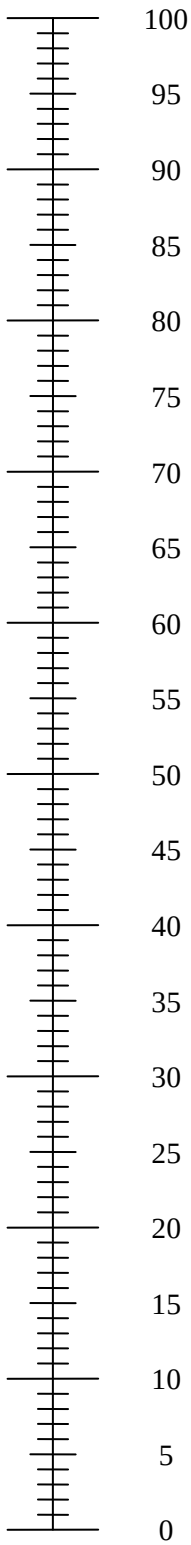
Ek is erg angstig of neerslagtig ❑

Ek is uiters angstig of neerslagtig ❑

- Ons wil graag weet hoe goed of sleg u gesondheid VANDAG is.
- Hierdie skaal is van 0 tot 100 genommer.
- 100 beteken die beste gesondheid wat u u kan indink.

  0 beteken die slegste gesondheid wat u u kan indink.
- Merk met ’n kruisie op die skaal om aan te dui hoe u gesondheid VANDAG is.
- Skryf nou die nommer wat u op die skaal gemerk het in die blokkie hier onder.

U GESONDHEID VANDAG = ☐



Appendix D

EQ-5D-5L (Zulu version for South Africa)

Ngaphansi kwesihloko ngasinye, sicela ukuba uthikhe ibhokisi ELILODWA eliyichaza kahle kakhulu impilo yakho NAMUHLA.

UKUHAMBA / UKUNYAKAZA

Anginankinga yokuhamba ❑

Nginezinkinga ezincane zokuhamba ❑

Nginezinkinga ezilingene nje zokuhamba ❑

Nginezinkinga ezinkulu zokuhamba ❑

Angikwazi ukuhamba ❑

UKUZINAKEKELA

Anginazinkinga zokuzigeza noma ukuzigqokisa ❑

Nginezinkinga ezincane zokuzigeza noma ukuzigqokisa ❑

Nginezinkinga ezilingene nje zokuzigeza noma ukuzigqokisa ❑

Nginezinkinga ezinkulu zokuzigeza noma ukuzigqokisa ❑

Angikwazi ukuzigeza noma ukuzigqokisa ❑

IZINTO EJWAYELEKILE *(isib. ukusebenza, ukutadisha, umsebenzi wasendlini, okwenziwa nomndeni noma okwenzelwa ukungcebeleka)*

Anginazinkinga ukwenza izinto yami eyejwayelekile ❑

Nginezinkinga ezincane ukwenza izinto yami ejwayelekile ❑

Nginezinkinga ezilingene nje ekwenzeni izinto yami eyejwayelekile ❑

Nginezinkinga ezinkulu ekwenzeni izinto yami eyejwayelekile ❑

Angikwazi ukwenza izinto yami eyejwayelekile ❑

UBUHLUNGU / UKUNGAKHULULEKI EMZIMBENI

Anginabuhlungu noma ukungakhululeki emzimbeni ❑

Nginobuhlungu noma ukungakhululeki okuncane emzimbeni ❑

Nginobuhlungu noma ukungakhululeki okulingene emzimbeni ❑

Nginobuhlungu noma ukungakhululeki okumandla kakhulu emzimbeni ❑

Nginobuhlungu noma ukungakhululeki okumandla ngokwedlulele emzimbeni ❑

IXHALA / UKUDANGALA

Anginalo ixhala noma ukudangala ❑

Nginexhala noma ukudangala okuncane ❑

Nginexhala noma ukudangala okulingene nje ❑

Nginexhala noma ukudangala okukhulu ❑

Nginexhala noma ukudangala ngokweqile ❑

- Sifisa ukwazi ukuthi impilo yakho ngabe yinhle noma yimbi kangakanani NAMUHLA.

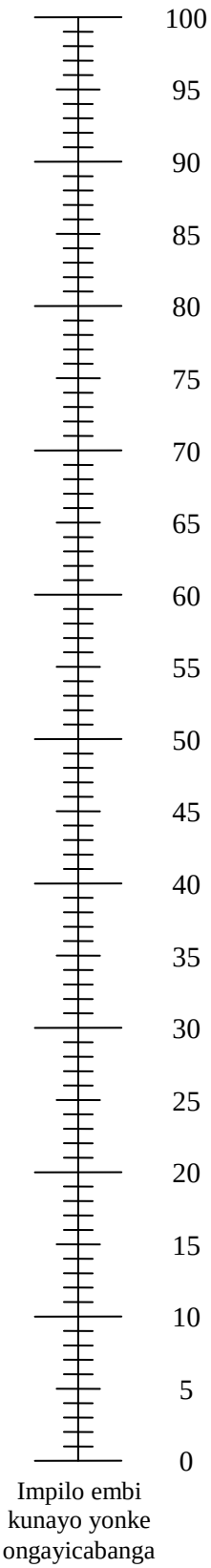
- Lesi sikali sinezinombolo ezisuka ku-0 zifike ku-100.

- U-100 usho impilo <u>enhle kunayo yonke</u> ongayicabanga. U-0 usho impilo <u>embi kunayo yonke</u> ongayicabanga.

- Faka uphawu luka-X esikalini ukuze ubonise indlela lokho impilo yakho eyikho NAMUHLA.

- Manje, sicela ubhale inombolo oyiphawule esikalini ebhokisini elingezansi.

IMPILO YAKHO NAMUHLA = ☐



Appendix E

PHYSICAL SELF MAINTENANCE SCALE (ACTIVITIES OF DAILY LIVING OR ADL)

In each category, circle the item that most closely describes the person's highest level of functioning and record the score assigned to that level (either 1 or 0) in the blank at the beginning of the category.

A. Toilet _____

1. Care for self at toilet completely; no incontinence 1

2. Needs to be reminded, or needs help in cleaning self, or has rare (weekly at most) accidents 0

3. Soiling or wetting while asleep more than once a week 0

4. Soiling or wetting while awake more than once a week 0

5. No control of bowels or bladder 0

B. Feeding _____

1. Eats without assistance 1

2. Eats with minor assistance at meal times and/or with special preparation of food, or help in cleaning up after meals 0

3. Feeds self with moderate assistance and is untidy 0

4. Requires extensive assistance for all meals 0

5. Does not feed self at all and resists efforts of others to feed him or her 0

C. Dressing _____

1. Dresses, undresses, and selects clothes from own wardrobe 1

2. Dresses and undresses self, with minor assistance 0

3. Needs moderate assistance in dressing and selection of clothes. 0

4. Needs major assistance in dressing, but cooperates with efforts of others to help 0

5. Completely unable to dress self and resists efforts of others to help 0

D. Grooming (neatness, hair, nails, hands, face, clothing) _____

1. Always neatly dressed, well-groomed, without assistance 1

2. Grooms self adequately with occasional minor assistance, eg, with shaving 0

3. Needs moderate and regular assistance or supervision with grooming 0

4. Needs total grooming care, but can remain well-groomed after help from others 0

5. Actively negates all efforts of others to maintain grooming 0

E. Physical Ambulation _____

1. Goes about grounds or city 1

2. Ambulates within residence on or about one block distant 0

3. Ambulates with assistance of (check one)

   a ( ) another person, b ( ) railing, c ( ) cane, d ( ) walker, e ( ) wheelchair 0

   1.__Gets in and out without help. 2.__Needs help getting in and out

4. Sits unsupported in chair or wheelchair, but cannot propel self without help 0

5. Bedridden more than half the time 0

F. Bathing _____

1. Bathes self (tub, shower, sponge bath) without help. 1

2. Bathes self with help getting in and out of tub. 0

3. Washes face and hands only, but cannot bathe rest of body 0

4. Does not wash self, but is cooperative with those who bathe him or her. 0

5. Does not try to wash self and resists efforts to keep him or her clean. 0

For scoring interpretation and source, see note following the next instrument.

APPENDIX F

INSTRUMENTAL ACTIVITIES OF DAILY LIVING (IADL) SCALE

In each category, circle the item that most closely describes the person's highest level of functioning and record the score assigned to that level (either 1 or 0) in the blank at the beginning of the category.

A. Ability to Use Telephone _____

1. Operates telephone on own initiative; looks up and dials numbers. 1

2. Dials a few well-known numbers. 1

3. Answers telephone, but does not dial. 1

4. Does not use telephone at all. 0

B. Shopping _____

1. Takes care of all shopping needs independently. 1

2. Shops independently for small purchases. 0

3. Needs to be accompanied on any shopping trip. 0

4. Completely unable to shop. 0

C. Food Preparation _____

1. Plans, prepares, and serves adequate meals independently. 1

2. Prepares adequate meals if supplied with ingredients. 0

3. Heats and serves prepared meals or prepares meals, but does not maintain

   adequate diet. 0

4. Needs to have meals prepared and served. 0

D. Housekeeping _____

1. Maintains house alone or with occasional assistance (eg, heavy-work domestic help). 1

2. Performs light daily tasks such as dishwashing, bedmaking. 1

3. Performs light daily tasks, but cannot maintain acceptable level of cleanliness. 1

4. Needs help with all home maintenance tasks. 1

5. Does not participate in any housekeeping tasks. 0

E. Laundry _____

1. Does personal laundry completely. 1

2. Launders small items; rinses socks, stockings, etc. 1

3. All laundry must be done by others. 0

F. Mode of Transportation _____

1. Travels independently on public transportation or drives own car. 1

2. Arranges own travel via taxi, but does not otherwise use public transportation. 1

3. Travels on public transportation when assisted or accompanied by another. 1

4. Travel limited to taxi or automobile with assistance of another. 0

5. Does not travel at all. 0

G. Responsibility for Own Medications _____

1. Is responsible for taking medication in correct dosages at correct time. 1

2. Takes responsibility if medication is prepared in advance in separate dosages. 0

3. Is not capable of dispensing own medication. 0

H. Ability to Handle Finances _____

1. Manages financial matters independently (budgets, writes checks, pays rent and bills, goes to bank); collects and keeps track of income. 1

2. Manages day-to-day purchases, but needs help with banking, major purchases, 1 etc.

3. Incapable of handling money. 0

Appendix G

Human Research Ethics Committee (Medical) approval certificate

R14/49 Mr Iyare Uwumagbe

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160767

NAME: (Principal Investigator)	Mr Iyare Uwumagbe
DEPARTMENT:	Physiotherapy Joseph Gerald Home of Peace, Itlhokomeleng Old Age Home, Queen Alexandra Retirement Home, Nazareth Home
PROJECT TITLE:	Functional Status and Health-Related Quality of Life of the Institutionalised Elderly in Selected Johannesburg Areas
DATE CONSIDERED:	29/07/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Witness Mudzi and Mrs Sonti Pilusa
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	24/08/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in July and will therefore be due in the month of July each year.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix H

Gauteng Department of Social Development approval letter



GAUTENG PROVINCE
SOCIAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Enquiries: Dr Sello Mokoena
Tel: 011 355 7855
File No: 2/9/42

Dear IYARE UWUMAGBE

RE: APPLICATION TO CONDUCT RESEARCH IN THE DEPARTMENT OF SOCIAL DEVELOPMENT

Thank you for your application to conduct research in the Gauteng Department of Social Development.

Your application on the research **"Functional status and health-related quality of life of the institutionalised elderly in selected Johannesburg areas"** has been considered and approved for support by the Department as it was found beneficial to the Department's vision and mission. The approval is subject to the Departmental terms and conditions as endorsed by you on the 12/09/2016.

May I take this opportunity to wish you well in the journey that you are about to embark upon.

We are looking forward to a value adding research and a fruitful co-operation.

With thanks.

Ms. WR Tshabalala
Head of Department: Social Development
Date: 10/10/16

Appendix I

Participant information document

INFORMATION DOCUMENT

Study title: Functional status and health-related quality of life of the institutionalised elderly in selected Johannesburg areas.

Introduction:

Dear elder,

Professor W Mudzi, Mrs S Pilusa and Mr. IB Uwumagbe are carrying out a research on functional status and health-related quality of life among the elderly who reside in old age homes. This research will provide information, independently, on the functional status and quality of life of the elderly and also provide information on the relationship between functional status and quality of life among the elderly in old age homes.

Invitation to participate: we therefore invite you to participate in this study.

What is involved in the study – if you give consent to participate in the study, you will be asked some questions using questionnaires that will ask for your age, sex, religion, how long you have stayed in the old age home, how you carry out basic activities like bathing, feeding, telephone use, your pain if you have, anxiety if you have etc. The period to be spent with you using the questionnaires is estimated not to be more than 25mins. No physical activity is going to be carried out on you during the period of this study and if you feel more comfortable conversing in Afrikaans, Zulu or Greek instead of English, an interpreter will be provided.

Benefits: there is no financial reward for participating in this study. However, your scores on functional status and quality of life measurements from the study would be made available to you only at the time of your participation if you request for them. Information on the outcome of the study will be made available to you if you request for it. Same information will be made available to the management of the home you reside for action if need be.

Participation is voluntary: you can only participate in this study if you give voluntary consent. You can decide to withdraw as a participant from this study at any time you wish. If you have any reservations regarding this study, you can contact any of Professor Mudzi, Mrs. Pilusa, Mr. Uwumagbe or the Wits University Human Research Ethics Committee (Medical) with contact details .

Confidentiality: pieces of information that can publicly identify you distinctively such as name, family etc relating to any questionnaire to be used for this study will not be made public and

every piece of information gotten from you shall be kept strictly confidential and used only for the purpose of the study. Pieces of information regarding this study intended to be kept confidential may be made public if required by a court of law.

Contact persons:

Professor Witness Mudzi

Main Supervisor

Department of Physiotherapy, Wits Education campus

Wits University, Johannesbourg

Tell: +27 (0) 11 717 3716

Mrs. Sonti Pilusa

Co-Supervisor

Department of Physiotherapy, Wits Education campus

Wits University, Johannesbourg

Tell: +27 (0) 11 717 3715

Mr. Iyare Uwumagbe,

Master degree student,

Department of Physiotherapy, Wits Education campus

Wits University, Johannesbourg

Cell: +27 61 250 6739

Wits University Human Research Ethics Committee (Medical)

Chairperson: peter.cleaton-jones1@wits.ac.za

Administrators : Ms Zanele Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng

Tel 011 717 2700/2656/1234/1252

Email: HREC-Medical.ResearchOffice@wits.ac.za

Appendix J

Consent form

Consent form

I…… do hereby consent to voluntarily participate in the study on "Functional status and health-related quality of life of the institutionalised elderly in selected areas in Johannesburg". I consent to having information about my functional status, quality of life and demographics collected and used for the purpose of this study. I understand that my participation in this study is confidential and that no material to identify me personally will be used in reports (based) on the study. I acknowledge that I will not receive any monetary benefit from this study. I may also withdraw my voluntary participation from the study at any point I so desire. If I have got any reservations regarding this study, I have been furnished with contact details of relevant people that would assist.

Signature ……..

Date ……

Researcher's name ……

Signature ……

Date ……..

Appendix K

research report for examination

by Iyare Uwumagbe

FILE	735_IYARE_UWUMAGBE_RESEARCH_REPORT_FOR_EXAMINATION_1155_278299100.DOCX (1.81M)		
TIME SUBMITTED	31-MAR-2017 05:50AM	WORD COUNT	30861
SUBMISSION ID	792129776	CHARACTER COUNT	173791

research report for examination

ORIGINALITY REPORT

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