EFFECT OF REGULAR PHYSICAL ACTIVITY ON FUNCTIONAL INDEPENDENCE AND HEALTH OF THE ELDERLY AT BAKATEYAMBA HOME IN KAMPALA

BY

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Effect of regular physical activity on
DECLARATION

This thesis is my original work, and has not been presented for a degree or any other award in any other University.

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I dedicate this work to my late grandmother Norah.
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ACRONYMS AND ABBREVIATIONS

ADL - Activities of Daily Living

CHIPS – Community Health Intervention Programmes

IADL - Instrumental Activities of Daily Living

MAK - Makerere University

MoGLSD – Ministry of Gender, Labour and Social Development, Uganda

OECD - Organization of Economic Cooperation and Development

PAP - Physical Activity Programme

SPSS – Statistical Package for Social Scientists

U. S - United States

WHO - World Health Organisation
ABSTRACT

The study was set to determine the functional independence: the physical and health fitness (the lower body muscle strength, the static balance, the gait quality, the dynamic balance and the cardiovascular endurance and the changes in the blood pressure). In addition, the physical activity patterns, the nutrition patterns, the sleep patterns and the prevalence of chronic illnesses of the elderly were assessed before and after an intervention of a physical activity programme (PAP) based on the Community Health Intervention Programmes (CHIPs). The study employed a quasi-experimental design. Purposive sampling technique was used in selecting the target group: the Bakateyamba Home and the sample of the 40 elderly that were residing in the home. The researcher conducted a pre-test before commencement of the PAP that lasted 8 weeks and post tests at halftime (4 weeks) and fulltime (8 weeks) to determine the effect of PAP on the variables under study. An interview was administered to both the elderly subjects and the caregivers to obtain information about their physical activity patterns, nutrition patterns, sleep patterns and prevalence of chronic illnesses. The personal data files for the elderly were used to provide more information about the elderly. 17 elderly who successfully completed the study availed the data for this study. The results have been organized in tables, graphs and analyzed using the Statistical Package for Social Sciences (SPSS) programme and Statistics data analysis (Stata 9). The pre-test and post test data of the group was analysed using a Kruskal Wallis Test and Fishers’ Exact Test at p=0.05. The eight-week PAP caused significant effect on the lower body strength p=0.001, the gait quality p=0.013, the diastolic blood pressure p=0.016 and the heart rate p=0.010 of the elderly. Changes were also noted in the activity patterns of the elderly. Significant improvement were noted in the sleep patterns p=0.006. The nutritional problems were significantly improved p=0.025. Additionally, the frequency of chronic illness attacks reduced significantly p=0.012 just as the self reports on how the elderly persons perceived their health showed significant improvement p=0.0001. There were however, no significant changes in the cardiovascular endurance, the systolic blood pressure, the static and dynamic balance of the elderly by the end of the 8-week PAP. The study concluded that the 8-week low intensity PAP was safe and effective in improving the functional independence and health of the elderly. The 8 weeks’ PAP is adequate in improving the activity patterns, reducing constipation problems, reducing chronic illness attacks and reducing sleep problems among elderly. However, other aspects where the 8 week PAP did not cause significant effects may require administering the PAP for a longer period with varying intensity. The elderly should be encouraged to involve in adequate and regular forms of physical activity and exercise at least three days a week for 30 -50 minutes each day.
CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

There is evidence that the numbers of people age 60 and above is increasing worldwide (World Health Organisation [WHO], 2000) due to provision of health facilities and nutrition. According to WHO (2000) sharp decreases in fertility rates are being observed throughout the world, which is partly responsible for this increase as well. It is estimated that by 2025, 120 countries will have reached total fertility rates below replacement level of 2.1 children per woman. This is expected to increase the proportion of people aged 60 and over compared to the proportion of children and young people, which is expected to decline. By 2025 therefore, the number of older persons worldwide is expected to rise to 1.2 billion people with a bigger percent of them living in developing countries WHO (2000). In Africa alone, the number of older persons by 2050 is projected to be between 204 and 210 million people (African Union Policy Framework and Plan of Action on Ageing, 2002).

This growing number of older persons has profound economic consequences at individual, community, national and international levels. The increase in old age implies a reduction in the labour force, increased absenteeism and sicknesses and reduced productivity unless opportunities for participation in health-promoting activities are improved to enhance quality of life. The rapid increase in the older population is also likely to place increasing demands on the public health system, medical and social services among others (WHO, 1998.1).
Primarily, ageing should be looked at positively because it is a natural process of the total life cycle that has no other alternative except premature death (Wykle, Whitehouse & Morris, 2005). Naturally, as people age, they tend to become inactive and the inactivity leads to deterioration of one's physiological capacity and function (Wilmore & Costill, 2004). The activity level decline is partly attributable to the loss of both muscle and bone mass that is associated with ageing. The loss in muscle and bone mass is due to reduction in muscle protein synthesis, which occurs with ageing and the rate at which bone synthesis by osteoblasts and resorption by osteoclasts takes place (Wilmore & Costill, 2004). With ageing resorption exceeds synthesis which results in some amount of bone loss. The loss in muscle and bone mass is partially attributable to decreased physical activity and poor nutrition yet maintaining an active lifestyle attenuates the losses in function that we see with ageing (Wilmore & Costill, 2004). Extreme loss of physical work capacity may also limit the ability of older persons to maintain an independent lifestyle resulting in institutionalized care (Abernethy, Hanrahan, Kippers, Mackinnon & Pandy, 2005). Additionally, this may lead to developing chronic diseases and disabilities (Baechle & Earle, 2000). As people age, therefore, they have to make deliberate effort to live actively to reduce the effects of ageing.

Although ageing is a set of biological processes that are genetically determined (Kirkwood, 1996), there are many other environmental factors that affect ageing to a greater degree than heredity. Kirkwood (1996) notes a combination of heredity, environment, lifestyle, nutrition and chance as factors affecting longevity. According to Baechle & Earle (2000) and Komi (2005), determinants of ageing include: social, physical, behavioural, personal, economical, health and social services. Based on
these, it is possible that the quality of life one enjoys as a grand father or grand mother depends on the opportunities or risks experienced throughout the life course as well as the manner in which succeeding generations provide aid and support when needed (WHO, 2000). Additionally, health and activity among the older people largely depend on experiences, exposures and actions of an individual during the whole span of life (WHO, 1998.2).

In Uganda where poverty is one of the biggest challenges, older persons tend to be most affected (Ministry of Gender, Labour and Social Development, Uganda, [MoGLSD] 2007). Majority of them have low or no income at all and therefore their access to food, health and other related facilities is limited (MoGLSD, 2007; Mugayehwenkyi, 2004). According to WHO (1998.1), the older adults are resourceful people who greatly contribute to the fabric of society yet are often ignored. A major concern now therefore, is how to promote active ageing in order to maintain health and productivity throughout the lifespan of the elderly. This will greatly reduce the medical bills and other expenditures on the elderly and promote functional health (WHO, 1999).

There is need also to establish avenues of improving the quality of life in the older persons; promoting functional health and keeping them active and independent (MoGLSD, 2007). The quality of life needs to be improved to promote functional health and to reduce morbidity and mortality (Cerny & Burton, 2000). The functional ability of the older adults is crucial to how well they cope with activities of daily living (ADL), which in turn affects their quality of life (WHO, 1998.2). Being inactive results in loss of muscle strength and balance and increases the risk of falls
(Bouchard, Malina & Perusse, 1997; Wilmore & Costill, 2004). Promoting and strengthening the health of the older adults so that they remain active and productive is the role of every individual, family and state (WHO, 1998.1). Thus this study aimed at evaluating the physical activity and health fitness levels of the elderly before and after a physical activity programme.

1.2 Statement of the Problem

According to WHO (2000), the burden of disease is one of the global problems. In both developed and developing countries, chronic diseases are significant causes of disability yet disabilities associated with ageing and the onset of chronic diseases can be prevented or delayed. Additionally, there is a rapid growth of non-communicable diseases which is projected to continue escalating to 78 percent by 2020 in developing and newly industrialized countries (WHO, 2000). In view of this, there is need to control the development of these chronic and non-communicable diseases and disabilities if quality life and productivity are to be improved among the older adults in the communities.

According to Nayiga (2002), developing nations in Africa and Uganda in particular need to institute mechanisms and support systems to care for the aged. This is because the family that has the fundamental responsibility of providing social, moral and financial support to their ageing family members has been weakened by the social-economic changes that have taken place (Nayiga, 2002). Due to the escalating food prices and living costs, urban migration and rising unemployment, many older adults fail to have regular support from their children (Chronicles, 2009). The older adults are also vulnerable to diseases (Chronicles, 2010). According to
Chronicles (2010), issues related to old age in Uganda, get very little attention and few older adults have a voice. The most common health problems of the older adults in Uganda include high blood pressure, diabetes, stroke, trachoma and blindness (MoGLSD, 2009). Poor health, compounds their access to living independent lives. Furthermore, the older adults may not be able to access medical facilities because of lack of income.

According to WHO (1998) a high number of older people in most parts of the world live sedentary lives. Sedentary living leads to loss of muscle function and physical impairment. It was not clear then what form of physical activities the elderly were involved in. The aged also sometimes face visual and hearing impairment which may lead to decreased access to contacts because of the constraints involved (WHO, 2002). Poor vision and hearing impairment affect balance and may lead to controlled movement for fear of falling. Old people also usually suffer from lack of sleep and eating disorders leading to poor appetite. The nutrition habits, sleep patterns and general health affect the wellbeing of an individual; hence they needed to be determined in order to promote functional independence and quality of life of the elderly.

As people get older, degenerative conditions and diseases like diabetes, high blood pressure, cancers, joint and back pains tend to set in (Komi, 2005). These conditions often lead to impaired mobility, degeneration and deterioration of the human systems especially the musculoskeletal system (Abernethy et al., 2005). Sedentary lifestyle could also lead to sleep problems. According to Neubauer (1999), primary sleep disorders are more common among the elderly than in young people. This is because
the causes of sleep problems as shown in The Medical Encyclopaedia (2007) which, include sedentary lifestyle, medication, depression, neurological conditions, chronic diseases, the need to urinate frequently and the use of stimulants such as caffeine, are more common among the elderly. On the other hand, Shahar, Shai, Vardi and Fraser (2003) observe the high prevalence of malnutrition in the elderly. This nutritional inadequacy in the older persons is attributed to physiological decline, low income, medication and insufficient food consumption. In this regard, the study sought to establish the lifestyles of the older adults staying in this home and other details relating to their functional independence and general health. The physical activity patterns, sleep patterns, nutritional patterns and the general health of the elderly were assessed before providing the required intervention.

1.3 Purpose of the Study

The purpose of the study was to assess the functional independence levels, the physical activity patterns, the nutritional patterns, the sleep patterns and the general health status of the elderly at baseline, halftime and end of an eight-week regular Physical Activity Programme (PAP).

1.4 Objectives of the Study

The objectives of this study were to determine the:

a) Physical and health fitness levels of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP using the selected components (lower body muscle strength, gait quality, static balance, dynamic balance and cardiovascular endurance).
b) Physical activity patterns of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP.

c) Usual food intakes by meal pattern and by food groups of the elderly at Bakateyamba Home in Kampala.

d) Sleep patterns of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP.

e) General health status of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP.

1.5 Research Questions

The study was guided by the following questions:

a) What are the levels of the selected components of physical and health fitness of the elderly at the Bakateyamba home in Kampala before, during and at the end of an eight-week PAP?

b) What are the physical activity patterns of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP?

c) What are the usual food intakes by meal patterns and by food groups of the elderly at Bakateyamba home in Kampala?

d) What are the sleep patterns of the elderly at Bakateyamba Home in Kampala before, during and at the end of an eight-week PAP?

e) What is the health status of the elderly at Bakateyamba home in Kampala before, during and at the end of an eight-week PAP?

1.6 Statement of Hypotheses

The study was guided by the following hypotheses:
There would be no significant difference in the physical and health fitness levels of elderly at Bakateyamba Home in Kampala by the end of an eight-week PAP in the selected components of (lower body muscle strength, static balance, dynamic balance, and cardiovascular endurance).

There would be no significant difference in the physical activity patterns of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.

There would be no significant difference in the sleep patterns of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.

There would be no significant difference in the health status of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.

1.7 Significance of the Study

The knowledge from this study will help policy makers to come up with strategies that will enable the older adults participate in physical activities and exercises that will promote their functional health. The elderly that participated in the study will be motivated to participate in regular physical activities and exercise that promote functional independence and health basing on the benefits gained during the time of the study. Additionally, the elderly may sensitize other older adults that did not participate in the study on the benefits of regular participation in physical activities and exercises as opposed to living sedentary life styles. The study will be reference for further studies on the older adults in Uganda and other parts of the world. The findings will prompt tertiary institutions of learning to design new and review existing programmes to address the needs in the community on the relevance and importance of regular physical activities and exercise and equipping trainees with
skills on designing exercise and physical activity regimens that respond to different physical activity needs. Knowledge about the PAPs may be used to benefit other similar populations for whom they may be found favourable.

1.8 Delimitations of the Study

The study was delimited to both men and women aged 60 and above residents of Bakateyamba home for the elderly in Kampala. This home is located at Nalukolongo, Rubaga Division in the City of Kampala, Uganda. This is a charity home under the care of the Catholic Church. Most of the elderly in this home were destitute, neglected or poverty stricken and without much care before joining the home.

1.9 Limitations of the Study

The study was constrained by the following limitations:
Most elderly (77.3%) had a negative attitude towards involvement in physical activities at the beginning of the study. From the observations made during an eight week intervention one needs considerable patience to work with the elderly. The researcher and assistant had to constantly remind them of the importance of their participation in the physical activities and exercises on a regular basis. Other motivational strategies employed included sitting with them and listening to them and trying to answer some of the questions they asked. It was not easy to convince them to accept that something could be done about their situation because they suffered from various ailments including backache, pains in arms, legs, joints and general weakness. Others complained about constipation and high blood pressure. Many of them used to stay indoors and sleep nearly the whole day on most of the days of the week before the PAP was introduced. For example after taking their breakfast, they
would go back to bed and wait for the next meal. Some male elderly would come out of their rooms to bask in the sun when their rooms were being cleaned by the attendants or sometimes volunteers and afterwards they would go back to bed.

Statistics and other details relating to ailments, blood pressure and sleep are given later in chapter four. It took about three weeks of listening and gradually introducing simple exercises that they were encouraged to come out of their beds and rooms and carry out exercises outdoors. Otherwise before then, some would hide, while others would keep under their blankets and they would give various reasons.

Secondly, a big number of them had disabilities that required specialized handling and equipment, which could not be offered in this study. This reduced the numbers of those who could take part in the study. The other limitation was frequent sicknesses of the respondents and sometimes delayed medical intervention to treat them. This affected the attendance and consistence of the elderly for the PAP.

The study was carried out during a rainy season and this could sometimes interfere with the arrangements since the physical activities and exercise were conducted outside in the compound. It was not easy to have the elderly come out of their beds on a cold day. There were 2 days when the rain interrupted the programme and the exercises had to be postponed to the following day and that meant there was no resting day between the two consecutive schedules. However, this happened after the elderly had been used to the activities in the 5th and 7th weeks respectively. The resources on the other hand, had to be hired, borrowed or use alternatives that could
not compromise the quality of the study. Hence the study was limited by the following factors:

- Attitude of the elderly towards physical activity, their lack of awareness of the benefits of regular exercise and physical activity and their willingness to get involved in the PAP regularly.
- Lack of facilities and resources.
- Disability and uncontrolled blood pressure levels of the elderly.

### 1.10 Conceptual Framework

According to Evans (1995), Brennan (2002) and Astrand, Rodahl, Dahl & Stromme (2003) regular exercise improves health and promotes independence in the elderly more than any pharmacological interventions. Through physical activity and training especially resistance training, older people can prevent and/or reduce loss in skeletal muscle mass and other age-related ailments such as diabetes type 2, coronary heart disease, hypertension and osteoporosis (Astrand et al., 2003; Komi, 2005). Additionally, regular exercise increases muscle strength and functional capacity and decreases loss in bone mineral, basal as well as metabolic rate and fat content (Hakkinen & Pakarinen, 1993; Cerny & Burton, 2000; Baechle & Earle, 2000; Komi, 2005).

The figure below (Figure 1) indicates how active-living and/or, sedentary lifestyles affect the older adults. The arrows from the box labelled ‘adult life’ to ‘physical inactivity’ and to the box on the right hand side show that physical activity levels, ability to sleep, health status, mobility levels, balance, flexibility levels, coordination, agility and functional independence decrease if one leads a sedentary (physically inactive) lifestyle. On the other hand, the same aspects: physical activity levels,
ability to sleep and all the remaining aspects, increase if an individual 60 years and older lived actively. This model was designed by the researcher basing on the works of Baechle & Earle (2000); Brennan (2002); Astrand et al. (2003); Wilmore and Costill (2004) who indicate that there is a relationship between sedentary living and decreased functional independence and vice-versa.

Figure 1. Model showing the Relationship between Active and, or Inactive Lifestyles and Functional Independence among the Aged.


According to Astrand et al. (2003), in the ageing individual, the genetic code may have more of an impact on the function of systems of importance for physical performance than environment and lifestyle. However, a change in lifestyle definitely can modify the biological age both upwards and downwards at almost any chronological age. Physical inactivity is also linked to digestive problems, reduced
metabolism, high blood pressure, development of over weight, obesity, reduced glucose tolerance, increased plasma lipid levels with the development of unfavourable blood cholesterol profile, and mental disorders such as depression (Cerny & Burton, 2000).

Physical activity plays a major role in the ageing process. The common skeletal disorders like arthritis and osteoporosis can be controlled through regular physical activity comprising weight bearing activities (Wilmore and Costill, 2004). Muscle weakness and poor balance that are responsible for most of the falls among older persons are reversible. These qualities can be improved through regular physical activities that include strengthening exercises even among those who have already developed osteoporosis (Brennan, 2002; Astrand et al., 2003).

The capacity for shock absorbency of the heel decreases with age thus older individuals should be discouraged from taking on high impact activities like jogging and should rather walk (Astrand et al., 2003). It is also important to carefully select the type of exercises; the foot wear and floor surfaces for the elderly in order to reduce risks of injury. The study established the lifestyles of the elderly and related it to their physical activity levels, ability to sleep well, health and their physical and health fitness in selected components before putting them on a regular exercise programme that lasted 8 weeks. The relationship was evaluated again after an eight-week programme to determine if there was improvement in and functional independence (lower body muscle strength, gait quality, static balance, dynamic balance, cardiovascular endurance); physical activity levels, ability to sleep well,
health status, mobility levels as a result of regular involvement in physical activities and exercise.

1.11 Operational Definition of Terms

Caregivers – People taking care of the elderly at the Bakateyamba home on a daily basis ensuring that they have eaten all meals, bathed at the right time, their beds are made, their health needs are met.

Elderly- Men and women aged 60 years and above living in the Bakateyamba home.

Functional Independence- is in reference to lower body muscle strength, gait quality, static balance, dynamic balance, and cardiovascular endurance.

General Health – refers to health status including how elderly perceived their health in addition to available health records; putting into consideration their psychological, social, physical and mental wellbeing.

Nutritional Patterns- Usual food intakes a person consumes; food choices and how they compare with recommended dietary intakes / food groups recommended for healthy eating.

Older Adults /Persons – The same definition as used by United Nations is used in this study referring to men and women aged 60 years and above.

Physical Activity Patterns- description of an individual's daily or regular involvement in activities comprising self-care, exercise, leisure and recreational activities and/or, Activities of Daily Living (ADL) and Instrumental Activities of Daily Living . This may be with ease or with some difficulty.
Population Ageing – refers to a decline in the proportion of children and young people and an increase in the proportion of people age 60 and above.

Sedentary living – lifestyle characterised by mainly sitting, lying down with no or with very limited movements from one place to another.

Sleep Patterns- Assessment focussed on persons sleep, rest and relaxation practices; how an individual describes his/her sleep-wake habits.

Sleep well – Sleep easily without disturbance when in bed and long enough (6-8 hours).

Uncontrolled Blood pressure – Blood pressure level higher than 160/100 and not on medication.
CHAPTER TWO
REVIEW OF LITERATURE

2.1 Introduction
This chapter covers the literature on ageing and its effects on functional independence and the interplay of other factors to improve the quality of living and health among the elderly. The literature is organised under the following subheadings: The impact of population ageing and the factors affecting ageing: the physical activity, social, economic and nutritional factor. This is followed by a discussion of the impact of physical inactivity on ageing, the health benefits of regular physical activity and challenges facing older persons. Finally, the chapter focuses on sleep patterns of the elderly populations, dietary habits of the elderly persons, studies done in the area of the elderly populations and the summary of the literature review.

2.2 The Impact of Population Ageing
Population ageing is one of the global challenges in the 21st Century due to the fact that life expectancy has risen sharply thus the number of people reaching old age is increasing (WHO, 1999). Life expectancy is expected to go on rising as long as innovations and improvement in various aspects of life like medical, nutrition, and sanitation continue advancing which leads to reduced premature mortality rates. Additionally, there is a decline in the number of children being born to each family because of controlled fertility rates (WHO, 1999). This means that with time, there is going to be a bigger number of older adults compared to the children and youth. The implications are that the retirement age may be elevated to allow the older adults to continue serving their countries and, or communities. In some countries like South
Africa, Australia, the retirement age has already been reviewed to 65. This is yet to happen in Uganda where currently the debate is about revising it downwards to 55 (Among, 2010.1). It is widely agreed that the older adults possess a wide experience of knowledge and contribution that should not just be lost (WHO, 2002). Therefore, they should be helped to live longer and healthier. The quality of life and health of the older persons is mandatory if they are to remain productive and active citizens in their families and society as a whole. The quality of life is affected by disease, calamities, poverty and lifestyle such as nutrition, lack of sleep and smoking (WHO, 1999). Most of these can be controlled because they depend on choice.

2.3 Factors Affecting Ageing

There are a number of factors that influence the quality of life and well being of the elderly. These include the physical activity, social, economic and nutritional factors.

2.3.1 Physical Activity

Physical activity comprises all forms of being active including exercise, sport and the activities that are part of day-to-day life, such as gardening, washing the car manually and walking. While ageing almost inevitably brings with it decline in functional capacity due to the physiological changes that occur in the ageing body (Burbank & Riebe, 2002), participation in physical activity on a regular basis is associated with improved health. The physiological changes affect the speed at which certain movements are made and the range of movement at the joints. The ability to accomplish certain tasks is often reduced in older adults. This is due to the fact that aerobic capacity decreases, maximal cardiac out put and stroke volume decrease, bone mass, muscle mass and muscle strength reduce, size and the number of muscle
fibres decrease, pulmonary function decreases while body fat percentage increases
(Riebe, Burbank & Garber, 2002; Bird, Smith & James, 2002). All these factors
affect one's capacity to perform movements although the degree of influence of each
factor depends on the kind of movement or task to be performed by the body. Pate et
al. (1995) show the role and contribution of endurance, strength and flexibility
exercises in preventing chronic diseases, performing daily activities, controlling
development of back pain and disability, especially as one advances to older age.

In a study by Nelson et al. (2004), a 6-months single-blinded randomized controlled
trial with 72 community-dwelling men and women aged 70 and above with a
functional impairment, was carried out. The participants were randomly assigned to
either a home-based progressive strength, balance and general physical activity
intervention, or to an attention-control group that received home-based nutrition
education. Functional performance was measured in the laboratory using Physical
Performance Test (PPT) and the Established Populations for Epidemiologic Studies
of the Elderly (EPESE) short physical performance battery. Physiologic capacity was
measured by strength (one repetition maximum), dynamic balance (tandem walk),
gait speed (2-metre walk) and cardiovascular endurance (6-minute walk). 70
participants (95%) completed the 6-months trial. PPT increased by 6.1 ± 13.4% in
exercisers and decreased by 2.8 ± 13.6 in controls (p=0.02). EPESE improved by
26.2 ± 37.5 in exercisers and decreased by 1.2 ± 22.1% in controls (p=0.001).
Dynamic balance improved by 33.8 ± 14.4% in exercisers versus 11.5 ± 23.7% in
controls (0.0002). There were no differences between groups in the change in
strength, gait speed or cardiovascular endurance. They concluded that minimally
supervised exercise is safe and can improve functional performance in elderly
individuals. The improvement in functional performance occurred along with improvements in balance with no significant changes in cardiovascular endurance, strength and gait speed. The study demonstrates that physical activity improves functional performance in older persons.

Muscular strength and muscular endurance are important factors in physical capacity. Strength is required in the movement of heavy objects while muscular endurance is important in repetitive or prolonged activities. Muscle strengths and muscle mass decline 30 to 50 percent between the ages of 30 and 80 years (Khan, McKay, Kannus, Bailey, Wark & Bennell, 2001). This deterioration in physiological function associated with ageing, usually reduces the levels of activity and independence, which affects the quality of life. Research shows that physical activity interventions can prevent or reduce a number of functional declines associated with ageing (Nelson et al., 2004; Riebe et al., 2002; Khan et al., 2001). In order to improve the quality of life of older adults, there is need to reduce inactivity since it is considered a health risk by many authorities (Bird et al., 2002).

Seynnes, Fiatarone, Hue, Pras, Legros and Bernard (2004), conducted a single blinded, randomized, placebo-controlled trial and measured the dose-response effect of a free weight-based resistance training program by comparing the effect of two training intensities: high and low-moderate intensities of the knee extensor muscles on muscle function, functional limitations and self-reported disability. 22 institutionalised men and women, mean age 81.5, were assigned either to a high-intensity strength training; N=6, a low-moderate intensity strength training; N = 6 or a weight-free placebo-control training N=8. Each of the 3 groups performed 3 sets of
8 repetitions 3 times a week for 10 weeks. The outcome measures included knee maximal strength, knee endurance, functional performance (assessed by 6-minute walking, chair rising and stair climbing and also by self-reported disability). Results indicated significant improvements in the knee extensor strength and endurance, chair rising time and stair climbing power in the high intensity and low-moderate intensity groups compared to the control group. 6-minute walking distance improved significantly in the high-intensity and not in the low-moderate intensity group and also in the control group. Furthermore, there were significant differences observed in the High intensity group compared to the low-moderate intensity group in knee extensor strength, endurance, chair rising time stair climbing power and 6-minute walking. There were significant relationships between changes in strength and functional outcomes. From a physiological point of view, low-moderate intensity resistance training may not be sufficient to cause desired impact in muscle strength. There were strong dose-response relationships between resistance training intensity and strength gains and between strength gains and functional improvements after resistance training. This implies that older adults can respond to physical activity and improve health conditions and functional independence. In order to improve functional performance the component of strength is a key factor that should be one of those targeted. Also, the nature and design of physical activity programme will affect the level of improvement.

Regular physical activity has been found to delay the onset of degenerative conditions and chronic diseases such as diabetes, obesity, cancers, cardiac related diseases, osteoporosis, and arthritis and to reduce the risk of falls (Cerny & Burton, 2000; Nieman, 1999). Moderate and vigorous intensity physical activities have health
benefits especially in reduction of several chronic diseases. Moderate-intensity physical activity means working hard enough to raise your heart rate and break a sweat, yet still being able to carry on a conversation (American College of Sports Medicine [ACSM], 2007). Despite all the available information on benefits of physical activities most people and older adults in particular are increasingly sedentary (WHO, 2000). The individual’s physical activity attitudes, habits and behaviour influence their activity levels (Burbank & Riebe, 2002).

Regular physical activity should be promoted for the general health and well being of the older adults. This will promote their functional ability and independent living. However, there is need to enhance the following components of physical fitness: balance, strength, endurance and flexibility. Balance involves complex coordination of the flow of information and instruction between the musculoskeletal system and the nervous system (Brukner, Khan & Kron, 2004). Balance is important to support the body both in motion (dynamic balance) and while stationary (static balance). With ageing, the 3 systems that control posture: somatosensory, visual and vestibular deteriorate (Brukner et al., 2004; Riebe et al., 2002). The impairment and disability which occur with ageing compromise balance and they are risk factors for falling. The age-related changes in muscles also predispose the older adults to falls. Balance can be improved and the risk of falling reduced through involvement in an exercise programme that includes balance training, strength training and resistance training.

Research indicates that the elderly involved in a physical activity training or exercise training programme experience a lower rate of falls compared to those who are sedentary. In a study by Kolbe, Lambert & Charlton (2004) in South Africa, the
effectiveness of a community-based low-intensity exercise programme was assessed in older adults from socio-economically and historically disadvantaged communities. Three community centres 2 exercise groups (EX1 and EX2) and 1 control group (CTR) were involved in a 20-week twice-weekly exercise programme. Static and dynamic balance, gait, upper and lower body strength, cardiovascular endurance (6-minute walk test), blood pressure, activities of daily living and instrumental activities of daily living, physical activity and perceived health status were assessed at baseline, 10 and 20 weeks. Exercise training significantly improved dynamic balance in both groups (75 ± 31.5 versus 55.3 ± 13.6 s, and 53.3 ±17.0 versus 37.0 ± 10.4 s, for EX1 and EX2, respectively, (p=<0.001) compared to CTL (57 ± 27 versus 53 ± 15 s). Lower body strength, was also significantly improved in both EX1 and EX2 (p=0.001).

In another study by Chan, Marshall, Winters, Faulkner, Schwartz and Orwol (2007) that lasted 4.5 years, the relationship among physical activity, physical performance and incident falls was examined in a large population of older men of at least 65 years of age located in 6 different ethnically geographical sites of United States of America. Men with greater leg power and grip strength had significantly reduced fall risk (0.82, 95% CI: 0.73, 0.92 for highest leg power and 0.76, 95% CI: 0.69, 0.85 for grip strength). In this study, narrow walk was used as an indicator of dynamic balance. Furthermore, the study excluded those who had physical limitations, who could not walk without support of another person and those who had undergone a bilateral hip replacement. (Barak, Wagenaar & Holt 2006) indicate that approximately 25% – 35% of people age 65 and above world wide experience falls each year. These statistics particularly for Uganda are not very clear. Although young
people experience falls too, the projected proportion of 18% is smaller compared to that of older adults of 26%.

Strength, which is the maximum amount of force that can be produced by a muscle or group of muscles (Brukner et al., 2004); is important in performing a number of movement activities such as walking, stretching and standing up from a seated position. Strength is required in lifting and carrying weight however light it may seem to be; for example lifting a cup or jar of water or carrying a kettle full of water from the tap to the next point to boil the water. Inevitably, muscular strength in most muscle groups declines with age (Khan et al., 2001). The decline may occur if a muscle is not regularly used (Bird et al., 2002; Kelly, 2010). This may be due to restrictions as in cases of medical conditions, injury or sedentary lifestyle. Under use affects the number and size of individual muscles (Riebe et al., 2002; Bird et al., 2002) yet skeletal muscles fulfil most movement functions of the body and body parts. Activities like rising from a chair require lower body strength. Inadequate lower body strength is a risk factor for falls. Muscle strengthening can help older adults reduce the risk of falls, perform household chores and generally maintain their independence (Bird et al., 2002). The rate of decline in muscle strengths with increasing age can be attenuated by participating in a resistance training programme (Riebe et al., 2002).

In a study by Fiatarone et al. (1990) elderly patients in a nursing home ranging from 86 to 96 years experienced increase in their muscle strengths and muscle size after a high-intensity resistance training that lasted 8 weeks. They also made several functional gains including lower body strength and gait. In another study by Kallinen,
Siplia, Alen and Suominen (2002) Jyvaskyla, Finland, elderly women aged 76-78 years with no severe disease or functional impairment, who participated in the strength training that lasted 18 weeks, increased in cycle ergometer peak power from 68.1 to 70.3 W; (p=0.035) compared with controls. Their peak power per kg body weight increased from 1.02 to 1.05, while that of the endurance training group increased from 0.91 to 0.93 (p=0.027 and p=0.049 respectively).

Although the ageing body experiences loss of strength with increasing age, the rate of decline is lower in individuals who participate in resistance training (Burbank & Riebe, 2002). In a 10-week randomized, placebo-controlled study by Fiatarone et al. (1994), comparing resistance training, multi-nutrient supplementation, both interventions and neither any in 63 women and 37 men residents of a nursing home, muscle strength increased by 113 ± 8 percent in the subjects that underwent high-intensity progressive resistance training as compared to 3 ± 9 percent in the non-exercisers (p=0.001). The implications for this study are that resistance training, if involved in for a considerable amount of time, helps offset the magnitude of strength loss.

The age-related loss of muscle is primarily from the changes in the body, which lead to substantial reduction in muscle mass. A great contribution in the loss results from sedentary life style that is common among the elderly. The decrease in muscle mass is due to the decrease in number and size of individual muscle fibres. In addition to sedentary lifestyle, inadequate dietary intake may contribute to the loss of muscle mass in the older adults. The American College of Sports Medicine (2007) recommends that the protein intake for the elderly should be 1.0 to 1.25 grams of
proteins per kilogramme of body weight per day. WHO (1998.1) notes a high number of older people in most parts of the world leading sedentary lifestyles. It is therefore, important to provide older persons opportunities to live actively. Active living promotes functional health and independence among the older persons (Wilmore and Costill, 2004).

Cardiovascular endurance also known as aerobic fitness, involves all major body systems. Maximal oxygen consumption (VO2 max), the best measure of cardiorespiratory fitness, can be used to measure the amount of oxygen used by the body per minute of physical activity. VO2 max can be accurately measured from a laboratory. The VO2 max tends to decrease with age and it is linked to the decreased cardiac output and stroke volume. Cardiovascular endurance is important in as far as delivery of oxygen to all body parts is concerned. The muscles use the oxygen to produce energy that is required in movement and all other body functions. In their study on the effectiveness of a community based low-intensity program for older adults, Kolbe et al. (2004); and in another study on the effects of multidimensional home-based exercise on functional performance in elderly people by Nelson et al. (2004), used a 6-minute walk to assess the cardiovascular endurance. In both studies, the exercise programmes did not affect the cardiovascular endurance significantly.

2.3.2 The Social Factor

The musculoskeletal system degenerates and deteriorates as one advances in age and thus affects mobility (Abernethy et al., 2005). Since muscle mass, joint mobility and stability, vision and hearing all decline with age, physical activities and exercises are required to rejuvenate the strength, flexibility and balance that are needed for
movement. Impaired mobility decreases one's ability to keep in contact with other people (WHO, 1998.1), therefore, a certain level of physical and health fitness is required for one to keep in contact with others and to be involved in social activities. According to MoGLSD (2007), the architectural plans of many buildings and outdoor spaces in Uganda, are not age-friendly, thus hinder the older adults from accessing venues for social gatherings. This also discourages the elderly from leaving their homes to enjoy their social rights.

Inadequate lower body strengths, impaired vision and/or, impaired hearing in addition to poor joint mobility usually result in increased risk of falls. The fear for falls that the older adults may be experiencing may be due to the fact that they or their friends have fallen victims of falls before (Chan et al., 2007). This fear may hinder older adults from reaching their friends or from accessing places of social gathering where they would get a chance of meeting with their peers and making new friends who may have similar needs. Keeping in contact with others allows older adults to share with and encourage each other. This helps in reducing tendencies of stress and depression resulting from loneliness and isolation. Isolation and loneliness may result in poor dietary habits, depression, lack of motivation, loss of confidence and decline in cognitive functioning (Baechle and Earle, 2000). The older persons may easily skip meals; eat very little or eat unhealthy because of lack of company.

According to WHO (1998.2), loss of functionality for example in cognitive functioning is often a result of disuse. The older adults should therefore be helped to keep social contacts, as these are often a source of encouragement. During interaction amongst themselves, they could discuss a topic that requires them to recall something
in the past or think logically about something thus improving their cognitive functioning. On the other hand the elderly may also share topics of interest for example: education, politics, sports thus increasing their confidence and motivation. They may also listen to music together, dance demonstrating the strokes of their past times, share jokes and fun moments which make them relax, laugh and/or smile. It is easier for older adults to come to social gatherings where they expect to meet their peers than those where they are likely to be alone. They look up for those times when they will share with each other and catch up on a few or a number of things.

2.3.3 The Economic Factor

The health status of an individual and their fitness dictates the capacity of involvement in economic ventures. The older persons usually suffer from chronic illnesses like high blood pressure, diabetes and respiratory diseases among others, which may render them unhealthy and unfit to engage in income generating activities. In addition they experience disabilities resulting from falls and impairments such as vision impairment, hearing impairment; memory loss, due to the physiological changes that occur in their bodies. If these conditions are not controlled and/or treated, they weaken the elderly and disable them from participating in the economic and social development. Frequent attacks of illnesses render one inefficient and unable to cope with the demands of a job. This also leads to frequent absences that may not be tolerated as well as high medical bills that become uneconomical burdens to an individual, family, company and the state as a whole.

Furthermore, illiteracy and low levels of education lead to unemployment due to the limitation in skills and knowledge required for most jobs. According to MoGLSD
illiteracy and low levels of education are major influences of unemployment among older adults in Uganda. The illiterate and uneducated are left no choice but to take on unreliable income generating activities, which may turn out to be insufficient sources of income. Unreliable and insufficient incomes tend to influence access to health care, education and healthy eating (WHO, 1998.1). All these directly or indirectly affect active living in that one may not be able to participate in regular physical activity and exercise if they are unwell and unable to access food or health care. This leaves one with no motivation to engage in physical activities.

According to WHO (2000), older people require skills and confidence in order to live productively. This is more important now than even before because the numbers of older adults are increasing and the older adults will therefore be needed to support the economy. The government of Uganda has promised to support, empower and mobilize older adults to participate in economic growth and social development and to deal with risks that hinder their productive capacities (MoGLSD, 2007). As already observed, in many nations now, the retirement age is being adjusted upwards to allow people aged 60 and above (to a certain limit) to continue serving their nations. However in Uganda and other African countries it is the reverse. The government of Uganda is considering lowering the retirement age to 50 from 60 years (Among, 2010.1). The members of parliament were reported to have proposed the revision to be 55 instead of the 50, yet the youth leaders supported the President’s idea of retiring at 50 so that this could pave job opportunities for the youth (Among, 2010.2). If this recommendation becomes law, it is estimated that 30,000 civil servants will be affected.
In Mozambique females are referred to as aged when they reach 55 and the men at 60 years. According to Velkof & Kowal (2007) and Kanyoni & Phillips (2009), 60 years is not appropriate to characterise one as aged for Sub-Saharan Africa; instead 55 years was adopted to qualify one as elderly. This is due to the fact that in this region, most countries have a life expectancy at birth of less than 55 years. Diseases such as HIV/AIDS have taken a stall on many families thus older persons have no choice but to take on grand children left behind by their children after death (Nankwanga & Phillips, 2009). This means the older persons must have an income in order to take on this role ably. In the present study 60 years was used to qualify one as elderly.

In this dynamic world, older persons require new training in innovations and new technologies in order to stay relevant and productive in society (WHO, 2000). Older persons should, therefore be provided the opportunities to learn new skills if they are to remain active and productive citizens of their countries. Since the ultimate goal is to keep the older persons strong and able to earn a living to sustain themselves and those they support, participation in regular physical activity and exercise is inevitable. This will delay the onset of chronic disease, reduce the risks of attacks from chronic illnesses, and slow down the ageing process among other benefits of regular involvement in physical activity.

According to MoGLSD (2007), most old people in Uganda are poverty stricken, unable to access health facilities, have limited economic opportunities, have no social security and are therefore totally vulnerable. Furthermore, although most old people may have assets like land, they rely on family support since they rarely have personal savings in form of money (MoGSLD, 2007). According to (WHO, 2002), in
countries like South Africa and Namibia where they have a national old age pension, the benefits are a major source of income for survival to many poor families. In more developed countries, there is old age security and gradual retirement (Organisation of Economic Cooperation and Development [OECD], 1998). This old age pension promotes active living, functionality and participation in family and social functions. This is because one is able to pay for the exercise programme or for a specialist to prescribe relevant exercises and activities in addition to accessing medical care.

2.3.4 Nutrition Factor

Healthy eating and physical activity are important for all age groups. Therefore, older adults need to eat sufficient and balanced meals (Baechle and Earle, 2000), which include minerals, vitamins, carbohydrates, proteins and fats. They also need plenty of fluids, which is said to prevent constipation (Remig, 2002). Also the thirst sensation decreases as one gets older (Remig, 2002; Reese, 2007) hence the need to encourage older adults to drink a lot of fluids to guard against dehydration. Healthy eating for older adults includes a variety of rich-nutrient foods including fruits, vegetables, foods rich in fibre, proteins, and foods low in fat (Reese, 2007). According to Riebe, Burbank & Garber (2002) inadequate dietary proteins may lead to the loss of muscle mass in the older adults.

According to the Dietary Guidelines for Americans (2005), unhealthy food habits are linked to health risks especially of chronic diseases such as diabetes and high blood pressure and to conditions such as overweight and underweight. Also intakes of some foods and nutrients such as diets rich in saturated fats, salt and sugars are not recommended. Reese (2007) indicates that healthy eating can reduce the negative
effects of ageing and the risk for many conditions associated with ageing such as some cancers, type II diabetes, osteoporosis and heart disease. For example, foods rich in vitamin C help fight infections while those rich in vitamin D, calcium and phosphorus maintain the health of bones and reduce the risk of osteoporosis.

Nations like Canada and United States of America have developed dietary guidelines for their people, which is one of the strategies of dealing with unhealthy eating. Uganda is yet to come up with such for her citizens. In the Dietary Guidelines for Americans (2005), information concerning nutritious diet, maintenance of health weight, exercising adequately and safe ways of storing food is provided. The recommended food types, the quantities to be consumed and the caution to special groups of people are clearly stipulated out. This helps the citizens to plan accordingly when they are well aware of what they should eat, why it is recommended and how it should be prepared in order to benefit them.

Older persons may not have access to a balanced diet or may lack what to eat due to low or no income. They may also live in isolation and lack company, which often results in loss of appetite. Disability and sometimes loss of teeth (WHO, 1998.1) may compound access to healthy eating in older adults. Older adults need a lot of calcium to deal with the increased bone loss in old age (Wilmore and Costill, 2004). Poor choices of foods, poor timing of meals and poor preparations of foods should be avoided for the well being and longevity of the elderly (Wilmore & Costill, 2004; Abernethy et al., 2005). In a study by Osler, Heitmann, Gerdes, Jørgensen, and Schroll (2001), they analyzed the risk of all-cause and cardiovascular mortality associated with dietary patterns in men and women, while taking a number of
potential confounding variables into account. The prudent dietary pattern was inversely associated with all-cause and cardiovascular mortality after controlling for confounding variables. Thus it was associated with the lowest risk to mortality. The prudent dietary pattern was positively associated with frequent intake of whole meal bread, fruits and vegetables.

According to the Report on nutrition situations and living conditions of older people in Uganda by Ministry of Health (2004), little is known about nutritional situations and needs of older people in Uganda. Most nutrition research and interventions focus on children and pregnant and lactating mothers. Furthermore, older people are denied access to essential health services and lack income, which exacerbates access to health care and nutrition. Older people in Uganda take one meal a day or none in two days (MoGLSD, 2007; Mugayehwenkyi, 2004) which comprises mainly carbohydrates, and as a result they suffer malnutrition and poor health. The legal frameworks show that the Government of the Republic of Uganda is committed to addressing the concerns and needs of older persons (MoGLSD, 2009).

2.4 Physical Inactivity and Ageing

Physical inactivity is a key risk factor for mortality, morbidity and reduced functional ability among older persons (Bouchard et al., 1997; Astrand et al., 2003; Wilmore & Costill, 2004). Among the problems affecting older adults, is the problem of being inactive which often affects their quality of life and functional independence. According to Wilmore & Costill (2004), prolonged physical inactivity leads to bone fragility, which is due to demineralization in the skeletal bone structure through accelerated urinary excretion of calcium. Loss of calcium can lead to osteoporosis,
the risk of which increases with age particularly in women at post-menopause. Furthermore, joint function is reduced and stiffness is gradually increased because of the deterioration in the joint capsule and the shortening of adjacent muscle groups (Astrand et al., 2003). Astrand et al. (2003) further show that the weight-bearing joints become prone to strain and injury when the cartilage in them becomes thinner. Blood circulation in the muscles and bones becomes impaired with possible leg pain as a result.

Lack of physical activity and poor diet are the major causes of an epidemic of obesity that is affecting the elderly as well as middle-aged and younger populations. In the United States of America, health care expenditures on people aged sixty five years and/or, older were four times that for 40-year-olds and the direct medical costs attributable to inactivity and obesity accounted for nearly ten percent of all health care expenditures (Colditz, 1999). Basing on the available evidence, the impact of lack of physical activity on medical care costs is likely to grow as a result of an ageing population, unless trends in physical inactivity change. This may cause inflation in the economy especially of developing countries like Uganda.

The older adults need resistance training to strengthen their muscles and slow down the process of muscle and bone loss (WHO, 1998.2); flexibility exercises to enhance mobility; aerobic activities to promote muscle endurance and balance exercises to promote coordination and balance (Bird et al., 2002). Exercise programmes must be adapted to the individual’s fitness and functional level. The recommended frequency for cardiovascular fitness (aerobic fitness) is 3 for high intensities and 5 for low-levels of intensity a week and a duration of 20 -60 minutes of continuous activity
(Lawrence & Hope, 2007). The minimum duration to improve cardiovascular fitness in healthy adults is 20 – 30 minutes, warm-ups and cool-down excluded (ACSM, 2007; Lawrence & Hope, 2007). The less fit groups need to progress gradually to increased durations. According to Bird et al. (2002), older adults show beneficial adaptations to exercise although generally more slowly. Through continued participation, they become more fit. Caution on excessive repetition of either stepping or deep bending is necessary as such movements can be stressful if not alternated with other activities (ACSM, 2005). The ACSM guidelines (2005), further show that movements of upper body are comparatively less effective because muscles in this region are smaller and make a relatively low insignificant demand of oxygen.

For muscular strength and endurance training require specific muscle groups to contract and work through full range of motion, shortening and lengthening. The recommended intensity for muscle strength is 2-3 times a week; high resistance and low repetition (lifting heavy loads for a short period of time). For muscular endurance 2- 3 times a week, low resistance and high repetition where lighter resistance are lifted for an extended period of time is recommended. 8- 10 repetitions targeting main muscle groups are recommended for older adults (Lawrence & Hope, 2007).

Factors affecting fitness include heredity: 75% inherited, 25% changeable; body type, health, lifestyle and age (Lawrence & Hope, 2007). Although fitness declines with age, inactivity exacerbates the process. The speed at which fitness declines can be reduced through regular physical activity and exercise (Lawrence & Hope, 2007; Bird et al., 2002). However, a thorough health screening of all individuals should be
required before committing one to a regular physical activity or exercise programme despite all the benefits behind it. For example high blood pressure if not controlled, increases the risk for heart failure, kidney damage and stroke (ACSM, 2007; Lawrence & Hope, 2007).

2.5 Health Benefits of Regular Physical Activity

There is substantial scientific evidence that regular physical activity is helpful in combating health problems and diseases (Bird et al., 2002; Burbank & Riebe, 2002). Specifically in older adults, physical activity has been found helpful in lowering the risk of developing health-related diseases like heart disease, improving the conditions of the elderly living with health-related conditions like high blood pressure and improving the ability to function and stay independent even with conditions like arthritis (DiPietro, 2001). It is of great importance to know that regular physical activity sustains the ability of older adults to live actively and independently.

Research studies have suggested that muscle-strengthening exercises may protect against the decline in bone mass especially experienced by post-menopausal women and protect against falls. Baechle & Earle (2000) further affirm that although ageing is associated with undesirable changes in body composition, the older adults who are physically active improve in strength and functional ability. Strength training helps maintain strength and physical function (Nelson et al., 1997; Bird et al., 2002). This means, the elderly are able to progressively increase strength and other components of fitness. Since older adults show beneficial adaptations to exercise, participation in strength exercise programmes and resistance training may help reduce the loss of muscular strength. According to Riebe, Burbank & Garber (2002), muscular strength
declines by 15% in the 6\textsuperscript{th} and 7\textsuperscript{th} decade consequently, the importance to maintain strength with increasing age through exercising. Muscular strength is vital to health, functional ability and independent living. Although exercising will not stop all the changes that occur with ageing, it will slow them considerably.

2.6 Challenges Facing Older Persons

According to WHO (2000), the burden of disease is one of the global problems. A rapid growth of non communicable diseases which was projected to continue escalating to 78 percent by 2020 in developing and newly industrialized countries needs immediate intervention. In both developed and developing countries, chronic diseases are significant causes of disability yet disabilities associated with ageing and the onset of chronic diseases can be prevented or delayed through regular physical activity and exercise. In view of this, there is need to control the development of these chronic noncommunicable diseases and disabilities if functional ability and independent living are to be realised among the elderly. According to the Disease Control Priorities Project (2007), non-communicable diseases are becoming a significant burden in the sub-Saharan Africa. Motoyoma et al. (1998) carried out a study to determine the effect of 9 months low-intensity aerobic training on blood pressure in elderly hypertensive patients on anti-hypertensive medication. The training group \((n = 13; \text{mean age } 75.4 \pm 5.4 \text{ years})\) trained using a treadmill for 30 min 3 to 6 times a week for 9 months. The rest \((n = 13; \text{mean age } 73.1 \pm 4.2 \text{ yr})\) served as controls. The resting systolic (-15 ± 8 mm Hg), mean (-11 ± 6 mm Hg), and diastolic blood pressures (-9 ± 9 mm Hg) decreased significantly after 3 months of training \((p < 0.01; p < 0.05, \text{ respectively})\) and the blood pressure of all participants stabilized to a significantly lower level by the end of the study (9 months) in the
training group, whereas no significant changes in blood pressure were found in the control group.

Vision and hearing are often a problem among the aged (WHO, 2002) which lead to difficulty in movement as pointed out earlier. Hearing impairment particularly leads to difficulties in communication. This can easily lead to withdrawal, and social isolation (Wilson, 1999). Therefore there is need for proper and timely diagnosis and treatment. In addition, the physical environment for the older adults should be user friendly and encouraging them to continue with physical activity and exercise for example the walking passages should be well lit and barrier-free while the stair ways should have rails for support.

The older adults tend to provide care and support for other family members who may either be older, younger or sick (MoLGSD, 2007). This is in itself strenuous and can cause major declines in the older person’s life. Additionally, it requires economic security yet normally at this age, older persons living in developing countries have no stable income (Nankwanga & Phillips, 2009; Mugayehwenkyi, 2004). This means that they cannot have access to basic needs such as balanced diet, medical care, good shelter and clothing. This may sometimes result in social insecurity. According to Wilkinson (1996), the higher the social economic status, the longer and healthier the lives of people are. However, this may not always be the case as high-social economic class can only be associated with longer and healthier life if the members in that class use it to access balanced diet, timely medical care, health facilities for example, a gym and trained exercise physiologists and trainers. Otherwise high-social economic class has been associated with poor eating habits and sedentary life styles
since families in such a class usually have house helps, machines to do nearly all the work, vehicles to drop them at the points where they intend to go and generally easy life characterized with less physical activities. Thus, lifestyle diseases such as heart disease, type II diabetes and high blood pressure may be more prevalent among the higher socio-economic groups of people.

Negligence and abuse are common problems among the older adults nearly everywhere in the world. Common forms of negligence and abuse include physical abuse such as assault and beating, which are often injurious; psychological which diminish the dignity and self-worth of an individual and ageism which is discrimination based on age. Other forms of abuse include sexual abuse which may be verbal, suggestive or rape; financial abuse or exploitation such as stealing, fraud and misuse of money, land grabbing and/or, stealing; intimidation, restricting the older adults’ freedom and civil rights and failure to provide them with basic requirements such as food and medication. The abuse and/or, negligence may be committed by strangers, family members, close friends or trustees. According to Kinnon, (2001) indicators of abuse and negligence are sometimes not obvious and may require investigation and the cooperation of the elderly especially when committed by someone close to them. All forms of abuse and negligence tend to cause either fear, anxiety and/or, stress in the victims. This may affect one’s wellbeing and may lead to withdrawal and failure to participate in quality life-promoting activities. Many older adults may not have adequate knowledge on the benefits of physical activity and exercise. This may hinder them from participating in such programmes that would benefit them. This implies that there is need for
awareness programmes to sensitize the older adults and caregivers on the need for regular participation in physical activity and exercise.

The cultural set up and social norms of a given society may promote or hinder the older adults’ involvement in physical activity and exercise. For example in many African cultures, the older adults may not be expected to participate in sports and other forms of physical activity. Instead, culture expects the old adults to simply sit and be served by the younger ones. This may therefore need motivation in order to help older adults adjust to participating in physical activity and exercise regularly. Motivation is that inner drive that leads one to pursue something (goal). Motivation is important because it influences achievement of set goals and productivity. In order to motivate others, it is important to know their needs. This involves understanding their behaviour and why they behave that way. For example, an exercise physiologist who may wish to work with a group of older adults that are sedentary needs to find out why they are sedentary. Some of them it may be because they lack awareness, others may be knowledgeable on the benefits but they may lack facilities, yet others still may find it difficult to exercise all by themselves. This will enable the researcher to find appropriate ways of handling each challenge facing the people before setting out a programme.

There are different theories on motivation and life satisfaction (Bass & Avolio, 1993) discussed below. Maslow’s need of hierarchy ranks the needs in a pyramid form with the most important needs at the bottom. The basic physiological needs such as food, water and warmth for satisfying human life fall in the primary list of satisfaction. According to Maslow, when one set of needs is satisfied, this kind of need ceases to
be a motivator. In that case, focus should be put on the next need on the line. Another theory of motivation focuses on individual differences. This implies that exercise programmes should be based on individual needs such as fitness levels, health status and interest. The third type of motivation theory is cognitive theory which focuses on suitability that is to say setting right goals; implying that there is need to identify the most appropriate physical activity or exercise that will lead to the desired goal. For example if the purpose of the exercise programme is to improve cardiovascular endurance, the activities chosen, the duration and intensity should all be appropriate. Another theory is self-efficiency theory based on the fact that one’s belief in the ability or inability to accomplish a task is the main factor that influences one’s motivation. This implies that in order to help an older adult participate in regular physical activities, they should be helped to believe in themselves and have a positive attitude towards physical activity and exercise.

2.7 Sleep Patterns of the Elderly Population

Sleep problems have been reported to be common among the older persons in general (The Medical Encyclopedia, 2007). Neubauer (1999) points out the following sleep disorders such as daytime napping, irregular sleep-wake times, difficulty in falling asleep, less time spent in the deeper stages of sleep; early morning awakening and less total sleep time as being common. Neubauer (1999) further observes that the first two disorders, daytime napping and irregular sleep-wake times, may contribute to insomnia. In another study by Habte-Gabr, Wallace, Colsher, Hulbert, White, and Smith (1991) they suggest that sleep problems among the elderly are sometimes associated with treatable health conditions and modifiable behavioural and environmental characteristics. Furthermore, Habte-Gabr et al. (1991) show that sleep
patterns were also related to educational attainment, self-perceived health status, physical functional status, psychotropic drug use, alcohol use, depressive symptoms, life satisfaction, and social and recreational activity level.

The Medical Encyclopedia (2007) shows that older people require less sleep and that their sleep is less deep compared to that of the young people. The Medical Encyclopedia (2007) further suggests that in order to rule out causes of sleep disturbance being medical-related, history of sleep disturbances and history of contributing factors be should be examined. The National Sleep Foundation (1998) shows that the time recommended for sleep varies with age and that as people age, they require less sleep of 6.5 hours per day. In another controlled study of 18 subjects aged 60-70 years, all healthy and not on medication, it confirms that older people need less sleep between 6-7 hours in 24 hours (Klerman and Derk-Jan, 2008). This implies that if the wake-sleep pattern is not linked to other factors that may be threatening one’s quality of life, less sleep is normal and expected. The older adults should therefore invest this time when they are awake in productive ventures that will enhance their quality of life.

2.8 Dietary Habits of the Elderly Population

In a nutritional survey of older people conducted by Maccabi Health Services in Tel Aviv (2002), over 40% were found to consume less than the Recommended Dietary Allowances (RDA) for energy, protein and calcium. Dror, Stern, Nemesh, Hart and Grinblat, (1996) confirmed these findings in what are widely considered well established homes for the aged in Israel. This is further confirmed by in the large national surveys including the United States Department of Agriculture (USDA) food

Another study by Kikafunda & Lukwago (2005), nutritional status and functional ability of the elderly aged 60-90 years in Mpigi District, Uganda were assessed in 100 subjects that were randomly selected. Prevalence of under nutrition was 33% in men based on Body Mass Index (<18.5kg/m²). 68% of women were undernourished compared to 32.4% of men. Dietary assessment showed that intake of fish, cereals, vegetables, tubers and legumes were moderate (3-6 times / week). Furthermore, 33% were independent. The relationship between Body Mass Index and variables associated with functional ability were significant (p<0.05). The study concluded that older adults should be incorporated in health programmes and policy.

2.9 Analytical Studies Done in the Area of Ageing

Inal, Sabusi, M'ay and Hayran (2007) carried out a study on the link between health-related behaviours and life satisfaction in elderly individuals who prefer institutional living. Socio-demographic characteristics, health-related behaviours, leisure time activities and fall histories were assessed by a structured questionnaire during face-to-face interview. A validated life-satisfaction index questionnaire (LSI-A) was completed. The results indicated participants who declared moderate or high mean LSI-A score than those in the low-income bracket (P=0.009). Multivariate analysis of the data suggested that leisure time activities and participation in regular physical activities are significant predictors of LSI-A scores (R²:0.112; P=0.005 and p=0.002 respectively). The findings imply that regular physical activity and leisure time
Activities are significantly related to life satisfaction among residents in institutions. Participation in leisure and physical activity programmes may help to improve the life satisfaction of elderly people living in institutions. This study showed that there was a significant relationship between life satisfaction and regular physical activities and leisure time activities. The conclusion does not indicate whether health-related behaviours had a significant relationship with life satisfaction. Furthermore, the health-related behaviors are not clearly specified.

Githang’a (2008) carried out a study of Metabolic Equivalents for functional independence of the elderly Kenyans in homes for the aged in Nairobi Province in Kenya. This study investigated the metabolic equivalents (METs) of past and present selected physical activities of the elderly in the 3 homes: Kariobangi, Little Sisters of the poor and Mji wa Huruma. The study used MET to assess the intensities of physical activity patterns of the elderly in the homes. The study also used the Functional Independence Measure (FIM) to establish independence levels of the elderly in performing Activities of Daily Living (ADL) and Mobility. All 150 elderly residents of the three homes were selected for the study. The accrued data on METs and FIM were subjected to Statistical Package of Social Sciences (SPSS) using a t-test and Pearson’s Product Moment Correlation coefficient index at significance level of ≤ 0.01 to test the research hypotheses.

The major findings of the study indicated significant differences between METs of past (6.5 ± 0.8 METs) and present (1.8 ± 0.9 METs) physical activities of the elderly. Additionally, there was a significant relationship between the MET intensities of past physical activities and the level of functional independence in ADL and mobility of
the elderly and also there was a significant relationship between the MET intensities of present physical activities and functional independence in ADL and mobility of the elderly in the homes for the aged in Nairobi Province. However, this study did not show whether the MET intensities affected other areas of life like nutrition, sleep and blood pressure, which the current study investigated.

In another study by Leslie, Frank, Carole, Mary and Sharon (2006) the effectiveness of a resident-led walking programme was assessed at an Assisted Living Facility (ALF) in America. Seventeen women aged 62-99 years participated in a “walking club”. In this study the Barthel Index was used to evaluate independence in activities of daily living (ADL). The 9-week walking intervention programme had significant increase in all of the measurements. The results of this study suggested that a walking program could be instituted in ALF with minimal staff effort and significant benefit to residents. This study employed an intervention on resident older adults just like what the present study. However, in this study, the intervention was only carried out on women aged 65 -90 years. Additionally, the measurements to which the interventions caused significant increase were not clearly specified.

The study by Lin, Wu, Hsiung and Kuo, (2004) compared the Functional Independence Measure between urban and rural residents living in Long-term Care Facilities in Taiwan. The subjects were interviewed to obtain the basic data, and the Functional Independent Measure score. Most of the subjects in urban and rural Long Term Care Facilities were males, less than 80 years old, single or widowed, having multiple diseases, using more than one support device, and having social welfare financial support. The results showed that motor abilities and cognition in rural Long
Term Care Facilities subjects were significantly higher than those in urban areas as shown in the Functional Independence Measure assessment. It was concluded that, some of the functional performance of subjects in rural Long Term Care Facilities was better than those in urban areas. This was a comparative study between the resident in a rural home and those in an urban home. Also, the study does not explain why those in the rural home had significantly higher motor and cognition abilities as compared to those in an urban home.

Mathieson, Kronenfeld and Keith (2002) investigated whether health status was an important predictor of the use of equipment for mobility or activities of daily living (ADL) such as canes or walkers. The study used 3,485 non-institutionalised U.S adults, aged 65 and older from the National Survey of Self-Care and Ageing. The findings showed that although several health status variables had significant, direct effects on functional adaptations, the effects of ADL limitations were diminished at higher levels of impairment. The implication of the study was that promotion of functional adaptations among elderly people might be beneficial from both a proactive approach that targets elders with few limitations and a consideration of health status. This study was carried out with older adults who are not living in homes. Furthermore, it is not clear how the researcher minimised the confounding variables since health status could have been influenced by other factors.

A study by Rubenstein, Josephson, Trueblood, Loy, Harker, Pietruszka & Robbins (2000) a randomized controlled trial on the effects of a low- to moderate-intensity group exercise program on strength, endurance, mobility, and fall rates in fall-prone elderly men with chronic impairments was carried out. 59 men mean age 74 years
with specific fall risk factors: leg weakness, impaired gait, balance or previous falls were randomly assigned to a control group or to a 12-week exercise program. exercising 90 minutes, three times per week with a purpose to increase strength endurance, improve mobility and balance. The results indicated that exercisers showed significant improvement in measures of endurance and gait. Isokinetic endurance increased 21% for right knee flexion and 26% for extension. Exercisers had a 10% increase (p<05) in distance walked in 6 minutes, and improved (p <05) scores on an observational gait scale. Isokinetic strength improved only for right knee flexion. Exercise achieved no significant effect on hip or ankle strength, balance, self-reported physical functioning, or number of falls. Activity level increased within the exercise group. Exercisers had a lower fall rate than controls p<05). Thus exercise can improve endurance, strength, gait, and function in chronically impaired, fall-prone elderly. This implies that physical activity was associated with reduced fall rates.

2.10 Summary of Literature Review

Most of the above studies were not done in Uganda and the set up and other factors were different. Furthermore the studies did not take care of the effect of regular physical activity on factors of sleep, nutrition and general health status, which this study was designed to address. This study therefore was designed to fill this gap and provide the necessary intervention with a view to helping the older adults enhance quality life.
CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, the methodological details are given which include: the research design, the independent and dependent variables, the location where the study was done, the target population and the techniques that were used to select the study sample, methods of collecting and analysing data and how reliability and validity of the instruments and tools used in this study were determined. Finally, it focuses on the logistical and ethical considerations that were taken.

3.2 Research Design

The participants in this study were all from one home for the elderly, the Bakateyamba Home. Both men and women aged 60 years and above participated in a quasi-experimental Physical Activity Programme (PAP) intervention that lasted 8 weeks. The baseline data was compared with the post data to determine the effect of the intervention. The PAP sessions were carried out three times a week on every other day basis.

3.2.1 Description of Intervention

The Community Health Intervention Programmes (CHIPs) as used by Kolbe et al., (2004) was adapted for use in this study. The CHIPs was used to design a Physical Activity Programme (PAP) which comprised strength, balance and aerobic activities.

The PAP comprised 3 sessions per week of low to moderate intensity exercises that lasted 45 minutes in the first half (weeks 1 – 4) and 50 minutes in the last half of the
intervention period (weeks 5 – 8). Each session comprised a warm up that lasted 10 minutes, the main activity that lasted 30 minutes (Weeks 1 - 4) and 35 minutes (Weeks 5 - 8) and a cool down of 5 minutes characterized mainly by stretches. A combination of the aerobic, balance and strength activities was conducted in all 3 sessions throughout the 8 weeks. 3 sets of 8 repetitions for 3 -5 strength activities were performed 3 times per week for 8 weeks. Most activities were performed while seated on chairs to control fall risks. Plastic bottles of 0.5litre capacity partially filled with sand and used as weights for upper body exercises were first introduced in the 5th week. In the 7th week, the bottles were fully filled (0.5kg) and the same exercises were performed. The 0.5litre plastic bottles half filled in the 5th week weighed 0.125kg, in the 6th week ¾ filled (0.375kg) and in the 7th week, the plastic bottles were fully filled (0.5kg).

3.2.2 Specific Activities for the PAP

The activities for warm-up included mobility and pulse raising activities targeting all major muscle groups and preparatory stretching activities. Rhythmic activities such as seated-matching legs, leg raises, knee lifts, bent arm pull-over, toe-tapping, step-taps, finger-thumping, calf raises, shoulder shrugs, ankle-circles, arm-circles, wrist-circles, arm-swings, heel digs, arm-rows comprised the menu from which activities for specific sessions were selected. The exercises with weights included the biceps curls, the arm raises and the chest press. In addition to rhythmic exercises such as marching; balancing exercises, flexibility exercises targeting joints and surrounding tissues; strengthening exercises especially for large muscles, comprised the wide menu of activities for the PAP.
3.3 Variables

One group of elderly was used in this study. The group was assessed before (baseline), at half time (4 weeks) and at the end of the intervention (8 weeks). The following measurements were carried out at baseline (pre-test), at halftime and at the end of the programme (post tests) on the same group of participants living in this home: blood pressure and heart rate, lower body muscle strength, cardiovascular endurance, static and dynamic balance and gait. The routine physical activities involved in by the elderly, the foods consumed by the elderly and the meal patterns, the sleep patterns and the health status of the elderly were also recorded at baseline, halftime and end of the PAP.

3.4 Location of the study

The study was carried out in Uganda at Bakateyamba home the elderly located at Nalukolongo, a suburb of Kampala, in the capital city of Uganda. This home is commonly known as ‘Bakateyamba Home’ which directly translates to mean home for the helpless.

3.5 Target Population

This study aimed at all institutionalized men and women aged 60 and above residing at the Bakateyamba Home, Nalukolongo being the only functional home with the elderly in Uganda, at the time of the study, was used in the study. The study targeted all men and women aged 60 and above at the home provided they did not require specialized handling and equipment. Additionally, all those with uncontrolled blood pressure, that is blood pressure higher than 160/100 (Kolbe et al., 2004) and not on
medication were left out. There were 40 men and women in this home at the start of the study. Only 33 (82.5%) of the 40, that is 20 men and 13 women were elderly.

3.6 Sampling Techniques and Sample size

Both men and women aged 60 years and above at Bakateyamba home provided they did not require specialized handling and equipment were purposively selected to participate in this study. The total number of the elderly that were recruited to the study was twenty two (22); 12 were males while 10 were females.

3.7 Construction of Research Instruments

The study used self designed interview schedules that were administered to the elderly and the caregivers. The interviews sought for information on demographic data, routine physical activities involved in by the elderly and their attitudes towards these physical activities, foods consumed by the elderly and meal patterns, health status and sleep patterns of the elderly. The interview schedules were peer-reviewed and in addition reviewed by the supervisors for approval. The interview schedule items were based on the objectives of the study and the reviewed literature. Related items were grouped together in one section and a logical sequence of the flow was observed.

3.8 Pilot Study

A pilot-run with a group of older priests at Bishop Kakooza House in Nsambya, Parish, Kampala, was carried out. There were few elderly priests at this place by the time the pilot was running. When old priests were brought to this home, they stayed for about 2 weeks before they relocated to the Bakateyamba home if found
considerably weak. This pilot ran for only 2 weeks. The participants recruited to this pilot were not available after the first 2 weeks.

The interview was administered to this group and the caregivers as pre-arranged. During the pilot, the researcher and assistant trained on how to use the tools that were used in the major study; the procedures, taking measurements, observing and recording findings and administering the PAP. The results of the pilot interviews were used to make some adjustments to the instrument before it was administered to the elderly at Bakateyamba, Nalukolongo. Some questions items that were not adequately answered were discarded while others were improved.

3.8.1 Validity

The Interview schedules that were designed by the researcher were critiqued by other researchers and supervisors to deal with ambiguities and irrelevancies. The average Content Validity Index (CVI) was calculated after the pilot study to ensure adequate content representation.

\[
CVI = \frac{\text{Number of items declared valid}}{\text{Total number of items}}
\]

\[
CVI = \frac{26}{37} = 0.7027027 = 0.7
\]

The CVI was 0.7 thus the instrument was accepted as valid (Amin, 2005).

3.8.2 Reliability

The interview was checked for accuracy and completeness using a test-retest method. The different items that needed adjustment were addressed as necessary before retesting. Some items were modified by rewording to improve clarity while others were reorganized to improve the flow and sequence. Other items were discarded.
3.9 Data Collection Techniques

Data was collected through direct measurement and assessment of the selected physical fitness components, health records and interviews administered to the elderly and the caregivers before and after administering the PAP. The personal files of the elderly were provided by the administrator of the home and the nurse. Self reporting by the elderly on how they perceived their health status and the activities they were able to do was also considered. Information from self reports and observations of the routine physical activities, attitudes towards the PAP, meal patterns, sleep patterns, and health status during the PAP and after were recorded every two weeks to monitor progress, however, the halftime and 8th-week records were considered for analysis to determine any changes in the variables during the 8 weeks the PAP was going on. The first two weeks of the programme were ideal for the subjects to get familiar to the physical activities while the remaining six was long enough to determine the effect of the intervention on the variables under study.

The interview for the caregivers was used to seek information relating to the routine physical activities each elderly was involved in and the attitudes of the elderly towards those physical activities, the usual food intakes and meal patterns, sleep patterns and the health status of the elderly they were taking care of in the home. Additional information was sought through document analysis. The documents that the researcher used were mainly the personal files for the elderly, which included their profile and health records. The files showed details of the elderly right from the time of entry to the home up to when the elderly would cease to be part of that home. The researcher and assistant carried out all the interviews, tests, exercise sessions, the measurements and recordings the entire period of 8 weeks and before the
intervention. The research assistant was a trained physiotherapist in addition to being trained for this study during the pilot study.

Specifically, the following procedures were adopted by the researcher:

1. Assessed the blood pressure, the lower body strength, the gait, the static and dynamic balance.

2. Recorded the routine physical activities involved in by the elderly and attitudes of the elderly toward the physical activities; the food intakes and meal patterns and sleep patterns before during and after the PAP that lasted 8 weeks.

3. Checked health records and caregivers' reports on the participants' general health before and after the PAP.

4. Put the participants on PAP.

5. Monitored the physical activity patterns, sleep patterns, the food intakes and meal patterns and health status closely and regularly for the entire time of 8 weeks the elderly spent on PAP.

6. Recorded self-reports of individual subjects on how they felt and the improvements they were making or had made, for example on mobility levels, sleep patterns, meal patterns and health status.

7. Observed behavioural changes towards the PAP comparing the pre and post data.

The blood pressure and heart rate readings were taken in the morning using a calibrated sphygmomanometer. The participants were lying down for at least 10 minutes on their beds before the first measurement was taken. The measurement was done twice with a difference of 1 minute before the second reading could be taken.
The lower systolic reading with its corresponding diastolic measurement was included in the analysis (Kolbe et al., 2004).

The cardiovascular endurance test required the participants to walk for six minutes. The distance covered with in that period was taken. Stop watches were used for timing and tape measures to measure the distance covered. The participants used a path around the compound and the veranda to which the paths connect that had been marked before the commencement of the activity. This same path was used for the gait quality test (20 metre walk) and the dynamic balance test (10 metre walk).

The gait quality test required participants to walk a distance of 20 metres and the time taken to cover the distance was recorded. The lower body muscle strength was measured by the number of sit-to-stand repetitions a participant made in 30 seconds. The dynamic balance test required participants to walk a distance of 10 metres; walking heel to toe and the time taken was recorded. The static balance test required participants to stand comfortably with feet shoulder width apart and also in a narrow stance when feet are together for as long as they could for a maximum of 30 seconds for each stance (Kolbe et al., 2004).

The paraplegic cases and the seriously crippled could not undertake these tests. That is why they were excluded from the study. The participants who were confined to wheel chairs were unable to roll the wheel chairs themselves. Those with uncontrolled blood pressure would be at a great health risk since they were not on medication. So all these, were excluded from the study.
3.10 **Data Analysis**

Data was analyzed using both the Statistical Package for Social Sciences (SPSS-15.0) and STATA 9. Descriptive statistics covering the mean, median, and standard deviation were used to determine the occurrences. Furthermore, in order to determine differences between independent groups the *Kruskal-Wallis analysis of ranks*, a non-parametric test equivalent of the analysis of variance (ANOVA) and the median was employed to determine changes between multiple groups of baseline, halftime and fulltime). Kruskal Wallis Test was used because the data was not normally distributed and the sample size was small. Additionally, the *Fisher's Exact Test* was employed instead of the chi-square because the frequency value of some cells was less than five. The Confidence level was $p=0.05$ (Thomas & Nelson, 2001; Thomas, Nelson & Silverman, 2005; Kuzma & Bohnenblust, 2004; Hinton, 2004). Data collected was summarized and presented in frequency tables and graphs.

3.11 **Logistical and Ethical Considerations**

The study proposal was presented to a post-graduates’ Committee at the Department of Exercise, Recreation and Sports Science that passed it. The researcher sought permission from the Administrator of the home (Appendix I) to allow the elderly to be used as subjects in this study. The participants were also requested individually to be part of the study after the details of the study were explained to them. The elderly who were within the criteria bracket, made a verbal consent since most of them could neither read nor write. The caregivers were similarly requested to consent and the request was granted through the administrator of the home who assigned the researcher the caregivers to work with. All data collected was used for study purposes and confidentiality was observed.
CHAPTER FOUR
FINDINGS AND DISCUSSION

4.1 Introduction

Findings of the study are presented in this chapter under the following headings: subjects of the study, the socio-demographic characteristics, physical activity patterns, physical and health fitness, general health, nutritional patterns and sleep patterns of the elderly at baseline, halftime and end of a physical activity intervention programme of eight (8) weeks.

The study was conducted to determine the effect of an eight-week regular Physical Activity Programme (PAP) on the functional independence, the physical activity patterns, the nutritional patterns, the sleep patterns, and the general health of the elderly. The study was guided by the following hypotheses:

H₀₁ There would be no significant difference in the physical and health fitness levels of the selected components: (lower body muscle strength, gait quality, static balance, dynamic balance, cardiovascular endurance) of the elderly at Bakateyamba Home in Kampala by the end of an eight-week PAP.

H₀₂ There would be no significant difference in the physical activity patterns of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.

H₀₃ There would be no significant difference in the sleep patterns of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.

H₀₄ There would be no significant difference in the health status of the elderly at the Bakateyamba Home in Kampala by the end of an eight-week PAP.
4.2 Subjects of the Study

There were twenty-five (25) male and fifteen (15) female elderly that this home was taking care of at the beginning of the study. Of the twenty-five (25) male, five (5) were less than 60 years of age while eight (8) had conditions such as paraplegic cases, seriously crippled and those with blood pressure higher than 160/95 and not on medication, that could not allow them to be part of the study. This reduced the number to twelve (12) males to be part of the study. Although the study started with twelve (12) males, two (2) were not able to complete the study successfully due to illness. Of these two, one (1) attended only once and fell ill while the other was off and on with different bouts of illnesses. Although these two returned and joined the group, the researcher did not consider them as part of the study despite the fact that they reported positive changes in some of the conditions they had presented when the baseline data was being recorded. Similarly, of the fifteen (15) females found at the home, two (2) were not yet 60 years of age although they attended the program; three (3) had conditions that could not allow them to be part of the study similar to those of the men mentioned above. This brought down the number of women to ten (10) although still two (2) of these did not complete the programme due to sickness, and one (1) left the home during the course of the programme. Thus, out of the twenty-two 22 eligible elderly at Bakateyamba Home, only seventeen (17) elderly (77.3%) successfully completed the study with seven (7) females (31.8%) and ten (10) males (45.5%). Table 4.1 below shows a summary of the elderly persons who took part in the study.
Table 4.1: Summary of Nature of Elderly at Home and Those Who Took Part in the Study

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total No. in Home</th>
<th>&lt; 60 Years</th>
<th>Uncontrolled BP / require specialized attention</th>
<th>Eligible for PAP</th>
<th>Did not successfully complete the PAP</th>
<th>Completed the PAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>25</td>
<td>5</td>
<td>8</td>
<td>12 (54.5%)</td>
<td>02 (9.1%)</td>
<td>10 (45.5%)</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>2</td>
<td>3</td>
<td>10 (45.5%)</td>
<td>03 (13.6%)</td>
<td>07 (31.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>7</td>
<td>11</td>
<td>22 (100%)</td>
<td>05 (22.7%)</td>
<td>17 (77.3%)</td>
</tr>
</tbody>
</table>

In response to whether the elderly carried out routine activities with ease, 7 (41.2%) indicated ‘yes’, 9 (52.9%) indicated ‘no’ while 1 (5.9%) showed that sometimes it was with ease and other times when her blood pressure rose high, it was not. Out of the 9 elderly who were not at ease while carrying out these activities 8 (88.9%) attributed this to chronic pain especially pain in the back, but also in the muscles of the leg and arms. The remaining 1 elderly (11.1%) found it hard because he was totally blind. From the responses to one of the interview questions about the fears the elderly had, it was noted that many of them 8 (47.1%) had the fear of falling. Half of this number of those that feared falling, 4 (23.5%) feared because they had either been victims before or had a colleague that had fallen before. The other remaining half, the fear for falling was due to the fact that they either had a hearing and/or a sight problem or a serious back problem. The researcher continuously encouraged them and provided necessary support for them to start moving around the home. Eventually, they gained confidence and they sought each other’s support whenever they wanted to come out because they had discovered that most times it was warmer outside. They also liked the fresh air and the light outside.
The situation in this home showed there was a high risk of developing not only chronic diseases and disabilities as one advances in age as noted by Baechle & Earle (2000), but also other diseases due to poor eating habits as reported later in this chapter. This observation appears to be in line with the observations obtained during the discussion with the administrator of the Bakateyamba home in 2007. The administrator expressed that the elderly in this home were weak and most of the time they were seated or lying down. Many complained of backache, muscle pains and others confined themselves to wheel chairs for fear that they would fall.

Many of the elderly were not actively involved in the day to day chores of the home. They shunned work and mostly kept in bed complaining that they were unable to do anything. Furthermore they constantly sought sympathy and attention and complained of being sick. The elderly seemed to have taken the caregivers for granted and assumed a lot more than was actually possible. For example failing to wash one’s plate after food and yet one is able to take the plate to the serving room and pick the food after it is served. Some elderly wanted this done for them. This kind of life style is risky as no sign of interest in being active is demonstrated. Although house chores alone do not equate to desired amounts of physical activity, they demonstrate one’s interest levels of being active. Such activities like brisk walking around the home, involvement in a number of household activities and gardening would help in addition to participation in an exercise programme. Moreover elderly who are active in the day to day chores are easier to sensitize and encourage to participating in an exercise programme than those that are totally dependent.
4.3 Socio-Demographic Characteristics of the Elderly

The elderly found in this home were from a low socio-economic status. They had attained little or no formal education and had either been housewives (11.8%), casual labourers 10 (58.8%) or peasants 5 (29.4%) in their localities as shown in their responses to an interview question about their previous jobs before they retired. All the 17 elderly indicated that the jobs they were doing before they became helpless, required them to move a lot. Out of 17 participants, 13 (76.4%) walked to their places of work, 2 (11.8%) were housewives and did not require transport, while 2 (11.8%) rode bicycles to their work places. This implies that to a greater extent majority of these elderly had some exercise of walking or riding on most of the days of the week. This study however did not establish the distances involved that the elderly had to walk or ride. The other socio-demographic characteristics of the elderly, presented in Table 4.2 below, comprised age, sex, marital status and highest education level.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-74</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>75-90</td>
<td>13</td>
<td>76.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>58.8</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>41.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>8</td>
<td>47.1</td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>11.8</td>
</tr>
<tr>
<td>Widowed</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>Separated</td>
<td>3</td>
<td>17.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>10</td>
<td>58.8</td>
</tr>
<tr>
<td>Primary</td>
<td>6</td>
<td>35.3</td>
</tr>
<tr>
<td>Post-primary</td>
<td>1</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>100%</td>
</tr>
</tbody>
</table>
Results summarized in Table 4.2 show that majority of the elderly (76.5%) at the home, were above 74 years (median age of elderly aged 60-90 was 76 years). There were no major differences in the proportion of males to females (58.8% male versus 41.2% females). A larger proportion 10 (58.8%) of those at the home had no formal education, while 6 (35.3%) had some primary education. This lack and low levels of education implies a limited access to high income employment due to lack of skills and limited competences. The limited income affects access to all other basic needs such as access to medical care and good nutrition. This lack of skills explains why many were casual labourers especially for the men and housewives for some of the women in their earlier active lives. Additionally, at retirement such elderly would not have a retirement benefit since the formal social security system covers a very small percentage, 7.1% (MoGLSD, 2009) and is mainly for public servants. Furthermore, Uganda has no such special grants and allowances or schemes for her older adults (Nankwanga & Phillips, 2009). This means, the older adults who had no or had low education may experience a higher level of poverty. They may not be able to work as casual labourers any more because of the waning physical capacity, leave alone being discriminated by the prospective employers as observed by Mugayehwenkyi (2004) and Nayiga (2002). Since old age is associated with increased risk of poverty, with reduced capacity to work arising from the process of ageing, this would reduce the older adults’ income generation regardless of their former economic status and increase their vulnerability to poverty and disease.

In the data collected from the elderly through the interview and from the records (files), before joining this home, many elderly 16 (94.1%) had either been abandoned by their relatives in their homes or hospitals and others were on the streets. This is
similar to Kinnon (2001) observations that the abuse towards older adults is usually by family members. Only 1 (5.9%) had been brought to the home because she was weak and could not work anymore. Majority 14 (82.4%) of the elderly had been brought to this home by priests from their parishes or by someone else after identifying them as helpless. A few (11.8%) had been brought by police while others by relatives (5.9%) after convincing the management that they had no one to stay with or help them in the situation in which they were. This indicates that they were helpless, weak, without income and with limited access to the basic requirements. They had become dependent, inactive and/or rejected. This kind of situation can easily lead to anxiety and depression. Wilmore and Costill (2004), show that inactivity leads to deterioration of one's physiological capacity and function. Additionally, as already pointed out by Abernethy et al. (2005), extreme loss of physical work capacity may also limit the ability of older persons to maintain an independent lifestyle resulting in institutionalized care.

Majority of the elderly indicated that they had ever been married before joining the home. These included 2 (11.8%) that were still married by the time they joined the home, 4 (23.5%) that were widowed and 3 (17.6%) that had been separated. The remaining 47.1% were single and had never been married. However, by the time they joined the home, a bigger proportion (88.2%) of the elderly were living a single life. This percentage, 88.2 is derived from the sum of those that were widowed (23.5%), separated (17.6%) from their spouses and those that had lived a single life all along (47.1%) as indicated in the table above. Furthermore, 10 (58.8%) elderly reported that they did not have children at all, 4 (23.5%) had children before, but they all died while 3 had children and they were still alive.
The findings also imply that most elderly were affected emotionally after losing their children and having no income, with no close person such as spouse or children to provide them the necessary support at the time of need. Furthermore, the traditional support service system where older persons lived with their extended family and community is slowly, but surely crumbling. These findings support the information provided in the Uganda National Policy for Older Persons which shows that older adults are neglected and excluded in the design and management of various interventions (MoGLSD, 2009). Although there were many elderly in this home whose backgrounds were of other nationalities: 5.9% Kenyan, 11.8% Sudanese, 11.8% Burundians and 23.5% Rwandese, they had stayed long enough in Uganda to be established.

This home was fully taking care of these people without any contribution from the government, their relatives or even from the elderly themselves. Support to this home was in form of handouts from few well wishers and volunteers whenever they could. This confirms the declaration in the draft policy of the elderly in Uganda that poverty was one of the biggest challenges in Uganda and older persons were affected most. The document further indicates that the elderly had low or no income at all and therefore their access to food, health and other related facilities was limited (MoGLSD, 2007). Additionally, the findings are in agreement with the observation by WHO (1998.1) that the elderly are often ignored. Thus, the challenge to society and government to promote active ageing, productivity and maintaining health throughout the lifespan of the elderly still remains. However, in the Uganda National Policy for the Older Persons (MoGLSD, 2009) and the Constitution of the Republic of Uganda (1995) it is stated that the government will promote ageing with dignity,
provide easy access to basic services and take affirmative action in favour of marginalized groups of which elderly are part.

4.4 Physical Activity Patterns among the Elderly at Bakateyamba Home.

It was important to find out how the elderly felt about certain things before introducing them. This enabled the researcher to find the most suitable way to introduce what they feared and yet believed to be of help to them, having established their concerns. Establishing rapport and building trust progressively proved to be a very essential tool because the elderly were sensitive. It was very difficult for one to work with them unless they trusted you. Listening and empathising was very helpful; but sympathising made them become more dependent and it was avoided. It was also necessary to identify the hindrances and interferences they were experiencing in order to come up with ideal support. For example some elderly were partially blind and others completely blind. This brought about the fear to fall because they were unable to see properly. Others had a hearing impairment. Initially support was provided and once they gained confidence in what they used to fear or dislike, then the support was gradually removed. Both emotional and physical motivation provided to the elderly was varied and spread over the entire period of the intervention.

This present study sought to discover the routine activities the elderly were involved in before the start of the intervention (baseline), during the time the intervention was on-going (half-time) and at the end of the intervention (fulltime). The question-item called for multiple responses where a respondent could mention more than one
physical activity the elderly were involved in. The results obtained are summarised in table 4.3 below:

Table 4.3: Routine Activities Involved in by Timing of Assessment

<table>
<thead>
<tr>
<th>Timing</th>
<th>Timing of Assessment N = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
</tr>
<tr>
<td>Washing clothes</td>
<td>17</td>
</tr>
<tr>
<td>Cleaning room</td>
<td>2</td>
</tr>
<tr>
<td>Cleaning compound</td>
<td>3</td>
</tr>
<tr>
<td>Peeling matooke/cassava</td>
<td>3</td>
</tr>
<tr>
<td>Sorting beans</td>
<td>6</td>
</tr>
<tr>
<td>Laying bed</td>
<td>3</td>
</tr>
<tr>
<td>Going to church</td>
<td>5</td>
</tr>
<tr>
<td>Going for medication</td>
<td>1</td>
</tr>
<tr>
<td>Exercising</td>
<td>0</td>
</tr>
<tr>
<td>Arranging chairs</td>
<td>0</td>
</tr>
<tr>
<td>Moving around</td>
<td>0</td>
</tr>
</tbody>
</table>

From the table, the routine activities engaged in by the elderly varied. All 17 (100%) elderly reported participating in washing their own clothes all through the different times of assessment. At the beginning of the intervention, 2 (11.8%) reported being involved in cleaning rooms. This number rose at half time to 5 (29.4%) and remained the same even at the end of the programme. 3 (17.6%) elderly reported being involved in the cleaning of the compound at the beginning (baseline), but this number dropped to 2 (11.8%) at halftime and remained the same at the end of the programme. Peeling of matooke / cassava was reported only once at the beginning of the intervention and only 3 (17.6%) were involved in it. This supports the
information given later in this chapter about the menu being constant and not varied. The second most participated in to washing own clothes was sorting beans (35.3%; 70.6% & 70.6%) at baseline halftime and end of intervention respectively. The other activities participated included going to church, going for medication, and laying their beds. Activities like exercising, arranging chairs and moving around were exclusively involved in after the intervention had started at half time and full time. This was at the elderly own volition. Otherwise before then, none of the elderly were involved in any of those three activities. Moving around in particular rose to 35% at the end of the intervention. This implies some of the elderly had started appreciating the benefits of active involvement in variety of physical activities and they tried to participate where they could.

The results indicate better involvement and improvement in the physical activities the elderly participated in. In a related study, Manini et al. (2007) measured how much energy was used up each day as opposed to type of physical activity people engaged in. The findings show that if elderly people could expend 600 calories daily, equivalent to about 2 hours of physical activity; this would be adequate to provide protective cover for longer life. This does not explain the intensities involved.

The current study was limited to only establishing the routine activities without relating these activities to energy expenditures. The total related energy expenditure was not calculated. This limitation was due to the fact that it required the co-operation and commitment of the elderly persons and the caregivers to giving the specific amounts of time spent on most of the activities that the elderly indulged in at the time when the researcher and assistants were not present at the home. The related total
energy expenditure could be determined by assigning each activity a MET value multiplied by the time spent on that activity to find the kcal/week (Dipietro, Caspersen, Ostfield and Nadel, 1993). This would then be divided by 1000 to determine the mega joules per week. Thus, it was not possible to know the accurate time spent on each activity by each elderly person especially activities related to house work and recreation. Similarly, Thompson, Batterham, Bock, Robson and Stokes (2006) observed that the reliability and validity of all self-report methods is limited by issues such as subject compliance, misreporting, miscoding of activities, inaccurate estimation of activity intensity or duration, and the environment. Furthermore, Neilson, Robson, Friedenreich, and Csizmadi (2008) indicate that conversion of self-reported activity into energy expenditure continue to be problematic especially in addressing issues of validity. Accurate measurement of habitual physical activity is fundamental to both the epidemiological study of relations between physical activity and health and the recommendation of an appropriate pattern of physical activity to maintain good health (Shepherd, 2003). The researcher did not want to use inaccurate estimations. Hence, hypothesis number one as stated could not be determined.

4.5 Physical and Health Fitness

Both the physical and health fitness components of the elderly were assessed at baseline, halftime and full time. The physical fitness components assessed included lower body muscle strength, static balance and dynamic balance. Gait quality as a factor that affects balance was also assessed. On the other hand, the health fitness aspects measured included the blood pressure and the heart rate. The cardiovascular endurance was assessed using a 6-minute walk. Table 4.4 presents descriptive
Table 4.4: Descriptive Statistics on Physical and Health Fitness Aspects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean value (SE), (N=17)</th>
<th>KRUSKAL-WALLIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Systolic</td>
<td>133.4 (6.8)</td>
<td>132.1(6.3)</td>
</tr>
<tr>
<td>Diastolic</td>
<td>78.7(3.4)</td>
<td>67.7(3.7)</td>
</tr>
<tr>
<td>Heart rate</td>
<td>79.4 (6.7)</td>
<td>63.1(3.6)</td>
</tr>
<tr>
<td>Gait</td>
<td>72.3(10.6)</td>
<td>49.8(7.6)</td>
</tr>
<tr>
<td>Sit-to-stand</td>
<td>3.2 (0.4)</td>
<td>5.2(0.4)</td>
</tr>
<tr>
<td>Cardio endurance</td>
<td>160.6 (19.4)</td>
<td>221.6(24.1)</td>
</tr>
<tr>
<td>D. balance</td>
<td>26.9 (5.6)</td>
<td>26.7(5.7)</td>
</tr>
<tr>
<td>S. balance</td>
<td>26.9 (1.2)</td>
<td>29.4(0.6)</td>
</tr>
</tbody>
</table>

4.5.1 The Physical Fitness Components

The physical fitness aspects assessed included the gait functional capacity, the lower body strength, the dynamic balance and the static balance. The gait quality was assessed using a 20 metre walk test. The time taken to cover the distance was recorded in seconds. The stride length and frequency was noted. In table 4.4 summary statistics of the time taken to cover a 20 metre walk for baseline, half time and full time levels are shown. The mean levels reduced significantly from 72.3 (95%CI 61.7 – 82.9) seconds during baseline to 45.2 (95%CI 35.9 – 54.5) seconds at full time; (p=0.013) as reflected in Table 4.4. The average gait speed among the older adults is influenced by stride frequency which increases while stride length decreases. Gait is a key factor in influencing falls especially in older adults (Barak et al., 2006). The findings are similar to those in another study by Rubenstein et al. (2000); the 12-week intervention caused significant improvement in the gait quality of the exercising
group (F=6.6, p=0.02). Falls increase injury risks and their consequences are very costly particularly among older adults. Falls may result in disability and even death. The intervention caused significant improvement in the gait quality (p=0.013). Thus the elderly should be encouraged to be involved in regular exercising as this may help in reducing incidents of falls, which are usually common among the older adults due to decreased strength (Chan et al., 2007 & Rubenstein et al., 2000).

The lower body muscle strength was assessed by the number of sit-to-stand repetitions an elderly person was able to make in 30 seconds from a chair without support from the arms. From the test, a significant increase existed between the lower body strength mean levels of the baseline and full time from 3.2 (95%CI 2.8 – 3.6) to 5.6 (95%CI 5 – 6.2) sit-to-stand repetitions performed in 30 seconds at full time; (p=0.001). The findings are similar to Kolbe et al. (2004) who showed significant group by time improvement for the ANCOVA analysis; (p=0.003). Contrary to Rubenstein et al. (2000), in a 12-week intervention there was no significant improvement in the sit-to-stand performance; (p=0.07). Kolbe et al. (2004) indicate that lower body strength may impact positively on balance and functional capacity. This in turn reduces incidences of falls and increases functional independence. In the following studies exercise programs were found beneficial in improving strength and endurance in older adults Seynnes et al. (2004) in both high and low-moderate intensity programs and Fiatarone et al. (1990). The physical fitness components tested in this study were four (4) namely: gait, lower body strength, tandem balance and static balance, only two (2) aspects were significantly influenced by the PAP. The aspects that showed significant differences when tested at baseline, halftime and full time were gait and lower body strength. Thus, hypothesis number 2 “There would be
no significant difference in the physical fitness components of the elderly in Kampala by the end of an eight-week PAP", was rejected for the gait and lower body strength components.

The dynamic balance was assessed using a 10 metre walk. The time taken by the elderly to cover the 10 metre distance using the tandem gait walk of heel to toe was recorded in seconds. The results indicated that there was a reduction in the mean levels of the time taken to cover a 10m walk at baseline compared to full time. Despite the reduction in the mean levels from 26.9 (95%CI 21.3 – 32.5) seconds at baseline to 23.1 (95%CI 18 - 28.2) seconds at full time, results as shown in Table 4.4 indicated no significant difference when tested using Kruskal-Wallis, a non-parametric test; (p>0.05). In studies by Kolbe et al. (2004) and also Nelson et al. (2004) there was significant improvement in the dynamic balance of the exercising groups of older adults where (p=0.013) and (p=0.0002) respectively.

The static balance was assessed by making the elderly stand balanced for as long as possible for a maximum of 30 seconds. The feet together stance and the feet shoulder width-apart stance were both used. The results obtained indicated that there were no significant changes in the static balance mean levels between baseline 26.9 (95%CI 25.7 – 28.1) seconds and full time 29.3 (95%CI 28.8 – 29.8) seconds; (p> 0.05). This could be due to the fact that the elderly were already functionally independent in this aspect of static balance at baseline. Many of them could stand balanced for the maximum period of 30 seconds using either stance. These findings are very similar to those of Kolbe et al. (2004). In their findings, the 20 week intervention did not cause significant impact on static balance of the elderly. Furthermore, the subjects in their
study were found functionally independent on the aspect of static balance right from baseline. Their study involved three different groups of elderly from three different disadvantaged communities. This is an interesting phenomenon worth further investigation to determine whether static balance has any relationship with race or otherwise. Static balance just like gait and dynamic balance influence functional independence and are all associated with fall risks (Rubenstein et al., 2000).

Although there were changes in the mean levels of the tandem and static balance between the baseline and full time records, these differences were not significant. The 8-week PAP did not cause significant differences in the aspects of tandem and static balance. Thus, hypothesis number 2, “There would be no significant differences in the physical fitness components in the elderly in Kampala by the end of an 8-week PAP”, was accepted for the components of tandem and static balance.

The Physical Activity Programme (PAP) was effective in improving gait quality and the lower body strength. This implies that eight (8) weeks of a low intensity physical activity intervention are adequate to cause significant improvement in the lower body strength and gait of elderly people that are sedentary. Improvement in gait may help in reduction of falls among the elderly since most of the falls are related to poor balance and quality of gait. Pate et al. (1995) reiterate that regular physical activity also may contribute to better balance, coordination, and agility, which in turn may help prevent falls in the elderly. In the same vein, Chan et al. (2007) indicate that poor physical performance, such as leg extension strength, walking speed, lower extremity performance, and balance, increase the likelihood of falling. In addition, low physical activity has been identified as a risk factor for falling among older adults, and exercise
interventions show that exercise is beneficial, potentially because physical activity helps to maintain mobility, physical functioning, muscle strength, and balance, all of which may be protective against falls.

4.5.2 The Health Fitness Components

The cardiovascular endurance component was assessed using a 6-minute walk test and the distance covered in that time was recorded in seconds. Additionally the blood pressure and the heart rate measurements were taken using a calibrated sphygmomanometer and the records are reflected in table 4.4. The blood pressure and heart rate are possible indicators of one’s health condition, which influence one’s ability to participate in physical activities and exercise programmes. The blood pressure and heart rate were taken early morning when the elderly were lying down on their beds doing nothing. Two readings were taken at intervals of one (1) minute apart and the lower reading was used in these results. The results of the blood pressure were split into the upper (systolic) and lower (diastolic) levels. The systolic pressure being the pressure that is generated in the arteries when the heart contracts while the diastolic is the pressure in the arteries when the heart is relaxed.

The results in table 4.4, indicate a significant decrease in the diastolic mean levels between the baseline measurements 78.7 mm Hg (95%CI 75.3 – 82.1 mm Hg) and full time measurements 70.3 mm Hg (95%CI 68.6 – 72 mm Hg); (p=0.016). Both the baseline, halftime and full time measurements were within the normal levels (60-80mm Hg). Similarly, there was a significant decrease in the heart rate levels from 79.4 beats (95%CI 72.7- 86.1) at baseline to 65.6 beats (95%CI 62.1- 69.1 beats) at
full time; \( p = 0.010 \). This implies that a low-intensity regular exercise programme can effectively improve the diastolic pressure.

Despite a reduction in the systolic mean levels between baseline 133.4 mm Hg (95%CI 126.6- 140.2 mm Hg) and full time 116.1 mm Hg (95%CI 112.7- 119.5 mm Hg), results in table 4.4 indicate no significant difference; \( p > 0.05 \). The baseline and halftime results were within the pre-hypertension zone (120-139 mm Hg) while the full time results fell within the normal blood pressure (110-120 mm Hg). The results indicate a significant relationship in both the lower (diastolic) levels and the heart rate and the intervention. However, the changes in the upper (systolic) levels were not significant. In contrast to Kolbe et al. (2004), their findings showed significant reduction in the systolic blood pressure as a result of the 20-week exercise programme, but showed no significant differences in the diastolic blood pressure. Motoyoma et al. (1998), registered significant improvement in both the systolic and diastolic resting blood pressures \( p=0.01; \ p<0.05 \) respectively of the exercisers after the 9 months physical training.

High blood pressure was one of the predominant complaints and chronic diseases reported among the elderly (Figure 2). Furthermore, the results indicate significantly reduced attacks of the chronic diseases including high blood pressure, at full time compared to baseline as shown in table 4.6. Although there were no significant changes in the systolic levels, there is evidence that the intervention caused significant impact in reducing the chronic illness attacks such as high blood pressure. Blood pressure is believed to be greatly influenced by smoking, alcohol abuse, stress and anxiety, high salted foods, saturated fat and lack of exercise (Remig, 2002). In this
case, most of the elderly lacked exercise and could perhaps be experiencing stress and anxiety. For instance, by the time they joined the home, many of the elderly had been abandoned, they had no income, they lost their children, and they entirely depended on this home. In order to promote healthy and active ageing, it is important to control high blood pressure. Blood pressure could be controlled by exercising regularly, reducing stress, reducing weight, consuming low salt and low protein foods, having sufficient rest, stopping smoking, controlling alcohol intake and eating variety of fruits and minerals (Dietary Guidelines for American, 2005, Remig, 2002).

There was an increase in the distance covered in during a 6-minute walk, a measure used to assess cardiovascular endurance, between the baseline measurements 160.6 metres (95%CI 141.2 – 180.0) and the fulltime 220.1 metres (95%CI 196.5 -243.7). Although the distance covered by the elderly in 6 minutes improved from baseline compared to fulltime, the increase was not found significant when tested using Kruskal-Wallis (p>0.05). These findings are similar to those of Kolbe et al. (2004) and Nelson et al. (2004) where cardiovascular endurance was not significantly affected by exercise. However, Rubenstein et al. (2000) registered significant changes in the cardiovascular endurance in their 12-week study; (F=6.6, p=0.01).

Thus, hypothesis number 3 “There would be no significant difference in the health fitness components of the elderly in Kampala by the end of an eight-week PAP”, was accepted for the cardio endurance component and systolic pressure aspect. However, for the heart rate and diastolic pressure levels, the changes were significant. Thus the hypothesis was rejected for the diastolic blood pressure.
Table 4.5 below presents prevalence of chronic illnesses by demographics of elderly. The percentage of the elderly reported to be suffering from chronic illnesses was 82.4%. Furthermore, there is no significant evidence of association between the prevalence of chronic illnesses by the demographics (p > 0.05). However, despite a non-significant result by sex, chronic illnesses appeared to be more predominant among the males 10 (100%) compared to 4 (57.1%) females had some chronic illness.

Table 4.5: Distribution of Health Problems by Background Characteristics

<table>
<thead>
<tr>
<th>Background characteristics</th>
<th>N</th>
<th>Chronic illnesses %</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>%</td>
<td>Yes</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>0</td>
<td>0.00</td>
<td>10</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>3</td>
<td>42.9</td>
<td>4</td>
</tr>
<tr>
<td>Fisher's exact Sig. = 0.051</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>60-74</td>
<td>4</td>
<td>1</td>
<td>25.0</td>
<td>3</td>
</tr>
<tr>
<td>75-90</td>
<td>13</td>
<td>2</td>
<td>15.4</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>3</td>
<td>17.6</td>
<td>14</td>
</tr>
<tr>
<td>Fisher's exact Sig. = 1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2 shows the illnesses and conditions that elderly were experiencing at the time of the study.
Figure 2: Percentage Distribution of Chronic Illnesses among Elderly

The findings in figure 2 indicate chronic pain due to musculoskeletal disorders as the most prevalent chronic ailment (44%) followed by high blood pressure (16.0%) and effects of stroke (12.0%). Other conditions included sight problems (12%), effects of physical trauma (8%), respiratory diseases (recorded as cough) (4%) and hearing problems (4%). The musculoskeletal disorders included rheumatoid, arthritis, osteoporosis and back pain. It was noted that those that experienced sight problems and effects of stroke such as frequent body spasms, had suffered stroke as a result of high blood pressure although many were on medication. Furthermore, the elderly who were experiencing effects of trauma were always very emotional too. Anxiety is known to be one of the causes of high blood pressure as pointed out earlier. Nearly all the identified chronic illnesses could be reduced through exercising and involvement in adequate physical activity of 30 minutes of exercising at low to moderate intensity 5 days per week (Lawrence & Hope, 2007; ACSM, 2005).
The frequency of chronic illness attacks by timing of intervention in percentage is indicated in table 4.6 below. The elderly were experiencing attacks of chronic ailments including high blood pressure and chronic pain. The attacks would make it difficult for the elderly to go about their routine activities well. They would feel sick, weak and uncomfortable and sometimes they would lose appetite too. This would imply they had to see a doctor.

Table 4.6: Frequency of Chronic Disease Attacks by Timing of Intervention

<table>
<thead>
<tr>
<th>Frequency of attacks</th>
<th>Timing</th>
<th>N</th>
<th>Baseline</th>
<th>%</th>
<th>Halftime</th>
<th>%</th>
<th>Fulltime</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td>17</td>
<td></td>
<td>1</td>
<td>5.9</td>
<td>1</td>
<td>7</td>
<td>41.2</td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
<td>17</td>
<td></td>
<td>3</td>
<td>11.8</td>
<td>9</td>
<td>52.9</td>
<td>29.3</td>
</tr>
<tr>
<td>Frequently</td>
<td></td>
<td>17</td>
<td></td>
<td>7</td>
<td>47.1</td>
<td>4</td>
<td>23.5</td>
<td>17.7</td>
</tr>
<tr>
<td>Always</td>
<td></td>
<td>17</td>
<td></td>
<td>6</td>
<td>35.2</td>
<td>3</td>
<td>17.7</td>
<td>11.8</td>
</tr>
</tbody>
</table>

Fisher's exact Sig. = 0.012

In table 4.6 above, the findings indicate that before the intervention started (baseline), 35.2% elderly at the home were always experiencing attacks while 47.1% experienced frequent attacks, 11.8% rarely experienced attacks and only 5.9 were not experiencing any attacks. At half time and full time the numbers of those that experienced attacks always and frequently changed. The number of the elderly who always experienced attacks dropped from 35.2% at baseline to 17.7% at halftime and 11.8% at fulltime. The number of the elderly that suffered frequent attacks reduced from 47.1% at baseline to 23.5% at halftime and 17.7% at fulltime. The numbers of elderly who rarely experienced attacks rose from 11.8% at baseline to 52.9% at halftime and those who experienced no attacks the numbers rose from 5.9% at baseline to 41.2% at
fulltime. Results show evidence of relationship between the occurrences of attacks by timing; (\(p=0.012\)). More frequent attacks were predominant during baseline (47.1%) compared to halftime (23.5%) and fulltime (17.7%). On the other hand, absence of attacks was highest during fulltime (41.2%) compared to baseline (5.9%) and halftime (5.9%). In other words, more frequent attacks were less likely at fulltime compared to halftime and baseline. This implies that the regular involvement in physical activities contributed to improvement in the health and wellbeing of the elderly. Many scholars in this area (Wilmore & Costill, 2004; Astrand et al., 2003; Riebe et al., 2002; Cerny & Burton, 2000) show that exercising has great potential of preventing and reducing the risk of chronic diseases and improving and maintaining function (Lawrence & Hope, 2007; Bird et al., 2002 Burbank & Riebe, 2002) in older adults with chronic conditions.

Table 4.7 below shows how the elderly rated their health status at different times of assessment. The health status varied significantly by timing (\(p<0.0001\)).

<table>
<thead>
<tr>
<th>Timing of assessment</th>
<th>N</th>
<th>Poor (F)</th>
<th>%</th>
<th>Good (F)</th>
<th>%</th>
<th>Improved (F)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>17</td>
<td>13</td>
<td>76.5</td>
<td>4</td>
<td>23.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Halftime</td>
<td>17</td>
<td>2</td>
<td>11.8</td>
<td>0</td>
<td>0.00</td>
<td>15</td>
<td>88.2</td>
</tr>
<tr>
<td>Fulltime</td>
<td>17</td>
<td>2</td>
<td>11.7</td>
<td>0</td>
<td>0.00</td>
<td>15</td>
<td>88.3</td>
</tr>
</tbody>
</table>

Fisher's exact Sig. = 0.000

Improved health was rated highest during fulltime (88.3%) and halftime (88.2%), while poor health was realized more during baseline (76.5%). This implies the intervention made significant impact towards the perceived improvement of the
general health conditions of the elderly. The results indicate a significant difference in the general health of the elderly in Kampala by the end of an eight-week PAP. The findings were based on the self-perceived health status by the elderly and not clinically tested. Hypothesis number 4 “There would be no significant difference in the health status of the elderly in Kampala by the end of an eight-week PAP” was rejected. The findings by Kolbe et al. (2004) show there were no significant differences in the self-rated health status and health concerns between the two groups at baseline and after 20 weeks.

4.6 Nutritional Patterns of the Elderly at Bakateyamba Home

This home had a standard menu and time for the meals. Breakfast and lunch were provided to the elderly in the home. Breakfast was served by 8.30 am while lunch was served by 12.30p.m. The home mainly served tea and some bread for breakfast and ugali (food made out of maize flour) and beans for lunch. Sometimes the home provided some other menu whenever they could. In their study, Kikafunda & Lukwago (2004) concluded that there was prevalence of under nutrition among the older adults in Mpigi District in Uganda. At Bakateyamba home, there was no dinner served to the elderly. It was reported that the home used to provide dinner before, but the caregivers would find most of it dumped in the bin. So they stopped providing it because the elderly were deemed wasteful yet food was so costly.

According to the Ministry of Health Report on Nutrition Status (2004), most older adults had only 1 meal daily and where there was more than one, preparation was done once a day because of lack of fuel such as firewood. Mugayehwenkyi (2004) also showed that in many parts of Uganda, the older adults were having only one
meal a day and others had one meal in two days. This he attributed it to poverty. Similarly, the Bakateyamba home was not finding it easy to provide supper. This home was a charity organization that relied more on donations and handouts. Furthermore the home did not have adequate space around where gardening could be carried out to obtain some of the foods required, for example vegetables. However, some of the elderly thought this was unfair to them while others took it in good faith. Of the 17 elderly on the PAP, 3 (17.6%) showed that they would have loved dinner or supper to be provided. Although some of the elderly felt they were being poorly fed, the home tried hard to meet the needs of the elderly who registered special diet problems on joining the home. For example those who had no teeth and could not eat hard foods 3 (17.6%), those who did not eat fried foods 5 (29.4%) and those who did not eat salt 3 (17.6%).

All meals were served from one common room. The elderly were required to take their containers for tea or food early enough before serving time. They would then sit and wait to be served and later move to their rooms with their food or tea. Some of the elderly would eat the food immediately while others would keep it for sometime and by the time they would eat it was already cold. Further still, others kept it for dinner or even longer, till the following day in the morning. This practice could easily lead to consuming contaminated food that could lead to sickness. In the Dietary Guidelines for Americans (2005), the Americans are guided on the primary sources of the required nutrients, how to prepare the food, what to avoid and how to store both raw and cooked food in order to achieve quality life. The government of the United States of America demonstrates that the quality of a nation is determined by the quality of life of its people. So the government takes responsibility to ensure that
her citizens' needs, particularly quality of life are satisfied. This remains a challenge to developing nations such as Uganda as no guidelines are available leave alone poverty that impedes access to the required food nutrients.

*Ugali* is a carbohydrate while beans are proteins and contain other nutrients. Although a combination of the two is nutritious, it is inadequate to cover all the nutrients and certainly the other food groups are left out such as fat, fruits and greens which contain most of the vitamins and minerals required in healthy eating. Since the same menu was provided nearly everyday, there was no hope of compensating for the nutrients that were absent in the staple food. Furthermore, although there was a standard time of providing the meals, the elderly consumed it at varying times. There was no enforcement on the elderly persons to eat the food at the time it was provided.

The findings are still in line with the Ministry of Health Report on Nutrition Status and Living Conditions of the Older People (2004), which show that commonly consumed food, was the bulky starch from the indigenous staple foods. The inadequate food consumption was mainly attributed to poverty that compounds access to nutrition. Furthermore, this report indicates that the several studies conducted in Uganda on nutrition policies, standards and practices did not include the older persons’ category. The concern was always on pregnant and lactating mothers and children. This implies that there were no clear guidelines yet by relevant authorities in Uganda on the dietary requirements for the older adults.
4.6.1 Nutritional Problems

The major problem noted was insufficient dietary intakes taking into consideration that the foods regularly consumed were limited to just a few food groups. The foods available at the home were short of a variety of rich-nutrient foods. Although the home served the meals at the appropriate times; the elderly decided when they would eat this food. Poor timing, poor preparation and poor choices of foods were some of the caution given on nutrition in order to promote healthy eating (Dietary Guidelines for America, 2005; Reese, 2007; Remig, 2002). Additionally Osler et al. (2001) show that frequent intake of whole-grain, fibre, fruits and vegetables was associated with low cardiovascular mortality risks.

The other problem mentioned by the elderly and influenced by physical activity and exercise was constipation. Table 4.8 presents results from cross-tabulation of prevalence of constipation problems among the elderly by timing of intervention.

<table>
<thead>
<tr>
<th>Timing of assessment</th>
<th>N</th>
<th>Constipation problem</th>
<th>%</th>
<th>Yes (F)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>17</td>
<td>No (F)</td>
<td>9</td>
<td>52.9</td>
<td>8</td>
</tr>
<tr>
<td>Halftime</td>
<td>17</td>
<td>13</td>
<td>76.5</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>Fulltime</td>
<td>17</td>
<td>16</td>
<td>94.1</td>
<td>1</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Fisher's exact Sig. = 0.025

The results in Table 4.8 above show that before the elderly were involved in the intervention that is at baseline, 8 (47.1%) were experiencing constipation while 9 (52.9%) were not. At halfway of the intervention, the numbers of those experiencing constipation had dropped to 4 (23.5%) and those who were not experiencing constipation had risen to 13 (76.5%). At the end of the intervention, only 1 (5.9%)
was still experiencing constipation while 16 (94.1%) were not. Thus there was
evidence of a significant association of inactivity and prevalence of constipation
problems among the elderly by timing of assessment; (p=0.025). Constipation
problems were more prevalent during baseline (47.1%) compared to halftime (23.5%)
and fulltime (5.9%). The elderly with constipation problem improved as they got
more involved in physical activities and exercises. Thus, there is a significant
relationship between physical activity and constipation. This implies sedentary
lifestyle increases chances of constipation because when one is participating in a
physical activity, there is improved removal of waste products from the cells and
tissues and the increased supply of oxygen from the lungs to the cells and tissues.
Constipation on the other hand may be caused by lack of fibre in one’s diet, or not
having plenty of fluids (Remig, 2002). Older adults have decreased thirst and may
therefore not take enough fluids and as a result may experience constipation.
Additionally, as people age, their bowels may become less active (Reese, 2007) and
lack of physical activity may exacerbate the condition. The fact that there was
significant improvement in the elderly that experienced constipation when they
participated in the PAP, the improvement for this particular study is therefore
associated with physical activity.

The researcher was interested in finding out if the elderly had ever been involved in
smoking and, or drinking alcohol at any one time in their lives. This is because
smoking and drinking alcohol influence health. From the responses obtained, there
were more men than women with a smoking and drinking history. Only a percentage
of all men (17.6%) indicated they still had the desire to smoke, but had no access to it.
4.7 Sleep Patterns of the Elderly

The elderly persons involved in the study acknowledged experiencing interrupted sleep. Of the 17 elderly on the PAP, 13 (76.5%) suffered varying sleep problems as shown in figure 2 below. Table 4.9 presents results from cross-tabulation of prevalence of sleep problems among the elderly by timing of intervention.

Table 4.9: Distribution of Sleep Problems by Timing of Assessment

<table>
<thead>
<tr>
<th>Timing of assessment</th>
<th>N</th>
<th>Sleep problems (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No (F) (%) Yes (F) (%)</td>
</tr>
<tr>
<td>Baseline</td>
<td>17</td>
<td>4 23.5 13 76.5</td>
</tr>
<tr>
<td>Halftime</td>
<td>17</td>
<td>11 64.7 6 35.3</td>
</tr>
<tr>
<td>Fulltime</td>
<td>17</td>
<td>13 76.5 4 23.5</td>
</tr>
</tbody>
</table>

Fisher's exact Sig. = 0.006

The results shown in Table 4.9 indicate that there were more elderly persons experiencing sleep problems at baseline 13 (76.5%), compared to those at halftime 6 (35.3%) and those at full time 4 (23.5%). This implies that the intervention caused reductions in the sleep problems that most of the elderly who participated in the study were experiencing before the intervention. In other words, sleep problems were more prevalent during baseline (76.5%) compared to halftime (35.3%) and fulltime (23.5%). This indicates evidence of association between prevalence of sleep problems and involvement in exercise and physical activity among the elderly by timing; (p=0.006).

Similarly, Figure 3 below shows predominance of sleep problems during baseline compared to halftime and fulltime. Sleep problems experienced included thoughts and worries during sleep time, short sleeping duration, inability to sleep again and pain
interruptions during sleep. These problems reduced significantly during halftime and fulltime. This clearly indicates that the PAP was effective in improving the sleep problems that most elderly were experiencing at the beginning of the intervention. The elderly who continued experiencing sleep problems by the end of the programme were less than 20% and they showed that these problems were less frequent. These had their sleep interrupted by pain. The other problems that were common by the start of the intervention were no more by halftime and the trend continued up to the end of the programme. The results indicate a significant difference in the sleep patterns of the elderly in Kampala by the end of an eight-week PAP. Based on these results, hypothesis 6 as stated “There would be no significant difference in the sleep patterns of the elderly in Kampala by the end of an eight-week PAP” was rejected. This implies that the elderly may experience improved sleep patterns if they involve in low to moderate physical activity on most of the days of the week for a minimum of 30 minutes as long as the sleep problems they experience are not medical related.

![Figure 3: Distribution of Sleep Problems by Timing of Assessment](image-url)
Apart from pain, other causes of sleep interruption included thoughts and having naps during day time. Those who slept during day time, would wake up in the middle of the night and would either not be able to sleep again, or take too long before sleeping again. As they kept busy with some work, it helped them to desist from sleeping during day. This worked out well for all of them who followed the advice. Furthermore, others were anxious worrying and thinking deeply about their situations and sometimes wildly so, which led to lack of smooth sleep patterns. It was noted that even interruption due to pain had greatly reduced from slightly above 60% at baseline to slightly below 20% at fulltime. These findings have some similarities with findings in other studies. For example, Habte-Gabr, et al. (1991) associated sleep problems among the elderly with treatable health conditions and modifiable behavioural characteristics. It is further shown that sleep patterns were also related to self-perceived health status, physical functional status life satisfaction, and social and recreational activity level.

Neubauer (1999) on the other hand, observed that the elderly tend to achieve less total night time sleep compared to young persons. He clearly ruled that this did not mean that elderly persons required less sleep; instead their sleep cycle tended to be more fragmented, with more night time arousals and awakenings and increased daytime sleepiness. Neubauer pointed out various stressors influencing the sleep-wake cycle such as excessive light, uncomfortable temperature in the bedroom, anxiety, noise; as well as poor sleep habits such as day time napping. According to Neubauer (1999) daily exercise and exposure to daylight can help reinforce the circadian cycle. He observed that the two had great potential for improving the quality of sleep in elderly persons. Exposure to bright light for 30 to 60 minutes in the evening may benefit
patients with early bedtimes who complain of early-morning awakening. The elderly that participated in the current study were exposed to a session of physical activity that lasted 45-50 minutes 3 days a week. They were in addition exposed to day light during an 8-week PAP.

4.8 General Remarks

After the third week most elderly had become fond of the activity program and did not want to miss the sessions. After their breakfast, they would try to organize seats and wait anxiously at the place where exercises were conducted. This was a result of continued persuasion, encouragement and patience otherwise there was some resistance in the first and second weeks. The elderly freely confessed beginning from the second week that they were feeling better than before the start of the PAP. Individually, the elderly pointed out how they felt as the researcher probed the general remarks to make them more specific. For example, one elderly said that she slept without any interruptions, another said the pain he felt on his left hand side had reduced and he could walk for at least an estimation of 200m without support. The elderly started demanding that sessions for physical exercises be held daily. They were encouraged to get involved in physical activities other than those offered them on the other days when the PAP sessions were not held.

The home had some limitations in accessing medical care or assistance; as a result there were continuous complaints of untreated sicknesses. This affected the smooth running of the intervention. Five (5) elderly persons did not attend the physical activity intervention regularly due to sickness. This reduced the numbers from 22 to 17 (77.3%) as pointed out earlier. Although some ailments, which could have been
sedentary related, had reduced, the other problems that needed medical attention impacted the lives of the elderly and reduced their activity and ability to be more independent. To a greater extent, the elderly were unable to obtain medical care whenever needed. Sometimes they would go for check ups, but would fail to go for follow ups. This would not be very helpful because many times they would not complete the medication or medical treatment. There were others who needed crutches and were using ill-fitting ones just for the sake of support.

The emphasis in this chapter has been on the findings and the similarities and differences they had compared with other related studies. The next chapter presents specific conclusions regarding the findings of the study as well as the specific recommendations in relation to the study objectives.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the summary, conclusion and recommendations based on the results. The study findings revealed information about the activity patterns, the sleep patterns, the nutritional patterns, the general health and the functional independence of the elderly in the Bakateyamba Home in Kampala.

5.2 Summary of Findings
As observed in chapter 1 and 2 of this study, the practice of confining the elderly to homes was still not common in Uganda by the time of the study. Thus, only one home was used in the study and the elderly that were eligible were few. However, this did not affect the number of tests carried out nor the quality of intervention. The study did not consider the older persons living with their family. This is because it was not easy to determine how many homes in a particular area had an older person living there. There is no existing system to record such information so that it can be retrieved when required. Even if this had been done, controlling the intervening variables would not be easy. Furthermore, getting the elderly from different homes in the same locality and having them attend the intervention together perhaps would not be possible. It would require a lot especially in terms of movement and transport costs involved in bringing all of them to a common meeting point, time management, administering of the different tests and management of the activities. Furthermore, it was not possible to calculate the kcal/week since the actual time spent on each activity could not be accurately determined. The key findings from the study are summarised as follows:
5.2.1 Most of the elderly persons at the Bakateyamba home were functionally independent in the component of static balance. However, they were experiencing some difficulties in some of the components leading to functional independence such as: the lower body muscles strength, the dynamic balance and gait.

5.2.2 Some elderly were experiencing high rest systolic and high rest diastolic blood pressure at the beginning of the PAP. This had implications on the scores recorded for the cardiovascular endurance test following the PAP.

5.2.3 The elderly were not actively involved in most of the physical activities at the beginning of the programme. Their involvement in the personal care, leisure time and routine activities at the home was considerably low.

5.2.4 The breakfast and lunch were served timely and regularly although it was the same menu throughout the period the PAP was going on, thus the foods they regularly consumed did not cover all the food groups. Despite the food provision being timely, the consumption of this food was done at varying times depending on individual elderly. Some of the elderly had a problem of constipation at the commencement of the PAP.

5.2.5 The elderly experienced a number of sleep problems at the beginning of the study. The problem subsided following the PAP.
5.2.6 The elderly experienced different chronic illnesses and the attacks of such illnesses were frequent at the beginning of the study one of the most prevalent being hypertension. The hypertensives were on medication provided to them by their medical personnel.

5.3 Conclusions

The regular low- moderate intensity physical activity programme participated in by the elderly was effective in improving health and functional independence. The following specific observations were made:

5.3.1 The eight-week regular low-moderate intensity physical activity programme improved the lower body strength and the gait quality effectively. The improvement in the dynamic balance was not statistically significant. The elderly were found functionally independent on the component of static balance.

5.3.2 The low-moderate intensity PAP was effective in reducing the resting diastolic blood pressure and heart rate. The changes registered in the resting systolic blood pressure were not found statistically significant. Additionally, the low-moderate PAP did not cause significant changes in the cardiovascular endurance.

5.3.3 The physical activity patterns of the elderly were not considerably different from what they were at the beginning of the study. During the 8-week intervention period, the elderly engaged in slightly more physical activities. A
few participated in active leisure activities such as moving around. Although there was minimal change in the physical activity patterns, there was some improvement shown by some elderly compared to the time before the intervention. The elderly can easily cope with ADLs and IADLs if they engage in adequate physical activity programmes that improve their physical and health fitness levels.

5.3.4 The diet at the home was most unlikely to provide an adequate range of nutrients in sufficient quantities to meet the nutritional requirements of the elderly based on the monotony. The constipation problem was significantly reduced. The impact of the intervention was distinct from the 4th week of the intervention. Therefore, the low-moderate PAP was effective in overcoming constipation experienced by the elderly at the beginning of the programme.

5.3.5 By the end of the eight-week PAP, the sleep problems that caused interferences in the sleep patterns of the elderly had significantly reduced with the exception of the kind of pain that needed medical intervention.

5.3.6 There was a significant reduction in the prevalence of chronic illnesses by the end of an eight-week low-moderate physical activity programme. The general health status of the elderly improved significantly based on the self reports by the elderly. They were more interactive as a result of exercising together as a group. The 8-week intervention PAP was effective in reducing the frequency of chronic illness attacks that were so frequent before the programme. The attacks were rare as the programme came to an
end. This enabled the elderly experience improved health by the end of the intervention compared to the time before the PAP.

Physical activity programmes of low-moderate intensity can be used to improve the functional independence of the elderly. Physical activity helps prevent impairment of body systems, which would lead to poor health and sometimes disability.

5.4  **Recommendations for Practice and Policy**

The following recommendations have been made basing on the objectives of the study and findings:

5.4.1 All elderly persons should be encouraged by the caregivers to participate in adequate forms of physical activities and exercises on a regular basis for at least 5 days a week, 30 minutes daily (this time does not include time spent on warm up and cool down). The activity may be of low intensity and some could even be performed in a seated position to reduce the injury risks. The physical activities and exercises in required amounts will help control a number of chronic illnesses and disabilities. The elderly should be encouraged to continue engaging in regular physical activities of 10-minute fragmented activities if one cannot sustain all 30 minutes at ago.

5.4.2 The non-governmental organisations such as Help Age Uganda should promote and support the awareness and motivation programmes for the elderly to engage in regular physical activity. Physical activity should be incorporated in day-to-day living using more user-friendly strategies of
improving awareness, strengthening communication and networking. Sensitization of all stakeholders should therefore be considered so that all support (social, facilities and other resources) can be garnered to sustain participation. It is important to increase public awareness on the need for active living since the culture of exercising is relatively new in Uganda and the elderly in this era in particular, need motivation and patience if they are to be attracted to physical activity programmes. Motivation is required even more where the older persons are institutionalized because this still, is a foreign practice in Uganda.

5.4.3 The administrators of homes and caregivers should provide the elderly persons opportunity to indulge in exercises for strength, balance and flexibility 2-3 times a week in order to control muscle loss. There should be regular sensitization of the elderly on the benefits of being actively involved in physical activity and exercises regularly.

5.4.4 The caregivers should encourage the elderly to get involved in recreational, personal care activities and house chores so as to desist from the temptation of being idol and sleeping during day. This practice interferes with one’s sleep at night. Involvement in regular physical activities will reduce prevalence of those sleep problems that are a result of being inactive. Furthermore, this will enhance functional independence, which is crucial in sustaining the health and longevity among the elderly.
5.4.5 The administrators and caregivers should ensure that older persons receive regular medical check-ups for vision, hearing, hypertension and other related problems. Such regular medical check ups would help identify the problems early enough for possible and timely intervention. With good vision and hearing, the elderly persons may not find it difficult to move around freely. Additionally, when the high blood pressure is controlled, they may be involved in various physical activities without the fear of attacks. The government should help such homes taking care of the aged and vulnerable people to access free treatment by providing avenues that are dependable.

5.4.6 The Government and Non-Governmental organisations and the individual homes should provide facilities and equipment needed to encourage the elderly to engage in more forms of recreational activities.

5.4.7 In order to help society change from being sedentary to living active lifestyles, health organizations and educational institutions should communicate to the public the amounts and types of physical activity that are needed to prevent disease and promote health. The tertiary institutions such as universities may have a role to play of designing and redesigning training programmes in exercise science, physical education and health. These organizations and institutions, providers of health services, communities, and individuals should also implement effective strategies that promote the adoption of physically active lifestyles (Pate et al., 1995).
5.5 Recommendations for Further Research

The present study was confined to Kampala in Uganda. The study has provided some basis upon which further studies in the area of lifestyle and health can be made. Intervention that last longer than 8 weeks may be carried out with similar groups of elderly people that have been sedentary for six (6) months or longer. The aspect of nutrition should be given more attention and provide insight on the indigenous foods and their content of the most required nutrients in the diet of the elderly and the quantities that should be consumed in order to attain functional longevity. There is need to quantify the activities carried out by each elderly and to determine the caloric requirement.

From the study, it was also observed that the Physical activities involved in should be assessed and the exercise programmes that suit the different needs of elderly designed in order to promote health among the older adults in Uganda. All stake holders should be reminded of their role in promoting active living not only to the current generation that is ageing, but to all children and youth alike, because everyone is affected in one way or the other. There will always be an older adult in a family or community that needs support. The study exposed a number of issues related to the elderly that need attention. Although the specific goals were explored, relating to functional independence, physical activity, nutrition, sleep and health there is still a lot unexplored. There were indicators to show that little has been done to help the elderly live longer, healthier and happier. There was evidence of negligence towards the elderly in terms of various support required to enable them continue live productively. There were still few studies done about the elderly in Uganda yet issues affecting the elderly that need addressing are still many. Furthermore, a study on the
categories of elderly that need special handling with the availability of required equipment may be necessary.

Communities offering care to the elderly persons have limited or no knowledge on the role physical activity and exercise play in the lives of an individual. Caregivers have no training in the area of recreational management for the elderly. As a result, no effort had been made to try and address the need for exercising. Training institutions in conjunction with non-governmental organisations supporting the older persons such as Help Age Uganda should design short term training courses to enable the caregivers attain some knowledge in the area of recreational management for the older adults. Sedentary living deteriorates the muscle and other physical functions and could lead to disability and impairment.

The elderly persons' fears and limitations should be clearly identified prior to prescribing any form of intervention. This helps in dealing with those problems adequately and timely.

Based on the above observations from the study, the following recommendations have been proposed for further research:

5.5.1 Exercise programmes to last longer time and with higher intensity may be carried out to determine the dose required to effectively improve dynamic balance and systolic blood pressure in similar groups. The discrepancy in the two studies (the present study and that of Kolbe et al, 2004) on the systolic blood pressure may need further investigation.
5.5.2 Further studies may be done for older persons living with their families. The nutrition aspect may be investigated further where the elderly have varied menu unlike the case in this study where the menu was not varied.
REFERENCES


USDA Human Nutrition Information Service (1996). *Food intake Analysis System Version 3*, Houston, TX; University of Texas Health Science Center at Houston, School of Public Health.


APPENDIX A

LETTER OF INTRODUCTION

Makerere University
Department of Sports Science
P.O.Box 7062, Kampala, Uganda

Dear Director,

I am currently a Ph.D. Student at the Department of Exercise, Recreation and Sports Science, Kenyatta University, Kenya. I am expected to undertake a field research study as a requirement for my thesis. I have chosen to undertake a study on Effect of Regular Physical Activity on Functional Independence in the Elderly in Uganda: A case of the Bakateyamba Home. I wish to get information by way of an interview and come up with data that will be analyzed to enable me objectively make recommendations about the Effects of Regular Physical Activity on Functional Independence in Older Adults in Homes in Uganda.

The study targets older adults in your home aged between 60 years and above who are not disabled to require specialized handling. These are thought to be fairly well versed with the goings on in your institution and therefore, better placed to respond to the items in the interview and take part in the Physical Activity Programme (PAP). By this letter therefore, I kindly request you to allow me spend time up to 10 weeks with the adults in your home who will be expected to respond to the items in the interview as well as take part in the proposed PAP. Their responses shall be treated in strict confidence and used only for the intended purpose. Finally, I hope the study findings and recommendations made thereof will be found useful in addressing the problem of sedentary lifestyles as part of the overall cause of health problems thus better strategies for improved health and productivity especially among the elderly.

Thanking you in advance for your co-operation in this exercise.

Sincerely,

Sandra S. B. Kasoma
APPENDIX B

INTERVIEW FOR THE ELDERLY

Clients Profile (Fill in appropriately)

1. Age..............................................
2. Gender.............................................
3. Status: Married before / Not, Widow / widower, Divorced..............................
4. Educational level.................................................................
5. No of children..................................Living..................Dead..........................
6. Place of birth.................................................................
7. Common (known) problem or ailment ...........................................

PAST EXPERIENCES

Socio Economic Status

(Tick appropriate space)

8. Previous job (specify kind of job before retirement)
   Self-employed........................................................................
   Public servant........................................................................

9. What means of transport did you often use at that time (Tick the choice given)
   Public transport......................................................Walking ..........
   Own car.......................................................... Riding a bicycle............

10. Did your job require you to move around a lot? Yes No (Circle the choice given)

11. How would you spend your leisure time? ..............................................
    When did you move to this home? .........................

12. Why did you move to this home?

    ..............................................................................................

13. Who introduced you to this home? ..............................................

ACTIVITIES

14. What activities are you involved in routinely involved in at this home? (write all)

15. Do you carry out these activities with ease? Yes No (Circle the choice given)

16. If “No” why not? Record reasons as they are given.
17. How do you spend most of your time now? ..................................................
18. What are some of the fears you have? ..................................................................
19. Do you move around freely? Yes  No  (Circle the choice given)
20. If “No” what hinders you to move more freely? ..................................................

NUTRITION / SLEEP
21. Which meals do you have regularly?
   Breakfast .................., Lunch  ................. Supper  ..................
22. What time are your meals? (Record the different times for the different meals.)
23. What do you feed on regularly? (List foods as they are mentioned)
24. How do you rate the meals you are given? Adequate / Inadequate (Why?)
25. Do you have any problems with the food you are given? (List them)
26. Do you experience constipation?
27. Do you experience any sleep problems .......... (Name them) ........
28. Did you smoke before? Yes  No. Do you still do so? Yes  No.
29. Did you drink before? Yes  No. Do you still do so? Yes  No.

GENERAL HEALTH
30. Do you suffer from any chronic illnesses? List them if any......................
31. How regular are the attacks? .............................................................................
32. How do you rate your health generally? Good / Poor  (Why?)
33. What activities are you involved in routinely? ..............................................

Thank you for your time

Note: In the post-test, responses to questions 15-21; 26-28; 31-33 were sought again
to provide data for the post-test.
APPENDIX C

INTERVIEW FOR THE CAREGIVERS

What activities is ---------------(Name of elderly) frequently involved in?

(Tick what is mentioned and probe about what is not mentioned, put a cross against what they cannot do)

Sweeping Floors
Watering Plants
Bathing
Mopping
Moving household items
Wash clothes
Wash dishes
Iron clothes
Lay a bed
Dressing
Dancing to music
Reading materials e.g. bible, newspapers
Others (specify)

What activities are the elderly in the home interested in most?

What other physical activities are provided for the elderly in the home? (List them)

What is the routine in the typical day of (name of elderly person)?

What are the common ailments s/he suffers? (List them as they are mentioned)

How are those ailments dealt with?

What are her/his eating habits?

Does s/he complain about any problems to do with sleep? (Name them if any)

What is your general observation about the lifestyle of this individual?

Are there any other observations you would like us to know about her/him?

Thank you for your time
APPENDIX D

THE COMMUNITY HEALTH INTERVENTION PROGRAMMES (CHIPS)

The study used the Physical Activity Programme adapted from the Community Health Intervention Programmes for older adults as used by Kolbe, Lambert and Charlton, (2004). The tests included: The sit-to-stand test to assess the lower body muscle strength. The number of sit-to-stand repetitions accomplished in 30 seconds were recorded. The Cardiovascular endurance test was used to assess the cardiovascular endurance. Subjects walked for six minutes and the distance covered at the end of the 6 minutes was recorded. The tests were repeated at the same time of the day at both the 4th week and 8th week. The gait quality test was used to assess functional gait capacity using a 20m walk. The time taken to cover the distance was recorded. The static balance test and dynamic balance test were used to assess balance. In the static balance, the subjects were required to stand for as long as possible for a maximum of 30 seconds. The tests were varied: when feet are together when shoulder width apart and at tandem stance. In the dynamic balance, the subjects took a 10-metre tandem walk and the amount of time taken to cover the distance was recorded. The digital sphygmomanometer was used to measure the systolic and diastolic blood pressure and the heart rate. Two measurements of systolic and diastolic blood pressure were taken one minute apart in the morning. The subjects were lying down doing nothing for at least 10 minutes prior to taking the first measurement. The lower systolic value with its corresponding diastolic value was included in the analysis. The baseline Blood Pressure (BP) of >140/90mmHg will be identified as hypertensive.
# APPENDIX E

## SESSION PLAN FOR THE PHYSICAL ACTIVITY PROGRAMME

### WEEK 1 – 4

<table>
<thead>
<tr>
<th>TIME</th>
<th>PHASE</th>
<th>DETAILS /ACTIVITIES</th>
<th>ORGANISATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 min</td>
<td>Warm-up</td>
<td>Marching legs</td>
<td>While seated (on chairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clapping hands</td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td>Lower body exercises</td>
<td>Straight leg raises (5L+5R)</td>
<td>While seated (on chairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knee raises (5L+5R)</td>
<td>Note: performed without weights (A minimum of 3 activities from the menu)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alphabet tracing (3L+3R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heel raises (5L+5R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ankle circles (6L+6R)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 clockwise and 3 anticlockwise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balancing exercises</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strength exercises</td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td>Cool down</td>
<td>Slow matching</td>
<td>While seated</td>
</tr>
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<td></td>
<td></td>
<td>Stretching</td>
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### WEEK 5 – 8

<table>
<thead>
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<th>TIME</th>
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<th>DETAILS /ACTIVITIES</th>
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</thead>
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<tr>
<td>10 min</td>
<td>Warm-up</td>
<td>Marching legs</td>
<td>While seated (on chairs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clapping hands</td>
<td></td>
</tr>
<tr>
<td>10-20 min</td>
<td>Upper body exercises</td>
<td>Biceps curls</td>
<td>Using 500l plastic bottles half filled with sand as weights</td>
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<tr>
<td></td>
<td></td>
<td>Front and side ways arm raises</td>
<td>Interlude of 2-min marching while seated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single-arm shoulder press and chest press</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 sets of 10 – 15 repetitions</td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td>Cool down</td>
<td>Slow matching</td>
<td>May be seated or standing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stretching</td>
<td></td>
</tr>
</tbody>
</table>
Heart rate and blood pressure levels were taken regularly using digital sphygmomanometers because blood pressure and heart rate affect involvement in activity. Although the recording was done every 2 weeks, it was for purposes of
monitoring for safety only. The baseline, halftime and fulltime records were the ones used for analysis.

Self-reports on sleep and nutrition patterns as well as their general feelings about health were sought and recorded before the PAP at halftime and at the end of the PAP.

Reports from the elderly and caregivers on how they perceived PAP in terms of interest levels “Helpful” and “Not helpful” were sought before at halftime and end of the PAP.
## APPENDIX G

### Table II.1: Descriptive Statistics on Physical and Health Components

<table>
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<tr>
<th>Variable</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev</th>
<th>Skewness</th>
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<td>95</td>
<td>207</td>
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<td>111</td>
<td>111</td>
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<td>91</td>
<td>142</td>
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<td>110</td>
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<td><strong>Diastolic</strong></td>
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<td>72.0</td>
<td>27.7</td>
<td>1.83</td>
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<td>60.0</td>
<td>14.7</td>
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<tr>
<td><strong>Heart rate</strong></td>
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<td>162</td>
<td>79.4</td>
<td>72.0</td>
<td>27.7</td>
<td>1.83</td>
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<tr>
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<td>42</td>
<td>97</td>
<td>63.1</td>
<td>60.0</td>
<td>60.0</td>
<td>14.7</td>
<td>0.94</td>
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<td>95</td>
<td>65.6</td>
<td>65.0</td>
<td>65.0</td>
<td>14.4</td>
<td>0.46</td>
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<td><strong>Gait</strong></td>
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<td><strong>Sit-to-stand</strong></td>
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<td>66.2</td>
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<td><strong>t. balance</strong></td>
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<tr>
<td></td>
<td>8.5</td>
<td>105.1</td>
<td>26.7</td>
<td>18.2</td>
<td>18.2</td>
<td>23.6</td>
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<td>15.1</td>
<td>15.1</td>
<td>21.2</td>
<td>2.01</td>
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<tr>
<td><strong>s. balance</strong></td>
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