ROLE OF SOCIAL PROTECTION ON NUTRITIONAL STATUS OF ELDERLY PERSONS: THE CASE OF IMENTI NORTH DISTRICT, KENYA

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DECLARATION

I hereby declare that this dissertation is my original work and has not been presented in any other university.

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DEDICATION

To my parents Murango and Priscilla Mwenda

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LIST OF ABBREVIATIONS

ASAL	Arid and Semi-Arid Lands
AU	African Union
BMI	Body Mass Index
CDF	Constituency Development Fund
DFID	Department for International Development
GOK	Government of Kenya
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune deficiency Syndrome
LSHTM	London School of Hygiene and Tropical Medicine
MUAC	Mid Upper Arm Circumference
NSA	Non State Actors
NHIF	National Health Insurance Fund
NSSF	National Social Security Fund
OVC	Orphaned and Vulnerable Children
PWD	People with Disabilities
TB	Tuberculosis
UN	United Nations
UNDP	United Nations Development Program

DEFINITION OF TERMS

Cash transfers	Regular non-contributory payments of money provided by Government or Non-Government Organizations to individuals or households with the objective of reducing chronic or shock induced poverty
Elderly persons:	Persons aged 60 years and above
Nutritional Status	State of nutrition in a person, degree of under or over nutrition (severely underweight, moderately underweight, normal, overweight and obese)
Nutritional vulnerability	Exposure to one or more risk factors leading to an increased chance of having poor nutritional status
Older persons	Refers to persons aged 55 years and above
Social protection	Public interventions to assist individuals, households and They include pension, family and community social networks.
Vulnerability	State of defenselessness, insecurity and exposure to risks, shocks and stress and having difficulty coping with them

ABSTRACT

Elderly persons are defined as persons aged 60 years and above. Unlike other demographic groups, there is relatively little information about the situation of elderly people in Kenya. Although identified as vulnerable, the nutritional status of the elderly has not been viewed as critical as that of mothers and children. The objectives of this study were to determine the nutritional status of the elderly, the Household Dietary Diversity Scores and how these are influenced by existing Social Protection mechanisms for the elderly. The study was cross-sectional, with descriptive and analytical components. The study involved a household survey and anthropometric measurements of elderly persons. Focus group discussions were also conducted. A total of 337 (107 males, 123 females) elderly persons, obtained through random sampling, were interviewed during the survey. Social protection instruments were categorized into family, community and monthly pension. The data obtained was analyzed using SPSS. Difference in outcome variables was tested at $p=0.05$. A greater proportion of the study population was females and the mean age was 71 years. The number of elderly persons was 462 with a mean of 1.4 elderly persons per household. Out of the 337 elderly persons interviewed 68.2% reported receiving some form of social protection mainly from family. Family support was however irregular and inadequate. Only 14.8% of the subjects received a monthly pension. Overall, 38.1% of the subjects were underweight (BMI<18.5). Males were significantly more severely underweight than females (17.2% and 7.7% respectively). Majority of the households (84.2%) had a Dietary Diversity Score of more than 4 indicating that most households had economic access to a varied diet. Households with elderly persons with social protection were 0.5 times less likely to have a low Dietary Diversity Score (1 – 4 food groups) compared to those without any

form of social protection (OR: 0.5, 95% C.I. 0.3 – 0.9) and were 0.7 times less likely to be underweight (OR: 0.7, 95% C.I. 0.4 – 1.4). The study concludes that Social Protection is an important tool in improving the nutritional status and general wellbeing of the elderly. Recommendations made include long term planning of social welfare provision for the elderly in Kenya as well as assessment of the status of elderly persons in other parts of the country.

1.0 INTRODUCTION

1.1 Background

Elderly persons are defined as persons aged 60 years and above. Unlike other demographic groups, there is relatively little information about the situation of elderly people in Kenya. Although this population has been identified as vulnerable (GOK, 2007), the nutritional status of elderly persons has not been viewed as critical as that of mothers and children under five years of age (HelpAge International Africa Regional Development, 2004). In addition, their nutritional status is not given emphasis in curricula and programs dealing with nutrition (Wagah *et al.*, 2000). The lack of attention to the elderly in policies and programs is mirrored by the paucity of information from research studies on their condition (Charlton and Rose, 2001).

High unemployment rates, coupled with low remuneration packages, are inadequate to enable adults to make adequate financial provision for old age thus upon retirement they often become dependent on their families and communities (HelpAge International Africa Regional Development Centre, 2004). This, in addition to the usual physical, mental and physiological changes associated with aging, as well as the disintegration of traditional community and family social networks that provided care and support, makes the elderly persons vulnerable to poverty.

Social protection refers to public actions carried out by the state or privately that enable people to deal with their vulnerabilities (DFID, 2006). The term 'social transfer' may be used to refer to the same, and includes pensions, grants for families, public works scheme

and other programmes. In Kenya, these programmes include the National Social Security Fund (NSSF) and the Civil Service Pension Scheme for elderly persons upon retirement from formal workforce. Other informal social protection instruments include family and community social support networks.

Due to their role in improving human development, as well as in reducing hunger and tackling extreme poverty and vulnerabilities, social transfers are attracting growing interest from national governments and multi-lateral donors, as a key tool in achieving the Millennium Development Goals (MDGs) (Omiti and Nyanamba, 2007). In addition to tackling income poverty, social transfers also provide effective support for broader developmental objectives (Samson *et al.*, 2006). The government of Kenya has endorsed Social Protection as one of the strategies to reduce vulnerabilities. This will involve restructuring of pension schemes to increase savings for the elderly and reduce dependency as well as establish a consolidated fund for cash transfers to orphaned and vulnerable children, and the elderly (GOK, 2007)

Understanding how existing programs reduce social risks and vulnerabilities is fundamental to identifying the gaps that need to be addressed with reformed or new instruments (Sherpherd *et al.*, 2005). It is against this background that this study was undertaken to establish the forms of social protection that exist in Imenti North district, Eastern province, Kenya and their effect on the nutritional status of the elderly.

1.2 Problem Statement

Old people lack social security for their everyday social and economic needs. The care and support through the family and community social networks that was taken for granted in the past is greatly eroded because of changes in the society associated with urbanization and development in general (HelpAge International Africa Regional Development Centre, 2004). In addition to this, in some communities, the elderly are obliged to take up responsibility of caring for children as young adults succumb to HIV/AIDS (HelpAge International, 2008).

Nutrition research and interventions in African countries are directed primarily towards infants and young children, pregnant and lactating mothers (Charlton and Rose, 2001). Whilst important to lifetime health, the focus has resulted in a failure to acknowledge the needs of other population groups. In emergencies, older people are also not targeted as a priority group for humanitarian assistance (HelpAge International Africa Regional Development Centre, 2004). Apart from children, old people are the social group most vulnerable to the numerous ills facing Africa: food insecurity, civil strife, armed conflict, violence, and inadequate social welfare services.

The majority of poor elderly people in developing countries enter old age after a lifetime of poverty and deprivation, poor access to health care, and a diet, that is usually inadequate in quantity and quality. For most of these older people, retirement is not an option (ACC/SCN, 2000). Poverty, lack of pensions, deaths of younger adults from

AIDS, and rural to urban migration of younger people are among the factors that compel elderly people to continue working. Adequate nutrition, healthy aging, and the ability to function independently are thus essential components of a good quality of life.

Social protection mechanisms in Kenya have not been evaluated to determine their influence on nutritional status of vulnerable groups, the elderly included, a step necessary in improving and developing more effective social protection instruments.

1.3 Justification of the study

For the process of any interventional strategy to integrate nutritional care and support of the elderly there is need to first determine and accumulate data on their current nutritional status as well as the roles of existing forms of social welfare services. In Kenya, such data is inadequate and this study was set out to avail this data. This will supplement existing understanding of the nutritional vulnerability of the elderly and how their needs can be addressed effectively.

1.4 Aim

The study aims at improving the nutritional status of elderly persons in Kenya

1.5 Purpose of the study

The outputs of this study are expected to inform health and nutrition policy makers, planners, and implementers drawn from the public, private and Non State Actors (NSA) .This will supplement existing knowledge and contribute to the designing, testing and

adoption of interventions that will promote the nutritional status and overall wellbeing of the elderly.

1.6 Objectives

1.6.1 Main objective

To assess the role played by social protection on the nutritional status of the elderly in Imenti North district, Kenya.

1.6.2 Specific objectives

1. To determine the socio-demographic characteristics of households with elderly persons in Imenti North district
2. To determine the availability of various social protection mechanisms to households with elderly persons in the study area
3. To determine the nutritional status of elderly persons in Imenti North district
4. To determine Household Dietary Diversity Score (HDDS) of study population
5. To determine the relationship between social protection, HDDS and nutritional status of the elderly in the study area
6. To identify risk factors for malnutrition among elderly persons in Imenti North

1.7 Research questions

1. What are the socio-demographic characteristics of households with elderly persons in Imenti North district?
2. What social protection mechanisms are available to households with elderly persons in Imenti North district?
3. What is the nutritional status of elderly persons in Imenti North district?

4. What is the influence of the available social protection mechanisms on the nutritional status of elderly persons in Imenti North district?

1.7.1 Hypothesis

Elderly persons with social protection have a better nutritional status than those without social protection.

2.0 LITERATURE REVIEW

2.1 Definition of an elderly person

There is no consensus regarding what constitutes old age. Although there are commonly used definitions of old age there is no general agreement on the age at which one becomes old. The UN uses a chronological approach, defining the elderly as those aged 60 years and above. This definition is commonly associated with the age at which one can begin to receive pension benefits. Currently, in Kenya, the age at which one begins to receive pension is 60 years. Biological and physiological definitions associate old age with changes in body functions whereas socio-cultural definitions may link old age with the inability to produce children, the number of children an individual has or issues of retirement from the formal work force (HelpAge International, 2000).

2.2 Demographic profile

The world population aged 60 years and above is increasing rapidly. Projections show that by 2025, the world population of the aged will reach 1.2 billion and by 2050, 2 billion. Currently the population of the elderly is estimated to be slightly over 38 million (HelpAge International, 2000).

The majority of older people in almost every country are women (55% globally) with differences in gender ratios increasing with age. The majority of old people in Africa live in rural areas and this trend is expected to continue. By 2020, projections show that 64% of people over 60 years, in Africa, will be living in areas defined as rural. The increase in

the number of elderly people provides a challenge for the continent as a whole, as well as individual countries (HelpAge International, 2000).

Normal age structures for sub-Saharan African populations include a large population proportion in the age group 0-14 years which gradually diminishes in the subsequent age groups. Kenya is a typical example of this distribution. The proportions of both men and women decline with increasing age, reflecting the comparatively young age structure of the Kenyan population, with only 4-5% above 60 years (Kakwani *et al.*, 2006). In Kenya the population aged 60 years and above is estimated at 1.3 million (CBS, 2004)

2.3 Risk factors for nutritional vulnerability in older people

Risk factors make a person more likely to become malnourished. Fig. 1 shows possible risk factors for elderly people, living at home, and how they can lead to poor nutritional status.

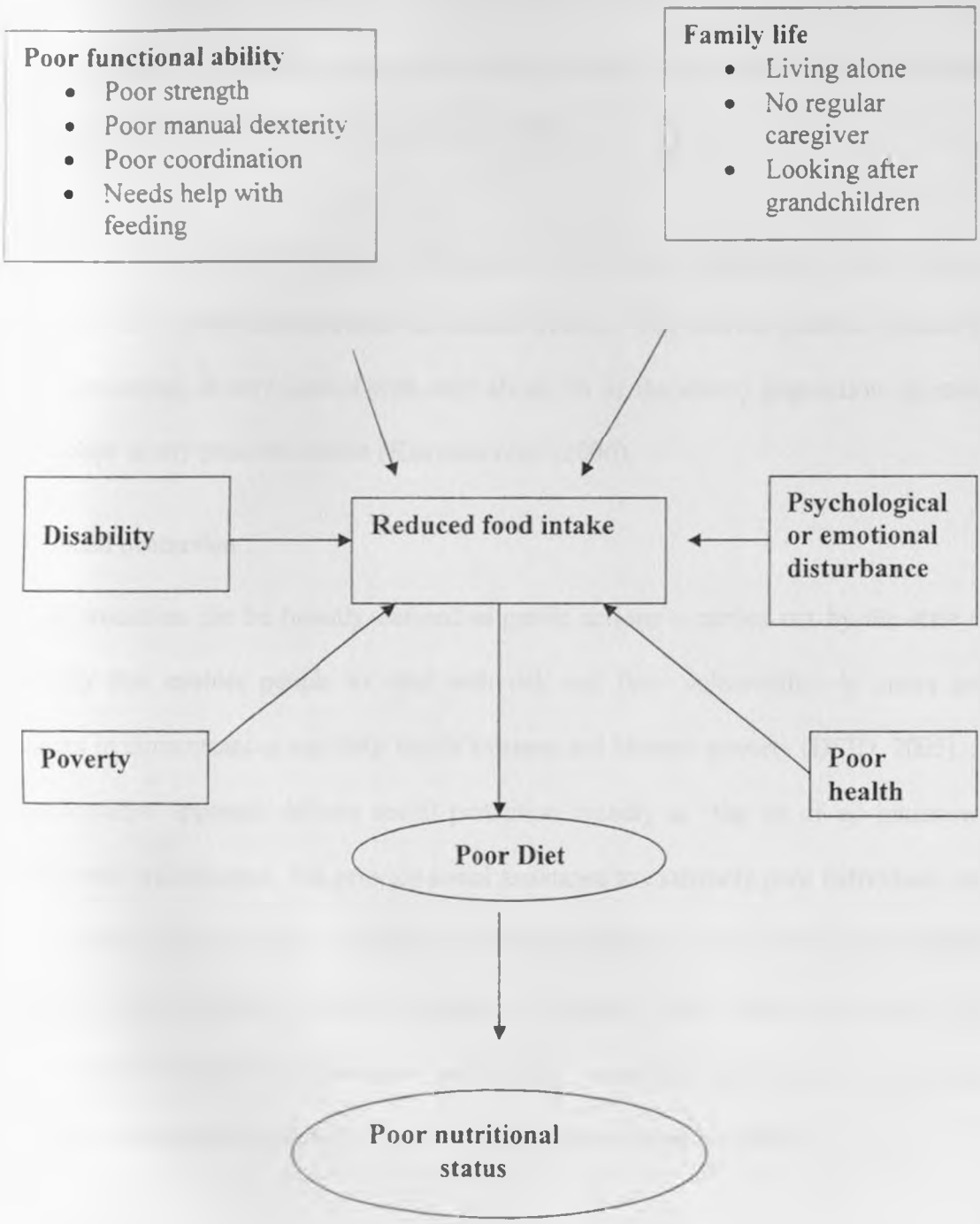


Fig 1: Risk factors for nutrition vulnerability among elderly persons

Source: Suraiya and Manandhar, 1999

Elderly persons performing care duties, also referred to as older carers, may already be trying to cope with declining health related to the aging process, leaving them physically exhausted by caring and more susceptible to the opportunistic infections of those in their care (HelpAge International, 2008)

In this context, pensions for the elderly could be of great importance and younger members have been demonstrated to benefit from it. The current pension system in Kenya, however, is very limited with only about 3% of the elderly population reporting the receipt of any pension income (Kakwani *et al.*, 2006).

2.4 Social protection

Social protection can be broadly defined as public actions – carried out by the state or privately that enables people to deal with risk and their vulnerability to crises and changes in circumstances and help tackle extreme and chronic poverty (DFID, 2005). A transformative approach defines social protection broadly as "the set of all initiatives, both formal and informal, that provide social assistance to extremely poor individuals and households; social services to groups who need special care or would otherwise be denied access to basic services; social insurance to protect people against the risks and consequences of livelihood shocks and social equity to protect people against social risks such as discrimination or abuse" (Devereux and Subates- Wheeler, 2004).

The national and international commitments to global poverty reduction reflected in the MDGs have focused attention on the extent and persistence of poverty in developing

countries and there is an emerging consensus around the view that social protection can be an effective response to persistence poverty and vulnerability (Barientos *et al.*, 2006).

Social protection interventions assist individuals, households and communities to better manage the income risks that leave people vulnerable (World Bank, 2004) and focuses on poverty prevention, providing support to the vulnerable, poor and poorest and on addressing the causes of poverty not simply its symptoms (Barientos *et al.*, 2006)

A narrower definition of social protection focuses on a subset of public actions that help address risk, vulnerability and chronic poverty. These comprise three sets of instruments: Social insurance where individuals pull resources to provide support in the case of a shock to their livelihoods; social assistance where non-contributory transfers are given to those deemed vulnerable by society and the setting and enforcing of minimum standards to protect citizens within the work place (DFID, 2006). In Kenya, social protection instruments for the elderly include the National Social Security Fund, family and community support networks as well as cash transfers handed out to elderly persons by Non-State Agencies such as HelpAge International.

Few countries in Africa offer social and welfare assistance programs for elderly people. In terms of formal economic support, only three countries, South Africa, Namibia and Mauritius, provide an old age pension system that is non contributory and means tested (Charlton and Rose, 2001). Social security in South Africa consists of targeted social grants that provide support for older people, individuals with disabilities and children under the age of 14. Social grants are financed through general tax revenues collected on

a national basis and the grants are directly deposited into a beneficiary's bank account. Grant recipient households spend a greater portion of their income on food and education and less on alcohol, tobacco and gambling than similar households not receiving grants. Analysis of household survey data shows that the grants reduce South Africa's poverty gap by 47% (Samson *et al.*, 2005).

Many countries which require effective social protection instruments already have existing schemes or institutions that address in part the objectives that social transfer programmes would achieve and these form a point of reference for comparing alternatives (Asian Development Bank, 2003). Societies almost always have at least some form of formal social protection institutions, but the institutions that exist may be very weak or cover only extremely small fraction of the population. Kenya, for instance, has not had social protection provisions that reach adequately workers in both formal and informal sectors (Omiti *et al.*, 2007) and according to a study by Kakwani *et al.* (2006) only 3% of elderly population reported receipt of any pension income. Some of the existing social protection programmes in Kenya are shown in table 1

Table 1: Examples of existing social protection programmes in Kenya

Intervention	Year when started	Target population
National Social Security Fund	1965	People working in the formal sector
Cash transfer programme for Orphans and Vulnerable Children in Kenya	2005	Families living with orphans and vulnerable children
Women Enterprise Development Fund	2007	Women throughout the country
School feeding programme	1979	Children in Arid and Semi-Arid districts and urban slum areas
Youth Enterprise Development Fund	2006	Youth (18-35 years)
HIV / AIDS Fund	2006	People infected and affected by HIV / AIDS
Secondary school Bursary Fund	1993	Orphans and girl children and those from poor households and are able to achieve good results
Free Primary education	2003	All Kenyan children attending formal and non formal public schools
Constituency Development Fund	2003	All constituency level development projects, particularly those aiming to combat poverty

Source: Omiti *et al*, 2007

2.4.1 Social protection and Nutrition

Social protection programs provide for people's consumption requirements, taking into account both food availability and food access. Food availability is about the supply of food. which should be sufficient in quantity, quality and provide variety. Food access addresses the demand for the food. It is influenced by economic factors, physical infrastructure and

consumer preferences. Although necessary in ensuring food security, food availability is not a sufficient condition to guarantee food security. For households and individuals to be food-secure, they should ensure a consistent and dependable supply of energy and nutrients through sources that are affordable and socio-culturally acceptable to them at all times (Omiti and Nyanamba, 2007).

Hunger reduces natural defenses against most diseases, and is the main risk factor for illness worldwide. People living in poverty often cannot produce or buy enough food to eat and so are more susceptible to disease. Sick people are less able to work or produce food. Nutrition is an essential foundation for poverty alleviation, and also for meeting Millennium Development Goals (MDGs) related to improved education, gender equality, child mortality, maternal health and disease. Hunger is a major constraint to a country's immediate and long-term economic, social and political development (Omiti and Nyanamba, 2007)

2.4.2 Prevalence of malnutrition among elderly persons in Kenya

There is little information about the situation of elderly persons in Kenya. Studies done however indicate that there is a high prevalence of malnutrition among elderly persons with more males than females being underweight (Wagah *et al*,2000 and Busolo, 2001). Risk factors for malnutrition identified in the studies include chewing difficulties, living alone, lack of resources morbidity and psychosocial problems.

2.5 Methodological issues

2.5.1 Anthropometric measurements

2.5.1.1 Body Mass Index (BMI)

BMI is obtained by measuring the weight and height of the subject (BMI=weight/height in metres^2). Cut-off points are then used to determine the nutritional status (BMI<18.5 for under nutrition, BMI 25-29.9 for overweight and BMI>30 for obesity). Conventional BMI values, however, may not be appropriate for identifying poor nutritional status in people above 70 years of age because of changes in body composition and kyphosis (HelpAge International Africa Regional Development Centre, 2004).

Attempts have been made to address these problems. Where height can not be measured due to curvature of spine, arm span has been used to estimate height (Suraiya and Manandhar, 1999). BMA (Body Mass Index generated from arm span) is then generated. A study by Tayie et al (2004) shows that there is a high correlation between arm span and height (r=0.81) and a stronger correlation between BMI and BMA (r=0.99).

2.5.1.2 Mid Upper Arm Circumference (MUAC)

MUAC is an easy to perform measurement which requires only a tape. There are no agreed standard cut-off points for MUAC in elderly persons. For persons over 70 years of age, MUAC cut-off point of 21.7 cm has been used in emergencies and has been found to have a sensitivity of nearly 86% in relation to the BMI cut-off of 16Kg/m^2 (ACC/SCN, 2000)

2.5.2 Nutritional vulnerability

In addition to assessing the nutritional status, risk factors that make elderly people vulnerable to malnutrition are also assessed. Tools that have been used to assess this include a health questionnaire, with questions on illness in the past month, use of health

facilities or other health care strategies, reasons for not using health facilities, habitual lifestyle behaviors as well as observations of symptoms associated with impaired mobility or poor nutritional status such as edema (HelpAge International, 2004).

Dietary Intake is also an important factor that is assessed. Dietary intake of elderly persons may be assessed in a number of ways. Dietary Diversity assesses how varied a diet is. Nutritional vulnerability is higher in a person eating few food types (Suraiya and Manandhar, 1999). Twenty four hour intake dietary assessment on the other hand determines the caloric intake of a person in the previous 24 hours and involves measuring actual food intake.

2.5.2.1 Household Dietary Diversity

In this study Household Dietary Diversity Score was used to reflect, in a snapshot form, the economic ability of the study households to consume a variety of foods. Studies have shown that an increase in Dietary Diversity is associated with socioeconomic status and household food security (Hoddinott and Yohannes, 2002; Hotley *et al*, 2000). Dietary Diversity scores are created by summing up food groups consumed over a reference period. They give a valid picture of the Dietary Diversity at the community level only. Scores to capture Diet Diversity still need further standardization to be used at the global level (Swindale and Blinsky, 2006)

2.8 Gap in knowledge

Information on the status of elderly people in Kenya is inadequate. A few localized studies (Busolo,2001; Wagah *et al*, 2000) have addressed the nutritional and food

security issues of elderly persons in Kenya but no baseline data exists on the nutritional status and health status at national and district levels.

Existing schemes or institutions that address in part the objectives that social transfer programs would achieve form a point of reference for comparing alternatives. The influence of social protection services offered to elderly persons on their nutritional status and overall well being has not been evaluated.

3.0 METHODOLOGY

3.1 Study setting

3.1.1 Study site

Mirigamieru West Division is in Imenti North district, Eastern province. Imenti North district, formed in 2006 was part of Meru Central district, which was split in the year 2006, into Imenti North, Imenti South and Central Imenti districts. Having been formed recently, there is no data available on Imenti North district, therefore the description given below is that of Meru Central district.

The larger Meru Central is centrally located on the map of Kenya. It lays to the east of Mt. Kenya whose peak cuts through the southwest border of the former district. It shares borders with Laikipia district to the west, Nyeri and Kirinyaga districts to the southwest, Meru South district to the south, Tharaka district to the east and Meru North and Isiolo districts to the north. It lays within longitudes 37^0 and 38^U east. Meru Central straddles the equator lying within latitude 0^0 3' 45" north and about 2982 $km^2$of which Mt Kenya and Imenti forests cover 1030km^2 and the remaining 1952 km^2 is under human settlement (CBS, 1999).

3.1.1.1 Administrative structure

Mirigamieru West Division is sub-divided into 5 locations: Ntima, Municipality, Igoki, Ntakira, and Nthimbiri locations. These are further subdivided into 16 sub-locations. (District statistical office Meru Central, 2001)

3.1.1.2 Topography and Natural conditions

Mt. Kenya is the single most important feature that has influenced the natural conditions in the area. The wide range in altitude, 3,000 – 5,199m above sea level from the lowest point in Meru Central to the summit of Mt. Kenya has influenced the atmospheric conditions leading to a wide variety of microclimates and agro-ecological zones. The forested upper zones of the area are the catchment areas of the numerous rivers found there. The area is also endowed with five small lakes, located in the upper zones: Sacred Lake. Lake Rutundu, Lake Ellis, Lake Michaelson and Lake Alice.

Rains come in two seasons with the long rains occurring from mid March to May and short rains from October to December. In the recent past however, there has been a lot of climatic changes in the amount of rainfall received and the period when it comes.

3.1.1.3 Settlement patterns

According to the 2001 projected population, Mirigamieru West is the most densely populated division in the district, with a population of 77,053 people. The high population in Mirigamieru West division is mainly attributed to the population concentration within Meru municipality and its environs. There are pockets of poverty in the slums in the urban areas especially in Meru town (District statistics office Meru Central, 2001).

3.1.1.4 Demography

Imenti North district exhibits an age structure similar to that of Kenya. This includes a large proportion in the age 0-14, which gradually diminishes in the subsequent age groups. Persons aged 60 years and above make 5% of the population thus 24,944 elderly persons (CBS, 2004).

3.1.1.5 Health

Meru Central has slightly over 160 health facilities spread all over the district. There is a problem of accessibility of health facilities since the average distance to the nearest health facility is 7Km. There is only one doctor for every 33, 259, implying that most of the health facilities are manned by other cadres of health workers.

Table 2: Health and health facilities in the larger Meru Central region

Three most prevalent diseases	Malaria, Respiratory diseases, intestinal worms
Doctor / patient ratio	1: 33259
No. of hospitals (GOK)	3
No. of Mission hospitals	2
No. of Maternity Homes (private)	4
No. of Health Centers (GOK)	5
No. of Dispensaries (GOK)	21
No. of Dispensaries (private)	23
No. of clinics (private)	Over 100
Average distance to health centers	7km

Source: District statistics office Meru Central, 2001

3.1.1.6 Education Facilities

Table 3 shows the number of schools available in the area. Literacy level of adults is 67%. This data, however, is not segregated by age and thus does not indicate literacy levels among the elderly in the region. There are 122 literacy adult classes, locally referred to as "Ngumbaru" and refer to classes offered to illiterate adults on basic reading and writing skills.

Table 3: Education facilities in Meru Central region

Education Facility	
Pre-primary	
No. of pre-primary schools	380
Teacher / pupil ratio	1:30
Primary	
No. of primary schools	367
Teacher / pupil ratio	1:28
Secondary	
No. of secondary schools	72
Teacher / student ratio	1:16
Tertiary	
No. of other training institutions such as colleges and polytechnics	5
Main type of training institutions	Technical and Teachers Training
Adult Literacy	
No. of adult literacy classes	122
Literacy levels	67%

Source: District statistics office. Meru Central 2001

3.1.1.7 Agriculture

The main source of livelihood in Meru Central is farming.

Table 4: Agriculture in Meru Central

Average farm size (small scale)	1.1Ha
Average farm size (large scale)	680Ha
Main food crops produced	Maize, beans, potatoes
Main cash crops produced	Tea, coffee, pyrethrum
Main livestock bred	Cattle, sheep, goats
Main species of fish	Tilapia, common carps, mud fish, trout
Population of fish farmers	151
Main forest products	Timber, poles, firewood

Source: District statistics office, Meru Central 2001

3.1.1.8 Poverty Analysis

The most vulnerable groups affected by poverty are women, youth, and the aged and small- scale farmers. The number of those living in absolute poverty (rural and urban) is 41%. Its contribution to national poverty is 1.32%. The main causes of poverty include inadequate and unreliable rainfall hence crop failure, drought and lack of water in dry areas, inadequate land and landlessness.

The main problems faced by the elderly are increased poverty, lack of care and frequent cases of abandonment of elderly persons and inadequate shelter and health (GOK, 2005).

3.1.2 Study population

The study population comprised of elderly persons aged 60 years and above in Mirigamieru West division. The population of the elderly in this division is about 3,853

(5% of 77,053). The population of elderly persons in the four sampled locations (Ntima, Igoki, Ntakira and Nthimbiri) is 2505 (5% of 50105).

3.2 Research methods

3.2.1 Study design

The study was cross-sectional, with descriptive and analytical components. Both qualitative and quantitative data were collected. The study involved a household survey and anthropometric measures of elderly persons.

3.2.2 Sample

3.2.2.1 Sample size determination

Sample size was determined using Fisher formula as follows (Fisher et al, 1991):

$n=Z^2pq/d^2$

n= the desired sample size

z= the standard normal deviate chosen at 1.96 corresponding to 95% confidence interval

p= the proportion in the target population estimated to have characteristics being measured in this case estimated malnutrition prevalence among the elderly

q= 1-p

d= the level of statistical significance set (0.05)

50% malnutrition prevalence was used since malnutrition levels among the elderly at district level were unknown.

$n=(1.96)^2 (0.5)(1-0.5)/ 0.05^2$

n=384 households

Since the population of the elderly in Mirigamieru West division is less than 10,000 the final sample size was adjusted using the formula below:

nf = n / 1+n)/N

nf = the desired sample size (when the population is less than 10,000)

n = the desired sample size (when the population is more than 10,000)

N = the estimate of the population size

nf = 384/1.15

= 334 households

3.2.2.2 Sampling procedure

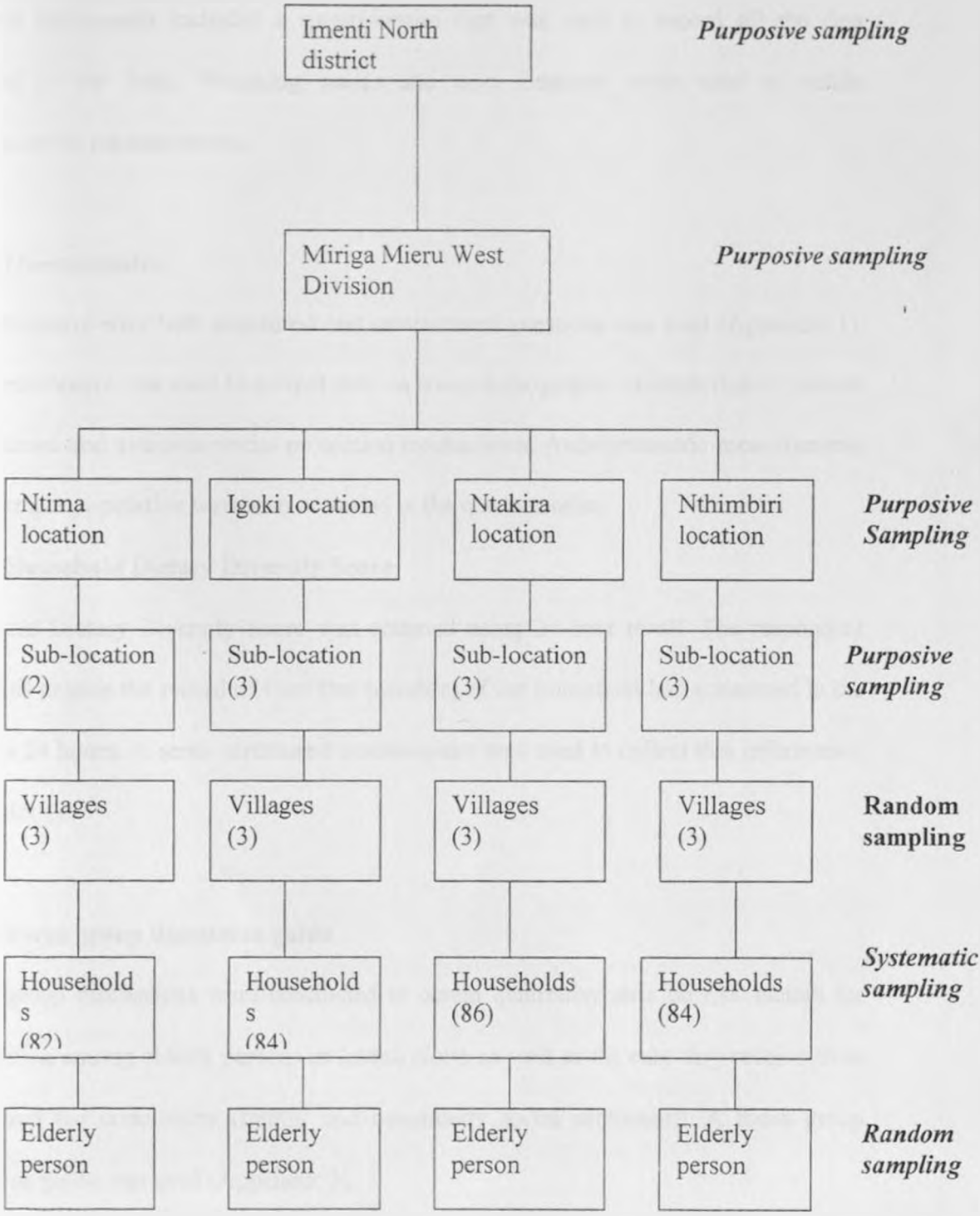
The sample was obtained through multistage sampling. In the first stage, the division of Miriga Mieru West was selected purposively, on the basis that it has the largest population compared to the other divisions in the district. Given that the population of the elderly is generally low in Kenya (about 5% of the total population), the large population increased the chances of getting the required sample size. In the second stage, locations were also selected purposively. Four locations (Ntima, Igoki, Ntakira, Nthimbiri) were selected, leaving out the municipality which comprises mainly the town as the study was designed for rural setting. All sub-locations in the locations were selected purposively (Upper Igoki and Tuntu from Ntima location; Gachanka, Lower Igoki and Muringombugi from Igoki location; Mburi, Nthimbiri and Kainginyo from Nthimbiri location) except for Ntakira location, where 3 sub-locations out of 5 were selected randomly (Ngonyi, Nchaure and Gituga). Villages were obtained through simple random sampling whereby, the names of all villages in each sub-location were written in small pieces of paper, the papers folded and put in a container, after which 3 villages were drawn from the container. The process was repeated for all the 11 sub-locations, yielding 33 villages. Households were selected through systematic sampling. The sampling frame consisted of all households with persons aged 60 years and above, which was developed with the help

of the sub-chiefs and village heads in the various sub-locations and villages. With the help of village heads, a list of households with elderly persons was drawn for the particular village. The total number of households was then divided by the desired sample size to yield the interval number. The interval number (k) was then used to sample households systematically by selecting every k^{th} household. In order to attain a sufficient sample size of elderly persons receiving pension, weighting was also done where all the households in a certain village with an elderly person receiving a monthly pension, as identified by the village heads, were included in the study. One elderly person was interviewed from each selected household. If a household had more than one elderly person, one person was selected randomly, whereby the names of the elderly persons were written on small pieces of paper, the papers folded and put in a container, after which one was drawn from the container. The elderly person whose name was drawn out became the respondent. This process yielded 337 elderly persons among which 50 received a monthly pension.

3.2.2.3 Inclusion and exclusion criteria

The study unit was the household. The inclusion criteria were households with elderly persons aged 60 years and above. The elderly person was the main respondent for data collection.

Weight and arm span was not obtained where the subject declined to be measured, was bed bound, too weak, disabled or completely bent.



2: Sampling schema

3.2.3 Research instruments / tools

Research instruments included a questionnaire that was used to record all the data collected in the field. Weighing scales and tape measures were used to obtain anthropometric measurements.

3.2.3.1 Questionnaire

A questionnaire with both structured and unstructured questions was used (Appendix 1). The questionnaire was used to collect data on socio-demographic characteristics, sources of livelihood and available social protection mechanisms. Anthropometric measurements of the sample population were also recorded in the questionnaire.

3.2.3.2 Household Dietary Diversity Score

Household Dietary Diversity Score was obtained using 24-hour recall. The respondent was asked to give the record of food that members of the household had consumed in the previous 24 hours. A semi- structured questionnaire was used to collect this information (Appendix 1).

3.2.3.3 Focus group discussion guide

Focus group discussions were conducted to obtain qualitative data on risk factors for malnutrition among elderly persons in Imenti North as well as the care they receive from family and the community (family and community social protection). A focus group discussion guide was used (Appendix 2).

3.2.4 Techniques of data collection

3.2.4.1 Anthropometric measurements

The methodology for taking anthropometric measurements was as described by Suraiya and Manandhar (1999). Measurements were done in duplicates and the average recorded. Values differing more than 0.5 were rejected and the measurements repeated.

Weight measurements

Body weight measurements were done near a support to assist the elderly person mount the platform of the weighing scale. Body weight was measured with the subject standing unsupported on adult weighing scale (Salter 462) placed on a smooth level ground. With the subject standing upright, unsupported on the weighing scale, feet together, wearing ordinary light clothing and looking straight ahead, the weight was recorded to the nearest 0.5Kg. The procedure was repeated to obtain a second reading and the average weight calculated and recorded. Scales were checked daily by measuring the weight of a team member and weekly using items of known weight. The scale was able to take a maximum weight of 100Kg.

Arm span

The arm span was used as an estimate of the height. The elderly person, wearing light clothing, was asked to stand with the back against a wall or a smooth upright support. With arms, wrists and fingers facing forward and horizontal in straight line. a flexible, non stretch steel tape was then extended from the tip of the middle finger of the left arm to the tip of the middle finger of the right arm straight across the chest. With the tape taut and arms straight and horizontal, the arm span was recorded to the nearest 0.5cm. The arm span, taken in cm was then converted into meters and the procedure repeated to

obtain a second reading. The two readings were used to calculate the average figure which was then recorded. The number of elderly persons measured this way was 302.

Half span

If the elderly person could not straighten his/ her fingers because of a condition such as arthritis, half span was measured using the less affected hand. The person was asked to stand with their back against a wall or doorpost for support. The measurer put her finger on the middle of the person's chin and slid it down the front of the person's throat to a bone at the base of the neck which is shaped like a U, and marked the middle of this spot using a soft pen that rubs off easily. The person was asked to stretch their arm with the palm of the hand facing forward. The elbow, wrist and hand were held out straight. The end of the tape was placed at the end of the middle finger of the outstretched arm and stretched along the arm to the point with a mark at the base of the neck. The measurement was taken at the marked point to the nearest 0.5 cm and the procedure repeated to obtain a second reading. The two readings were used to calculate the average figure which was then recorded. Elderly persons measured this way were 30.

MUAC

This was taken on the left arm. The unit of measurement was cm. The subject was asked to sit or stand and uncover their left arm as far as the shoulder. The hand was bent and the lower arm placed across the stomach, with the person looking straight. The tip of the bone at the back of the shoulder as well as the tip of the elbow was marked and the distance between the two marked spots was measured. This measurement was divided by two and the halfway point marked. The person was then asked to move their arm so that it hangs at their side. The tape was wrapped around the arm at the marked halfway point, making sure that the tape fit comfortably. The measurement was taken to the nearest

0.1cm and the procedure repeated to obtain a second reading. The two readings were used to calculate the average figure which was then recorded.

3.2.4.2 Dietary intake

Household Dietary diversity

The number of food groups taken in the last 24 hours was used to assess household dietary diversity. The respondents were asked to name all the foods consumed over the last 24 hours, including foods that had been consumed by other household members. The total number of food groups was then determined to yield Household Dietary Diversity Scores. 12 food groups were used: cereals and cereal products; milk and milk products; sugar and honey; oils / fats; meat, poultry and offal; pulses; roots and tubers; vegetables, fruits, eggs, fish and sea foods; miscellaneous (spices, chocolates, sweets, beverages etc)

3.2.4.4 Focus Group Discussion

Two focus group discussions consisting 10 elderly persons each who were not in the study sample were conducted using a Focus Group Discussion guide (see appendix 2). The information collected included the community's definition of old age as well as the common challenges associated with aging in the area

3.2.5 Ethical and human rights considerations in research

A research permit was obtained from the government of Kenya. Consent was sought from the local authorities before the research was undertaken. Consent was also sought from the respondents before administering the questionnaire; after clearly explaining the objectives of the study. The information obtained from the respondents was handled with

confidentiality. During the interviews the respondent could terminate the interview at will. The respondent was treated with respect and dignity and their interest was put first.

3.2.6 Recruitment and training of field enumerators

3.2.6.1 Recruitment

The data were collected with the aid of four enumerators (2 males and 2 females) recruited from the study area. The enumerators had a minimum academic qualification of Kenya Certificate of Secondary Education, spoke the local language fluently and had good communication skills. The selection of enumerators was done through interviews. A poster advertising the positions was put up in one of the local churches, after which interested candidates made applications. The interview had both oral and practical aspects. Candidates were required to read and translate the questions into the local language as well as demonstrate how to take weight measurements. The best four enumerators were then selected based on the ability to translate questions into the local language and knowledge on taking anthropometric measurements.

3.2.6.2 Training

A two day training of the enumerators was done, based on a training module prepared earlier by the principal investigator (Appendix 3). During the training enumerators were equipped with technical capabilities of taking anthropometric measurements, data collection technique using questionnaires appropriate language use and research ethics

3.2.7 Data collection process

Data were collected between the month of July and August 2009. An average of 15 questionnaires was collected daily, for a period of 30 days. The local language was used

n oral interviews and the response recorded in English on the questionnaire as accurately as possible. In cases where one was not able to translate the answer given into English, the response was recorded as given (in local language) and discussed during daily review to come up with the right translation, which was then recorded.

3.2.8 Data quality control/ assurance

Data collection tools that are relevant and easy to understand were designed (Appendix 1). Questions in the questionnaire were phrased in simple and clear language. Field assistants were trained on how to administer the questionnaires and fill them properly. The questions were asked in the local language. To avoid distortion, field assistants were taken through every question, its interpretation and translation into the local language. The questions were translated during oral interviews.

3.2.8.1 Pre-test of tools

Pre-testing of the questionnaires and other data collection tools was done to make sure that the questions are well understood by respondents and filled correctly by the field assistants. The actual data collection started after corrections were made on the questionnaires based on feedback that was obtained from the pre-test. The corrections and reconstruction of the pre-tested questionnaire was done with the help of professional and technical assistance of two research supervisors.

3.2.8.2 Data quality control

Supportive supervision was done on field assistants, as they collected data. The weighing scales were calibrated regularly to ensure accuracy. This was done daily by taking the weight of a team member, whose weight was known and weekly by taking the weight of

a particular item of known weight. Adjustments were the done to ensure the scale reading the correct weight. The questionnaires filled each day were checked and each question was reviewed at the end of the day. Discussions were also held at the end of the day, with field assistants, to identify problems encountered and how to go about them. When errors were detected, such as unrealistic anthropometric measurements, the enumerator was asked to go back to the respondent the following day and get the correct measurements. In the field, questionnaires were put in secure folders and later stored in a wooden box.

3.2.9 Data management and analysis

3.2.9.1 Data entry and cleaning

Data entry templates were used to enter data into the computer for data summary using SPSS software. Upon completion of data collection, the data was entered into the computer. Data cleaning, recoding and or post data collection coding was carried out. Any outliers in each question were omitted from calculations of means.

3.2.9.2 Data analysis

Data was analyzed using the SPSS software. Data analysis included descriptive statistics. BMI of the elderly was computed using weight and height/ arm span using the formula: BMI=weight (Kg) /Height (m) ^{2} after which prevalence of malnutrition was determined. The nutritional status was categorized into severely underweight (BMI<16), moderately underweight (BMI 16 - 18.49), normal (BMI 18.5 – 24.9), overweight (BMI 25 – 29.9) and obese (BMI>30) according to WHO (1995) BMI cut-off points for adults. Social protection mechanisms were categorized into: State led interventions, Community and Family social networks .The Chi-square, ANOVA and Odds ratio were used to test hypothesis. Difference in outcome variables was tested at p=0.05.

4.0 RESULTS

4.1 Demographic characteristics of study population

The respondents of this study were elderly persons aged 60 years and above. The survey covered a total of 337 households where 337 elderly persons (49.2% males and 50.8% females) were interviewed and their nutritional status assessed.

4.1.1 Household size

The size of households with elderly persons ranged from 1 to 8 with a mean of 2.97. The mean number of elderly persons per household was 1.4. The dependency ratio was 2.

4.1.2 Distribution of the households by age and sex

The male: female ratio was 1:1.2 (Table 5).The ages of household members ranged from 1 to 109 years. The total number of elderly persons in the households was 462 (46.5% males and 53.5% females), with a mean age of 71 years (Fig3). Four elderly persons were aged above 100years (102, 103, 105 and 109 years) and were excluded from the calculation of the mean as they were outliers.

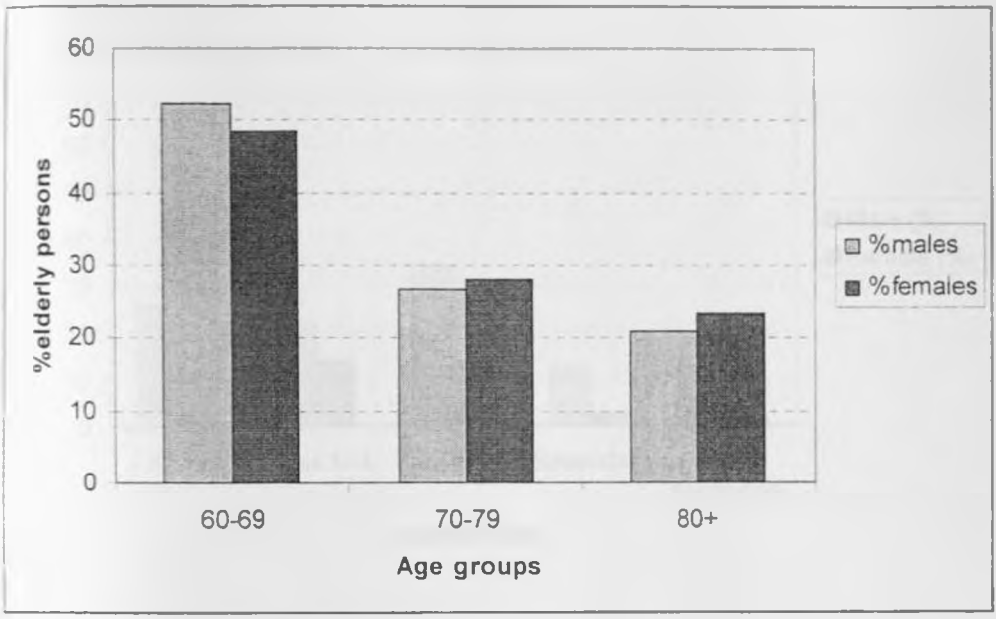


Fig. 3: Distribution of elderly persons by age

4.1.3 Education level of study population (elderly persons)

Literacy levels among elderly persons were low, with 48.5% having not attended school at all. Fig. 4 shows that more elderly females (68%) lacked formal education, compared to elderly males (26%). There was a significant difference between the level of education of males and females (Chi square p=0.000).

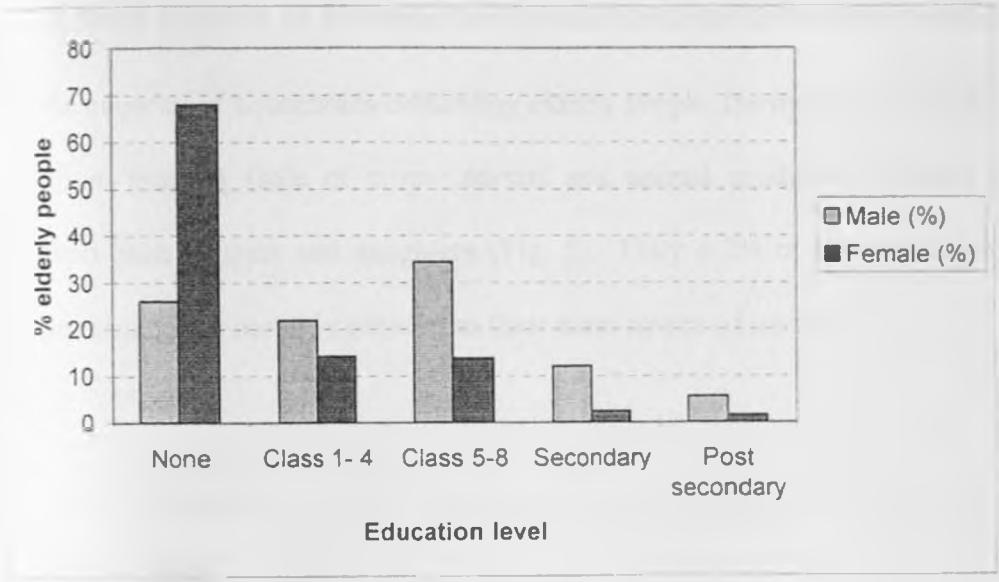


Fig 4: Education level of elderly persons

4.1.4 Marital status of elderly people

Table 6 shows the distribution of elderly persons by marital status. More elderly women were widowed compared to elderly men (43.7% and 24% respectfully).

Table 6: Marital status of elderly people

Marital Status	Male (%)	Female (%)	Total
Married	86	48.2	65.8
Divorced / separated	1.9	6	4.1
Widowed	24	43.7	28.6
Single	0.9	2	1.5

4.1.5 Main source of income for households with elderly persons

For the majority of households containing elderly people, the main source of cash income was from farming (sale of crops, animal and animal products) followed by family members such as sons and daughters (Fig. 5). Only 4.2% of households with elderly persons relied on a monthly pension as their main source of income.

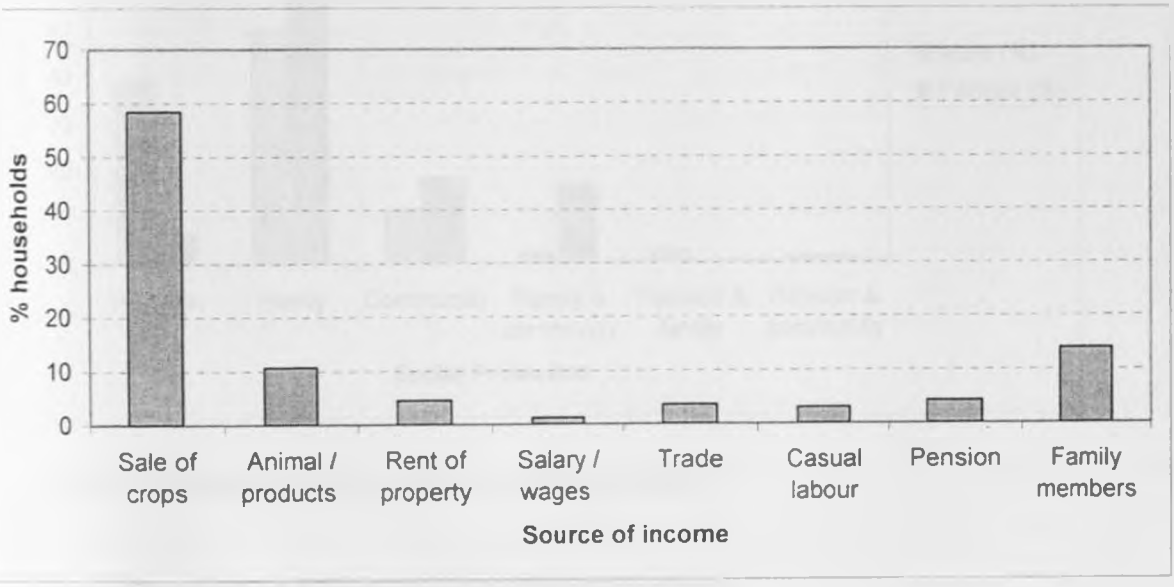


Fig. 5: Household main source of income

4.2 Social protection mechanisms available to households with elderly persons

Out of the 337 (107 males, 123 females) elderly persons interviewed, 68.2% reported receiving some form of social protection. More males than females did not have any social protection (56% males and 38% females respectively) The types of social protection mechanisms identified in the study area were: monthly pension, family and community social networks. Elderly persons receiving financial assistance from family members such as adult children were categorized as receiving family social protection,

whereas those receiving financial assistance from community such as belonging to a support group (such as merry go round) were categorized under community social protection. Fig 6 shows the distribution of elderly persons by social protection mechanisms.

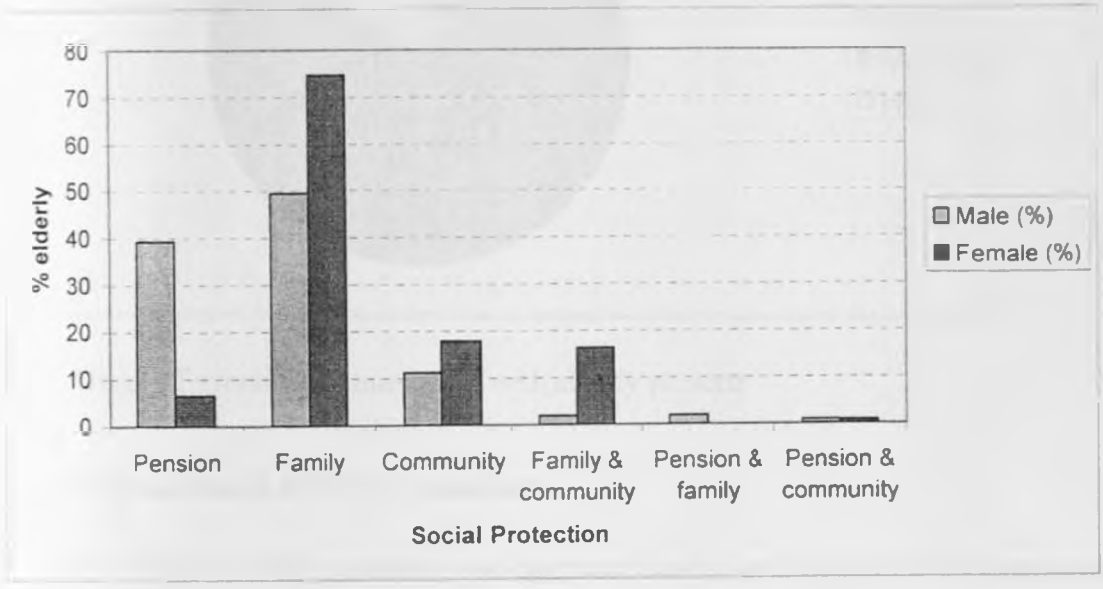


Fig. 6: Social Protection types available for elderly people

4.3 Dietary Diversity of households with elderly persons

Household Dietary Diversity Score was determined to assess the usual diet of households, using a recall period of 24hours.The mean number of food groups consumed was 6.5 (CI: 6.29, 6.72; SD: 2.00). Majority of the households consumed more than 4 food groups, that is, medium and high Dietary Diversity Score (68.5 % consumed 5-8, 15.7% consumed 9-12) whereas 15.7% consumed 1-4 food groups, categorized as low dietary diversity. HDDS was not affected by the age categories of elderly persons as there was no significant difference in the mean HDDS between different age categories (ANOVA p=0.915).

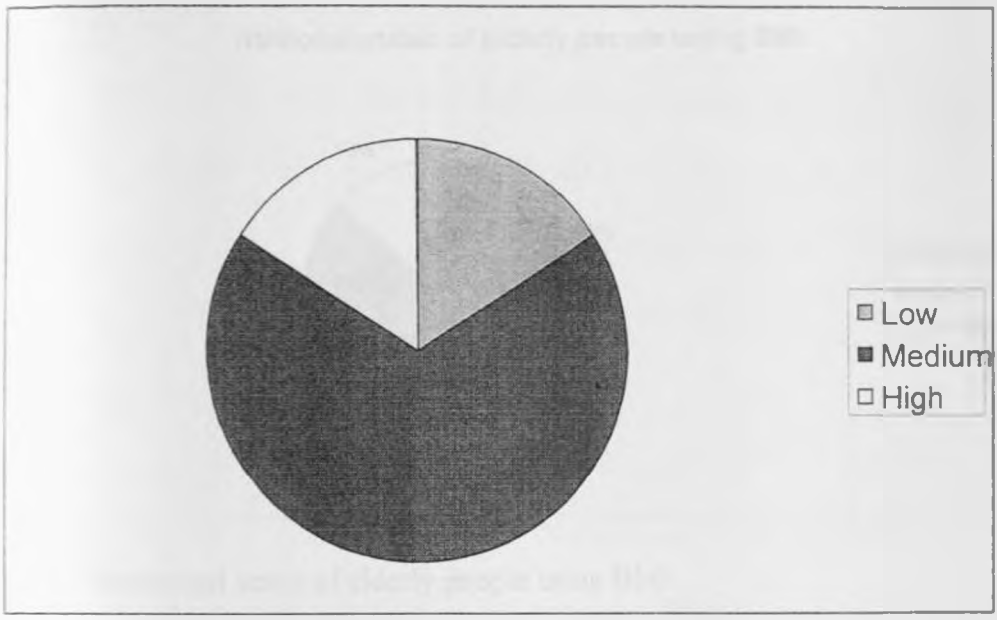


Fig. 7: Dietary Diversity of households with elderly persons

4.4 Nutritional status of study population

Nutritional status of elderly persons was determined using anthropometric measurements (weight, arm span and MUAC)

4.4.1 Nutritional status of the elderly using BMI

Body Mass Index generated from arm span (BMA) was computed from measured weight and arm span (BMA – weight in Kg / arm span in metres ^{2}). The measurements were obtained from 332 out of 337 (98.5%) subjects. Weight / arm span was not obtained where the subject declined to be measured, was bed bound, too weak or disabled.

Using cut- off points <18.5 for thinness (under nutrition) and >30.0 for obesity, gives an overall prevalence of 38.1% (fig. 5) for thinness and 3.3% for obesity.

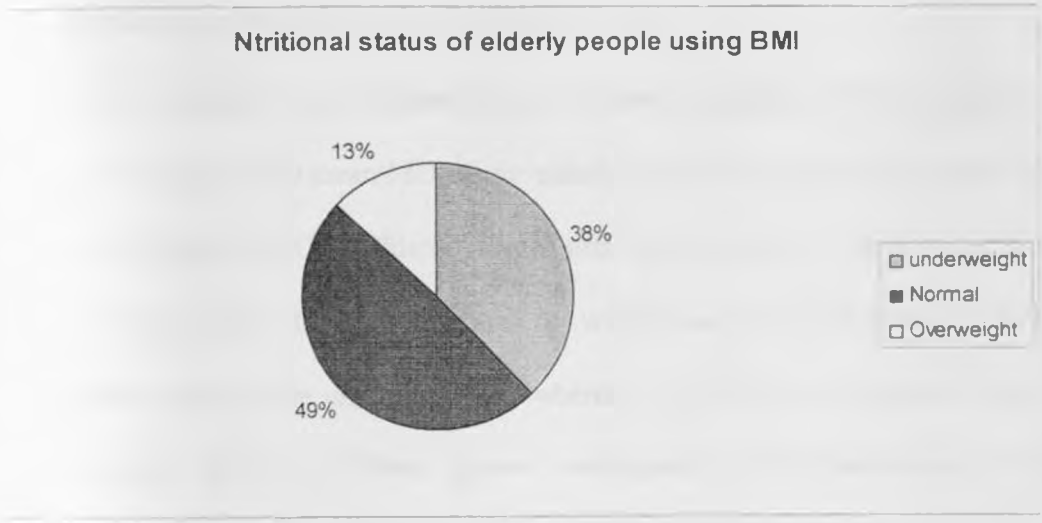


Fig 8a: Nutritional status of elderly people using BMI

BMI varied according to gender. More women than men were obese (5.4% and 1.2% respectively) whereas more men than women were severely underweight (17.2% and 7.7% respectively) as shown in Fig. 8b. The difference in nutritional status was statistically significant (Chi-square p = 0.028). Nutritional status as determined by BMI did not follow an age trend. There was no significant difference in the nutritional status of elderly people at different age categories (Chi square p=0.199).

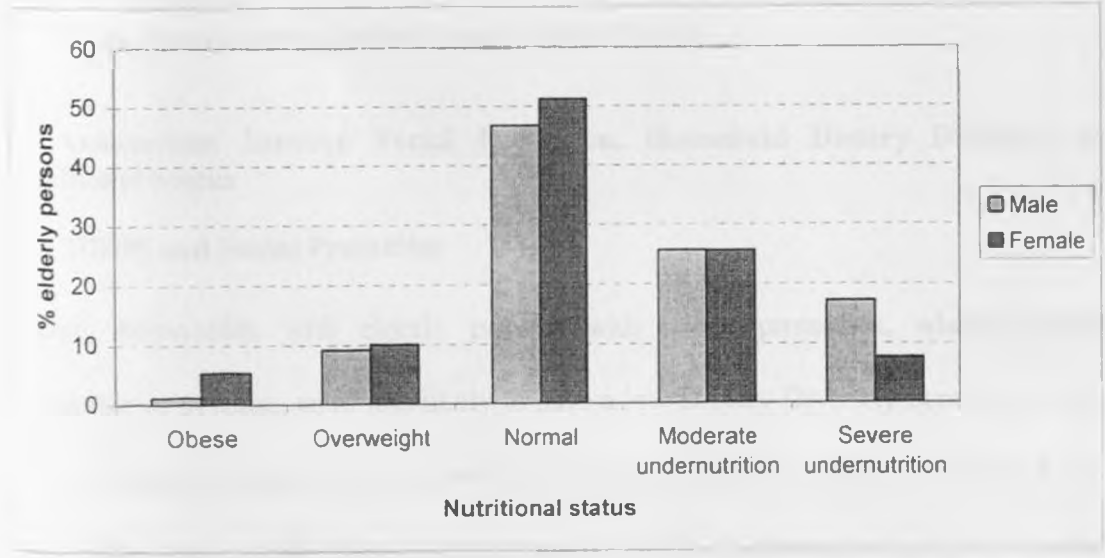


Fig. 8b: Nutritional status of the elderly by sex

4.4.2 Nutritional status of the elderly using MUAC

MUAC measurements were obtained from 317 elderly persons or 94% of subjects (156 males, 161 females). The mean MUAC for elderly men was 26.0 (CI: 25.4, 26.5; SD: 3.2) whereas the mean MUAC for elderly women was 26.8 (CI: 26.2, 27.4; SD: 3.9) Based on the WHO cutoff points for MUAC (22cm for women and 23cm for men), 9.3 % (15) of the assessed women were undernourished whereas 17.3% (27) of the assessed men were undernourished (Fig. 9). These figures correspond to the prevalence of severe malnutrition as determined by BMI (17.2% for males and 7.7 for females).

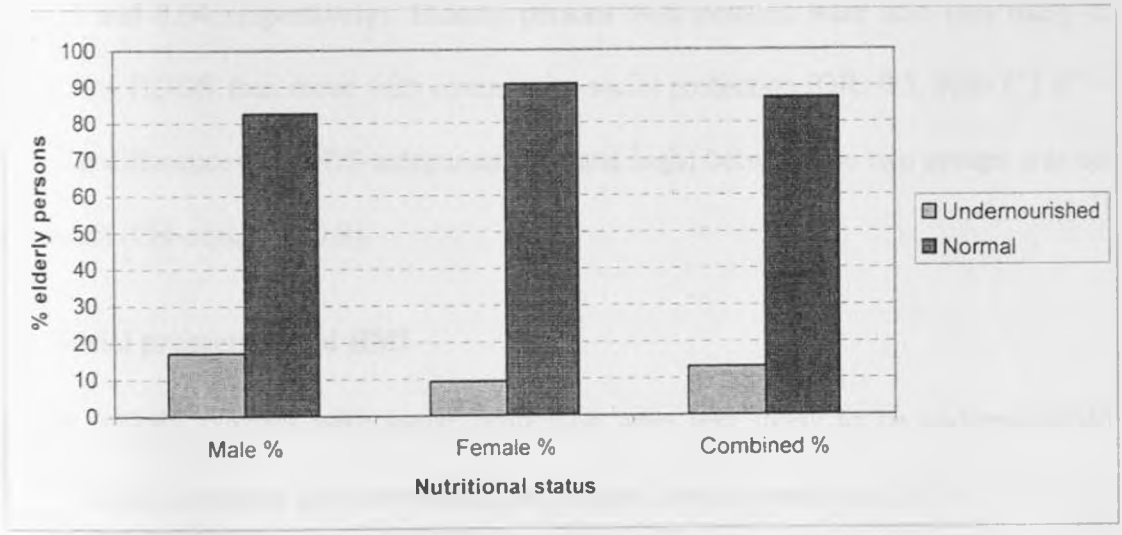


Fig. 9: Nutritional status of elderly people using MUAC

4.5 Associations between Social Protection, Household Dietary Diversity and Nutritional Status

4.5.1 HDDS and Social Protection

Overall, households with elderly persons with social protection, whether family, community or pension, were less likely to have a low Dietary Diversity Score (1 – 4 food groups) compared to those without any form of social protection (OR: 0.5, 95% C.I. 0.3 – 0.9). There was a difference in the means of HDDS between the groups of elderly

persons receiving different types of social protection (family, community and pension).The form of social protection received by elderly persons significantly affected the number of food groups consumed in households with elderly persons (ANOVA p=0.033). Elderly persons receiving a monthly pension were less likely to have a low HDDS compared to those with family social protection (OR: 0.4. 95% C.I 0.3 - 2.1) whereas those with family social protection were less likely to have a low HDDS compared to those with community social protection. The difference in HDDS categories (low and high) in both cases was, however, not statistically significant (Chi-square p=0.115 and 0.64 respectively). Elderly persons with pension were also less likely to have a low HDDS than those with community social protection (OR: 0.3, 95% C.I 0.7 – 1.3). The difference in HDDS categories (low and high) between the two groups was not significant (Chi-square p=0.9).

4.5.2 Social protection and BMI

Overall, elderly persons with social protection were less likely to be undernourished (BMI < 18.5) compared to those without any form of social protection (OR: 0.7, 95% C.I. 0.4 – 1.4). The type of social protection received by elderly persons however, (pension, family and community), significantly affected their BMI (ANOVA p=0.002). The nutritional status of elderly persons was different between the groups receiving different social protection mechanisms. Among elderly people with social protection, those that received a monthly pension were less likely to be undernourished compared to those that had family social protection (OR: 0.4, 95% C.I. 0.15 – 0.9) whereas those with family social protection were less likely to be undernourished compared to those with community social protection (OR: 0.62, 95% C.I. 0.3 – 1.4). In both cases the difference

in nutritional status was statistically significant (Chi-square p=0.026 and 0.24 respectively). Elderly persons on pension were also less likely to be undernourished compared to those with community social protection. The difference in nutritional status between the two groups was statistically significant (Chi-square p=0.006).The null hypothesis was thus accepted.

4.6 Risk factors for low BMI

Chewing difficulties were reported by 41.2 % and elderly people reporting this problem were more likely to be thin (BMI<18.5; OR= 1.2, 95% C.I. 0.7 – 1.8) Morbidity was high among elderly persons with 75.7% of the subjects reporting having been ill within the previous 2 weeks.

4.6.1 Risk factors for nutritional vulnerability

Focus Group Discussions yielded responses regarding the definition of an elderly person: Those who had children, those who were 70 years and above as well as those who belonged to certain age groups or had witnessed certain historic events.

Elderly persons noted that poverty affected their quality of life. They lacked money to access adequate food and healthcare. It emerged that a web of many issues particularly taking care of their grand children, compounded their poverty situation. The major problem faced by elderly persons interviewed was lack of resources.

The main activities of an elderly person, as identified in the Focus Group Discussions were looking after the homestead to ensure things were running as they should, taking care of grand children and their spouses.

Elderly persons reported that their changing roles in the society and family affected them psychologically. Elderly persons said that they were saddened by their weakened ability to continue tending for themselves. They also felt bitter with their children, whom they alleged had neglected them, saying that only 10% of the households with elderly persons in the area received regular help from their children and grandchildren. However, elderly persons felt that the girl child was generally more supportive to her parents than the boy child. In addition to this elderly persons felt disrespected by the society as a whole.

When asked how they dealt with the mental stress that came with old age and their new status in the community, elderly persons reported that they simply learn to live with it. Most elderly persons indicated that the extended family, as a social institution caring for them has weakened. They have been left out to care for themselves and although sometimes they got help from their children, it was irregular and inadequate.

It was identified that elderly persons taking care of orphaned children in the study area did not receive any help from the community. Orphaned children were left in their care, a responsibility they take as they grapple with chronic poverty.

To help cope with their challenges, elderly persons came up with various strategies. At family level, they want their families to take care of them and respect them; saying that mental stress caused by their families increased health problems. Some reported that they wanted establishment of homes for the elderly in the area, where they could be taken care of. At state level, elderly persons said that they would like a certain amount of monthly cash transfers in order to meet their needs and the needs of their dependants. Elderly

persons indicated that they could help themselves by forming small groups to run income generating activities but that they would need help in getting capital.

By implication, lack of social support systems, poor social integration and reduced social contact all impact on elderly persons, resulting in increased isolation and loneliness. This in effect has been translated into poor eating patterns hence an increased risk of malnutrition amongst elderly persons.

5.0 DISCUSSION

5.1 Demographic characteristics of the households

At the house hold level, the size and the composition of the household was established to describe the context within which the study was carried out.

The mean household size was found to be 2.97 a value lower than the national figure of 5.0 (CBS, 2004). This mean represents the mean of households with elderly persons. The low mean may be attributed to the fact that only households with elderly persons were surveyed and hence are not representative of all households. The higher proportion of females reflects their higher proportion in such elderly populations (HelpAge International, 2000). More elderly women were widowed compared to elderly men, reflective of the difference in life expectancy of men and women with that of men being lower. The male: female ratio of household members was found to be 1:1.2 typical of developing countries.

Literacy among respondents was low with 48.5% having not attended school at all. Elderly men had a significantly higher education level (chi square p=0.00) and this may be attributed to the traditional setting of the community where parents preferred to educate the boy child more than the girl child.

5.2 Social Protection mechanisms available to elderly persons

Social protection has gained recognition from the Government of Kenya as a means of helping people deal with their vulnerabilities (GOK, 2007). The study identified three forms of social protection (family, community and monthly pension) with majority of elderly persons (68.2%) reporting receiving some form of social protection. The main form of social protection received by elderly persons in the study area was from family members (43%) such as children. There was a high rate of dependency on family members for financial support, indicating a highly vulnerable group. The dependency ratio of the study population was found to be 2. Elderly women were particularly financially dependent which may be explained by the fact that in a traditional African society most women were dependent on their spouses for income. During focus group discussions, however, elderly persons reported that the help received from family members was both irregular and inadequate and that only 10% of the households in the study area received regular assistance from family members. This reflects the disintegration of the traditional set-up that provided care and support through the family and community social networks that was taken for granted in the past (HelpAge International Africa Regional Development Centre, 2008).

Important sources of income were the sale of agricultural produce and animal and animal products. The number of elderly persons who were supported by a monthly pension (14.8%) was higher than the national figure of 5% according to a study done by Kakwani, Son and Hinz (2006). Majority of elderly persons receiving a monthly pension were males (84%). This may be explained by the finding that males had a significantly higher

education level than females and therefore were more likely to have had formal employment before retirement.

5.3 Nutritional Status of elderly persons

The overall prevalence of malnutrition (BMI<18.5) was 38.1%, a figure higher than 29.8% observed among elderly men and women in Nairobi and Machakos districts (Wagah *et al*, 2000). The prevalence of under nutrition was more pronounced among the males than females, a trend similar to what was observed in Nairobi (32.6% and 12.8% respectively) and Machakos (32.3% and 24.7% respectively). In their report (Wagah *et al*. 2000) the prevalence of malnutrition was found to be higher in the rural area (Machakos) compared to the urban community in Kibera. The anthropometric results of this study can be generalized to elderly people living freely in the community and suggest that elderly persons in less industrialized countries are at nutritional risk, possibly resulting from the rapidly changing socio-economic and demographic status of the population in general. In the current rate of development the extended family concept is gradually breaking because most young people are moving to the urban settings in search of employment, leaving the elderly at home (HelpAge InternationalAfrica Regional Development Centre, 2004).

A nutritional assessment in Tanzania observed a higher prevalence of malnutrition among women (10.6%) than men (7.6%) (Tayie *et al*, 2004). In their report they found severe under nutrition to be more prevalent among elderly women (2%) than in elderly men (0.8%). This observation is the reverse of what was observed among elderly persons in Imenti North district where severe under nutrition was found to be more prevalent among

males (17.2%) than females (7.7%). In comparison to the results observed in this study, a recent study in rural Malawi showed a similar trend in under nutrition prevalence among elderly males (36.1%) and females (27%). The study results show that more males than females lacked social protection and this may explain why under nutrition was more prevalent among the males.

Elderly persons, during focus group discussions, identified several issues that affected them. This included psychological problems caused by lack of care and respect from family and community and lack of resources. Other factors observed were chewing difficulties (41.2%) and high morbidity (75.7% ill within previous two weeks) levels among the elderly. These factors contributed to nutritional vulnerability and explain the high prevalence of under nutrition. A small proportion of elderly persons, however, were obese (5.4% women, 1.2% men).

In a nutritional assessment in Ghana the prevalence of under nutrition was observed to increase with advancing age in both sexes (Tayie et al, 2004). As in other studies done in Kenya (Busolo,2001), however, the nutritional status of elderly persons as determined by BMI did not follow an age trend as there was no significant difference in the nutritional status of the study population at different age categories (chi-square p=0.199).

5.4 Dietary Diversity of households with elderly persons

Regarding food consumption sample households consumed a mean of 6.5 (CI: 6.29, 6.72; SD: 2.00) food groups. Majority of the households (84.2%) consumed more than 4 food

groups whereas 15.7% consumed 1-4 food groups. Household Dietary Diversity Score is mainly used as a proxy of food security and reflects a household's ability to cover basic energy needs of its members. Studies show that an increase in Dietary Diversity is associated with socio-economic status and household food security (Hoddinot and Yohannes, 2002; Hotley *et al*). A household that consumes an average of four different food groups implies that their diets offer some diversity in both macro and micro nutrients. However, Household Dietary Diversity is not directly related to the nutritional status of household members (Swindale and Blinsky, 2006). Despite the high proportion of households having high HDDS, the prevalence of under nutrition was high among the subjects. This may be due to poor intra-household division of food or inadequate portions sizes with regard to nutritional requirements.

5.5 Association between Social Protection, Household Dietary Diversity and Nutritional Status of the elderly

Elderly persons with any form of social protection (family, community and monthly pension) were less likely to have a low Dietary Diversity Score in their households (OR: 0.5, 95% C.I. 0.3-0.9) and were less likely to be under nourished (OR: 0.7, 95% C.I. 0.4-1.4) compared to elderly persons without any form of social protection. Further analysis indicates that among elderly persons with social protection, those who had a monthly income were less likely to have a low Dietary Diversity in their households and were less likely to be under nourished compared to those who had other forms of social protection, namely, family and community. This indicates that although social protection as a whole reduces under nutrition, a monthly income is a more effective means of reducing under nutrition among the elderly. Financial support from family, which was the main source of income for majority of elderly persons, is irregular and inadequate, and this explains why

elderly persons receiving this form of social protection were more vulnerable to under nutrition.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

A high prevalence of malnutrition was found in elderly persons living in Miriga Mieru west division, Imenti North district. Elderly persons are highly vulnerable to under nutrition, with a large proportion, particularly men, being underweight. Risk factors for malnutrition are poor health status and psychosocial problems.

The nuclear family remains a major source of financial support for elderly persons in Imenti North. This support is however irregular and inadequate with only 1 in 10 elderly persons receiving regular financial support from family.

Majority of the households with elderly persons have high HDDS indicating that they have economic access to a variety of foods. This however does not translate to good nutritional status of elderly persons.

A monthly income for elderly persons is a more effective means of reducing nutritional vulnerability among elderly persons, compared to other social protection mechanisms (family and community).

6.2 Recommendations

The findings from this survey indicate there is need for designing Nutrition Interventions focusing on the elderly. Assessment of the living conditions, degree of family support, accessibility of health services and care- giving responsibilities is essential in

determination of nutritional risk in elderly persons. There is need to conduct more studies in different communities in order to obtain more data on the condition of elderly persons which will help in designing interventions that will address their needs adequately. In addition, more detailed analysis of dietary intake of the elderly persons needs to be done at the community level, such as Individual Dietary Diversity or 24-hour recall to determine the exact dietary intake of elderly persons.

Given that the population of elderly persons in Kenya and in Africa as a whole has increased and is projected to continue increasing in coming years, long term planning of social welfare provision is required. This should include maintenance of reliable and appropriate levels of pension payments as they are major determinants of food security and therefore health in this age group. The integral existence of informal services, social support networks and kin support needs to be engaged and public-sector finance made available to support these systems.

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1. HOUSEHOLD IDENTIFICATION

Household no. …….. Village name…… sub-location…… Location……..

Interviewer …… Date of interview……..

The questions in this survey are for the elderly person. If there is more than one elderly person in a household, pick one at random to be interviewed about his / her household

2. HOUSEHOLD CHARACTERISTICS

2.1 Can you please tell me the names of all the members of your household who usually live here, sleep here and eat from the same bowl. First names are sufficient. This information is confidential and will not be shared with anyone. Names are only used in the interview and will not be related to data in the report. (*Make a list of all names before asking other questions*)

No.	Name	Sex 1=male 2=female	Age (to nearest yr)	Relation to HHH 1=head 2=spouse 3=son 4=daughter 5=grandchild 6=parent 7=other	Marital status 1=married 2=divorced 3=separated 4=widowed 5=single 6=N/A	Education level 1=none 2= primary 3=secondary 4=college 5=university 6=attending sch. 7=pre-sch. child	Occupation 1=unemployed 2=farmer 3=business 4=small scale trade 5=casual labour 6=employed 7=N/A
1							
2							
3							
4							

2.2 What is the household's main source of income? .....

1=Sale of crops
2=Sale of animal / animal products
3=Rent of property
4=Salaried or wage employment
5=Trade
6=casual labour

2.3 What was your occupation before retirement?.....

2.4 Are you on pension / other forms of social protection?.....

(1) Yes (2) No

2.5 If yes above, which form?.....

1= Public
2= Private
3=Cash transfers from Help Age International or other Non governmental Agencies

3. INCOME

How much income did you get from the following in the last one year?

Source	**Amount (Ksh)**
Pension	
Sale of crops	
Sale of goats	
Sale of sheep	
Sale of cows	
Sale of chicken	
Source	**Amount (Ksh)**
Sale of milk	
Rental property (houses)	
Labour	
Other	

4. FOOD SECURITY

3.1 Have you had any food shortages in the last one month?.....

(1) Yes (2) No

3.2 If yes how often? .....

(1) rare (2) sometimes (3) often

3.3 In which of these categories would you place your household?..... 1=food secure 2= food insecure 3=don't know

4. CARE AND FUNCTIONAL ABILITY QUESTIONNAIRE

No.	Social economic risk factor 1=Living alone 2=Physically disabled Care of children/spouse= Loss of children or spouse=4 Loss of land=5 Loss of animals=6 Chewing difficulties=7	No. of dependants under your care	Mobility Uses support=1 <1km=2 1-2 km=3 >2km=4	Able to Cook=1 Feed=2 Dress=3 Bath=4 N/A=5	Need help to Get food from source=1 Get water from the source=2 Food preparation=3 Get fuel=4 Milling=5 No need=7 Other specify=8	Who helps Husband=1 Wife=2 Son=3 Daughter=4 Brother=5 Sister=6 Neighbor=7 Daughter in law=8 Son in law=9 Community=10 Grandson=11 Grand daughter=12 Charity=13 NSA=14 Other (specify)=15	Helpers are Friendly=1 Respectful=2 Respect beliefs=3 Respect privacy=4 Consult us=5 Not kind=6 Other (specify)=7

5. MORBIDITY

No.	Have you experienced any illness in the last 30 days?	If yes, what were you suffering from? Back pains=1 Abdominal pain=2 Joint pains/arthritis=3 Fever/malaria=4 Poor eyesight=5 Poor chewing=6 Coughing=7 Scabies=8 Constipation=9 Hypertension=10 Headache=11 Diabetes=12 Ulcers=13 Any other =14	If sick treated where? Health Facility=1 Private=2 Traditional=3 Self=4 Spiritual=5 None=6 Other=7	Reason for not going to HF in last 30 days No money=1 Weak=2 Too far=3 Use traditional medicine=4 Not sick=5 Staff unkind=6 Other (specify)	Habit: Take Alcohol=1 Smoke=2 Drugs=3 Sniff tobacco=4 Chew miraa=5 Non of above=6 Other(specify)	Observe any signs Edema=1 Immobile=2 Extreme weakness=3 Dehydrated=4 Kyphosis(bent back)=5 Mental disability=6

6. ANTHROPOMETRY

Older person No.	Household No.	AGE IN YEARS	SEX (1=male, 2=female)	WEIGHT (Kgs)	HEIGHT (Cms)	MUAC (Cms)	ARMSPAN (Cms)	HALFSPAN (Cms)

7. WATER AND HEALTH FACILITIES

7.1 What is your main source of drinking water?..... 1=tap 2=borehole 3=river 4=others(specify)

7.2 Do you treat your drinking water?..... 1=yes 2=no If yes how (specify)

7.3 How far is the water source?.....Km .....minutes (to reach)

7.4 Do you have access to health facilities? ..... 1=yes 2=no

7.5 How far is the nearest health facility? .....Km .....minutes

7.6 Which means of transport do you use to get there? ..... 1=Walking 2=Bicycle ride 3=Matatu ride 4=Other(specify)

7.7 Is the distance far or near for you? ..... 1=near 2=far

The interviewer should establish whether the previous day and night was usual or normal for the households. If unusual, another day is selected

Food group consumed: What foods groups did members of the household consume in the past 24 hours (from this time yesterday to now)? Include any snacks consumed.	Did a member of your household consume food from any these food groups in the last 24 hours? *1=Yes* *0= No*	*Codes:* 1= Own production 2=Purchases 3=Gifts from friends/ relatives 4=Food aid 5=Bartered 6=Borrowed 7=Gathering/wi 8=Others, specify____ 9=N/A
Type of food		**What is the main source of the dominant food item consum (Use codes above)?**
1. Cereals and cereal products *(e.g.maize, spaghetti, rice, bread)*?		
2. Milk and milk products *(e.g. goat/cow fermented milk, milk powder)?*		
3. Sugar and honey?		
4. Oils/fats *(e.g. cooking fat or oil, coconut milk ,butter, ghee, margarine)?*		
5. Meat, poultry, offal *(e.g. goat, beef; chicken or their products)?*		
6. Pulses/legumes, nuts *(e.g. beans, lentils, green grams, cowpeas; peanut,)?*		
7. Roots and tubers *(e.g. sweet potatoes, , cassava, arrowroot Irish potatoes)?*		
8. Vegetables *(e.g. green or leafy vegetables, tomatoes, carrots, onions)?*		
9. Fruits *(e.g. water melons, mangoes, grapes, bananas, lemon)*?		
10. Eggs?		
11. Fish and sea foods *(e.g. fried/boiled/roasted fish, lobsters)?*		
12. Miscellaneous *(e.g. spices, chocolates, sweets, beverages, etc)?*		

APPENDIX 2: FOCUS GROUP DISCUSSION GUIDE

Topic: Issues affecting elderly persons in Mirigamieru West division, Imenti north district

Time duration: 45 minutes

INTRODUCTION

Introduce team, participants and the general purpose of the discussion

MAIN DISCUSSION

General

- How does the local community define older men and women?
- What is the role of older people in the home, in the community? (probe care for children, food preparation, and household custodian)
- To what extent do older people normally contribute to household food resources / decision making?
- How do older people perceive their changing roles/statuses? (Probe for changing access to resources)
- How do old people cope with these changes? (probe for coping mechanisms)

Care and support

- How are older men and women normally taken care of in the household and community?
- How do older men and women feel about themselves? (probe for physical, psychological and social perceptions)

- Who gives physical, emotional / spiritual care to older men and women in this community?
- What role do children play in the care of older men and women? (Probe for direct children and grand children)
- What are the opinions of older men and women on support and care they receive at home, community and health facilities?
- What should be done by the family, community, agencies (State, NSA,) and older men and women themselves to improve their health / wellbeing?

CONCLUSION

Summarize discussion

Thank participants and give permission to leave

Team members

1. Facilitator
2. Note taker
3. observer

APPENDIX 3: TRAINING MODULE FOR TRAINING FIELD ASSISTANTS

1.0 Topics

1.1 Administering the questionnaire
1.2 Conducting the interview
1.3 Taking anthropometric measurements

2.0 Objectives

The main objective of the training is to enable the field assistants to collect quality and reliable data. The sub- objectives are as follows

- To make field assistants familiar with data collection techniques using questionnaires
- To equip them with appropriate language use and persuasion skills
- To equip them with technical capabilities of measuring weight and arm span of study elderly persons
- To make them aware of the interests and feelings of respondents and to keep the information to be collected confidential during and after the interview process
- To make them familiar with research ethics including the rights of the respondents
- To groom them on positive attitude, cleanliness and etiquette during the interview

3.0 Teaching / Learning Methods

- Lecture
- Role play
- Field practice
- Illustrations

4.0 Materials

- Flip charts
- Notebooks
- Pens
- Pencils
- Anthropometric instruments
- Model questionnaires