



Dietary and care practices and nutritional status of the elderly in Meru County, Kenya

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Abstract

Background: Elderly persons may lose certain functional and physiological abilities leading to poor dietary practices hence social support is pertinent to prevent nutritional and health problems. There is inadequacy of information on the association among dietary and care practices on the nutritional status of the elderly persons living in the rural community. The aim of this study was to assess the dietary and care practices in and the nutritional status of the elderly in a rural set up in Meru County, Kenya.

Methods: Cross sectional analytical study design was used. A sample size of 152 elderly persons was calculated using a formula by Fisher. Simple random sampling was used to select the respondents. Data was collected using researcher administered questionnaires which were validated using focus group discussion and observation check list. Data was analyzed using statistical package for social sciences (SPSS) software and Nutrisurvey computer package. Body Mass Index and mid upper arm circumference measurements were used to determine the nutritional status of the respondents using World Health Organization cut offs. Pearson correlation coefficient established the association among socioeconomic status, dietary intake and the nutritional status of the elderly.

Results: The study population consisted of 58% females and 42% males. The mean age was 71 years. The mean energy intake was 69% for men and 72% for women of the RDA. Intakes of protein, calcium, iron, zinc, and folic acid did not meet the daily recommendations. Living alone was noted in more than a quarter (25.6%) of the elderly persons. Results show that 39.4% elderly persons were underweight, 50.7% were normal and 9.9% overweight and obese. Household income, energy, protein and calcium intake, meal frequency, living alone were significantly associated with nutritional status of the elderly.

Conclusion: The dietary and care practices of the elderly were poor. Proper care of the elderly people can play a crucial role in enhancing their dietary practices hence better nutritional status. Strategies to improve the nutritional status of the elderly should target economic empowerment and behavior change and communication on care of the elderly to caregivers and the community at large.

Keywords: dietary practices, care practices, elderly, nutritional status, caregivers

1. Introduction

Optimal nutrition is critical for elderly people for various reasons. One, they suffer frequent illnesses which may cause loss of appetite, nausea and vomiting that interfere with food intake and nutrients absorption. Secondly, physiological changes such as reduced digestive juices, loss of teeth, taste and smell, sight and hearing, reduced absorption and altered metabolism affect food consumption, its digestion, nutrients absorption and utilization in the body. Reduced mobility also interferes with the ability to look for and prepare food ^[1]. Reduced dietary intake often results from age-related physiological changes, such as reduced appetite, early satiation, constipation and dementia. These factors synergistically affect food intake especially when no one is available to offer support and encouragement.

It is a common scenario today that problems of both under and over nutrition exist across the populations and the elderly are not an exception. Globally, studies show a high prevalence of malnutrition among elderly persons. Research findings show that up to 48% of the elderly in Sub-Saharan Africa (SSA) are underweight and 21% overweight ^[2]. Findings of a study done in East Africa Lake Victoria basin indicate that 26.4% of the respondents were underweight, 10.8% overweight and 4.5%

obese ^[3]. The elderly are also at an increased risk of micronutrient deficiencies such as calcium, iron, zinc, vitamin D, E and B12 ^[4]. This can be attributed to physiological and physical changes exacerbated by food insecurity especially in low income settings.

Household food insecurity in developing countries is an important cause of poor dietary intake. Factors associated with food insecurity among subsistent farmers and the elderly include poor income, inadequate farming land and lack of knowledge on modern farming techniques. A study done in the Nyanza Province, Kenya found that respondents did not take fish, poultry and eggs mainly because of poverty and some cultural taboos ^[5]. According to ^[6] a diversified diet is likely to be higher in dietary quality and has a greater potential to meet the recommended dietary allowances. *Rathnayake et al.* ^[7] found that nutrient adequacy increased with increasing food groups. The most commonly consumed food groups are cereals, roots, fats and sugar probably because of their affordability across many regions.

WHO ^[8] and Cook and Carter ^[1] recommend that elderly people should have at least three meals per a day. In addition, elderly people who are underweight or with low appetite should take snacks that are nutritious in between meals.

Elderly persons generally depend on their families for their meals. In the modern society, daily busy schedules leave very little time for meal preparation hence reduced family meals. Low socioeconomic status is impendence to attaining the recommended meals per a day. Due to inability to consume large meals, less than 3 meals a day the elderly are less likely to meet their RDAs for both macro and micronutrients.

The elderly are vulnerable due to loneliness and loss of interest in life especially if a partner dies or they have no other family or friends to offer support. They particularly need help in selection of the right foods, buying or obtaining and preparation of food and in carrying out other activities of daily living (ADL). In modern times, family structures have changed and many elderly people are living alone. Loneliness has been associated with decreased food intake resulting in poor nutritional status^[9]. In elderly persons, loneliness has been associated with negative effects such as anxiety, moodiness, depressive symptoms and poor social relationships. Moreover, better social interactions during meals have been shown to improve dietary intake among the elderly^[10]. observe that social isolation can lead to poor nutritional status as a result of decreased food intake. This study investigated the dietary and care practices of the elderly and their relationship with the elders' nutritional status.

2. Materials and Methods

Design

The study was cross-sectional by design and was conducted in Meru County, Kenya. It was intended to investigate the dietary (nutrient density, dietary diversity, food frequency) and care practices (ADLS, company during meals, living arrangement) and their relationship with the nutritional status of the elderly persons. Meru County was purposively selected being the 2nd in Kenya in population of elderly persons^[11]. Igembe South sub-county was purposively sampled out of the 9 subcounties as it is a typical rural set up and densely populated. The area is characterized by rough terrain, high poverty index and poor public health infrastructure. The main economic activity in the area is agriculture mostly *miraa* (khat) farming.

Study population

The study targeted elderly persons 60 years and above having been resident in the area for not less than six months prior to the study. Elderly people who were severely ill or on wheelchairs at the time of the study were not included as it was not possible to take their heights and weights. Sample size of 138 was calculated using Cochran formula (1963). Due to the anticipated non-response possibility, 10% was added arriving at a sample of 152. Simple random sampling was used to select the respondents from a sampling frame obtained from the area administrative office. A research permit was acquired from National Commission for Science, Technology and Innovation (NACOSTI). Ethical clearance was sought from Kenyatta National Hospital/ University of Nairobi Ethics and Research Committee (KNH-UoN ERC). The research

assistants were trained on study methodology, anthropometric measurements and interviewing techniques. Face to face interviews were conducted in the households once age was confirmed and the respondents had signed a written consent. Tools for data collection included a structured questionnaire, a focus group discussion guide and an observation checklist. The questionnaire (administered in the local dialect) was used to gather data on demographic and socio-economic characteristics and care practices. Assessment of dietary practices was done using a 24-hour recall and a 7-day food frequency questionnaire. Anthropometric measurements which included weight, height and arm span and MUAC were taken using a bathroom scale, stadiometer and adult MUAC tape respectively. The measurements were taken using the standard techniques for anthropometric measurements. Two Focus group discussions (FGD) were conducted to elicit information on community and household care and support for the elderly. The observation checklist was used to validate data collected through interviews by providing information on mobility, sight, hearing, care practices and food availability. Data cleaning and coding was done before entry then analyzed using the Statistical Package for Social Sciences (SPSS) software version 17. Dietary data was analyzed using the Nutrisurvey software. Body Mass Index and MUAC measurements were used to determine the nutritional status of the respondents using WHO cut-offs. Pearson correlation coefficient established the association among socioeconomic status, dietary intake and the nutritional status. A p value of < 0.05 was the criteria for statistical significance.

3. Results

Socio-demographic and socioeconomic data is presented on Table 1. There were slightly more women 58% than men 42% in the study. The mean age of the study population was 71 years ± 8 with a range of 35 years. Close to half of the study population (49.0%) was below 70 years. Dependants in this study included children below 18 years, adults and elderly people (>60years) who had no source of livelihood. Slightly over a half (63.4%) of the respondents had dependants and more than half of the dependants (50.8%) were between five and eighteen years.

Marital status is an important factor especially in older persons as it has implications for their health and nutritional status. Unmarried individuals are likely to be living alone hence may lack the so needed support in obtaining and preparation of food and company during meal times which enhances appetite. Results of this study indicate that 39.2% of the respondents were widowed while 3.9% were single or separated. The level of education of an individual may affect their economic status and food choices. More than half (64.4%) of the respondents did not have a formal education. Only 6.6% of the respondents completed primary school and 0.7% had some secondary school education. In regard to occupation, more than half (62%) of the study population was not involved in any income generating activities. Both qualitative and quantitative data revealed that majority of the elderly did not earn an income of their own hence depended on their caregivers for sustenance.

Table 1: Demographic and socio-economic characteristics of the study respondents

	Frequency(n=152)	Percentage (%)
Sex		
Male	64	42
Female	88	58
Age category		
60-69	75	49.0
70-79	48	31.6
80-90	23	15.1
>90	6	3.9
Marital status		
Monogamous married	67	43.8
Polygamous married	20	13.1
Widowed	59	39.2
Single/Separated	6	3.9
Number of dependants		
0	56	36.6
1-3	32	21.1
4-6	42	27.5
7-9	18	11.8
10-13	4	2.6
Level of education		
No formal education	98	64.4
Incomplete primary school	42	27.6
Complete primary	10	6.6
Incomplete secondary school	1	0.7
Complete secondary	1	0.7
Current occupation		
Casual worker	20	13.2
Self-employment	37	24.3
Unemployed	92	60.5

Dietary Intake of the Respondents

Intake of selected nutrients is presented in Table 2. Males had a higher mean energy intake than females (mean 1588 ± 653 and 1442 ± 590 respectively) although more females met the recommended dietary allowances (RDA) for energy. However, both sexes did not meet the RDA for energy. The mean intake of calcium and folic acid was also low and did not meet the RDA. The mean intake of iron met the RDAs although this was achieved by 82.7% of the respondents.

Table 2: Intake of selected nutrients by the elderly

Nutrient	RDA/AI*	Mean Intake	% Met RDA/AI
Energy(kcal)	2300 (Male)	1587.8	69.0
	2000 (Female)	1442.4	72.1
Protein(g/kg)	1	1.1	60.1
Calcium(mg)	1000	349.7	35.0
Iron(mg)	10	10.0	82.7
Zinc(mg)	11 (Male)	10.4	85.4
	8 (Female)	9.7	92.6
Folic Acid(ug)	400	213.0	53.2

*Source: WHO/TUFTS University, 2002

Dietary Intake by Age of the Respondents

Findings on dietary intake by age are as shown in Table 3. The age group 60-69 years had a higher dietary intake of both micro and macronutrients except for folic acid (221ug). The

70-79 years age group had the lowest intake except for calcium. Energy intake was highest in the 60-69 age group (1595 Kcal) and lowest in the 70-79 age group. However, no age group met the RDA for energy. Protein, calcium and zinc intakes reduced with increase in age of the respondents.

Table 3: Intake of selected nutrients and age categories of the elderly

	RDA/AI	Age Categories			
		60-69	70-79	80-89	>90
Energy(kcal)	2100	1595	1360	1471	1573
Protein(g/kg)	1	1.7	1.6	1.6	1.2
Calcium(mg)	1000	359	356	325	259
Iron(mg)	10	11.1	8.8	8.9	8.8
Zinc(mg)	8	12.1	8.4	9.1	8.5
Folic acid(ug)	400	221.7	188.7	236.4	200.9

Frequency of Consumption of Various Foods

Using a 7-day food frequency questionnaire, the study findings show that fats (73.7%), milk (65%) and dry beans (60%) were the most frequently consumed foods (5 times or more within 7 days). However, milk was mostly taken in tea hence the amount consumed per day was relatively low. The consumption of beef and eggs was very low; 30% consumed beef twice while eggs were consumed by 20% of the respondents three times 7 days preceding the study. Fish was not consumed by the respondents in the 7 days. Vegetables and fruits are good sources of micronutrients and most importantly fibre which helps to prevent constipation, a common problem in old age related to reduced motility in the gut. Consumption of fruits and vegetables was low as the two commonly used vegetables in the study area (kales and cabbages) were not consumed by 51% and 66% of the respondents respectively.. Ripe bananas were the commonly consumed fruits and only about 4% elderly had consumed them more than 5 times. A variety of fruits and vegetables were not consumed especially the indigeneous vegetables which are rich sources of micronutrients.

Table 4: 7-day food frequency for the elderly based on food groups

Food type	Frequency in 7 days (%)					
	Once	Twice	3 times	4 times	>5 times	Not consumed
Maize	10.2	12.7	21.7	5.7	10.2	35.6
Rice	18.5	22.9	14	14	8.5	19.1
Milk	4.5	5.7	7.6	5.1	65.1	10.8
Beef	22.9	7.0	0	0	0	70.1
Dry beans	2.5	8.3	17.2	8.9	59.9	1.3
Green grams	24.8	14.0	5.1	0.6	1.2	50.3
Kales	21.0	15.9	15.9	0.6	0.6	51.0
Cabbage	15.9	10.8	1.9	0.6	1.2	65.5
Bananas	19.1	21.7	15.9	3.8	3.8	32.5
Sugar	2.5	6.4	9.6	7.0	75	8.9
Eggs	7.6	5.7	1.9	0	0	81.5
Fats	1.9	2.5	9.6	7	73.7	4.5
Fish	0	0	0	0	0	100

Other Dietary Practices of the Elderly

A 24-hour recall was used to establish the number of meals

the respondents had in a day. The majority (69.8%) had three meals a day. However, only 2.7% of the respondents took the recommended 5 meals a day. The mean DDS was 3.4 ±1.6 that is indicative of a high DDS. A minimum consumption of three food groups 24 hours prior to the study is considered as the minimum DDS [20]. The majority (90%) of the respondents had the company of relatives and friends during meal times but about 10% elderly persons ate alone.

Table 5: Other dietary habits and functionality

	Frequency (N=152)	%
Meal frequency		
One	5	3.2
Two	27	17.9
Three	106	69.8
Four	10	6.4
Five	4	2.7
Individual DDS		
Low (<3)	33	21.6
Medium (3-4)	41	27.1
High (>4)	78	51.6
Activities of daily living	N	
Cook	120	79
Feed	147	97
Use the toilet	149	98
Company during meals		
Spouse	48	31.6
Son/daughter	39	25.7
Grandchild(ren)	42	27.6
Others	7	4.6
Alone	16	10.5

Care Practices of the Elderly

Family caregiving is the voluntary care provided by family members or friends to a member with a longterm health condition, disability or age related problem. Nearly half (47.8%) of the respondents had relatives as caregivers, who mostly were their children. Slightly more than a quarter (25.6%) stayed alone. Living alone was more rampant in the older elderly (33.3%) than the younger ones (30.6%). It was reported in the FGD that it was not uncommon to see the very old elderly living alone and fending for themselves.

Table 6: Living arrangement and age categories of the respondents

Caregiver	Age category							
	60-69(N=75)		70-79(N=48)		80-89(N=23)		>90(N=6)	
	n	%	N	%	N	%	N	%
Spouse	12	16.0	20	41.6	4	17.3	0	0
Other relatives	38	50.7	14	29.1	9	39.1	3	50.0
Non-relatives	2	2.6	3	6.2	7	30.4	1	16.6
None	23	30.6	11	22.9	3	13.0	2	33.3

Nutritional Status of the Elderly

According to WHO body mass index (BMI) categories, about two-fifths (39.5%) of the elderly were malnourished. Slightly over half of the study population had normal nutritional status while 7.2% and 2.6% were overweight and obese respectively. According to the MUAC categories, 3.3% of the elderly were severely malnourished, 25.7% moderately malnourished and 71% normal.

Table 7

Nutritional status	BMI category*(kg/m ²)	Frequency	%
Severely malnutrition	<16	13	8.6
Moderately malnutrition	16-18.5	47	30.9
Normal	18.6-24.9	77	50.7
Overweight	25.0-29.9	11	7.2
Obese	>30	4	2.6
	MUAC category* (cm)		
Severely malnutrition	<16	5	3.3
Moderately malnutrition	1-18.5	39	25.7
Normal	>23(men) 22 (women)	108	71

*WHO, 2013

Factors Associated with Nutritional Status of the Elderly

The nutritional status of the elderly was correlated to household income, nutrient intake and meal frequency. BMI increased with an increase in the average income earned by the households. The BMI increased with an increase in dietary intake. Meal frequency had a positive significant relationship with both MUAC (P=0.046) and BMI (P=0.017).

Table 8: Relationship between income, nutrient intake, meal frequency, living arrangement and BMI

	BMI	
	R	P value
Income earned by household	0.221	0.006
Energy intake	0.241	0.003
Protein	0.229	0.005
Calcium intake	0.308	0.021
Meal frequency	0.239	0.017
Living arrangement	0.393	0.038

4. Discussion

Age and gender are important factors contributing to quality of life and nutritional status of elderly people. In man ageing comes with changes which usually interfere with food acquisition, digestion and metabolism. In this study, there were slightly more females than males which is in consensus with the 2009 Kenyan census [12]. This may be attributed to longevity in women which is also supported by the fact that the oldest persons in the study were women.

In analysis of food groups, it was found out that the dietary intake of the elderly was poor. Their meals were predominantly starchy staples with maize and rice being the most common. This result is consistent with findings of several Kenyan and African studies [13, 14]. Dry beans were the main source of protein. Plant protein contains non-heme iron which has been found to be of lower biological value than animal sources iron [15]. Hence the elderly persons are at a risk of iron and Vitamin B12 deficiency. Meat consumption was very low. Milk consumption was high (78%) though lower than the findings of Chollet and others that reported 96% consumption of dairy products [16]. However, it was a common practice to consume milk in tea. No one had consumed eggs and fish, which are good sources of protein and vitamin D. Animal based proteins are an important part of the diet of the elderly as their nutrients are readily absorbed and provide key micronutrients such as calcium, iron, zinc, selenium and vitamins A and B12. Some of the factors identified by the elderly persons and caregivers as a bottlenecks in achieving

optimum diet included; lack of money, lack of or weak teeth, lack of appetite, inability to prepare food (for those who did not have caregivers) among others.

Fruit and vegetable consumption has been linked to reduced risk of morbidity especially chronic disease and mortality. Dark green and orange coloured vegetables and fruits are particularly nutrient dense but less consumed by the elderly people. In the current study, consumption of fruits and vegetables was also low. This finding compares to [17] who found that fruits and vegetable intake among the elderly in Iran was lower compared to the daily recommendations. The study cited unavailability, expense, and lack of knowledge on importance of the two as the major barriers. Fruits and vegetable consumption is affected by seasons and since the study was conducted during a dry season this might explain the low intake.

The mean energy intakes for both males and females were low and did not meet their RDAs. This is despite the high intake of staples and legumes. Low energy intakes have been documented by both local and overseas studies [13, 14]. According to [6], energy deficient diets cannot adequately meet micronutrient requirements. This results show low micronutrient intake similar to reports by other studies [4, 14]. Calcium intake was very low. Although milk was consumed by majority of the respondents, this was only in form of tea which contained very little milk. Inadequate calcium intake is of great concern considering the important role it plays in maintaining bone health and blood pressure. The elderly are thus at an increased risk of osteoporosis, a debilitating bone disease which increases with aging.

It is recommended that elderly people should take small frequent meals and snacks 5-6 times per a day due to their diminished appetite. In this study, majority (72%) of the respondents had three meals in a day. This finding is higher than [18] where 29.3% of the elderly took 3 meals per day. However the frequency of five meals was higher (25.1%) than this study. The elderly persons did not have the recommended frequency of 5 meals per day. This means that they were less likely to meet their energy and nutrient requirements as they are not able to consume large meals. A minimum consumption of three food groups 24 hours prior to the study is considered as the minimum DDS [7]. Majority of the respondent had acceptable dietary diversity. However, the types of foods consumed are less likely to meet the so much needed micronutrient demands of the elderly. Financial constrains were cited as bottlenecks to low consumption of some foods especially animal proteins. A participant in the FGD reported *“Eggs and meat are too expensive, so we may have them even once a month. Although we keep chicken, children are given the priority when eggs are available.”* (Elderly person, FGD).

Similar to the practice in other societies, the traditional way of supporting the elderly is evident in this study. There was a relatively high number (26.5%) of elderly persons living alone. This may be attributed to the rural urban migration as younger adults who would have been the caregivers of the elderly are forced to seek employment in other areas to be able to support their own families. This finding is lower than [19]

which found that 69.2% of the elderly lived alone and were more likely than their counterparts to be malnourished. Hence the elderly are at risk of poor nutrition as loneliness is associated with negative feelings that may result to decreased food intake [8].

Majority of the respondents were able to carry out ADLs. However a quarter of the study population needed help in cooking of their meals. Considering the low literacy levels and the high nutritional demands of the elderly persons it is pertinent then that they have someone living with them to assist in meal preparation as well as offer them company during meal time. Supportive settings can contribute significantly to better dietary and physical activity habits among the elderly and consequently, improve and maintain their overall health [9].

The findings of this study show that malnutrition is high among the elderly (undernutrition 39.4% and overnutrition 9.8%). The older elderly (>80 years) were more likely to be undernourished while the younger elderly (<80 years) were more likely to suffer overnutrition. This result concurs with Mohfouz and colleagues in Egypt where 5.8% of those aged 60-69 years, 6.4% of those aged 70-79 years and 37.9% of those 80 and above were malnourished [20]. This may be attributed to deterioration in health, physical and social status that accompanies ageing. Thus the older elderly need more focused interventions if their nutritional status is to be impacted. The finding of this study contrasts with other studies that show higher prevalences of overnutrition than undernutrition [21, 22]. This may be attributed to low socioeconomic status of the elderly in the study area.

5. Conclusion and recommendation

According to this study, the respondents had low literacy levels, poor income and high levels of dependency. Dietary intake was poor not meeting RDAs for both micro and macronutrients. Dietary diversity was generally good but meal frequency did not meet the WHO recommendations. Poor care practices were evidenced by loneliness among the elderly and this had a negative implication on their dietary intake. Findings show that both under and over nutrition existed in the study population. Factors associated with malnutrition included, income earned by the households, age, dietary intake, meal frequency, functionality and living alone. Care practices played a crucial role in enhancing dietary practices hence better nutritional status and health of elderly people. Therefore, approaches to address malnutrition among the elderly in the area and others with similar characteristics should target economic empowerment to improve dietary intake and diversity and improved care and support to the elderly by the caregivers and the community at large.

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