Determinants of Nutritional Status among Geriatric Populations in Kween District, Eastern Uganda

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Abstract

Background: Geriatric persons may exhibit diverse feeding patterns due to age-associated changes. We report the determinants of nutritional status of geriatric population in Kween district, Eastern Uganda.

Methods: A cross-sectional survey was conducted among of 250 adults above 50 years during June 2014 to August 2015. Data was collected using a structured questionnaire, and Chisquare test for association analysis was done to assess factors associated with geriatric nutritional status.

Results: The determinants of geriatric nutritional status were; age, weight, education attained, number of children, declined food intake, neuropsychological problems, and body mass index.

Conclusion: The study results affirm a nutrition gap which necessitates awareness strategies through caregiver nutrition education and health promotion.

Keywords: Geriatric; Determinants; Nutrition status; Uganda

Introduction

Population ageing is a global pattern that describes a life-course trend. It affects all countries, although at varied levels [1], and is a measure of better lifespan and lowered mortality [2]. Despite, the geriatric population is prawn to various challenges, including malnutrition [3,4]. This is due to varied feeding ability as well as age-associated patterns dictated by factors like financial status, physical and functional changes in relation to physiological and psychological status [5-7]. This leads to nutritional difficulties manifesting with a poor quality of life [4,8-11].

As the poverty levels remain high in sub Saharan Africa [12,13], 64% of Uganda's geriatric lives below the poverty line; which fosters a high risk of malnutrition [14]. Socio-ecological and geographical aspects further amplify the situation, for example, 84.3% of the population of Kween district depends on subsistence farming. As environmental factors have hindered agronomic yields, there has been a discernible poor quality of life. These combined with rapid population growth, cattle rustling practices among the Karamajong have exacerbated food insecurity. These complex factorial interplays fosters low standards of living, which prompts to poor feeding and quality of life. These may portend the recently launched Sustainable Development Goals (SDGs) that seeks to attain sustainable development in a balanced manner for all aspects of the society, at all ages, with a particular focus on the most vulnerable, which includes older persons [15]. The geriatric population cuts through a section of varied goals, namely: poverty eradication, good health, gender equality, economic growth and decent work, reduced inequalities and sustainable cities.

As part of improved geriatric livelihood, the government of Uganda initiated a Social Assistance Grants for Empowerment (SAGE) support program [16,17], nonetheless, challenges have not seen its countrywide operation and also the costs of living continues to escalate, hence poor quality of life. As major programs have centered on the productive population (under 50 year category), it ought to be known that the geriatric population has in part been neglected. One critical risk of the geriatric population is the risk of malnutrition, which is reportedly high in most part of Uganda [12]. This study explored the geriatric nutritional status and its determinants among the population of Kween district, eastern Uganda.

Materials and Methods

Study design and setting

This was a community based cross sectional study that enrolled the geriatric population aged 50 years and above in all sub-counties of Kween district. Participants were selected using cluster sampling; which involved a random selection of 10 out of 19 parishes in five sub-counties in Kween district. The district is inhabited by Sebei; a sub-tribe of Kalengins that originated from Kenya. It is divided into 3 zones; the upper mountainous zone, the middle and lower zones with a warm weather and plain terrain. Agriculture is the main source of income.

Sample size estimation and enrolment criteria

Using Kish and Leslie formula to estimate the sample size [18], given the prevalence of geriatric malnutrition reported at 33.3% in Mpigi district, Uganda [19] and the allowable error of 5%, we consecutively enrolled a total of 250 geriatric populations.

Data collection tools and management

A structured questionnaire was designed to capture socio-economic and health related data on the geriatric nutritional status [20-22]. The main outcome measure was assessed using the Body

Table 1: Socio demographic characteristics associated with nutrition status of the elderly.

Variables	Frequency N=250 (%)	Malnourished		X²	P-value
		Yes	No		
Gender/sex					
Male	134(53.6%)	8(6.0%)	126(94.0%)	0.316	0.574
Female	116(46.4%)	7(6.0%)	109(94.0%)		
Age					
50-60	94(37.6%)	5(5.3%)	89(94.7%)	0.289	0.004*
61-70	132(52.8%)	21(15.9%)	111(84.1%)		
71-80	24(9.6%)	1(4.2%)	23(95.8%)		
81 and above	00 (00%)	00 (0%)	00(0%)		
Height/cm					
121-140	2(0.8%)	0(0.0%)	2(100.0%)	0.879	0.831
141-160	58(23.2%)	3(5.2%)	55(94.8%)		
161-180	178(71.2%)	12(%)6.7	166(93.3%)		
181-200	12(4.8%)	0(0.0%)	12(100.0%)		
Weight/kg					
30-50	69(27.6%)	1(1.4%)	68(98.6%)	12.59	0.003*
51-70	147(58.8%)	12(8.2%)	135(91.8%)		
71-90	34(13.6%)	2(5.9%)	32(94.1%)		
91 and above					
Marital Status					
Single Adult	12(4.8%)	1(8.3%)	11(91.7%)	3.479	0.481
Monogamous married	169(67.6%)	9(5.3%)	160(94.7%)		
Polygamous married	55(22.0%)	4(7.3%)	51(92.7%)		
Separated or Divorced;	2(0.8%)	0(0.0%)	2(100.0%)		
Widowed	12(4.8%)	1(8.3%)	11(91.7%)		
Education Attained					
No formal education	108(43.2%)	3(2.8%)	105(97.2%)	15.45	0.004*
Adult education only;	2(0.8%)	0(100.0%)	2(100.0%)		
ended in primary	97(38.8%)	7(7.2%)	90(92.8%)		
ended in secondary	34(13.6%)	2(5.9%)	32(94.1%)		
Tertiary level	9(3.6%)	3(33.3%)	6(66.7%)		
Economic Activity					
Unemployed	215(86.0%)	13(6.0%)	202(94.0%)	4.866	0.182
Salaried employee,	8(3.2%)	2(25.0%)	6(75.0%)		
Formal business owner	14(5.6%)	1(7.1%)	13(92.9%)		
Retired with pension	13(5.2%)	1(7.7%)	12(92.3%)		
Religion					
Catholic	88(35.2%)	4(4.5%)	84(95.5%)	2.098	0.718
Protestant	128(51.2%)	6(4.7%)	122(95.3%)		
Muslim	4(1.6%)	2(50.0%)	2(50.0%)		
Pentecostal	28(11.2%)	2(7.1%)	26(92.9%)		
African tradition	2(0.8%)	0(0.0%)	2(100.0%)		
Family type					
Monogamous	178(71.2%)	9(5.0%)	169(95.0%)	0.354	0.838

Polygamous	63(25.2%)	4(6.7%)	59(93.7%)		
Extended family	9(3.6%)	5(55.6%)	4(44.4%)		
Total number of children					
2 and below	34(13.6%)	5(14.7%)	29(85.3%)		
2-6 children	92(36.8%)	13(14.1%)	79(85.9%)	23.66	0.003*
More than 6	124(49.6%)	19(15.3%)	105(84.7%)		
husband and wife/wives all alive					
Yes	224(89.6%)	11(4.9%)	213(95.1%)		
No	26(10.4%)	9(34.6%)	17(65.4%)	0.714	0.398
IF No, the cause of death					
Malaria	12(46.2%)	6(33.3%)	8(66.7%)		
Asthma	6(23.1%)	3(50.0%)	3(50.0%)	12.25	0.798
Road traffic accident	3(11.5%)	1(33.3%)	2(66.7%)		
Don't know	5(19.2%)	4(60.0%)	2(40.0%)		

*p<0.05

Table 2: Screening of geriatric respondents.

Variables	Frequency N=250(%)	Malnourished		X²	*P*-value
		Yes	No		
Declined food intake					
Severe loss of appetite	29(11.6%)	1(3.4%)	28(96.6%)	20.9	0.000*
Moderate loss of appetite	173(71.2%)	6(3.5%)	167(96.5%)		
No loss of appetite	48(19.2%)	8(%16.7)	40(83.3%)		
Weight loss(3 months)					
Weight loss greater than 3 kg	66(26.4%)	0(0.0%)	66(100.0%)	5.55	0.136
Does not know	110(44.0%)	5(4.5%)	105(95.5%)		
Weight loss between 1 and 3 kg	66(26.4%)	9(13.6%)	57(86.4%)		
No weight loss	8(3.2%)	1(12.5%)	7(87.5%)		
Mobility					
Bed or chair bound	5(2.0%)	0(0.00%)	5(100.0%)	0.15	0.697
Able to get out of bed/or wheelchair	245(98.0%)	15(6.1%)	230(93.9%)		
Suffered psychological stress					
Yes	147(58.8%)	10(6.7%)	137(93.3%)	2.55	0.111
No	103(41.2%)	7(6.8%)	96(93.2%)		
Neuropsychological problems					
Severe dementia or depression	10(4.0%)	0(0.0%)	10(100.0%)	20.1	0.000*
Dementia	175(70.0%)	7(4.0%)	168(96.0%)		
No Psychological problems	65(26.0%)	8(12.3%)	57(87.7%)		
Body mass Index					
BMI less than 19	82(32.8%)	1(1.2%)	81(98.8%)	10.9	0.001*
BMI 19 to less than 21	64(25.6%)	0(0.0%)	64(100.0%)		
BMI 21 to less than 23	48(19.2%)	6(12.5%)	42(87.5%)		
BMI 23 and greater	56(22.4%)	8(14.3%)	48(85.7%)		
Mid-arm circumference					
MAC Less than 21	10(4.0%)	0(0.0%)	10(100.0%)	0.35	0.841
MAC 21 to 22	30(12.0%)	3(10.0%)	27(90.0%)		
MAC 22 or more	210(84.0%)	12(5.7%)	198(94.3%)		

Calf-circumference					
CC less than 31	97(38.8%)	3(3.1%)	94(96.9%)	0.37	0.425
CC 31 or more	153(61.2%)	12(7.8%)	141(92.2%)		

*p<0.05

Table 3: 24 hour's dietary recall by respondents associated with nutrition status of the elderly.

Variables	Frequency	Malnourished		X^2	p-value
		Yes	No		
Time/Meal					
Breakfast, lunch & super	70(28.0%)	10(14.3%)	60(85.7%)	0.75	0.085
Breakfast & lunch	45(18.0%)	8(17.8%)	37(82.2%)		
Breakfast & supper	100(40.0%)	14(14.0%)	86(86.0%)		
Lunch & super	35(14.0%)	5(14.3%)	30(85.7%)		
method of preparation					
Boiled	248(99.2%)	15(6.1%)	233(93.9%)	0.06	0.97
Steamed	1(0.4%)	0(0.0%)	1(100.0%)		
Shallow fried	1(0.4%)	0(0.0%)	1(100.0%)		
Description of the food					
Fresh	233(93.2%)	15(6.4%)	218(93.6%)	0.1	0.756
Dry	17(6.8%)	3(17.6%)	14(82.4%)		
Three most important staples					
Posho/matooke/sweet potatoes	183(73.2%)	6(3.3%)	177(96.7%)		
Posho/irish/rice	39(15.6%)	1(2.6%)	38(97.4%)	1.72	0.632
Posho/chapati/rice	12(4.8%)	0(0.0%)	12(100.0%)		
Posho/cassava/matooke	16(6.4%)	1(6.2%)	15(93.8%)		
Three most important relishes					
beans/green/g-nuts	71(28.4%)	5(7.0%)	66(93.0%)		
beans/green/egg	98(39.2%)	2(2.0%)	96(98.0%)	3.28	0.351
beans/green/simsim	6(2.4%)	0(0.0%)	6(100.0%)		
beans/green/meat	75(30.0%)	8(10.7%)	67(89.3%)		

Mass Index (BMI) and Mid-Upper Arm Circumference (MUAC). Weight measurements were taken using a digital scale while putting on light clothing, height was recorded to the nearest 0.1 Centimeter (Cm) and a non-stretch insertion tape was used to measure MUAC. A food-frequency questionnaire was used to determine dietary intake data with focus on the interactive 24-hour recalls [23,24].

Adult equivalent a measure of the household's calories for its members was determined by scaling the requirements of each individual to those of a reference adult based on age, sex and assumed moderate activity. Data was entered into the EPI-INFO; BMI was calculated as a ratio of weight to height. MUAC less than 19 were considered thin, 19.1-23 were nourished and those above 23 were overweight [25,26]. The MUAC under 21 and calf circumference (CA) below 31 were regarded as thin and under nourished [25].

Ethical approval

We obtained ethical approval from the research and ethics committee of Clarke International University (Formerly, International Health Sciences University). In addition, informed consent was sought from all participants.

Results

We enrolled 250 participants. Of these, 134 (53.6%) were males, participants' median age was 65.5years (IQR, 61-70). Majority; 178 (71.2%) were 161-180cm in height, and 147 (58.8%) were 51-70Kg in weight. 169 (67.6%) were in a monogamous marriage with almost half of the families 124(49.6%) having 6 or more children. 108 (43.2%) of the respondents lacked formal education and more than three quarters (N=215, 86.0%) were unemployed as shown in (Table 1).

The prevalence of malnutrition was 6.0% (N=15). This varied across a continuum of mild moderate and severe. In addition, there was a varied feeding pattern as 112(44.8%) had two meals a day. Further, majority (N=210, 84.0%) of the respondents had MUAC of 22cm or more, and 153 participants (61.2%) had calf-circumference of 31 or more, as presented in (Table 1).

Chisquare test for association analysis indicated the determinants of geriatric nutritional as: the number of drug prescribed (X^2=1.059, CI=95%, p=0.000), numbers of meals taken (X^2=2.741, CI=95%, p=0.002), mode of feeding (X^2=16.069, CI=95%, p=0.000), and thoughts about nutrition (X^2=16.421, CI=95%, p=0.001) as given in

Table 4: Assessment of food security index associated with nutrition status of the elderly.

Variables	Frequency	Malnourished		X²	P-value
		Yes	No		
In the past month, how often has your food supply run out before you were able to get more food from either your garden or the market?					
Never	25(10.0%)	3(12.0%)	22(88.0%)		
Sometimes	202(80.8%)	12(5.9%)	190(94.1%)	3.203	0.202
Often	23(9.2%)	2(4.3%)	21(95.7%)		
In the past month, how often have you had to borrow money for food in order to ensure that your household eats enough?					
Never	35(14.0%)	5(14.3%)	30(85.7%)		
Sometimes	187(74.8%)	10(5.3%)	177(94.7%)	5.648	0.059
Often	28(11.2%)	0(0.0%)	28(100.0%)		
In the past month, how often have you had to limit the amount that you yourself ate in order to make sure that the other members of the household eat enough food?					
Never	23(9.2%)	3(13.0%)	20(87.0%)		
Sometimes	202(80.8%)	12(5.0%)	190(95.0%)	12.77	0.004
Often	25(10.0%)	1(4.0%)	24(96.0%)		
In the past month, how often have you or your children been forced to skip meals because the food is not enough?					
Never	37(14.8%)	3(8.1%)	34(91.9%)		
Sometimes	191(91.2%)	12(6.3%)	179(93.7%)	21.58	0
Often	22(8.8%)	0(0.0%)	22(100.0%)		
In the past month, have you worried that you yourself is not getting an adequate diet?					
Yes					
No	207(%82.8)	14(6.8%)	193(93.2%)	0.059	0.807
	43(17.2%)	1(2.3%)	42(97.7%)		
In the past month, have you worried that the children or other members of the household are not getting an adequate diet?					
Yes	214(85.6%)	8(3.7%)	206(96.3%)		
No	36(14.4%)	4(11.1%)	32(88.9%)	1.068	0.301
In the past month, have you had to reduce your household size to reduce food costs?					
Yes	177(70.8%)	11(6.2%)	166(93.8%)		
No	73(29.2%)	4(5.5%)	69(94.5%)	2.49	0.076
In the past month, have you had to sell some of your non-productive household assets to buy food?					
Yes	191(76.4%)	12(6.3%)	179(93.7%)		
No	59(23.6%)	3(5.1%)	56(94.9%)	0.531	0.025
In the past month, how often have you or your children been forced to go for a whole day without eating because the food is not enough?					
Never					
Sometimes	38(15.2%)	5(13.2%)	33(86.8%)	4.659	0.097
Often	197(78.8%)	9(4.6%)	188(95.4%)		
	15(6.0%)	1(6.7%)	14(93.3%)		
In the past month, how often has the food for your household been insufficient?					
Never	24(9.6%)	2(8.3%)	22(91.7%)		
Sometimes	205(82.0%)	15(7.3%)	190(92.7%)	30.747	0.000
Often	21(8.4%)	0(0.0%)	21(100.0%)		

(Table 2).

Assessment of the 24-Hour dietary recall for respondent indicated that 40% (N=100) of the respondents reported taking only breakfast and supper in a day. The major foods consumed were posho, matooke and sweet potatoes, as shown in (Table 3).

Food security index indicated that in the six past months, most of

the respondents (N=202, 80.8%) had food supply run out, 191(91.2%) were forced to skip meals because the food was not enough. The variables; skipping of meals (X^2=21.584, CI=95%, p=0.000) and having insufficient foods (X^2=30.75, CI=95%, p=0.000) were significantly associated with malnutrition, as given in (Table 4).

Discussion

There are few published studies on geriatric nutrition. In this study, majority of the respondents were between 61-70 years, which suggests a probable longer-life that may give hopes to many. We too found a statistical association in the risk of geriatric malnutrition with increase in age. This agrees with previous findings [4,20,27,28], and is ascribed to systemic deteriorations and body changes [19,28,29]. Also, being in a monogamous marriage had a nutritional significance, similar to previous findings [3,27-30]. This is explained by the fact that marriage is a socio-cultural phenomenon that is associated with improved support and motivation to cook, eat and find solutions together [31,32]. As majority of the participants reportedly did not attain, or had low education, it could be one of the promoters of malnutrition. This vividly concurs with previous findings [8,20,21], in which it was urged that one can tell the utilization of education and health services from education and health status. As most participants were uneducated, it confirms the likelihood of poor economic status as earlier indicated that educational status possibly could reflect the outcome of household economic welfare, and determines the nutritional and health status of individuals [13,22]. We also found that majority of the households had more than 6 children which could be due to early marriages and child bearing to late reproductive age; a feature that agrees with earlier reports which indicated that every increase in family size causes decrease per capita food and nutritional availability, and reduces the nutritional and health quality thus risk to malnutrition [2,12]. There were 44.8% who could have two full meals in a day and this could be because most people reported that they go to the garden and find it hard coming midway to cook food or could be a way of economizing the available food or also due to food insufficiency as a number of them reported running short of food at one point in time which therefore has a nutritional significance [4,11,32]. Relatedly, 74.5% had at least one serving of dairy products a day and 66.0% consumed two or more servings of fruits or vegetables daily which could be because of easy accessibility. Interestingly, nearly all participants (96.4%) were able to feed without any problem which had a nutritional significance, and it contravenes a previous report [7], in which it was reported that despite the question of inadequacy, swallowing problems due to old age may also pause challenges in feeding and increases the risk of geriatric malnutrition. Further, 55.6% of the participants acknowledged not knowing whether they were healthy or not which had an association with one's nutritional status given the fact that most didn't bother taking weights, a feature attributed to lack of awareness [13].

On the food security context, most respondents (N=187, 74.8%) reported to have sometimes run out of food supply in the past six months before they could get more from either their gardens or the market. A big number of respondents (N=191, 91.2%) agreed to sometimes having limited amount to eat in order to make sure that the other members of the household got what to eat. This is ascribed to poverty, and the fact that most respondents were unemployed;

a fact in agreement with earlier report that "food insecurity" exists every time the accessibility of nutritiously adequate, safe foods or the capacity of acquiring individually and socially satisfactory foods in suitable ways is restricted or uncertain [3]. The study also found out that 207 respondents (82.8%) or their children sometimes skipped meals because the food was not enough, 214 respondents (85.6%) worried that they were not getting an adequate diet.

Conclusion

Based on our results, age, weight, number of children, frequency of meals, availability of a sufficient supply of food, decline in weight, BMI, psychological and neurological problems, full meals a person takes, prescription drugs a person takes, mode of feeding and whether they had a radio, oxen cart, bicycle, cow/s, sheep and chicken had nutritional significance. Of importance also was whether the respondents had clean drinking water, a latrine, and source of light, how often they limited the food they ate, skipped meals or had insufficient food in the previous six months. The study further confirms that level of formal education attained is an important determinant of employment, utilization of health and educational services. To this, we make the following propositions; 1) there is need to supplement with fruits and vegetables; 2) the government together with stakeholders ought to launch collective approach of sensitizing and educating the masses about the importance of elderly care; 3) the social assistance grants for empowerment which is covering only 15 districts in Uganda ought to be extended to Kween and the amount increased from the current 25,000 Uganda Shs per month to ensure adequate financial support of these senior citizens; 4) the feeding program ought to target the elderly more since they are the ones with poor nutritional status; 5) Food Based Approaches (FBAs), which include food production, dietary diversification and food fortification, are sustainable strategies for improving the micronutrient status of the elderly population.

Ethics Approval and Consent to Participate

We received ethical approval from Clarke International University (Formerly, International Health Sciences University) Research Ethics Committee (REC). All respondents provided written informed consent after receiving detailed description of the study. Eligible participants were consented in privacy and no incentives were given. Anonymity of the respondents was ensured at all stages of data analysis.

Acknowledgement

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