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*Original Article*

# ASSESSING THE SOCIO-DEMOGRAPHIC FACTORS FOR NUTRITIONAL STATUS OF OLDER PERSONS IN DOKOLO DISTRICT OF NORTHERN UGANDA

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## ABSTRACT

**Background:** Undernutrition and over nutrition are common nutritional problems among older persons, but less is known about their association with socio-demographic factors and food security factors.
**Objective:** The major objective of this study was to determine the nutritional status and its associated factors among persons aged 60 years and above in Dokolo District, Uganda.
**Methodology:** This was a cross-sectional household survey that employed the Lot Quality Assurance Sampling (LQAS) method with 10 supervision areas, and targeted sample size of 190. The MNA-SF and anthropometric measures were used to measure nutritional status. The anthropometric measures employed included the mid-arm circumference, body mass index and the calf circumference.
**Results:** Using the, MNA-SF, 66% (124) of the older persons aged 60 years and above were at risk of malnutrition, 23% (44) were malnourished, and only 11% (22) had normal nutritional status. Age (p-value for Crammers' V = 0.001) was the only socio-demographic factor significantly associated with nutritional status among older persons. Other demographic factors such as sex of respondents (p=0.130), level of education (p=0.362), nature of occupation/employment (p=0.061), and religious status (p=0.280) were not seen to influence nutritional status of the older persons. The respondent's wealth quintile (p= 0.000) was also significantly associated with nutritional status, with older persons in the highest income quintile less likely to get malnourished than those in the poorest quintile. The corresponding proportions of malnutrition among older persons in the highest and lowest income quintiles stood at 4.6% and 28.6% respectively. Food security factors such as access to food (p=0.001), food adequacy/sufficiency (p=0.001), number of meals had per day (p=0.000) and the main source of food for the household (p=0.000) had significant influence on the nutritional status of the respondents.

**Conclusion**: Undernutrition is the major nutritional problem of older persons in Dokolo district with high proportion (66%) of them at risk of malnutrition. Socio-demographic factors associated with nutritional status of adults aged 60 years and above were age and income level. Food security-related determinants also influenced nutritional status of older persons. The food security-related factors isolated to influence nutritional status of older persons include; frequency of replenishing food, food adequacy and sufficiency, number of meals had per day and main source of food for the household.

## INTRODUCTION

Older persons are important people in every society. Older persons are often regarded as important and productive persons, and their nutritional outcome is known to predispose them to chronic disease conditions such as heart disease, hypertension, and diabetes (Hawkes & Sassi,
2015). Globally about 795 million people of the 7.3 billion people were known to be suffering from chronic nutritional related burdens between 2014 - 2015. About 780 million of them live in the developing nations. Approximately 1 in 8 older persons are said to be malnourished (FAO, 2015). Several factors are attributed to poor nutritional status in elderly persons both in developed and developing nations, namely inadequate and poor consumption of quantity and quality food, chronic diseases, income, poverty, loneliness, poor environmental hygiene, and inadequate physical activity among others (Hawkes & Sassi, 2015).

The World Health Organisation (WHO) defines older persons as adults 60 years and above with the majority being women. The world demographic projections put the ageing persons 60 years and above currently at 524 million and are expected to rise to 1.2 billion people by 2025 (WHO, 2015). Older persons in Africa are currently estimated to be over 42 million and are projected to go over 200 million by 2050 (UNPFA, 2012). According to Uganda Bureau of Statistics (UBOS) (2014), 4.2 % of Uganda's 34.9 million people are aged 60 years and above (UBOS, 2014). Accordingly, Dokolo District has an estimated 7,851 older persons (UBOS, 2014).

Nutrition-related problems are highly prevalent among older persons and often overlooked, as such; the elderly are predisposed to negative health outcomes. Progressively, as age takes effect, obvious challenges emerge in the ability of the elderly to undertake their routine activities such as the ability to move without support, preparation of food, and engaging in livelihood and income-generating activities. On the other hand, major contributions to the deterioration in the lives of older persons are chronic health diseases, especially those associated with poor nutrition such as obesity and underweight that lead to various disease conditions such as heart diseases, hypertension, anemia, and cancer among others (WHO, 2012). This study focused on the neglected population health phenomena, which is the nutritional status of older persons aged 60 years and above by using MNA- SF tools in Dokolo district, Uganda. Socio-demographic factors were the primary independent variables while food security-related factors were also evaluated.

## METHODOLOGY

A cross-sectional household survey based on the Lot Quality Assurance Sampling (LQAS) method was adopted for this study. The study was carried out in Dokolo District, Uganda consisting of ten sub-counties and one town council. In our sampling, the sub-counties and town councils were re-stratified into 10 Supervision Areas (SA's). The target population constituted both men and women aged 60 years and above in Dokolo district.

A list of villages in Dokolo and their corresponding populations was obtained from the UBOS' population and census data of 2014. Probability proportionate to size technique was employed to randomly select 19 interview locations (villages) from the list of villages within each SA. This was attained through computing the cumulative population, sampling interval and selecting a random starting point between 1 and the sampling interval. The rest of the villages were then selected using the sampling interval until all the 19 villages for the SA were identified. In each interview location, 1 respondent was interviewed. Accordingly, a total sample size of 190 respondents was targeted in the catchment area of Dokolo district.

In order to select the households (HHs) for the study, list of the HHs in the interview location were used in order to identify the reference HH. Where such list did not exist, we employed segmentation sampling as described by Valadez (1991), Davis and Valadez (2014) and Valadez *et al.* (2015).

From the reference HH, the search for eligible respondent started at the nearest HH to the front door of reference HH. Where the HH did not have an eligible respondent, the research assistant proceeded to the next nearest HH to the front door of the HH s/he is stationed at until the respondent identified and interview/measurements for the interview location was done.

The selection criteria of respondents thus followed a random selection within the HH in the interview location. In instances where two or more participants were eligible to participate in the study at the same HH, we randomly selected one.

**Study Variables**

Four anthropometric assessments; weight, height, mid-arm circumference (MAC), and calf circumference (CC) with valid indicators of nutritional status among the older persons 60 years and above were taken into account. The participants dressed in light clothing and took measurements with barefoot. Weight was measured by using a digital weighing scale, while height was measured using a mechanical stadiometer. Body mass index (BMI) was calculated as the weight in kg / (height in meter) squared. Calf circumference was measured while the participant was seated with an inextensible tape at different locations to find the maximum bare calf circumference. For mid-arm circumference, the participant's forearm was held in the horizontal position to locate and mark the mid-distance between the acromial surface and the olecranon process of the elbow. The circumference at that marked arm midpoint was measured. According to the MNA guide, BMI, CC, MUAC, and MNA were converted from a continuous scale to categories, hence the nominal measurement scale. Secondary independent variables include food security factors.

**Table 1: Study Variables, Indicators, Method of Data Collection and Data Analysis**

| Variable | Indicator | Method of data analysis |
|---|---|---|
| Socio-demographic factors associated with nutritional status | • Demographic factors: age, sex, level of education, religion, family type, marital status, past employment | ✓ Descriptive statistics<br>✓ Chi square ($\alpha$=0.05) |
| | • Socio-economic factors: wealth quintile, food consumption, living condition, and social welfare fund for the elderly. | ✓ PCA & Chi square ($\alpha$=0.05) |

**Data Collection Tools, Procedure, and Quality Control Method**

Individual interview questionnaires were conducted using the MNA-SF tools at each participant's home by a research assistant.

Anthropometric measurements and clinical assessments were conducted to measure weight, height, and calf and arm circumferences (Guigoz, 1994). Structured questionnaires, semi-structured questionnaire was included in the questions to assess the measurement of nutritional status in

adults by use of MNA assessment short form. All the research assistants were trained before the data collection process started. Uniform nutritional assessment questionnaires were used for nutritional screening and measurement of the following: the height of the respondent was measured without the shoes; weight was measured from the respondent with the clothes on but without the shoes.

The body weight balance was used for measuring the weight. Weight measurement was calibrated to ± 0.2Kg, and the height ruler was calibrated to ±0.5 cm. The upper arm-circumference was measured with soft tape ruler and data calibrated to 0.1 mm; all measurements were subjected to their respective checklists for quality check.

**Data Management, Processing, and Data Analysis**

The data collected were independently entered by two entrants into different data files in a computer using the Epi Data version 3.1 software package. The two data files were then compared for discrepancies. The discrepancies were addressed before exporting clean data sets to Stata. Stata version 13.0 (Stata Corp. Inc., 4905 Lakeway Drive, College Station, Texas, USA) software was used to perform statistical analyses.

Frequencies, and charts were generated. At the second level of analysis, weighted proportions of indicators of nutritional status and the associated factors of malnutrition were calculated.

Chi-square was used to test for the independence of association between factors and the nutritional status of the respondents. Cramers V test was used to test for the strength of association. Cramer's V (sometimes referred to as Cramér's phi and denoted as $\varphi_c$) was used to measure the strength of association between two nominal variables, between 0 and +1 (inclusive).

***Interpretation of Cramer's V:*** If the p-values of $\Phi_c$ is less than 0.05, it implies that there is a significant relationship between the two variables and where the p-values of $\boldsymbol{\Phi_c}$ is equal to or greater than 0.05, it implies that there is no significant relationship between the two variables.

**Ethical Considerations and Limitations of the Study**

Ethical approval was sought from the Uganda Martyrs University Research Ethics Committee to ensure compliance with ethical standards and adequate human participants protection. Informed consent and the risk of data collection procedures were taken, and confidentiality was strictly observed. There were difficulties in the accurate assessment of height and weight of the respondents with disabilities. Participants with mental disorders and those who were bedridden were excluded from the study.

**RESULTS AND DISCUSSION**

**Demographics Factors and Nutritional Status**

The study response rate of 98.4% (187 out of 190) was achieved. The data was representative of the entire population given that the LQAS sampling technique used required that a sample size of 190 be used from 10 supervision areas. All the respondents were residents of Dokolo District and had been residing in their respective sub-counties of Dokolo District by the time of data collection

The majority, 78% (146) of respondents were male, while only 22% (41) were female. The majority, 78% (112) of the respondents were aged 60 to 69 years, while 24% (45) were aged 70 to 79 years, and only 16% were 80 years of age and above. This study aimed to assess the socio-demographic factors associated with the nutritional status of older persons from which it was established that the age of respondents had a significant influence on their nutritional status (p- value for Crammers' V = 0.001). This implies that older persons in higher age categories were more likely to be malnourished (*Table 2*) than their counterparts in the lower age groups. However, other demographic factors were not seen to significantly influence nutritional status. Sex of respondents did not have any significant influence on nutritional status (p > 0.130). This implies that for either sex, the respondents had equal likelihood of malnutrition or living a healthy life.

**Table 2: Summary of Chi-Square and Crammer's V Test results for association between the Demographic factors Vs Nutritional Status**

| Demographic Factors | Chi-Square Tests | | | Cramer's V Test | |
|---|---|---|---|---|---|
| | Value | Df | P-Value | Value | P-Value |
| Age | 18.210 | 4 | 0.001 | 0.221 | 0.001 |
| Sex | 4.074 | 2 | 0.130 | 0.148 | 0.130 |
| Ever Attended School? | 0.773 | 2 | 0.679 | 0.064 | 0.679 |
| Highest Education Level | 8.773 | 8 | 0.362 | 0.184 | 0.362 |
| Marital Status | 9.857 | 10 | 0.453 | 0.162 | 0.453 |
| Nature of Occupation or Employment | 14.885 | 8 | 0.061 | 0.200 | 0.061 |
| Religious Status | 9.790 | 8 | 0.280 | 0.162 | 0.280 |

The majority, 68% (126) of the respondents had ever attended school, while 32% had no formal education. The highest level of education ever attained by respondents was primary, at 77% (97 [n=126]) while, 14% (18 [n=126]) had attained secondary level of education, 6% institutional (e.g. vocational, other diploma) training, with only 1.5% (2 [n=126]) who had attained university level education. The respondents' educational level had no significant influence on their nutritional status (p=0.362), implying that likelihood of malnutrition among older persons is not dependent on level of education *(Table 2)*. Regarding marital status, 66% (123) of the respondents were married, 22% (44) were widowed, 9% (16) were single, and 3% (5) were divorced. The marital status of the older persons was equally found to have no significant influence on their nutritional status (p= 0.453); thus, whether married, widowed, divorced, or single, the likelihood of malnutrition is the same *(Table 2)*.

Many of the respondents were peasant farmers 89% (165), only 4% (7) were retired civil servants with pensions, and 4% (7) were retired civil servants without a pension, while 3% (5) had informal jobs. The nature of occupation or employment of the respondents had no significant influence on the nutritional status of respondents (p = 0.061) *(Table 2)*. Likewise, the religious status of the respondents had no significant influence on the nutritional status of the respondents (p = 0.280). The majority, 47% (87), of the respondents were Catholics, 37% (70) were Protestants/Anglicans, and 14% (27) were Pentecostal/Born-again, while only 1% (2) were Muslim.

**Socio-economic Factors and Nutritional Status**

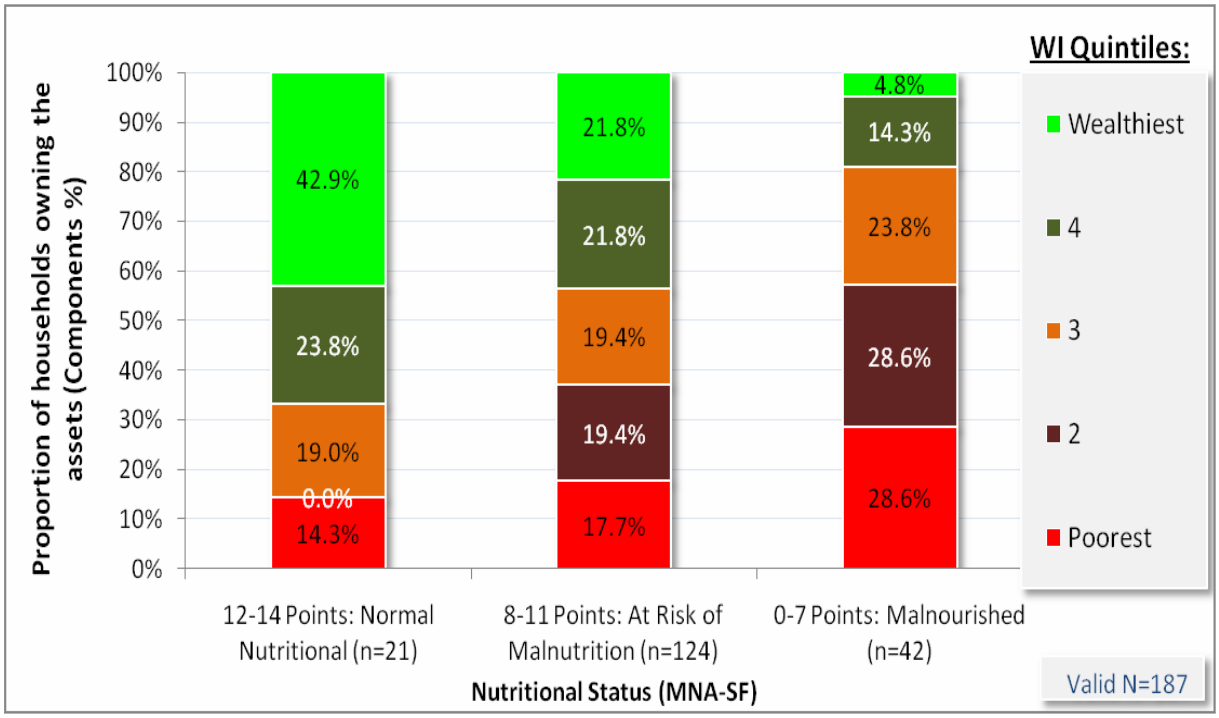
In this study, we determined the nutritional status of older persons 60 years and above using MNA- SF tools in Dokolo district. The findings vindicated that the majority, 66% (124) of the interviewed older persons were at risk of being malnourished, with slightly less than one quarter, 23% (44) malnourished, and only 11% (21) had normal nutritional status. Furthermore, the BMI indicated that 33% (58) were underweight, whereas the MUAC revealed that 60% (92) were wasted, and only 30% (46) depleted.

The LQAS findings revealed that Okwongodul had the highest number of the older person who were malnourished (12 out of 18), followed by Batta (9 out of 19), and Adeknino (6 out of 18). Amwoma and Agwatta sub-counties had better nutrition status of the older persons than the rest.

***Wealth Quintile***

Following several proxy measures of wealth, which this study considered during the principal component analysis, it was revealed that wealthier older persons had less likelihood of being malnourished compared to their counterparts in the poorer income quintiles. For example, only 4.8% of the older persons in the highest income quintile were malnourished compared to 28.6% of their counterparts in the lowest income quintile *(Figure1)*. This finding implies that economic empowerment of the elderly should be an integral component of interventions aimed at improving their nutritional status.

**Figure 1: Wealth index quintiles and nutritional status of the elderly in Dokolo district**




***Living Condition***

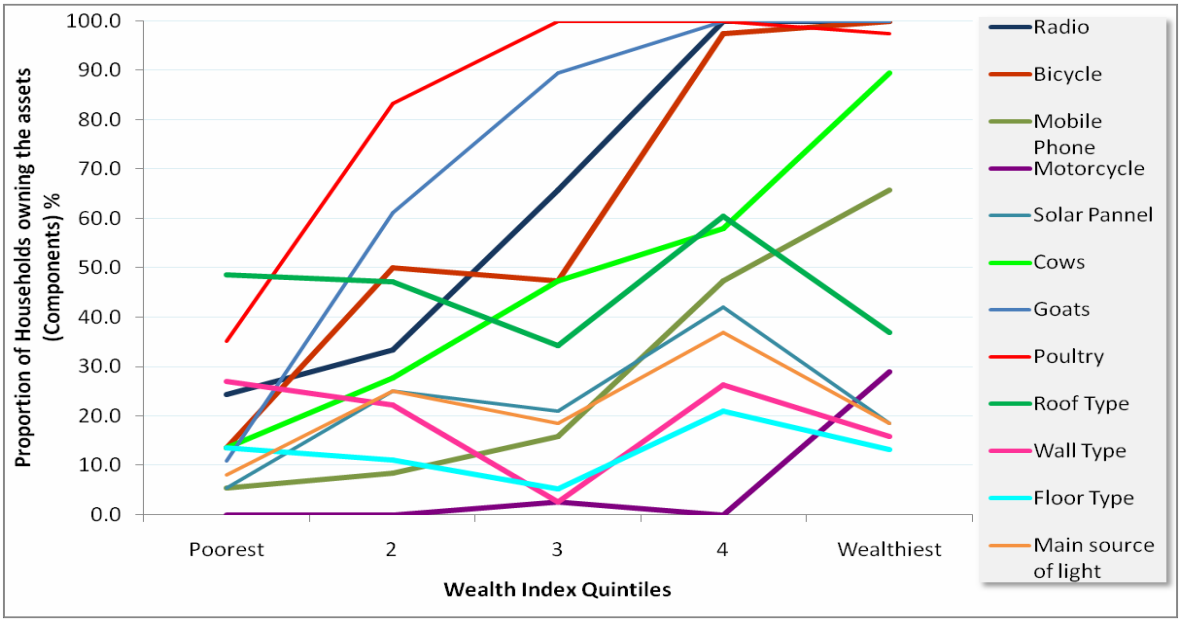
The living condition characterized by the type of house one lives in, the nature of the roof, wall, and floor was assessed. Majority, 55% (102) of respondents lived in grass-thatched houses and only 45% (84) lived under iron sheet roof. The respondents mainly lived in houses that either had mud wall (43%) or un-burnt bricks (37%) with 85% living in mud floored house. From the findings of this study, there was no significant correlation between the living conditions and nutritional status ($p = 0.371$) where wall ($p = 0.243$) and floor type ($p = 0.378$) had p-values greater than the pre-determined 0.05 level of $\alpha$ (*Table3).* It was further revealed that proxy measures of living condition (roof type, floor type, wall type) were unevenly distributed among the poorest and

**Table 3: Socio-economic factors**

| | Crammer's V Test Value | P-Value |
|---|---|---|
| Source of light | 0.276 | 0.000 |
| Source of fuel used for cooking | 0.138 | 0.319 |
| Roof | 0.107 | 0.371 |
| Wall | 0.166 | 0.243 |
| Floor | 0.131 | 0.378 |
| Household member responsible for fuel availability | 0.193 | 0.177 |
| Home garden ownership | 0.059 | 0.724 |
| Source of income | 0.231 | 0.011 |

wealthiest – those in poorest quintile were more likely to have grass roof, mud floor and/or mud wall. One major explanation for this is that the poor mainly lived in rural areas with over 85% of them living in mud floor house

**Figure 2: Wealth Index Quintiles for the Various Components**




***Social Welfare Fund for the Elderly***

None of the respondents was beneficiary of social welfare funds given to elderly persons by the government of Uganda. Accordingly, this variable was made a constant, hence no statistical test could be carried out to ascertain whether it influences nutritional status. For this reason, it was also eliminated from the principal component analysis. All the food security factors except distance to the nearest market for selling or buying food had significant influence on the nutritional status where all p- values were < 0.001. Specifically during the month preceding the survey, over 72% (135) of the respondents reported that sometimes their food supply had run out before they were able to get more, only 6% (12) reported that they had never had any run out of food supply. Running out of food supplies thus significantly contributed due malnutrition among older persons (p = 0.001). During the month preceding the survey, majority, 77% (142) of the respondents revealed that sometimes food for their household had been insufficient, with 18% noting that this happened almost every day, and only 5% (9) reported never to have had insufficient food. The quantity (insufficiency) of food was equally found to have a significant influence on the nutritional status (p = 0.001).

Over 72% (134) of respondents reported having two meals per day, and up to 21% (39) reported having only one meal a day. As low as 6% (12) reported having 3 or more meals a day. This study equally revealed that the number of meals per day had a significant influence on the nutritional status of respondents (p = 0.000). The more meals per day, the better the nutritional status. The majority, 137 (74%) of respondents mainly got food from their farm, 28% mainly bought food from the market/shop, while 10% relied on their children/relatives for food. This study also revealed that the main source of food for the household had a significant influence on their nutritional status (p = 0.000). However, it was also found that up to 30% of respondents had to travel more than 5 Km to the nearest market when buying or selling food, 24% travelled between 3-5 Km, with only 17% having to travel a distance of less than 1 Km to the nearest market. However, this was not found to have any significant relationship with their nutritional status (*Table 4*).

**Table 4: Food Security Factors Associated with Nutritional Status of the Elderly**

| Food Security Factor | Crammer's V Test Value | P-Value |
|---|---|---|
| Frequency of replenishing food supply when it runs out in the last one month | 0.247 | 0.001 |
| Food insufficiency in the household in the month | 0.225 | 0.001 |
| Number of meals are eaten in a day | 0.275 | 0.000 |
| Main source of food | 0.373 | 0.000 |
| The nearest market from household for buying or selling of food | 0.126 | 0.700 |

This study established that the age of interviewed older persons aged 60 years and above had a significant influence on their nutritional status. This concurs with the World Health Organization (2014), that states, "malnutrition, a nutritional condition, co-exists in older persons," clearly showing that age does influence nutritional status. However, other demographic factors such as sex of respondents, nature of occupation/employment, and religious status all had no influence on the nutritional status of the older persons.

This study established that the majority, 91% (170) of the respondents' source of income for the household was crop selling/produce, where only 3% were engaged in dairy marketing, 2% in shop keeping. It was revealed that the respondents' source of income for their households had a significant influence on the nutritional status of the respondent. USAID (2014) notes that "producing more staple food and increasing income alone does not guarantee an improved nutritional status." Therefore, the findings of this study are consistent with this earlier report (USAID, 2014) given that our study identities income of the respondents and source of food alongside other factors to significantly influence nutritional status of older persons. USAID (2014) also established that "severe causes of malnutrition were reported highest in the South Western Region of Uganda as a result of lack of dietary diversity, lack of access to food, cultural and social factors, and poverty level among others."

It was established that all the food security factors had a significant influence on the nutritional status of older persons aged 60 years and above aside from access to markets.

Factors such as access to food, food adequacy/sufficiency, number of meals had per day, the main source of food for the household. This finding was in agreement with FAO (2010) that noted, "food security exists when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life, and that in the absence of the above, the problem of food security becomes real, common, and widely increasing among the elderly population". These findings thus imply that addressing nutritional needs of older person requires multiple interventions. In the context of government interventions such as economic empowerment of the elderly, food-security-related issues need to be addressed. An integrated approach to nutritional problems of the older persons should therefore, be considered a key strategy for addressing their nutritional needs.

## CONCLUSIONS AND RECOMMENDATIONS

Undernutrition is the major nutritional problem of older persons in Dokolo district with high proportion (66%) of them at risk of malnutrition. Socio-demographic factors associated with nutritional status of adults aged 60 years and above were age and income level. Food security-related determinants also influenced nutritional status of older persons. The food security-related factors isolated to influence nutritional status of older persons include; frequency of replenishing food, food adequacy and sufficiency, number of meals had per day and main source of food for the household.

Given the contribution of food security-related factors to nutritional status of older persons, it is imperative that planners and implementers of livelihood and nutrition programmes for older persons consider integrating income-generating

initiatives with interventions addressing food security. In existing government programmes for economic empowerment of older persons like the Uganda Social Assistance Grants (SAGE), integrating food security interventions would make significant contribution to improving nutrition status of the older persons. In the event of resource inadequacy, the most at risk of the older persons, especially those in the older age categories and those in living in poorer HHs should be accorded higher priority.

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