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Awareness of Feeding Habits Nutritional Status and Nutrition-Related Health Problems Among Elderly Persons in Agbor Delta State Nigeria

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Research Article

Keywords: older persons, feeding habits, nutritional status, malnutrition, dietary practices, nutrition awareness, obesity, Agbor, Nigeria

Posted Date: November 3rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11285093/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Population ageing is accompanied by increasing nutritional challenges, including inadequate dietary intake, malnutrition, overweight and nutrition-related chronic diseases. However, limited information is available on feeding habits, nutritional status and awareness of nutrition-related health problems among older persons in Delta State, Nigeria.

Objectives

This study assessed the awareness of appropriate feeding habits, nutritional status, dietary practices and nutrition-related health problems among older persons in Agbor, Delta State, Nigeria.

Methods

A cross-sectional descriptive study was conducted among 392 older persons in eight communities in Agbor, Delta State. Data were collected using a structured interviewer-administered questionnaire covering sociodemographic characteristics, awareness of appropriate feeding habits and nutrition-related health problems, dietary practices and a 24-hour dietary recall. Anthropometric measurements were obtained to determine body mass index (BMI) and waist-to-hip ratio (WHR). Data were analysed using descriptive statistics.

Results

Participants were predominantly aged 65–74 years (65.0%), and 53.0% were female. Awareness of appropriate feeding habits was variable. While 65.0% recognised the importance of regular meals and 65.1% understood that feeding habits influence health and nutritional status, awareness was low regarding dietary variety (30.0%), adequate protein intake (35.0%), limitation of fatty or fried foods (31.1%) and consumption of whole grains and fibre (12.0%). Awareness of nutrition-related health problems was also inconsistent. Most participants recognised that inadequate food intake could cause malnutrition (83.5%) and that inadequate nutritious food could result in underweight (80.5%), while awareness of the relationships between excess salt and hypertension (23.0%), iron-rich foods and anaemia (22.5%), and dietary variety and micronutrient deficiency (24.3%) was poor. Dietary practices showed that 56.0% ate twice daily, 54.3% skipped meals and 48.0% reported that they did not eat enough food. Among those who skipped meals, lack of strength to prepare food (51.0%) and inability to afford food (49.0%) were major reasons. Anthropometric assessment revealed a substantial burden of malnutrition: 27.0% were underweight, while 24.0% were overweight and 30.6% had obesity. Overall, 54.6% were overweight or obese, and 51.5% had an elevated waist-to-hip ratio.

Conclusion

Older persons in Agbor experience a substantial double burden of malnutrition characterised by the coexistence of undernutrition, overweight/obesity and central adiposity. Gaps in awareness of healthy feeding practices and nutrition-related health risks were accompanied by frequent meal skipping and inadequate food intake. Community-based nutrition education, improved access to affordable nutrient-dense foods, routine nutritional screening and nutrition counselling should be integrated into healthcare and social support services for older persons in Agbor.

Introduction

Population ageing is becoming an increasingly important public-health issue globally. The number and proportion of older persons are rising rapidly, with the population aged 60 years and above projected to increase from approximately 1 billion in 2020 to 1.4 billion by 2030 and 2.1 billion by 2050. Most of this growth will occur in low- and middle-income countries, where health and social systems may have limited capacity to respond to the nutritional and health needs of ageing populations (World Health Organization, 2025). Healthy ageing is influenced not only by access to healthcare but also by lifelong health behaviours, including appropriate dietary practices, adequate physical activity and avoidance of health-risk behaviours. A balanced diet is particularly important in later life because it contributes to maintaining functional capacity, reducing the risk of chronic diseases and supporting independence among older persons (World Health Organization, 2025).

Ageing is accompanied by physiological, psychological and socioeconomic changes that can substantially influence food intake and nutritional health. Declines in taste and smell, dental and oral problems, reduced appetite, gastrointestinal changes and impaired physical function may make it difficult for older persons to consume sufficient quantities and varieties of food. Social isolation, loneliness, poverty and dependence on family members for food procurement or preparation can further compromise dietary intake. These factors may increase the risk of undernutrition, micronutrient deficiencies, sarcopenia and frailty, while unhealthy dietary patterns may simultaneously contribute to overweight, obesity and diet-related non-communicable diseases (World Health Organization, 2023; Volkert et al., 2024). Consequently, nutrition-related problems in older age encompass both inadequate nutrient intake and excessive consumption of energy-dense, nutrient-poor foods.

The relationship between feeding habits and health becomes particularly important among older persons because dietary behaviours can influence the occurrence and management of chronic diseases. Cardiovascular diseases, diabetes, hypertension, osteoporosis and some cancers are among the conditions for which dietary factors may contribute to risk or disease progression. In addition, inadequate dietary intake can compromise immunity and physical function and increase vulnerability to infection and other adverse health outcomes. Evidence from a Nigerian study of older adults showed that approximately 62% of participants had at least one chronic illness, while 21.4% were at risk of malnutrition and 1.9% were already malnourished. Nutrition was significantly associated with morbidity,

alongside factors such as age, education, income and physical activity (Faronbi et al., 2025). These findings demonstrate the close interrelationship between dietary health, nutritional status and morbidity among older Nigerians.

Malnutrition remains an important concern in older populations. Although undernutrition is a major problem, nutrition-related health problems in later life also include overweight, obesity, micronutrient deficiencies and diet-related non-communicable diseases. A 2024 Nigerian study assessing older adults reported evidence of nutritional deficiencies and identified malnutrition as a multifactorial problem associated with the vulnerability of older persons to inadequate nutrient intake and age-related changes (Isong et al., 2024). Similarly, a pilot study among elderly persons attending the University College Hospital, Ibadan, reported concerns regarding malnutrition and micronutrient deficiencies and highlighted the importance of dietary assessment among older Nigerians (Farombi et al., 2024). International evidence also indicates that malnutrition in older adults is associated with poorer quality of life, increased morbidity and mortality, underscoring the importance of early identification and preventive nutrition interventions (Riddle et al., 2024).

Awareness of appropriate feeding habits is an important component of nutrition-related health promotion. Awareness may influence whether older persons recognize the importance of dietary variety, adequate meal frequency, appropriate portion sizes, sufficient consumption of fruits and vegetables, adequate protein and fluid intake, and moderation of salt, sugar and unhealthy fats. However, awareness alone does not necessarily translate into appropriate dietary practices because food choices are also shaped by income, food availability, cultural preferences, household support, physical ability, oral health and access to nutrition information. Evidence from Delta State provides an indication of this broader challenge. Ogbolu et al. (2024), studying adults in a rural constituency of Delta State, found that 60.6% had poor nutrition knowledge and 74.9% had poor dietary habits, while more than half of the participants were overweight or obese. Although the study involved adults generally rather than only older persons, its findings suggest that nutrition knowledge and dietary practices remain important public-health concerns within the state.

Evidence specifically concerning older persons in Nigeria further illustrates the importance of examining feeding habits. A study among older adults in Nigeria found that nutritional status was associated with sociodemographic and lifestyle characteristics, including age, education, income and physical activity (Faronbi et al., 2025). Research in Benue State has likewise examined food habits and micronutrient status among elderly persons, reflecting concerns about the adequacy and quality of dietary intake in later life (Gbeyonron & Chikwendu, 2024). Furthermore, research among older adults in Cross River State identified malnutrition as a multifactorial problem and examined biochemical indicators associated with nutritional vulnerability (Isong et al., 2024). Collectively, these studies indicate that nutrition among older Nigerians requires attention beyond the assessment of anthropometric status alone, including consideration of dietary behaviours and awareness of nutrition-related health consequences.

The Nigerian National Policy on Ageing recognizes older persons as particularly vulnerable to malnutrition because of physiological and physical changes, reduced food intake, limited dietary variety and social factors such as isolation. The policy also notes that several common diseases affecting older persons are influenced by dietary factors and calls for appropriate attention to nutritional deficiencies and associated diseases in health-promotion and disease-prevention programmes (Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development, 2021). Despite this policy recognition, there remains limited community-level evidence describing what older persons know about appropriate feeding habits and the health problems they associate with inappropriate dietary practices. This evidence gap is important because identifying awareness levels can help inform targeted nutrition education and health-promotion interventions.

Agbor, in Delta State, represents an important setting in which to examine these issues. Older persons living in the community may experience diverse nutritional challenges arising from changes in appetite and food preferences, household economic circumstances, dependence on family support, chronic health conditions and access to health and nutrition information. However, available Nigerian studies have largely focused on nutritional status, morbidity or dietary practices, with comparatively less attention to the level of awareness of feeding habits and their relationship with nutrition-related health problems among community-dwelling older persons in specific local settings. Understanding this local context is necessary because nutrition-related behaviours and perceptions may differ according to socioeconomic, cultural and environmental circumstances.

Therefore, this study assessed the level of awareness of feeding habits and nutrition-related health problems among elderly persons in Agbor, Delta State, Nigeria. The study is intended to provide evidence on older persons' awareness of appropriate feeding practices and their understanding of nutrition-related health problems, thereby contributing to the development of context-specific nutrition education, health-promotion and preventive interventions for healthy ageing.

For this study, the Materials and Methods should clearly operationalize awareness of feeding habits and nutrition-related health problems so that the methods correspond directly with your title and results.

Materials and Methods

Study design

A descriptive cross-sectional study design was adopted to assess the level of awareness of feeding habits and nutrition-related health problems among elderly persons in Agbor, Delta State, Nigeria. The cross-sectional design was considered appropriate because information on participants' sociodemographic characteristics, awareness of appropriate feeding habits, and awareness of nutrition-related health problems was collected at a single point in time.

Study population

The study population comprised elderly persons aged 65 years and above who were residing in Agbor, Delta State, (both Ika North and Ika South Local Government Area) at the time of the study. Participants were community-dwelling older persons who were able to respond to the study questionnaire with assistance from the researcher.

Inclusion criteria

Participants were eligible for inclusion if they:

- were aged 65 years or above;
- had been resident in Agbor for at least six months;
- were available during the period of data collection; and
- voluntarily consented to participate in the study.

Exclusion criteria

Older persons who were severely ill, unable to communicate effectively, or unable to provide reliable responses because of severe cognitive or communication difficulties were excluded from the study. Persons who declined consent were also excluded.

Sample size determination

Taro Yamane model for determination of population (Yamane, 1973) was used to determine the sample for the study. The model is explicitly stated;

$$\text{Sample size (n)} = \frac{N}{1+N(e)^2}$$

Where

n = Sample Size

N = The total population of elderly persons in Agbor (Ika North and South LGA) (18,128)

e = margin error (0.05)

Therefore, from the sample size calculation, 392 of elderly persons in Agbor were used for this study.

Sampling procedure

A multistage sampling procedure was used to select participants. In the first stage, Agbor both Ika North and Ika South Local Government Area, Delta State, Nigeria were purposively selected. In the second

stage, four communities from each Local Government Area will randomly selected. In the third stage, a simple random sampling technique by balloting without replacement was used in the selection of forty-nine (49) elderly person from each selected communities, thus the sample size was 392.

Data collection

Data were collected using a structured, interviewer-administered questionnaire developed from the objectives of the study and relevant literature on nutrition and healthy ageing. The questionnaire was divided into three sections:

Sociodemographic characteristics: This section obtained information on participants' age, sex, marital status, educational level, occupation/former occupation, household composition, religion and other relevant socioeconomic characteristics.

Awareness of feeding habits: This section assessed participants' awareness of appropriate feeding habits for older persons. Items covered issues including: importance of eating regular meals, consumption of fruits and vegetables, consumption of adequate protein-rich foods, adequate water/fluid intake, dietary variety, moderation of salt and sugar intake, limitation of highly fatty/fried foods, consumption of whole grains and other fibre-rich foods, appropriate portion sizes, importance of maintaining adequate food intake despite reduced appetite; and the relationship between feeding habits and health in old age.

Awareness of nutrition-related health problems: This section assessed participants' awareness of health problems that may be associated with inadequate or inappropriate feeding habits in older age. Participants were asked about conditions including malnutrition, underweight, overweight/obesity, hypertension, diabetes, cardiovascular disease, constipation, anaemia, micronutrient deficiencies and other diet-related health problems.

Dietary/feeding habit assessment: Participants were also asked about their usual feeding habits, including meal frequency, consumption of fruits and vegetables, protein-rich foods, water intake, frequency of consumption of fried or fatty foods, and addition of salt or sugar to meals. These questions were used primarily to describe the feeding patterns of the participants and to provide contextual information for interpreting their awareness of appropriate feeding practices. Qualitative 24 hours recall was used to assess feeding habits also. Participants were asked to recall the food eaten within the last 24 hours.

Body mass Index (BMI)

The height and the body weight were read directly from the tape and scale respectively. BMI was calculated from the height and weight measurement using the following formula.

BMI=weight (kg)/height (m^2)

On this basis, body mass index (BMI) was graded as:

Body mass Index (BMI)

BMI	**(kg/m^2)**
Underweight	<18.50
Normal	18.50-24.90
Overweight	25.0-29.9
Obesity	
Grade I	30.0-34.9
Grade II	35.0-39.9
Grade III	≥40

Source: WHO (2012)

Waist Hip Ratio (WHR)

The waist hip ratio was obtained from the wait circumference and hip circumference of the respondent.

Waist-hip ratio= *waist circumference (cm)/hip circumference (cm)*

On this basis, wait-hip ratio was regarded as;

Reference Values for Waist-hip ratio

WHR			
Female		**MALE**	
Low risk	<0.8	Low risk	<0.9
Moderate	0.8-0.85	Moderate risk	0.9-0.95
High risk	>0.85	High risk	>0.95

Source: WHO (2012)

Data analysis

Data from the weight and height, waist circumference and hip circumference of the respondents was used to derive the BMI and WHR. BMI was calculated as weight on kilograms, divided by height in meter

square (kg/m^2) and WHR was calculated by dividing the waist circumference by the hip circumference

Statistical analysis

Data were analyzed using SPSS (Statistical Package for the Social Sciences) version 20.0. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize the data.

Results

Table 1 shows the sociodemographic and economic characteristics of respondents. The study comprised **392 older persons**. Females constituted a slightly larger proportion of the respondents **(53.0%)** than males **(47.0%)**. Most respondents were aged **65–74 years (65.0%),** while 35.0% were aged 75 years and above. This indicates that the study population was predominantly composed of the younger segment of the older adult population. Educational attainment was relatively low, with **65.0% reported as illiterate**, compared with 35.0% who were literate. This relatively high level of illiteracy may have implications for respondents' ability to access, understand and apply nutrition information. Most respondents were **Christian (88.0%),** while 12.0% were traditionalists. Regarding marital status, 65.0% were married, 20.0% were widows/widowers and 15.0% were divorced. Respondents were evenly distributed across the eight communities, with each community contributing 12.5% of the sample. Regarding monthly income, the largest proportion **(25.8%)** earned ₦31,000–₦50,000, followed by 25.0% earning ₦51,000–₦70,000. About 22.0% earned less than ₦30,000, while only 5.0% earned above ₦100,000. This suggests that a substantial proportion of the respondents had relatively limited financial resources, which could influence their ability to obtain diverse and nutrient-dense foods.

Table 1. Socio-economic and demographic characteristics of respondents

Variables	Frequency	Percentage (%)
Male	184	47.0
Female	208	53.0
Total	**392**	**100.0**
Age group		
65–74 years	255	65.0
75 years and above	137	35.0
Total	**392**	**100.0**
Educational status		
Literate	137	35.0
Illiterate	255	65.0
Total	**392**	**100.0**
Religious status		
Christian	345	88.0
Traditionalist	47	12.0
Total	**392**	**100.0**
Marital status		
Married	255	65
Widow/Widower	78	20.0
Divorced	59	15.0
Total	**392**	**100.0**
Community		
Owa Kingdoms	49	12.5
Otolokpo	49	12.5
Ute-Okpu	49	12.5
Umunede	49	12.5
Agbor-Obi	49	12.5
Alihame	49	12.5
Ekuku-Agbor	49	12.5

Variables	Frequency	Percentage (%)
Alihagwu	49	12.5
Total	**392**	**100.0**
Less than 30,000	88	22
31,000-50,000	101	25.8
51,000-70,000	97	25
71,000-10,000	87	22.2
Above 100,000	19	5
Total	**392**	**100**
Monthly expenditure (~~N~~)		
Less than 30,000	90	23
31,000-50,000	104	26.5
51,000-70,000	99	25.3
71,000-100,000	79	20.2
Above 100,000	20	5
Total	**392**	**100**

Table 2 indicates the awareness of appropriate feeding habits of respondents. The findings indicate **uneven awareness of appropriate feeding habits** among the respondents. Awareness was relatively high for the importance of **regular meals**, with 65.0% giving the correct response, and for the relationship between feeding habits and health/nutritional status, with 65.1% responding correctly. Similarly, 62.0% correctly recognized the need to limit excessive salt and sugar intake. However, awareness was considerably poorer for several important aspects of healthy ageing. Only **35.0%** correctly identified the importance of adequate protein intake, while only **30.0%** recognized the importance of dietary variety. Awareness of limiting highly fatty or fried foods was also low, with only 31.1% responding correctly. The most pronounced knowledge deficit concerned **whole grains and fibre-rich foods**. Only **12.0%** gave the correct response, while 64.6% did not know their importance. Awareness of appropriate portion sizes was moderate, with 43.5% answering correctly. Similarly, 44.9% recognized the importance of maintaining adequate nutritious food intake despite reduced appetite.

Table 2: Awareness of appropriate feeding habits among elderly persons in Agbor

Variables	Correct n (%)	Incorrect n (%)	Don't know n (%)
Eating regular meals is important in older age.	255 (65.0)	78 (20.0)	59 (15.0)
Fruits and vegetables should be consumed regularly.	176 (45.0)	98 (25.0)	118 (30.0)
Adequate protein is important for older persons.	137 (35.0)	137 (35.0)	118 (30.0)
Adequate water/fluid intake is important.	188 (48.0)	110 (28.0)	94 (24.0)
Dietary variety is important.	118 (30.0)	98 (25.0)	176 (45.0)
Excessive salt and sugar should be limited.	243 (62.0)	74 (19.0)	75 (19.1)
Highly fatty/fried foods should be limited.	122 (31.1)	104 (26.6)	166 (42.3)
Whole grains and fibre-rich foods are beneficial.	47 (12.0)	92 (23.4)	253 (64.6)
Appropriate portion sizes are important.	171 (43.5)	126 (32.2)	95 (24.3)
Adequate nutritious food should be maintained despite reduced appetite.	176 (44.9)	118 (30.1)	98 (25.0)
Feeding habits affect health and nutritional status.	255 (65.1)	69 (17.5)	68 (17.4)

Table 3 presents awareness of nutrition-related health problems. Awareness was highest regarding the relationship between inadequate food intake and malnutrition. **83.5%** correctly recognized that inadequate food intake over time can cause malnutrition, while 80.5% recognized that inadequate nutritious food intake could result in underweight. Similarly, 72.5% correctly recognized that excessive consumption of sugary foods and drinks can increase the risk of type 2 diabetes. However, awareness of the relationship between excessive salt intake and hypertension was poor: only **23.0%** answered correctly, while 72.0% gave an incorrect response. Awareness of cardiovascular consequences was moderate, with 49.2% correctly identifying unhealthy diet as a risk factor for cardiovascular disease. Knowledge concerning constipation was particularly poor: only 36.3% correctly recognized the role of inadequate fibre and fluid intake, while 50.5% responded incorrectly. Awareness of micronutrient-related problems was also limited. Only **22.5%** correctly identified inadequate iron-rich food intake as a possible contributor to anaemia, while 72.0% did not know the answer. Similarly, only 24.3% recognized that an unvaried diet could increase the risk of vitamin and mineral deficiencies. Awareness was somewhat better concerning poor nutrition and weakness/muscle loss, with 45.0% answering correctly, and 53.5% recognizing that a balanced and varied diet can reduce the risk of some nutrition-related health

problems. A particularly important finding was that **60.5% did not know that nutrition-related health problems can occur even when an older person does not appear visibly underweight**. This suggests that respondents may associate malnutrition primarily with visible thinness and may have limited awareness of less obvious forms of nutritional problems.

Table 3 Awareness of nutrition-related health problems of respondents

Variables	True n (%)	False n (%)	Don't know n (%)
Inadequate food intake over time can lead to malnutrition in older persons.	327 (83.5)	40 (10.2)	25 (6.3)
Older persons who do not eat enough nutritious food may become underweight.	316 (80.5)	40 (10.2)	36 (9.3)
Eating too much energy-dense food regularly can contribute to overweight and obesity.	106 (27.1)	237 (60.4)	49 (12.5)
Excessive consumption of salt can contribute to high blood pressure (hypertension).	90 (23.0)	282 (72.0)	20 (5.0)
Regular consumption of excessive amounts of sugary foods and drinks can increase the risk of type 2 diabetes.	284 (72.5)	67 (17.0)	41 (10.5)
An unhealthy diet can increase the risk of cardiovascular diseases such as heart disease and stroke.	193 (49.2)	80 (20.5)	119 (30.3)
Eating too little fibre and not drinking enough fluids can contribute to constipation.	142 (36.3)	198 (50.5)	52 (13.2)
Inadequate intake of iron-rich foods can contribute to anaemia.	88 (22.5)	22 (5.5)	282 (72.0)
Older persons who do not consume a varied diet may be at risk of vitamin and mineral deficiencies.	95 (24.3)	28 (7.2)	269 (68.5)
Poor nutrition can contribute to weakness and loss of muscle strength in older persons.	176 (45.0)	78 (20.0)	137 (35.0)
Poor dietary habits can contribute to poor control of some existing chronic diseases in older persons.	137 (35.0)	78 (20.0)	176 (45.0)
Eating a balanced and varied diet can help reduce the risk of some nutrition-related health problems.	210 (53.5)	59 (15.0)	123 (31.5)
Both inadequate food intake and excessive unhealthy food intake can cause health problems in older persons.	236 (60.2)	80 (20.4)	76 (19.4)
Poor nutrition can weaken the body's ability to maintain normal body functions and recover from illness.	229 (58.4)	65 (16.5)	98 (25.1)
Nutrition-related health problems can occur even when an older person does not appear visibly underweight.	68 (17.3)	87 (22.2)	237 (60.5)

Table 4 shows the dietary practices of respondents. More than half of the respondents (**56.0%**) reported eating **two meals per day**, while only 24.0% reported eating three meals daily. Furthermore, 48.0% indicated that they did not eat enough food each day. Meal skipping was common, with **54.3%** reporting that they skipped meals. Among those reporting skipped meals, lunch was the most frequently skipped meal (37.8%), followed by breakfast (33.6%) and dinner (28.6%). The reported reasons included being too weak to prepare food (51%) and inability to afford meals (49%). These findings suggest that both **functional limitations and economic constraints** may contribute to inadequate food intake among the older persons. Snacking was relatively common. Nearly half (49.0%) reported consuming meat pie, soft drinks, biscuits or similar foods as snacks, while 26.0% consumed moi moi. About half (**50.8%**) reported snacking once every two days, while 24.2% snacked daily.

Fruit and vegetable consumption was present but varied considerably. For vegetables, 33.7% consumed them three times per week, while 19.9% consumed them once weekly. For fruits, 30.9% consumed them three times weekly, 25.5% twice weekly and 23.5% once weekly. Thus, regular daily consumption of fruits and vegetables does not appear to be predominant in this population. Most respondents reported eating when hungry (**52.0%**) or once food became available (**44.0%**). The majority ate their meals at home (70.2%), while 18.6% ate at restaurants. Water was the most commonly reported liquid consumed after meals (**47.4%**), although palmy wine accounted for 25.5%, while soft drinks and alcoholic beverages accounted for 11.2% and 8.2%, respectively. This indicates that water was the predominant beverage, but consumption of alcoholic and sugar-sweetened beverages was also reported.

Table 4 Dietary Practice of the Respondents

Variables	Frequency (F)	Percentage (%)
The number of meals you have each day		
Once	43	11
Twice	218	56
Three	94	24
Others	37	9
Total	**392**	**100**
Eat enough meal each day		
Yes	204	52
No	188	48
Total	**392**	**100**
Reason for not eating enough meal		
Food not enough	79	20
Unable to prepare	100	26
Food not appetizing	60	15
No reason	153	39
Others	-	-
Total	**392**	**100**
Skipping meals		
Yes	213	54.3
No	179	45.7
Total	**392**	**100**
Meals skipped		
Breakfast	132	33.6
Lunch	148	37.8
Dinner	112	28.6
Breakfast+lunch	-	-
Breakfast+dinner	-	-
Lunch+dinner		

Total	**392**	**100**
Reason for skipping meal		
Weak to prepare	200	51
Cannot afford it	192	49
Fasting on religious reasons	-	-
Others	-	-
Total	**392**	**100**
Types of snacks taken in-between meals		
None	-	-
Meat pie, soft drink, biscuit e.t.c	193	49
Moi moi	100	26
Okpa	51	13
Nuts	28	7
Others	20	5
Total	**392**	**100**
The number of snacking in a week		
Everyday	95	24.2
Once in 2 days	199	50.8
Twice in a week	98	25
Others	-	-
Total	**392**	**100**
Frequency of vegetable intake in a week		
None	-	
Once	78	19.9
Twice	102	26
Three times	132	33.7
Four times	40	10.2
Five times	40	10.2
Total	**392**	**100**

Frequency of fruit intake in a week		
None	-	-
Once	92	23.5
Twice	100	25.5
Three times	121	30.9
Four times	79	20.1
Five times	-	-
Total	**392**	**100**
Eating of food		
At will	17	4
When hungry	202	52
When less busy	-	-
Once food is available	173	44
Others	-	-
Total	**392**	**100**
Where you eat meal		
Restaurant	73	18.6
At home	275	70.2
Friend’s house	44	11.2
Others	-	-
Total	**392**	**100**
Type of liquid consumed or after meal		
Water	186	47.4
Soft drink	44	11.2
Alcohol	32	8.2
Beverage	30	7.7
Pal wine	100	25.5
Others	-	-
Total	**392**	**100**

Table 5 shows the 24-hour dietary recall of respondents. The 24-hour dietary recall demonstrates a diet based substantially on **local staples and cereal/tuber-based meals**, including rice, yam, garri, beans, pap, okpa, plantain and various soups. For breakfast, commonly reported foods included okpa (12.5%), rice (6.6%), bread and akara (9.4%), akara and pap (7.9%), and beans and pap (6.4%). Lunch and dinner showed greater use of rice, yam, beans and various soups. The dietary recall suggests that respondents consumed a variety of traditional Nigerian foods, but the pattern appears to be **dominated by starchy staples**, with relatively less evidence of consistently high consumption of fruits, vegetables and other nutrient-dense foods. This finding is consistent with the relatively poor awareness of dietary variety, protein and fibre observed earlier.

Table 5: 24-hour dietary recall of respondents (N = 392)

Food consumed	Breakfast F	%	Lunch F	%	Dinner F	%
Okpa	49	12.5	–	–	26	6.6
Rice	26	6.6	65	16.6	29	7.4
Yam with palm oil/stew	10	2.6	–	–	22	5.6
Rice/beans	30	7.7	36	9.2	25	6.4
Yam/beans	6	1.5	26	6.6	11	2.8
Potatoes	17	4.3	–	–	16	4.1
Beans & pap	25	6.4	–	–	30	7.7
Melon soup & akpu	13	3.3	34	8.7	24	6.1
Garri and ogbono soup	5	1.3	37	9.4	18	4.6
Bread and akara	37	9.4	–	–	29	7.4
Garri and okro soup	8	2.0	24	6.1	15	3.8
Akara and pap	31	7.9	–	–	7	1.8
Moimoi and pap	7	1.8	–	–	–	–
Garri & bitter leaf soup	7	1.8	21	5.4	34	8.7
Yam pottage	5	1.3	–	–	14	3.6
Bread & tea	30	7.7	–	–	5	1.3
Beans & plantain	24	6.1	24	6.1	12	3.1
Spaghetti	15	3.8	–	–	18	4.6
Noodles	21	5.4	48	12.2	26	6.6
Garri/vegetable soup	6	1.5	43	11.0	12	3.1
Soaked garri (cassava source)	20	5.1	34	8.7	19	4.8
Total	**392**	**100.0**	**392**	**100.0**	**392**	**100.0**

Table 6 present Body Mass Index (BMI) and Waist Hip Ratio (WHR) status of respondents. Overall, **27.0% were underweight**, while 18.4% had normal weight. On the other hand, 24.0% were overweight and 15.8% had class I obesity, while 14.8% had class II obesity. No respondent had class III obesity. Therefore, approximately **27.0% were underweight**, while **54.6% were above normal weight** when overweight and obesity classes I and II are combined. This indicates that undernutrition and overnutrition coexist within the study population. Among males, 29.3% were underweight compared with 25.0% of females. Conversely, overweight and obesity were also common in both sexes. For example, 22.0% of males and 26.0% of females were overweight, while class I and II obesity affected both groups.

The waist–hip ratio findings provide further evidence of elevated nutritional/metabolic risk. Overall, **51.5% of respondents were classified as being at risk**, compared with 48.5% who had a normal waist–hip ratio. The proportion at risk was similar among males (51.6%) and females (51.4%).

Table 7: Body Mass Index (BMI) and Waist Hip Ratio (WHR) status of respondents

Body mass index (kg/m^2)	**Male**		**Female**		**Total**	
	F	**%**	**F**	**%**	**F**	**%**
Underweight	54	29.3	52	25	106	27
Normal weight	32	17.4	40	19.2	72	18.4
Overweight	40	22	54	26	94	24
Obesity class I	30	16.3	32	15.4	62	15.8
Obesity class II	28	15	30	14.4	58	14.8
Obesity class III	0	0.0	0	0.0	**0**	0.0
Total	**184**	**100**	**208**	**100**	**392**	**100**
Waist Hip Ratio						
Normal	89	48.4	101	48.6	190	48.5
At risk	95	51.6	107	51.4	202	51.5
Total	**184**	**100**	**208**	**100**	**392**	**100**

Discussion

This study assessed awareness of feeding habits, nutritional status, dietary practices, and nutrition-related health problems among older persons in Agbor, Delta State, Nigeria. This is important because nutritional problems in later life are not limited to inadequate body weight. Older adults may simultaneously experience inadequate dietary intake, poor diet quality, obesity, abdominal adiposity and micronutrient inadequacy. Recent evidence from Africa indicates that malnutrition, obesity, food insecurity, sarcopenia, constipation and micronutrient deficiencies commonly coexist among older populations, highlighting the need to move beyond a narrow focus on underweight alone (Manyara et al., 2025).

The sociodemographic profile of the respondents is relevant to understanding their nutritional circumstances. The predominance of respondents aged 65–74 years means that most participants were in the earlier part of older adulthood, while a substantial minority were aged 75 years or older. The relatively high proportion of respondents without formal literacy is particularly important because

education can influence the ability to obtain, understand and apply health and nutrition information. This interpretation is supported by recent Nigerian evidence. In a 2026 study among older adults attending a tertiary healthcare centre in south-eastern Nigeria, education, marital status and age independently predicted nutritional status, with older, poorly educated and socially unsupported participants more likely to experience malnutrition (Anyigor-Ogah et al., 2026).

The economic characteristics of the Agbor elderly population may further constrain dietary choices. Although the income distribution was heterogeneous, a considerable proportion reported relatively modest monthly income. This is particularly relevant in the current Nigerian context, where food-price pressures and reduced purchasing power can affect access to nutrient-dense foods. Evidence from south-eastern Nigeria has shown that household food insecurity is associated with age, education, income and employment status, with limited food variety being an important manifestation of inadequate food access (Ukonu et al., 2024). Similarly, a recent study of older adults in Kano found that financial hardship and limited food variety were recurring explanations for undernutrition, while poor family support was independently associated with undernutrition (Olawumi et al., 2025).

These findings suggest that nutrition interventions for older people in Agbor should not assume that poor dietary practices are solely the result of inadequate knowledge. Knowledge, affordability, food availability, functional capacity and family support may operate together to determine what older persons are able to eat. This distinction is important because education alone may have limited impact where nutritious foods are unaffordable or older persons are unable to prepare meals independently.

The pattern of awareness observed among elderly persons in Agbor suggests that respondents possessed better recognition of broad nutrition concepts than of specific dietary requirements associated with healthy ageing. Awareness of the importance of regular meals and the relationship between feeding habits and nutritional health was comparatively stronger, whereas knowledge of protein, dietary variety, fibre, whole grains and limitation of fried foods was considerably weaker. This pattern indicates that general awareness does not necessarily translate into knowledge of the specific dietary components required to maintain nutritional health in later life. The particularly limited awareness of protein is important because ageing is accompanied by progressive changes in muscle mass and function, making adequate dietary protein and appropriate physical activity increasingly important for maintaining physical function. The problem is compounded by the finding that respondents also had limited awareness of dietary variety and fibre-rich foods. Recent African evidence emphasizes that older adults require interventions addressing overall food intake, protein intake, micronutrient sufficiency and healthy dietary patterns rather than interventions directed exclusively at body weight (Manyara et al., 2025).

The low awareness of fibre-rich foods is also consistent with the dietary findings, in which meals were substantially based on cereals, roots, tubers and other starchy staples. Thus, the knowledge deficit identified among elderly persons in Agbor has potential practical consequences for dietary quality. However, the relationship should not be interpreted as causal because this cross-sectional study cannot

establish that limited awareness directly produced the observed dietary pattern. The findings are broadly consistent with evidence from Lagos, where Olatona et al. (2023) reported poor nutritional knowledge among adults and dietary inadequacies involving fibre and several micronutrients. Although the Lagos study involved adults rather than specifically older persons, its findings demonstrate that nutrition knowledge remains an important public-health challenge in Nigeria.

An important feature of the present study is the contrast between relatively good recognition of obvious consequences of inadequate food intake and poor recognition of specific diet-related chronic and micronutrient problems. Respondents were more likely to understand that inadequate food intake could cause malnutrition or underweight than to recognize the roles of salt, fibre, dietary variety and iron-rich foods in health. This pattern has important implications for healthy ageing because older persons may understand malnutrition primarily as visible weight loss while failing to recognize less visible nutritional problems. The limited recognition that nutritional health problems may occur in people who are not visibly underweight is particularly important in light of the anthropometric findings in this study. The coexistence of underweight with overweight and obesity demonstrates why relying on body size or visible thinness alone may fail to identify nutritional risk.

Recent Nigerian studies reinforce this concern. Faronbi et al. (2025), studying 330 community-dwelling older adults in Ile-Ife, found that 62% had at least one chronic illness and that nutrition was significantly associated with morbidity. They also reported that 21.4% were at risk of malnutrition and 1.9% were malnourished. The present findings therefore support the need for nutrition education that connects dietary behaviour with specific chronic conditions rather than providing only generic messages about “eating well.” The poor awareness of the relationship between salt intake and hypertension is particularly concerning because cardiovascular disease and hypertension are major health challenges among older adults. Likewise, limited awareness of the role of fibre and fluid intake in constipation may be clinically important. The African umbrella review by Manyara et al. (2025) estimated pooled prevalence of constipation at 32% among older people in Africa, demonstrating that gastrointestinal nutritional problems are sufficiently common to warrant attention in healthy-ageing interventions.

Similarly, the limited knowledge concerning iron-rich foods and micronutrient deficiencies suggests a potential blind spot in community nutrition education. The Ibadan pilot study by Farombi et al. (2024) found that although none of the participating older adults were classified as malnourished using the MNA, 27.3% were at risk of malnutrition and vitamin A and vitamin D deficiencies were identified. This demonstrates that apparently adequate nutritional status does not necessarily exclude micronutrient problems.

The dietary practices observed among older adults in Agbor suggest that food intake is influenced by both nutritional and socioeconomic factors. The predominance of two meals per day, frequent meal skipping and reports of inadequate food intake indicate that some respondents may have difficulty achieving consistent dietary intake. More importantly, the reasons given for inadequate intake point to functional limitations and economic constraints, rather than knowledge alone. The finding that some

respondents were too weak to prepare food is particularly relevant to older-age nutrition. Reduced functional capacity can create a cycle in which weakness limits food preparation and inadequate dietary intake subsequently worsens weakness. Nigerian evidence supports the importance of functional and social circumstances in nutritional status. Isong et al. (2024) found that activities of daily living were associated with nutritional status among older adults in Cross River State, while 58.2% of the older participants were classified as being at risk of malnutrition.

The importance of family support is also increasingly evident in Nigerian research. Olawumi et al. (2025) reported that poor family support was associated with substantially greater odds of undernutrition among older adults in northern Nigeria. Their qualitative findings further identified financial difficulties, irregular meal preparation and limited dietary variety as recurring problems. These observations are highly relevant to Agbor, where inability to prepare meals and inability to afford meals were both reported as reasons for inadequate intake. This suggests that interventions should include family members and caregivers rather than targeting older persons alone. The finding that lunch was the most frequently skipped meal may also reflect the practical demands of food preparation and food availability during the day. Rather than interpreting meal skipping simply as an unhealthy personal choice, it may be more appropriate to understand it within the socioeconomic and functional environment of older adults.

The reported frequency of fruit and vegetable consumption suggests that these foods were not consistently incorporated into daily meals. This finding corresponds with the low awareness of dietary variety observed in the study. The 24-hour dietary recall further showed a dietary pattern dominated by rice, yam, garri, pap, beans, plantain and other cereal- and tuber-based foods. The consumption of local staples is not inherently unhealthy and should not be interpreted as evidence of poor diet simply because these foods are traditional Nigerian foods. Rather, the concern is the relative balance and variety of the overall diet. Traditional staples can contribute substantially to energy intake, but diets dominated by starchy foods with insufficient legumes, animal-source foods, fruits, vegetables and other nutrient-dense foods may provide inadequate amounts of some micronutrients, protein or fibre.

This interpretation is supported by research from southern Nigeria. Ogbolu et al. (2024), studying low-income adults in rural Delta State, reported poor dietary practices in 74.9% of respondents and poor nutrition knowledge in 60.6%; more than half were overweight or obese. Although the population was not restricted to older adults, the study is particularly relevant because it was conducted within Delta State and demonstrates the interaction between socioeconomic circumstances, dietary behaviour and nutritional status. The findings also have relevance to broader food-security conditions in Nigeria. A recent south-eastern Nigerian study reported substantial household food insecurity and inadequate dietary diversity, with education, age and income among factors associated with food security. Therefore, improving dietary diversity among older persons may require measures that improve food access in addition to nutrition education.

One of the most important findings of the present study is the coexistence of undernutrition and overnutrition. Rather than representing two separate populations, these findings illustrate the double

burden of malnutrition among older persons in Agbor. The presence of underweight alongside a substantial proportion with overweight and obesity indicates that interventions should avoid a one-dimensional focus on either weight loss or prevention of undernutrition. This pattern is consistent with the wider Nigerian nutrition transition. Olatona et al. (2023) found that adults in Lagos had a prevalence of overweight of 24.8% and obesity of 17.3%, despite poor nutritional knowledge and evidence of dietary inadequacy. Similarly, Ogbolu et al. (2024) reported that 56.2% of low-income adults in rural Delta State were overweight/obese.

The Agbor findings extend these observations to an older population and demonstrate that excess weight can coexist with inadequate dietary intake. This is important because a high BMI does not necessarily indicate adequate nutritional quality. An older person may consume sufficient or excessive calories while simultaneously having inadequate protein, fibre or micronutrient intake. The African evidence synthesis by Manyara et al. (2025) similarly identified both underweight and obesity as substantial nutrition problems among older Africans, with pooled estimates of 21% and 27%, respectively. The high proportion of respondents with an elevated waist–hip ratio provides an additional reason for concern. Central adiposity is particularly relevant to cardiometabolic risk and should be considered alongside BMI when assessing older persons. Faronbi et al. (2025) demonstrated an association between nutrition and chronic morbidity among Nigerian older adults, while cardiovascular and other chronic conditions were common in their study population.

Overall, the nutritional picture observed among older persons in Agbor is consistent with, but also differs from, recent Nigerian studies. The Ile-Ife study by Faronbi et al. found substantially more favourable nutritional classification using MNA, with 74.1% normally nourished, 24.0% at risk and 1.9% malnourished. Similarly, the UCH Ibadan pilot study reported that 72.7% of older participants had normal nutritional status, while 27.3% were at risk of malnutrition, with none classified as malnourished according to the Mini Nutritional Assessment (MNA) (Farombi et al., 2024). In contrast, the Agbor findings demonstrate a much greater prevalence of low BMI while simultaneously showing a high burden of overweight and obesity. These differences may reflect differences in study setting, population characteristics, measurement tools and dietary environments. The Ibadan participants were recruited from a geriatric centre, whereas the Agbor study involved community-dwelling older persons. Differences in educational attainment, urbanisation, household support, income and access to healthcare may also contribute to differences in nutritional status. The importance of these contextual factors is supported by Nigerian studies showing associations between nutritional status and social or functional circumstances among older adults (Farombi et al., 2024; Isong et al., 2024; Olawumi et al., 2025).

Evidence from other Nigerian settings illustrates this heterogeneity. In Calabar, Cross River State, Isong et al. (2024) reported that 58.2% of older adults were at risk of malnutrition, while 9.1% had poor nutritional status; nutritional status was also associated with activities of daily living and dependency. In Kano, Olawumi et al. (2025) found among older adults and identified older age and poor family support as significant determinants. More recently, Anyigor-Ogah et al. (2026) reported that age, marital status and education independently predicted nutritional status among older adults in south-eastern Nigeria,

with older age, absence of a spouse and lower educational attainment associated with greater likelihood of malnutrition. These variations reinforce the importance of locally generated evidence rather than assuming that nutritional problems among older Nigerians are uniform across geographical or socioeconomic contexts.

The findings have several implications for practice. First, nutrition screening should become part of routine health assessment for older persons at community and primary healthcare levels. BMI alone should not be used to identify nutritional risk because the present findings demonstrate simultaneous underweight and excess weight. Screening should ideally incorporate dietary intake, recent weight change, functional capacity, appetite, anthropometry and, where feasible, validated geriatric nutrition tools such as the MNA.

Second, nutrition education should be redesigned to address the specific knowledge gaps identified in Agbor. Education should emphasize affordable sources of protein, fruits and vegetables, fibre-rich foods, appropriate fluid intake, moderation of salt, sugar and highly fried foods, and the importance of dietary variety. Messages should use simple language and culturally familiar foods because of the high level of illiteracy observed in the population.

Third, interventions should address food access and functional barriers, not knowledge alone. Community-based programmes could incorporate family nutrition education, assistance with food preparation, social support, community meal programmes and referral of nutritionally vulnerable older persons to health and social services. The recent Nigerian evidence showing strong relationships between family support and nutritional status supports this family-centred approach.

Fourth, the coexistence of undernutrition and overweight/obesity means that interventions should promote nutrient adequacy and healthy dietary quality rather than simply weight reduction. Older persons with excess weight should not automatically be placed on restrictive diets that could worsen protein or micronutrient inadequacy. Conversely, older persons who are underweight require interventions that improve energy and nutrient intake while considering underlying illness, appetite, oral health and functional limitations.

Finally, the findings contribute to the relatively limited Nigerian evidence base on nutrition among older adults. A recent African systematic umbrella and scoping review concluded that research and nutrition interventions for older people remain disproportionately concentrated in a small number of African countries and that future interventions should be multicomponent, combining dietary counselling and, where appropriate, supplementation with non-nutritional components such as physical activity. The Agbor study therefore provides useful community-level evidence that can support the development of locally appropriate healthy-ageing programmes in Delta State and similar Nigerian communities.

Conclusion

The study found a substantial double burden of malnutrition among older persons in Agbor, reflected in the coexistence of undernutrition (27.0%) and overweight/obesity (54.6%), with 51.5% having an elevated waist-to-hip ratio. These findings occurred alongside important gaps in nutrition awareness, particularly regarding protein intake, dietary variety, fibre-rich foods, micronutrient adequacy and nutrition-related chronic disease. Dietary practices were also suboptimal, as 54.3% reported skipping meals, 48.0% reported inadequate food intake, and fruit and vegetable consumption was relatively infrequent. Economic constraints and weakness affecting meal preparation further contributed to inadequate intake. Overall, the findings indicate that older persons in Agbor face both undernutrition and excess-weight-related health risks, highlighting the need for community-based nutrition education, routine nutritional screening, and interventions that improve access to affordable, diverse and nutritious foods as part of healthy ageing programmes.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Strengthen community-based nutrition education for older persons
2. Promote affordable, locally available nutrient-dense foods
3. Address economic barriers to adequate food intake
4. Incorporate nutrition screening into routine healthcare for older persons
5. Develop interventions addressing both undernutrition and overnutrition
6. Strengthen caregiver involvement
7. Integrate nutrition counselling into chronic disease services
8. Use community structures to deliver nutrition interventions
9. Improve access to nutrition professionals
10. Conduct further research

Declarations

Acknowledgements: The author thank the elderly population in Agbor who contributed making the research successful.

Author Contributions

C.V.E: Conception, methodology, investigation, data curation, writing original draft, manuscript preparation resources, and revision.

Declaration of Generative AI and AI-Assisted Technologies in Scientific Writing

AI was used to comprise and correct grammatical. CHATGPT and quillbot was used.

Availability of data and materials

The data and materials supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical declarations

Ethical approval/ Informed consent

Ethical approval was obtained from the Federal Medical Centre (FMC) Asaba Research and Ethics Committee, Delta State, Nigeria after submitting the project proposal with the necessary documents required by the Ethical Committee in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained orally from all participating elderly persons. The consent to participate process was designed to be thorough, transparent, and respectful of the participants' autonomy, in accordance with ethical research guidelines.

Declaration of Conflict of Interests: The authors have declared no conflicts of interest.

Source of Funding: The authors declared the study received no funding.

Consent for Publication: Not applicable

Clinical trial number: Not applicable.

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