NUTRITIONAL AND HEALTH STATUS OF OLDER PERSONS AGED ≥ 60 YEARS IN RURAL COMMUNITIES OF UDI LOCAL GOVERNMENT AREA, ENUGU STATE, NIGERIA

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ABSTRACT
Background: Nutrition plays significant role in health of older persons, as undernutrition and overnutrition are associated with greater risk of morbidity and mortality.
Objective: The study assessed the nutritional and health status of older persons ≥ 60years in Udi Local Government Area, Enugu State, Nigeria.
Materials and methods: This cross sectional multi-stage sampling study was carried out on 238 randomly selected community dwelling older persons aged ≥ 60 years who gave their informed consent. Semi-structured questionnaire was used to elicit information on socioeconomic and dietary pattern. Anthropometric indices of BMI, waist circumference (WC) and calf circumference (CC), waist hip ratio (WHR) were assessed using standard procedures and compared with recommended cut-off. Geriatric health questionnaire consisting of functional ability - Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL)) and nutritional health checklist (NHC) was used and judged for dependence and independence on recommended scales. Data was analyzed using IBM SPSS statistics version 22.0. Pearson correlation was used to determine relationship and significance judged at p< 0.05.
Results: Most (58.4%) were within 60-69 years. Some (33.2%) sourced their income from their children and 42.9% earned between ₦18, 000- ₦36, 000 (approx 50 – 100USD) monthly. Most (68.1%) skipped meals. Majority (60.6%) were overweight/obese with BMI. In CC (87%) were malnourished; 56% and 55.9% were at risk of cardiovascular disease from WC and WHR respectively. In ADL (66.4%) were very dependent; 27.7% were dependent in IADL. Most (62.6%) had high nutritional risk; 25.2% were moderately at risk using NHC. There was significant relationship between CC and ADL (r = -0.70; p=0.009); no significant relationship (P>0.05) between other anthropometric variables with ADL and IADL.
Conclusion: Most of the respondents skipped meals; majority were malnourished using CC. Most were dependent in ADL, few were dependent in IADL. Many were at high nutritional risk using NHC.

Key words: *Older Persons; Obesity; Dietary Pattern; Geriatric Health*

INTRODUCTION

World Health Organization (WHO) (1) defines the older persons as all persons over the age of 60 years. Although there is no definitive definition of the older persons, it is generally agreed that it is a concept that reflects an age continuum starting sometimes after age 60 which is characterized by a slow progressive frailty that continues until the end of life (2). It has been accepted that nutrition plays a significant role in the older persons' health status, and both undernutrition and overnutrition are associated with greater risk of morbidity and mortality (3; 4). Malnutrition among older persons is a key determinant of their mortality, healthcare and quality of life (5). The older persons are the gemstones of the society that are often ignored and, therefore, need to be preserved and respected as they are the building blocks for future generations. Aging is accompanied by an increased likelihood of suffering from one or more chronic diseases such as respiratory disease, arthritis, stroke, depression, dementia and

these conditions may affect appetite, functional ability or ability to swallow, all leading to altered food intake and impairment of nutritional status (4). Maintaining a good nutritional status has significant implications for health and wellbeing, delaying and reducing the risk of developing disease, maintaining functional independence and thus promoting continued independent living (6). A study by Charlton and Rose (7) noted that nutrition interventions in African countries, when available, are directed primarily toward infants, young children, as well as pregnant and lactating women, therefore, lacking in concentration on the older persons in policies and programmes which is mirrored by the rareness of data from studies on the older persons' health situation, nutritional status as well as dietary intake patterns. This is also corroborated by the SDGs which did not make any specific provision for the older persons in the seventeen goals. This study was therefore designed to assess the nutritional (dietary pattern and

anthropometric) and health status of older persons ≥ 60 years.

METHODOLOGY

The study was carried out in Ngwo, Udi Local Government Area of Enugu State, Nigeria which has an area of 897km^2 and a population of 234,002 people. The study area is made up of ten communities which have the same culture, custom, dialect, tradition and heritage. Most of the older persons in the study area are retired civil servants who have ventured into trading and farming.

The sample size was calculated using the formula by Areoye (8); n = $\frac{Z^2 \, P \, (100 - P)}{X^2}$. Where n = sample size, Z = confidence interval taken at 95% degree of probability which is 1.96% level, P = percentage of older persons in Nigeria which is 3.12% Nigerian Demographic Profile (9), X = width of confidence interval at 5% level of probability. The calculated sample size was 46 which were taken from the five communities that were randomly selected by ballot from the ten communities that make up the study area.

Subjects: A total of 238 older persons comprising males (n =104) and females (n = 134) (60 years and above) drawn from the five sampling areas were selected for the study.

Methods   Multi-stage sampling technique was used in selecting the older persons for the study. A total of 46 older persons were purposively selected from each of the five communities plus an additional 10 for attrition making a total of 240. However, only 238 older persons who gave their informed consent and participated fully in the study were used for the study. The addresses of those selected were obtained from the traditional rulers and village heads of the different communities. They were visited in their homes and informed consent was obtained before commencement of the study. Four research assistants were trained for two days on data collection using structured, validated and pretested questionnaire which was designed to elicit information on socio-economic status and dietary pattern of the respondents. The health status was assessed using the geriatric health questionnaire consisting of questions on functional ability(Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL)) and nutritional health checklist (NHC).

All the anthropometric measurements were done using the methods described by WHO (10) and Tolonen *et al.* (11). Weight was measured using the Hanson model bathroom scale with the subject made to stand without shoes and wearing light cloths and reading taken to the nearest 0.1kg. Locally produced stadiometer was used for measuring height for those without kyphosis while non-stretch flexible fibre tape was used to measure arm span (as proxy for height measured when the subject stood or sat against a wall with the arms extended laterally at shoulder height and measurement was made with an assistant at each end of the tape holding the arm and taking the measurement) for those with kyphosis and measurement was taken to the nearest 0.1cm. Non-stretch flexible fibre glass tapes were used for measuring the waist circumference taken with the tape placed midway between the upper hip bone and the uppermost border of the right iliac crest and reading taken to the nearest 0.1cm at the end of normal expiration. Measurements were taken with all heavy and tight clothing removed, belts loosened and pockets emptied. Hip circumference was measured with the tape placed around the buttocks in a horizontal plane and the measurement recorded to the nearest 0.1cm. The calf circumference was measured with non-stretch fibre tape when the subject was standing with the feet apart and tape measure positioned horizontally around the calf and moved up and down to locate the maximum circumference in a plane perpendicular to the long axis of the calf and the measurement was recorded to the nearest 0.1cm. Body mass index (BMI) was calculated from weight and height measurements as reported by Wardlaw *et al.* (12) and compared with the report of WHO (13; 14) which was <18.5kg/m^2 for underweight, 18.5-24.5 kg/m^2 (normal), ≥ 25kg/m2 overweight and ≥30 kg/m^2 (obese). Waist hip ratio (WHR) was compared for safe levels and at risk of heart disease using the standards classified as normal (male <0.90, female <0.80), at risk (male ≥0.90, female ≥0.80) (15; 16). The waist circumference for men and women was compared with the relative risk standard classified as normal (male <94cm, female <80cm), at risk (male ≥94cm, female≥80cm) and increased risk (male ≥102, female ≥88) (16). Waist circumference greater than 88cm for women and 102cm for men may indicate a health risk for obesity and other related disease (17).Calf circumference (CC) was assessed by the standards indicating that CC≥30.5cm provides a good/acceptable nutritional state while<30.5cm shows malnourished state (18).The general health assessment was analyzed using 5 point Likert scale which measured the level of quality of health (with score 1 for poor and 5 for very excellent) and the level of severity of pain (score 1 for none and 5 for very severe) (19).The functional ability assessment was analyzed using Katz index of independence in Activities of Daily Living (ADL) and Lawton Instrumental Activities of Daily Living Scale. ADL has six activities and each of them has the score of 1 if performed independently and a score of zero if performed dependently. The scores were summed up

and the total scores interpreted as score 6 for high independence and (0) for very dependent (20). Lawton Instrumental Activities of Daily Living Scale was used to assess IADL with a total of 9scores classified as zero (0) for very dependent, 1 for unable, 2 for needs assistance and ≥3 as independent (21).

The information gathered from the questionnaire and anthropometric measurements were assessed using IBM Statistical Product Service Solution (SPSS) for windows version 22. Descriptive statistics such as frequency and percentage was used to analyse data on socioeconomic parameters,nutritional status and health status of the respondents. Pearson correlation was used to show the relationship between the nutritional status and health status of the subjects and significance was judged as (P < 0.05).

RESULTS

Table 1 shows the socio-economic status of the respondents (male n= 104, females n=134). More than half (58.4%) were within the age 60-69 years, 28.2% were within 70-79 years, only 2.5% were 91 years and above. Some (34.5%) had no formal education, 32.4% had primary education and the rest had secondary and tertiary education. About 26.9% of the respondents were farmers, 30.7% were traders, 4.2% were retired without pension, 9.2% were retired with pension, 21.0% were unemployed and 6.3% were engaged in one business or the other. About 42.9% earned between ₦18,000-₦36,000 (approx.50-100USD) a month whereas 35.3% earned less than ₦18,000(50USD).

Table 1: Socioeconomic status of the older persons

Variables	Male Freq (%)	Female Freq (%)	Total Freq (%)
Age range			
60-69 years	56(53.8)	83(61.9)	139(58.4)
70-79 years	32(30.8)	35(26.1)	67(28.2)
80-90 years	12(11.5)	14(10.4)	26(10.9)
91 years and above	4(3.8)	2(1.5)	6(2.5)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Family size			
≥3	8(7.7)	9(6.7)	17(7.1)
5	25(24.0)	28(20.9)	53(22.3)
7	36(34.6)	28(20.9)	64(26.9)
9	10(9.6)	11(8.2)	21(8.8)
11	25(24.0)	58(43.3)	83(34.9)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Educational status			
No formal education	26(25.0)	56(41.8)	82(34.5)
Primary education	35(33.7)	42(31.3)	77(32.4)
Secondary Education	22(21.2)	20(14.9)	42(17.6)
Tertiary education	21(20.1)	16(11.9)	37(15.6)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Occupation			
Farmer	36(34.6)	28(20.9)	64(26.9)
Trader	30(28.8)	43(32.1)	73(30.7)
Housewife	0(0.0)	4(3.0)	4(1.7)
Retired without pension	5(4.8)	5(3.7)	10(4.2)
Retire with pension	12(11.5)	10(7.5)	22(9.2)
Unemployed	15(14.4)	35(26.1)	50(21.0)
Business man	6(5.8)	9(6.7)	15(6.3)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Average monthly income			
Less than ₦18,000	27(26.0)	57(42.5)	84(35.3)
₦18,000-36,000	38(36.5)	64(47.8)	102(42.9)
₦36,000-56,000	27(26.00	9(6.7)	36(15.1)
Above ₦56,000	12(11.5)	4(3.0)	16(6.7)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**

The dietary pattern of the respondents in Table 2 showed that most (55.5%) consumed food three times a day, 26.5% consumed food four times while 17.6% consumed it two times daily. Most of them (68.1%) skipped meals, out of which 57.4% skipped breakfast, 35.2% lunch and 7.4% dinner. Similarly, 44.4% claimed they skipped meals due to lack of money and 34% skipped due to lack of time to cook. Some (42%) of the respondents consumed food heaviest at lunch. Types of drinks/carbonated drinks taken showed that 37.4% and 33.2% consumed malt drinks and milk drinks respectively. Some (48.7%) consumed carbonated drinks more than two times a week.

Some (49.2%) of the respondents preferred 'garri' (steamed cassava pudding) and sauce while 26.9% and 10.1% preferred beans and yam or beans and rice respectively. Some (31.5%) and 31.1% preferred these foods because they grew up with them and they were liked respectively. Some of the challenges faced by the older persons in their eating pattern according to 26.9% was lack of times for food preparation, 23.9% was their desire to be fat while 21.4% was lack of money. Some (27.3%) consumed fruits twice a week while only 25.2% and 23.9% consumed it three times weekly and daily respectively. Some (40.3%) consumed beer while 26.1% and 20.6% consumed whisky/ brandy and wine respectively. Some(31.5%) took snuff, out of which 64% took it daily and 17.3% took it three times a week.

Table2: Dietary pattern of the subjects

Variables	Males Freq(%)	Females Freq(%)	Total Freq(%)
Number of meals eaten a day			
2 times	19(18.3)	23(17.2)	42(17.6)
3 times	52(50.0)	80(59.1)	132(55.5)
4 times	33(31.7)	30(22.4)	63(26.5)
5 times	0(0.0)	1(0.7)	1(0.4)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Meal skipping			
Yes	66(63.5)	96(71.6)	162(68.1)
No	38(36.5)	38(28.4)	76(31.9)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Meal times skipped (n=162)			
Breakfast	42(63.6)	51(53.1)	93(57.4)
Lunch	21(31.8)	36(37.5)	57(35.2)
Dinner	3(4.5)	9(9.4)	12(7.4)
Total	**66(100.0)**	**96(100.0)**	**162(100.0)**
Reasons for skipping meals (n=162)			
No time to cook	28(42.4)	27(28.1)	55(34.0)
To control weight	5(7.6)	8(8.3)	13(8.0)
Due to lack of money	24(36.4)	48(50.0)	72(44.4)
Fasting	5(7.6)	3(3.1)	8(4.9)
Habit formed	1(1.5)	0(0.0)	1(0.6)
Ill health	3(4.5)	10(10.4)	13(8.0)
Total	**66(100.0)**	**96(100.0)**	**162(100.0)**
Frequency of pastries/snacks consumption			
Daily	10(9.6)	15(11.2)	25(10.5)
Once a week	16(15.4)	25(18.7)	41(17.2)
Twice a week	43(41.3)	52(38.8)	95(39.9)
Three times a week	22(21.2)	34(25.4)	56(23.5)
Four times a week	13(12.5)	8(6.0)	21(8.8)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Types of drinks/carbonated drinks taken			
Mineral (coke, fanta, pepsi, etc)	23(22.1)	38(28.4)	61(25.6)
Malt drinks	31(29.8)	58(43.3)	89(37.4)
Fruit juices	8(7.7)	1(0.7)	9(3.8)
Milk drinks	42(40.4)	37(27.6)	79(33.2)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Frequency of carbonated drinks consumption			

Daily	42(40.4)	37(27.6)	79(33.2)
Once a week	4(3.8)	3(2.2)	7(2.9)
Twice a week	12(11.5)	24(17.9)	36(15.1)
More than two times a week	46(44.2)	70(52.2)	116(48.7)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Source of food eaten			
I cook where I live	75(72.1)	117(87.3)	192(80.7)
I eat in canteens around	12(11.5)	9(6.7)	21(8.8)
I buy sometimes and cook sometimes	16(15.4)	8(6.0)	24(10.1)
My children brings for me	1(1.0)	0(0.0)	1(0.4)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Your favourite meals			
Rice	9(8.7)	15(11.2)	24(10.1)
Beans	7(6.7)	3(2.2)	10(4.2)
Yam	8(7.7)	7(5.2)	15(6.3)
Fried foods	2(1.9)	3(2.2)	5(2.1)
Garri and soup	52(50.0)	65(48.5)	117(49.2)
Bread and tea	0(0.0)	3(2.2)	3(1.3)
Beans and yam or beans and rice	26(25.0)	38(28.4)	64(26.9)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Reason why they are your favorite foods			
They are readily available	9(8.7)	16(11.9)	25(10.5)
I like them	36(34.6)	38(28.4)	74(31.1)
They are cheap	1(1.0)	3(2.2)	4(1.7)
They are my family's favorite food	13(12.5)	16(11.9)	29(12.2)
They are tasty	3(2.9)	8(6.0)	11(4.6)
I grew up with them	34(32.7)	41(30.6)	75(31.5)
I have no reason for eating them	8(7.7)	12(9.0)	20(8.4)
Total	**104(100.0)**	**134(100.0)**	**238(00.0)**
Major challenge in eating pattern			
Skipping of meals due to time constraint	17(16.3)	12(9.0)	29(12.2)
Desire to be slim	2(1.9)	18(13.4)	20(8.4)
Desire to be fat	28(26.9)	29(21.6)	57(23.9)
Lack of money	23(22.1)	28(20.9)	51(21.4)
High cost of food stuff	9(8.7)	6(4.5)	15(6.3)
Lack of time for food preparations	24(23.1)	40(29.9)	64(26.9)
Health issues	1(1.0)	1(0.7)	2(0.8)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Frequency of fruits consumption			
Daily	25(24.0)	32(23.9)	57(23.9)
Once a week	11(10.6)	11(8.2)	22(9.2)
Twice a week	23(22.1)	42(31.3)	65(27.3)
Three times a week	27(26.0)	33(24.6)	60(25.2)
Rarely	18(17.3)	16(11.9)	34(14.3)
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**
Reasons for eating fruits			
I like them	1(1.0)	0(0.0)	1(0.4)
They are sweet	28(27.0)	31(23.1)	59(24.8)
they are nourishing	6(5.8)	6(4.5)	12(5.0)
They are cheap	65(62.5)	86(64.2)	151(63.4)
I have them at home	3(2.9)	6(4.5)	9(3.8)
We sell them	2(1.9)	5(3.7)	7(2.9)
Total	104(100.0)	134(100.0)	238(100.0)
Types of alcoholic beverages taken			
Stout	8(7.7)	16(11.9)	24(10.1)
Wine	20(19.2)	29(21.6)	49(20.6)

Beer		35(33.7)	61(45/5)	96(40.3)
Whisky or brandy		35(33.7)	27(20.1)	62(26.1)
Alumo bitters		6(5.8)	1(0.7)	7(2.9)
Total		104(100.0)	134(100.0)	238(100.0)
Intake of snuff				
Yes		36(34.6)	39(29.1)	75(31.5)
No		68(65.4)	95(70.9)	163(68.5)
Total		104(100.0)	134(100.0)	238(100.0)
Frequency of snuff intake (n=75)				
Daily		24(66.7)	24(61.5)	48(64.0)
Once a week		0(0.0)	4(10.3)	4(5.3)
Twice a week		4(11.1)	3(7.7)	7(9.3)
Thrice a week		6(16.7)	7(17.9)	13(17.3)
Four times a week		2(5.6)	1(2.6)	3(4.0)
Total		36(100.0)	39(100.0)	75(100.0)
Reasons for taking snuff (n=75)				
I like them		21(58.3)	32(82.1)	53(70.7)
My friends takes them		3(8.3)	1(2.6)	4(5.3)
They make me feel good		10(27.8)	4(10.3)	14(18.7)
They are medicinal		2(5.6)	2(5.1)	4(5.3)
Total		36(100.0)	39	75(100.0)

Table 3 shows the result of the anthropometric indices of the respondents. In BMI only 37.8% had normal weight, 34.5% (35.1% females and 33.7% males) were overweight while 37.3% females and 11.5% males were obese. There was significant relationship (χ^2=26.124; p=0.000) in the BMI of the males and females. Their calf circumference was not significant (χ^2=1.767; p=0.184) although the females (90.3%) were more malnourished than the males (84.6%).

There was significant differences (χ^2=238.000; P=0.000) in the waist circumference of the respondents, with more females (94.2%) centrally obese compared to 6.7% of the males. Similarly, almost all the females (98.5%) were at risk of obesity compared to 1.0% of the males from the WHR while 93.3% of the males and only 5.2% of the females had normal WHR.

Table 3: Anthropometric status of the older persons

Parameters	Males Freq (%)	Females Freq (%)	Total Freq (%)	χ^2	p-value
BMI (kg/m^2)				**26.124**	**0.000^s**
Underweight (<18.50)	2(1.9)	2(1.5)	4(1.7)		
Normal weight (8.50-24.99)	55(52.9)	35(26.1)	90(37.8)		
Overweight (25-29.99)	35(33.7)	47(35.1)	82(34.5)		
Obese (30 and above)	12(11.5)	50(37.3)	62(26.1)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Calf circumference(cm)	**Male**	**Female**		**1.767**	**0.184^{ns}**
Well nourished (>31cm)	16(15.4)	13(9.7)	29(12.2)		
Malnourished (<31cm)	88(84.6)	121(90.3)	209(87.8)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Waist circumference(cm)				**238.000**	**0.000^s**
Healthy for men and women (<102; <80)	97(93.3)	7(5.2)	104(44.0)		
Central obesity for men and women (≥102; ≥80)	7(6.7)	127(94.8)	134(56.0)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
WHR				**341.000**	**0.000^s**
Normal (female≤0.8; male≤1)	103(99.0)	2(1.5)	105(44.1)		
At risk (female≥0.8; male≥1)	1(1.0)	132(98.5)	133(55.9)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		

Ns=not significant; s=significant

Table 4 shows the health status of the older persons using the geriatric health questionnaire. Some (37.4%) and (31.9%) described their health to be good and very good respectively while 20.2% described it to be fair. There was no significant difference (P>0.05) in the responses of the males and females. No significant difference (P>0.05) was identified in ADL for the males and females, although more females (10.4%) were very dependent compared to 3.8% of the males. Majority (72.3%) comprising 74.6% males and 69.2% females were highly independent. In IADL, majority (72.3%) were independent. The Nutrition health checklist showed 62.6% (63.5% males and 61.9% females) were at high nutritional risk; 25.2% at moderate risk and only 12.2% had good nutrition.

Table 4: Health status of the older persons using geriatric health questionnaire

Variables	Males Freq(%)	Females Freq(%)	Total Freq(%)	χ^2	p-value
Health description				2.169	0.705ns
Poor	7(6.7)	9(6.7)	16(6.7)		
Fair	23(22.1)	25(18.7)	48(20.2)		
Good	40(38.5)	49(36.6)	89(37.4)		
very good	32(30.8)	44(32.8)	76(31.9)		
Excellent	2(1.9)	7(5.2)	9(3.8)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Amount of body pain experienced in the past 4 weeks				3.960	0.411ns
None	19(18.3)	21(15.7)	40(16.8)		
very mild	10(9.6)	8(6.0)	18(7.6)		
Mild	25(24.0)	24(17.9)	49(20.6)		
Moderate	45(43.3)	73(54.5)	118(49.6)		
very severe	5(4.8)	8(6.0)	13(5.5)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Activities of daily living				3.650	0.056ns
very dependent (0)	4(3.8)	14(10.4)	18(7.6)		
high independent (6)	100(96.2)	120(89.6)	220(92.4)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Instrumental activities of daily living				4.370	0.112ns
Very dependent (0)	0(0.0)	0(0.0)	0(0.0)		
Unable (1)	8(7.7)	16(11.9)	24(10.1)		
Need assistance (2)	24(23.1)	18(13.4)	42(17.6)		
Independent (3)	72(69.2)	100(74.6)	172(72.3)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		
Nutritional health checklist				0.602	0.740ns
Good nutrition (0 – 2)	14(13.5)	15(11.2)	29(12.2)		
Moderate nutritional risk (2-5)	24(23.1)	36(26.9)	60(25.2)		
High nutritional risk (6 and above)	66(63.5)	83(61.9)	149(62.6)		
Total	**104(100.0)**	**134(100.0)**	**238(100.0)**		

Ns=not significant

Table 5 shows the relationship between the anthropometric indices and health status of the older persons. There was negative significant relationship (r= -0.70; p=0.009) between the calf circumference of the older persons and their ADL. However, there was no significant (P>0.05) relationship among other anthropometric variables and the ADL and lADL.

Table 5: Pearson correlation relationship between anthropometric status and health status of the respondents

	BMI	CC	WC	WHR	ADL	NHC	IADL
BMI	1	0.320**	-0.171**	-0.336**	-0.085	0.120	0.034
		0.000	0.008	0.000	0.191	0.065	0.604
		238	238	238	238	238	238
CC		1	-0.007	-0.085	-0.170**	0.031	0.020
			0.915	0.190	0.009	0.631	0.758
			238		238	238	238
WC			1	0.897**	0.163*	0.070	0.014
				0.000	0.012	0.281	0.830
				238	238	238	238
WHR				1	0.160*	0.042	-0.037
					0.013	0.523	0.567
					238	238	238
ADL					1	-0.194**	0.313**
						0.003	0.000
						238	238
NHC1						1	-0.123
							0.058
							238
IADL							1

**. Correlation is significant at the 0.001 level
*. Correlation is significant at the 0.05 level

DISCUSSION

Most of the respondents between the ages of 60 – 79 years could probably be that were stronger than those above 80 years and could possibly be willing and available for the study. It has been reported that chronic diseases become increasingly common with age (22). About three-quarter of the respondents had one form of education or the other which did not agree with some earlier studies that older people especially females arrive old age after a lifetime of poor access to formal education (23). Again, those with no formal education in this study were lower than 48.6% reported by Ibiezugbe and Odion (24) in another part of the country. However, the time gap between this study and their studies would have made a difference. Most of the respondents had a family size of more than seven. A study in Sirilanka showed that the number of people living with the older person was a protective factor of being at risk of malnutrition (5). It was reported that many older adults lose their ability to live independently because of limited mobility, chronic pain, frailty or mental or physical problems and require some form of long-term care; therefore they need social association or people to live with them (25). About three-quarter had ≥ 100USD (N36, 000) as average monthly income which came majorly from their farms, trades and pension and the others depended on their children and family members for their provisions. Shubhangini (26) had earlier noted that elderly needs and burdens usually fall upon their children due to their vulnerability at this period of their lives in meeting their needs and so they depend on others to meet their day to day needs. Meal skipping among the respondents could be as a result of low income status as noted in this study where majority were living on less than 100USD. Breakfast was the meal most skipped and it had been reported that breakfast eaters have a higher frequency of health promoting behaviors, such as feeling of being energetic in their work, having more stress management skills, less tendency to eat unhealthy snacks in midmorning and possessing of less health problems (27). Consumption of heavy meals at lunch could be of help but consuming it at breakfast seems to be better as it could help to control their weight (28). Breakfast skipping of 8.1% in this study is higher than 41.2% reported in a study in Korea (29). High consumption of carbonated drinks noted in this study according to Lenny *et al.* (30) could predispose one to obesity. The favorite food of the older persons used in this study should be improved to ensure adequacy, since only few preferred rice and beans. However, since garri (fermented cassava pudding) is usually consumed with sauce and vegetables that contain other ingredients that add some nutrients, they should be encouraged to consume their *garri* with soup that is rich in nutrients. Some of the challenges observed in this study were similar to report by Suzana *et al.* (31) where determinants of the body mass index (BMI) were inability to cook and insufficient money to buy food. The frequency of consumption of fruits in this study could entail awareness of its health implication, as it can increase their micronutrient intake and also help in reduction of constipation due to its fibre

contents. WHO (32) had reported that increasing consumption of fruits and vegetables by one to two servings daily could cut cardiovascular risk by 30%. Prevalence of snuff intake among the study population was low compared to 50.8% by Rajnish *et al.* (33) among rural population of older persons in Wardha district located in central India. This could be because the older persons are becoming more informed about the dangers of taking snuff or that snuff taking is actually going into extinction in the older persons' population in Nigeria.

The study showed that some of therespondents were overweight and obese, which supports Nancy and Barbora (34) who reported that prevalence of obesity has increased in all ages, of which older persons are no exception. Similarly, Marais *et al.* (35) opined that overweight and obesity is associated with increase in mortality and contribute to many chronic diseases, therefore, care needs to be taken to give due consideration to changes occurring in the older persons as ageing sets in as to enable them age gracefully. Prevalence of overweight in this study was low compared to 54.1% reported by Adebusoye *et al.* (36) among older persons between ≥ 60 years in General Outpatients Department (GOPD) Clinic of University College Hospital (UCH), Ibadan, Nigeria, but higher than 25.9% among older persons in Osun State by Alao *et al.* (37). However, those who were underweight (9.1%) in their study were higher than 1.7% in this study. Nzeagwu (38) reported a prevalence of underweight of 11.5% among community-dwelling older persons. In a review of the role of nutrients in reducing the risk of noncommunicable diseases during aging, it was reported that an estimated 5-10% of community-dwelling adults > 70years years of age were undernourished (39). Those at risk based on their waist circumference and WHR in this study could be linked to their breakfast consumption as 54.7% of them skipped breakfast which they could try to make up in their next meal time, thus leading to abnormal fat distribution. This according to Chiu *et al.* (40) could predispose them to cardiovascular diseases. A higher percentage had normal BMI which agreed with reports from some other studies on older persons (41; 42). In this study more subjects were malnourished with calf circumference (CC) than with and BMI. This could be because BMI measures fatness and degree of malnourishment and CC indicates loss of total body muscle mass which is a sensitive sign for existing malnutrition and sarcopenia (43). The percentage of subjects "at risk" of co-morbidity using waist circumference (WC) which is 56% of the respondents is of concern and it may be due to the percentage that were in the overweight and obese category using BMI because it has been reported that individuals with a

BMI greater than 35kg/m^2 usually have their WC greater than 102cm in men and 88cm in women and WC has been said to assume a greater value at old age (44). Waist circumference has been confirmed as a factor in determining risk of cardiovascular disease (45). More females were at increased risk of heart disease than the males using WHR. This result of higher WHR of females than males is not at variance with earlier observations (41; 42). Katsuiku (46) reported that an increased risk of waist/ hip ratio indicate an increased risk of heart disease.   Calf and waist circumferences placed most of the respondents at malnourished and increased risk which could be because abdominal fat tend to accumulate with age and the weight loss may be attributed to loss of muscle mass and not fat reduction (43).

Oye and Ogunniyi (47) stated that poor perception of one's own health significantly predict the person's functional disability, with those reporting that their health was poor or very poor having about five times the risk of disability compared to those who rated their health as excellent, good, or fair. In this study majority rated their health as either good or very good which may have been why there was high independence on ADL. In line with this study, Oye and Ogunniyi (47) among older persons in Ibadan Nigeria found that more women than the men were dependent on IADL and ADL. This did not agree with an earlier study where more females were functionally dependent on IADL (48).The older persons were more independent in the ADL than in the IADL which had agreed with report in earlier studies (48; 49). This could probably be because the ADL comprises simpler activities compared to the IADL which are more complex. This agrees with Carla (49) who stated that IADL functions (such as using the telephone, getting to places out of walking distance, shopping for groceries, preparing own meals, doing own housework, performing small tasks, carrying out laundry activities, taking own medications, and management of own money) are usually lost before ADL functions (such as bathing, eating, and using the toilet) and assessment of IADL may identify beginning of decline in physical, cognitive, or both in older persons who might otherwise appear capable and healthy.

The functional status of the older persons according to Panigrahi (50) determines their ability to perform basic self-care tasks and live independently, which also includes food intake. It had been reported that many people reach a point in older age when they are no longer able to perform the basic tasks of day-to-day life without assistance, but they are not always dependent on formal care services (51). Older people are an asset because they offer rich life experience, special and sometimes forgotten talents and skills, accumulated wisdom and a unique perspective (2).

Therefore, it is important to have a holistic and integrated approach to promote health, wellbeing and participation in later life in order to prevent or delay the onset of frailty and to promote a sense of hope, resilience and adaptability to help people to live and function well even in old age (2). This is based on the fact that most of the older persons studied were either moderately or at high nutritional risk which is a curse for concern. Nutritional risk and low BMI have both been associated with poor health-related outcomes and mortality among some older adults (52; 53).

CONCLUSION

The findings from this study showed more than half within the age of 60-69 years. Most skipped meals mostly breakfast. Prevalence of overweight and obesity were high among the respondents especially the females and most were at risk of cardiovascular diseases from their WC and WHR classification. In ADL and IADL majority were very independent in performing daily activities. Most of them were at high nutritional risk while some were moderately at risk using NHC.

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