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ORIGINAL ARTICLE

PREVALENCE AND RISK FACTORS FOR UNDERWEIGHT AND OVERWEIGHT AMONG THE ELDERLY IN IBADAN METROPOLIS, NIGERIA

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Abstract

Poor nutritional status constitutes a significant risk factor to the onset and worsening of chronic diseases and functional disability in old age. This study assessed the prevalence and risk factors for underweight and overweight among the elderly in Ibadan Metropolis, Nigeria.

The nutritional status of 358 elderly individuals was assessed based on the Body Mass Index criteria. Data on the risk factors for underweight and overweight were collected using a structured questionnaire. Associations were examined using chi square and logistic regression tests at 95% confidence interval.

The prevalence of underweight and overweight were 17% and 24.6%, respectively. The odds for being underweight were significantly associated with older age, low fruit intake and low activity level. Meanwhile, overweight was associated with younger age, female gender, poor knowledge of the food groups, presence of a chronic disease and impaired word recall ability.

The higher prevalence of overweight and its associated factors in this study reaffirm the previous concerns raised on the impending obesity epidemic in the geriatric population. The identified socio-demographic, dietary, psychological, and health-related risk factors should form the basis for personalized nutrition-related interventions aimed at improving elderly nutritional status.

Keywords: *Disability; Elderly; Nutritional status; Overweight; Prevalence; Risk factors; Underweight*

Abbreviations:
BMI – Body Mass Index; CI – Confidence Interval; LGA – Local Government Area; mmHG – Millimeter Mercury; OR – Odds Ratio; SPSS – Statistical Package for Social Science

INTRODUCTION

Good nutritional status is essential for a healthy and disability-free aging process. This is because adequate nutrition plays beneficial roles in enhancing positive functional outcomes by preventing and delaying the onset of chronic diseases, cognitive impairment, and loss of physical capacity (Morgan et al., 2020; Wallace, 2020; Whitelock and Ensaff, 2018). However, the ongoing demographic transition is happening in a period where people of all ages in many developing countries are, on one side, facing hunger and food shortages, and on the other a shift to dietary habit that favours over-indulgence in cheap but nutrient-deficient food (Mapis, 2020). A major consequence of the nutrition transition that has emerged is the introduction of the concept of double burden of malnutrition described as the co-existence of undernutrition and overnutrition in elderly population sub-groups (Amankwaa et al., 2022; Pengpid and Peltzer, 2021).

Being underweight and overweight are two nutritional states that are detrimental to independent living due to the development of disabling chronic diseases, frailty, and sarcopenia (Calderón-Larrañaga et al., 2021). Unfortunately, malnutrition, which is common among elderly Africans, is yet to be given the necessary attention because the condition is perceived to be a part of the natural aging process that cannot be prevented, alleviated or reversed (Abate et al., 2020; Adebusoye et al., 2011). Furthermore, in recognition of the threats of elderly malnutrition, earlier studies have recommended continuous monitoring of the nutritional status of aging individuals through research that would inform context-specific interventions (Olayiwola, 2007; Olayiwola et al., 2012). Yet, the geriatric population has not been the focus of many nutrition studies in Nigeria compared to other age groups such as under-fives, adolescents, and pregnant women.

Furthermore, most of the available geriatric studies are facility-based where evidence points to a growing burden of malnutrition. These studies reported an underweight prevalence range of 1.7–9.1% and an overweight prevalence of 25.9–60.6% (Adebusoye et al., 2011; Alao et al., 2015; Nzeagwu and Ozougwu, 2019). Since malnutrition accelerates the aging process that underlies frequent health facility visits (Norman et al., 2021), it is vital that the research focus is also directed at community-dwelling older adults. This is important because research plays a role in curtailing the anticipated increase in health-related disability rates in this age group and the associated social burden to the society at large in the ongoing demographic transition (Norman et al., 2021). Based on these premises, this study assessed the prevalence and risk factors for underweight and overweight among the elderly in Ibadan Metropolis in the Southwest region of Nigeria. The findings have implications for prompting appropriate interventions by the government, non-governmental organizations, and the research community.

MATERIALS AND METHODS

Study area

The study was conducted in Ibadan, the second largest metropolitan city in the Southwest region of Nigeria after Lagos. Ibadan is mainly inhabited by the indigenous Yoruba speaking tribe. It has attracted people from other parts of the country due to availability of business opportunities, low cost of food and other household commodities, and better living conditions. The city is made up of 5 urban Local Government Areas (LGAs), namely Ibadan North, Ibadan Northeast, Ibadan Northwest, Ibadan Southeast and Ibadan Southwest. The study was conducted at a central point in the city where all the LGAs converge. This geographical area has a higher concentration of trans-generational housing structures and elderly individuals than any other part of the city (Makinde, 2012).

Study design and subjects

The study was descriptive cross-sectional. It was the baseline phase of an intervention study aimed at improving compliance with recommended guidelines on healthy eating and regular physical activity in six randomly selected wards in Ibadan Metropolis. The study was carried out between October 2019 and January 2020. A total of 358 elderly individuals were selected using a three-stage sampling procedure that entailed: selection of two out of the five LGAs in Ibadan Metropolis (Ibadan North and Ibadan Southeast) through

random sampling; proportionate sampling to select two and four wards in Ibadan North and Ibadan Southeast LGAs, respectively; and the use of cluster and simple randomly sampling to select respondents. In the last stage, each family compound (comprising of one or more houses situated close to one another that belong to individuals from the same family lineage) was identified as a cluster. Then proportionate and simple sampling techniques were used to select one respondent from a compound of 1–2 houses, two respondents from compounds of 3–5 houses and three respondents from compounds of >5 houses. The following inclusion criteria were met for participation in the study: ≥60 years old; apparently healthy and free-living at the time of the study; and gave consent for participation. Individuals that were less than 60 years old, who were on admission in the hospital, that could not participate independently due to very old age, frailty, or ill-health, and those who did not give consent for participation were excluded from the study.

Outcome measure

The primary outcome measure is nutritional status derived from anthropometry parameters of height (m) and weight (kg) measured with respondents wearing light clothing and in correct posture. Nutritional status was determined using the World Health Organisation (WHO, 2000) classification of Body Mass Index (BMI) (weight measured in kilograms divided by the square of height measured in metres) with values <18.5 kg/m² classified as underweight, 18.5–24.99 kg/m² normal, overweight (25.0–29.99 kg/m²) and obese (≥30.0 kg/m²). However, for the purpose of analysis, poor nutritional status in this study is categorised into underweight (<18.5 kg/m²) and overweight (≥25.0 kg/m²).

Explanatory variables

A semi-structured questionnaire covering seven categories of explanatory variables that have been reported to influence the nutritional status of older adults in the literature was used for data collection. A detailed description of the variables is given below:

Demographic variables: Respondents' age was assessed either based on verbal response or estimated in relation to past national or personal events. Age was categorized into: young-old (60–69 years) = 1, and old-old (≥70 years) = 0. Gender was dichotomized as female (1) and male (0). Marital status was assessed from 5 response options – married, single, divorced, separated and widow/widower. Marital status was categorized in a binary form as married = 1, and other (single, divorced, separated, widow/widower) = 0.

Economic variables: Educational status assessed highest level of educational attainment from four options: no formal education, primary, secondary, and tertiary education. Educational status was grouped as none (0) and primary education and above (1). Income assessed regular inflow of money from sources such as salary, pension, house rent, pocket money from children and proceeds from economic activities. Availability of stable income was dichotomized as no = 0, yes = 1.

Psychological variables: Psychological variables covered knowledge and beliefs in relation to healthy diet. Respondents' knowledge of the five food groups that are recommended for the elderly to consume regularly (cereals, grains and roots; fruit; vegetables; dairy products; and fish and poultry) was assessed with an open-ended question. Knowledge was grouped in a binary form as 1 = ability to state ≥ 1 food group(s) and 0 = inability to state any food group. Belief assessed respondents' perception in the efficacy of healthy diets in preventing onset of chronic diseases such as diabetes, hypertension, and cognitive impairment with yes (1) and no (0) options.

Physical activity variable: Physical activity measured the number of minutes on a typical day that respondents engage in moderate-intensity activities described as such that lead to a slight increase in breathing, sweating and heartbeat rates. Engagement in physical activity was grouped as 0 (<30 minutes/day) and 1 (≥30 minutes/day).

Cognitive ability: Cognitive ability was assessed using the delayed word recall test. Respondents repeated three items (orange, table and money) in order to register these items in the local language. A discussion on another subject (such as food preferences and dislikes, activities in the previous day) that lasted for about five minutes was introduced as a way of diversion. After this short period, respondents' ability to recall all three items was tested.

Responses were expressed in binary form as intact (recall all 3 items) = 1 and impaired (recall ≥2 items) = 0.

Dietary behavior variables: Dietary behavior covered 2 questions in which respondents were asked the number of days in the week that they consume fruit and vegetables. For each of these questions, intake of <3 days/week was ascribed 0 point while ≥3 days/week was ascribed 1 point.

Health status variables: Morbidity status assessed self-reports of the presence of chronic health conditions for which respondents had been taking medication in the past six months or more. Morbidity status was categorized as morbid (presence of ≥1 health conditions) = 0 and not morbid (absence of any health condition) = 1. Perceived health status assessed respondents' rating of their state of health when compared with their age mates as determined from good, fair and poor response options. Perceived health status was grouped as fair/poor (0) and good (1). Blood pressure was measured on the left arm in a seated position using a digital monitor. Blood pressure was dichotomized as unhealthy (≥140 mmHg) = 0 and healthy (<140 mm/Hg) = 1.

Data analysis

Data entry and analysis was achieved using the Statistical Package for Social Science (version 20). Findings are presented in frequencies and percentages. Bivariate analysis of the determinants of poor nutritional status was performed using Chi-square test. Logistic regression model was further used to explore the risk factors for underweight and overweight, using those variables that showed significant association at the bivariate level. Associations were considered significant at 95% confidence interval.

Ethical approval

Approval for the study was granted by the Oyo State Ministry of Health Ethics Review Committee. Each respondent gave informed consent for participation in the study.

RESULTS

Characteristics of respondents

The characteristics of respondents are presented in Table 1. The age of respondents ranged between 60 and 100 years (70.7 ± 8.2years) with 67% belonging to the young-old (60–69 years) age category. There were more females (67.6%) than males (32.4%). Less than half (42.7%) still have a spouse and 37.2% have a steady source of income. More than half (62%) had no formal education. 27% had safe systolic pressure and 36.6% had safe diastolic blood pressure.

Table 1 – Characteristics of respondents (*N* = 358)

Variable	Category	*N* (%)
Age (yrs)	60–69 ≥70	240 (67.0) 118 (33.0)
Gender	Male Female	116 (32.4) 242 (67.6)
Marital status	Married Other[a]	153 (42.7) 205 (57.3)
Education	None Primary and above	222 (62.0) 136 (38.0)
Availability of steady income	Yes No	133 (37.2) 225 (62.8)
Systolic blood pressure	Healthy Unhealthy	97 (27.1) 261 (72.9)
Diastolic blood pressure	Healthy Unhealthy	131 (36.6) 227 (63.4)

Note: [a] Single, widow/widower, divorced, separated.

Prevalence of underweight and overweight

Table 2 shows that 58.4% of respondents had nutritional status that falls within the normal range. 24.6% of the respondents had excess weight while 17% were classified as underweight.

Table 2 – Prevalence of underweight and overweight (*N* = 358)

Variable	Category	*N* (%)
Nutritional status	Underweight Normal Overweight **Total**	61 (17.0) 209 (58.4) 88 (24.6) 358 (100)

Determinants of underweight and overweight

Table 3 reveals that five variables have significant association with the prevalence of underweight at the bivariate level. Old-old respondents were more underweight than young-old respondents (52.5 vs 47.5%;

$p < 0.05$). Weekly fruit intake for <3 days was associated with significantly higher prevalence of underweight (82%) than intake of ≥3 days/week (18%). The prevalence of underweight was lower in the respondents that engage in at least 30 minutes of moderate-intensity physical activity than those that spend less than this (19.7 vs 80.3%; $p < 0.05$). In addition, the prevalence of underweight was significantly lower in the respondents with healthy systolic (41%) and diastolic (49.2%) blood pressures. Table 4 shows that the prevalence of overweight had significant association with eight variables. Specifically, being overweight was significantly higher with a younger age (84.1%), being female (80.7%), non-availability of steady income (54.5%), poor knowledge of the food groups (54.5%), lack of belief in the efficacy of healthy foods to prevent chronic diseases (61.4%), impaired word recall ability (65.9%), presence of at least one chronic disease (84.1%), and unhealthy systolic (85.2%) and diastolic (75%) blood pressures.

Table 3 – Determinants of underweight (*N* = 61)

Variable	Category	*N* (%)	χ^2	*p*-value
Age (yrs)	60–69 ≥70	29 (47.5) 32 (52.5)	12.65	0.000*
Gender	Male Female	24 (39.3) 37 (60.7)	1.62	0.131
Marital status	Married Other[a]	30 (49.2) 31 (50.8)	1.25	0.165
Education	Formal None	21 (34.4) 40 (65.6)	0.39	0.316
Stable income	Yes No	17 (27.9) 44 (72.1)	2.71	0.065
Knowledge of ≥1 Food Group	Yes No	25 (41.0) 36 (59.0)	1.56	0.136
Belief healthy foods can prevent chronic diseases	Yes No	13 (21.3) 48 (78.7)	1.90	0.109
Weekly fruit intake	≥3 days 0–2 days	11 (18.0) 50 (82.0)	5.79	0.010*
Weekly vegetable intake	≥3 days 0–2 days	24 (39.3) 37 (60.7)	1.14	0.178
Perform ≥30 min/day MPA	Yes No	12 (19.7) 49 (80.3)	4.613	0.02*
Word recall ability	Intact Impaired	12 (19.7) 49 (80.3)	1.17	0.18
Morbidity status	Not morbid Morbid	17 (27.9) 44 (72.1)	0.02	0.497
Perceived health status	Good Fair/Poor	16 (26.6) 44 (73.4)	1.211	0.17
Systolic blood pressure	Healthy Unhealthy	25 (41.0) 36 (59.0)	7.18	0.007*
Diastolic blood pressure	Healthy Unhealthy	30 (49.2) 31 (50.8)	5.02	0.019*

Note: [a] single, separated, widow, widower; * significant at 5% significance level; MPA = Moderate Physical Activity.

Table 4 – Determinants of overweight (*N* = 88)

Variable	Category	*N* (%)	χ^2	*p*-value
Age (yrs)	60–69 ≥70	74 (84.1) 14 (15.9)	15.35	0.000*
Gender	Male Female	17 (19.3) 71 (80.7)	9.12	0.001*
Marital status	Married Other[a]	32 (36.4) 56 (63.6)	1.94	0.102
Education	Formal None	32 (36.4) 56 (63.6)	0.131	0.409
Stable income	Yes No	40 (45.5) 48 (54.5)	3.45	0.043*
Knowledge of ≥1 Food Group	Yes No	40 (45.5) 48 (54.5)	6.72	0.007*
Belief healthy foods can prevent chronic diseases	Yes No	34 (38.6) 54 (61.4)	5.80	0.013*
Weekly fruit intake	≥3 days 0–2 days	32 (36.4) 56 (63.6)	1.57	0.132
Weekly vegetable intake	≥3 days 0–2 days	41 (46.6) 47 (53.4)	0.05	0.457
Perform ≥30 min/day MPA	Yes No	21 (23.9) 67 (76.1)	2.99	0.53
Word recall ability	Intact Impaired	30 (34.1) 58 (65.9)	4.968	0.02*
Perceived health status	Good Fair/Poor	23 (26.1) 65 (73.9)	2.34	0.08
Morbidity status	Not morbid Morbid	14 (15.9) 74 (84.1)	7.391	0.004*
Systolic blood pressure	Healthy Unhealthy	13 (14.8) 75 (85.2)	8.97	0.002*
Diastolic blood pressure	Healthy Unhealthy	22 (25.0) 66 (75.0)	6.76	0.006*

Note: [a] single, separated, widow, widower; * significant at 5% significance level; MPA = Moderate Physical Activity.

Risk factors for underweight and overweight

Logistic regression reveals that the odds of being underweight are significantly associated with older age (Odds Ratio, OR = 2.345, CI = 1.3–4.22), low fruit intake (OR = 2.214, CI = 10.8–4.54) and performing less than 30 minutes of daily moderate physical activity (OR = 2.08, CI = 1.022–4.23) – Table 5. The odds of being overweight were associated with younger age (OR = 0.302, CI = 0.168–0.623), female gender (OR = 2.465, CI = 1.308–4.646), lack of knowledge of ≥1 food group (OR = 0.536, CI = 0.31–0.928), presence of chronic disease (OR = 0.2184, CI = 1.115–4.276), and impaired word recall ability (OR = 1.808, CI = 1.01–3.234) – Table 6.

Table 5 – Risk factors for underweight (*N* = 61)

Variable	Category	Odds ratio	95% CI	*p*-value
Age (yrs)	60–74 ≥75	2.345	1.3–4.22	0.004*
Fruit intake	High (≥3 days) (ref) Low (0–2 days)	2.214	1.08–4.54	0.03*
Perform ≥30 MPA	Able (ref) Unable Poor	2.08	1.022–4.23	0.043*
Systolic blood pressure	Healthy (ref) Unhealthy	2.013	0.95–4.25	0.067
Diastolic blood pressure	Healthy (ref) Unhealthy	1.16	0.57–0.38	0.687

Note: * significant at 5% significance level; MPA = Moderate Physical Activity; CI = Confidence Interval.

Table 6 – Risk factors for overweight (*N* = 88)

Variable	Category	Odds ratio	95% CI	*p*-value
Age (yrs)	≥75 (ref) 60–74	0.323	0.168–0.623	0.001*
Gender	Male (ref) Female	2.465	1.308–4.646	0.005*
Availability of steady income	Yes (ref) No	0.628	0.366–1.078	0.091
Knowledge of ≥1 food group	Yes (ref) No	0.536	0.31–0.928	0.026*
Belief healthy foods can prevent chronic diseases	Yes (ref) No	0.751	0.425–1.327	0.324
Managing at least one chronic condition	Yes (ref) No	2.184	1.115–4.276	0.023*
Word recall ability	Intact (ref) Impaired	1.808	1.01–3.234	0.046*
Systolic blood pressure	Healthy (ref) Unhealthy	0.45	0.202–1.001	0.05
	Healthy (ref) Unhealthy	0.735	0.37–1.458	0.378

Note: * significant at 5% significance level; CI = Confidence Interval.

DISCUSSION

The findings of this study show that the prevalence of underweight and overweight among respondents were 17% and 24.6%, respectively. This finding has several implications. First, the fact that these proportions are comparable with findings in facility-based studies (Adebusoye et al., 2011; Alao et al., 2015; Nzeagwu and Ozougwu, 2019) is an indication that the nutritional status of community-dwelling elderly individuals also deserves urgent attention of major stakeholders. Underweight and overweight elderly individuals are at higher risk for disabling chronic conditions that might require frequent hospital visits and admissions (Abate et al., 2020). Second, the persistently higher trajectory of BMI in geriatric studies in Nigeria is a pointer to warnings on the impending obesity epidemic in the elderly population, particularly during the ongoing demographic transition (Mancuso and Bouchard, 2019). Excess weight in old age has been linked with poor dietary habits,

attributable to factors such as bereavement, isolation, retirement, unemployment and lack of disposable income (Shahar et al., 2019). Third, the higher prevalence of underweight and overweight elderly respondents than 5.7% and 20%, respectively reported by Afolabi et al. (2015) in similar community settings is also a pointer to the gradual collapse of the much cherished family bond and cultural value in Africa, which has hitherto provided a framework of companionship, financial and emotional support, and care for elderly individuals from younger family and community members (Animasahun and Chapman, 2017; Banwat et al., 2018).

In the final analysis, being overweight was associated with a higher number of risk factors than being underweight. However, age was the only variable that showed bimodal association with poor nutritional status. Young-old respondents were more likely to be overweight (OR = 0.323) while older respondents were twice as likely to be underweight. A similar linear relationship between age and BMI has been reported by other authors (Kiesswetter et al., 2020; Pengpid and Peltzer, 2021). Older age represents an independent risk factor for underweight due to the unavoidable and progressive loss of weight of about 0.1–0.2 kg every year that commences at the seventh decade of life (Bardon et al., 2021; Freha, 2018). Advanced age may cause low BMI through changes in the body systems attributable to the aging process, presence of chronic disease, and inadequate nutrient intake resulting from food insecurity, loneliness, bereavement, unemployment, and depression (Donini et al., 2013; Norman et al., 2021).

The association between low fruit intake and underweight is consistent with the literature (Pengpid and Peltzer, 2021). Although low vegetable intake was more prevalent among respondents that were underweight and overweight, the associations did not reach any statistical significance. This finding further underscores the importance of fruit and vegetable consumption in the maintenance of good nutritional status. Inadequate fruit and vegetable intake in elderly individuals has been shown to be influenced by poor physical and financial access, male gender, oral factors, and lack of knowledge of their recommendations and potentials in preventing chronic diseases (Almeida et al., 2021; Nicklett and Kadell, 2013; Shahar et al., 2019). The protective effect of fruit and vegetables to a healthy aging process informs the need to target elderly individuals with well-planned age-specific interventions that will address the issues of knowledge gap and access-related factors in this period of demographic transition.

Contrary to what has been established in the literature – that low-level physical activity increases the risk for overweight in older adults (Chen et al., 2021) – this study shows that respondents that did not accumulate up to 30 minutes of moderate-intensity physical activity were 2.08 times likely to be underweight. A possible explanation for this observation is that physical inactivity increases the risk for a less diversified dietary pattern that may be lacking the food groups (Dunneram and Jeewon, 2015; Jezewska-Zychowicz et al., 2018). Unhealthy food choices is a main cause for the onset of chronic diseases that may affect food intake through loss of appetite and multiple drug use (Shlisky et al., 2017). It is therefore essential that advocacy campaigns aimed at promoting active aging should not be limited to the dangers of low activity in the development of obesity. Efforts should also be made to address the threat of low physical activity to weight loss and its associated consequences, which, according to the Health Belief Model, could promote compliance with recommended action.

Several reviews have shown a higher prevalence of overweight in older females than males as documented in this study (Crichton et al., 2019; Bardon et al., 2021). This observation is attributable to cultural, economic, dietary, activity and genetic factors (Michalczyk et al., 2020; Schorr et al., 2018). For instance, young African women attach importance to having bigger body size as a sign of affluence and good living, as well as for beauty and fashion purposes (Turé et al., 2021). Unfortunately, the lifestyle that produces this body size is often maintained until older age. Excess body weight and longevity in older women increase susceptibility to sarcopenic-obesity, a state of severe functional disability caused by high fat mass and low muscle mass (Neri and Lucia, 2021).

In this study, it was also established that elderly individuals' knowledge of healthy eating guidelines based on the five food groups protected against the occurrence of overweight

(OR = 0.536; CI = 0.31–0.928). Knowledge is the first step in a series of processes that will lead to the translation of healthy eating guidelines into practice in older adults (Abdelwahed et al., 2018; Pandit-Agrawal et al., 2018), while a lack of this is a known barrier to healthier eating (Whitelock and Ensaff, 2018). Knowledge of healthy eating guidelines has the potential to dispel misconceptions and shape beliefs that may act as barriers to healthy eating. Adequate knowledge on healthy foods helps to prevent the risk of a monotonous dietary habit that is informed by low cost, ease of accessibility and seasonality (Brouwer et al., 2021). It is therefore essential that appropriate means be deployed to disseminate information on the benefits of healthy foods, particularly fruits and vegetables, to enable appropriate food selection for the overall health of older persons.

In congruence with a previous study (Zhang et al., 2020), this study found that an association exists between presence of a chronic disease and overweight. Excess body weight in old age ushers in a plethora of chronic conditions such as pain, diabetes and hypertension that accelerates the aging process (Keramat et al., 2021). On the other hand, chronic conditions limit older people from engaging in physical activities with the potential of increasing the risk for fat mass accumulation leading to excess weight (Izquierdo et al., 2021). With recent attention being focused on preventive health care and healthy aging, it is therefore important that more health promotion interventions such as nutrition education and multi-component physical activity should target middle- and old-age individuals to reduce the degree of functional disability and dependency that could be associated with excess body weight and its complications.

This study used the recall of word list method as a measure of cognitive performance. However, in contrast to previous studies that have shown an association between impairment in cognitive performance and underweight (Kronschnabl et al., 2021; Pengpid et al., 2019), this study shows that the odds of impaired word recall are almost twice as high in overweight respondents. This is similar to the finding of another study (Skinner et al., 2017). Cognitive impairment may be a cause or consequence of excess body weight in the elderly. Overweight elderly individuals are likely to indulge in dietary habits lacking in fruit and vegetables, deficiency of which has been linked to poor memory and learning abilities (Robinson et al., 2018). Also, low physical activity caused by low motivation to move extra body mass in overweight elderly individuals is a cause for neuro-degeneration (Quigley et al., 2020). A healthy and active lifestyle comprising of diversified dietary habit, physical activity, participation in cognitively challenging tasks and social interactions are widely recommended strategies for improving the psychological health of elderly individuals (Bull et al., 2020; Grande et al., 2020).

It is important to note that the findings of this study might have certain limitations. The risk factors for poor nutritional status were assessed based on self-reports that are fraught with biases. Second, the study was conducted among elderly individuals in a geographical area and therefore findings may not be representative of all community-dwelling elderly in Nigeria. More studies would be needed to profile the risk factors for underweight and overweight among different sub-groups of community-based Nigerian elderly. The availability of such a data pool would go a long way in curtailing the projected increase in the prevalence of health-related functional disability in the aged population.

CONCLUSIONS

This study affirms the presence of double burden of malnutrition in the elderly population, with a higher prevalence of overweight than underweight among the respondents. Significant associations with poor nutritional status were observed with age, gender, fruit intake, self-rated health status, blood pressure, income, knowledge and beliefs on healthy eating, physical activity, morbidity status and cognitive status. However, the odds for being underweight and overweight were associated with younger and older age, female gender, low fruit intake, presence of a chronic disease and impaired word recall ability. There is the need for more coordinated interventions between the government, research community and social support groups to address the myriad of demographic, economic, dietary and health related factors promoting poor nutritional status in the study communities.

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Ethical aspects and conflict of interests
We declare there are no conflict of interests with regards to the conduct of this research and the authorship list, as well as in the publication of this article.

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