Factors associated with undernutrition and overweight in elderly patients presenting at a primary care clinic in Nigeria

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Abstract

Background: Undernutrition and overweight are commonly overlooked health problems of the elderly, often due to the implicit assumption that undernutrition is a rare occurrence in old age and overweight is an invariable consequence of ageing.

Method: A cross-sectional descriptive study of 500 patients aged 60 years and above who presented consecutively at the general outpatient department, University College Hospital, Ibadan, between September and October 2009, was undertaken. The main outcome measures were prevalence of nutritional problems (undernutrition and overweight), healthcare utilisation pattern and morbidities. The Mini Nutritional Assessment (MNA) tool was used to assess undernutrition, while body mass index was used to assess body weight.

Results: The prevalence of undernutrition and overweight was 7.8% and 54.1%, respectively. Previous hospital admission ($p < 0.001$) and chronic morbidities like hypertension ($p < 0.001$), osteoarthritis ($p < 0.001$) and psychosomatic disease ($p < 0.001$) were significantly associated with undernutrition, but not with overweight. Logistic regression analysis showed that previous hospital admission (OR = 2.105, 95% CI 1.479-2.996) and hypertension (OR = 0.122, 95% CI 0.048-0.306) were the most important factors contributing to the development of undernutrition.

Conclusion: Nutritional problems were prevalent among the elderly in this setting. Co-morbidities in the elderly constitute risk factors to be addressed in order to reduce the occurrence of nutritional problems. Health workers should always assess the elderly for nutritional problems, together with other morbidities with which they may present, and institute appropriate management.

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Introduction

The nutritional status of the eldert has been described in various terms. Some authors define it in terms of undernutrition and overweight,[1,2] while others denote it as undernutrition alone.[3] In describing the nutritional status of the elderly, the use of both "undernutrition" and "overweight" is important. The World Health Organization (WHO) recognises the fact that elderly people living in developing countries face the double burden of food shortages and nutrient inadequacies, leading undernutrition-related diseases and "nutrition transition." This transition in dietary changes towards a higher-energy-density diet, with a greater role for fat and added sugar in foods, leads to overweight-related chronic health problems.[4] In addition, most nutritional intervention programmes are directed towards infants and young children, and occasionally pregnant and lactating women.

Studies have shown that undernutrition can adversely affect virtually every organ system of the body in elderly people.[1,5] Its degree of clinical manifestation depends on the duration and extent of nutritional compromise. Common clinical manifestations include delayed wound healing, development of pressure ulcers, susceptibility to focal and systemic infections, functional decline, cognitive decline and delayed recovery from acute illness.[5] There is a four-fold increased risk of elderly people who are hospitalised

and undernourished developing delirium, compared to those who are hospitalised, but not undernourished.[6] Fortunately, most clinical manifestations of undernutrition are reversible with appropriate and adequate nutritional support, if instituted early.[6] However, in cases of prolonged and profound undernutrition, clinical deterioration supervenes, culminating in irreversible organ damage and ultimately death.[2] When present concurrently in the elderly, profound undernutrition and serious illnesses accelerate the progression of each another. In other words, undernutrition can lead to grave illnesses, and serious illnesses can precipitate undernutrition in the elderly. For this reason, nutritional experts recommend early detection and aggressive intervention in nutritional support in the elderly to arrest the downward spiral.[2,5]

Obesity is generally a less important problem in elderly persons than in younger persons.[7] However, morbid obesity, which is defined as a body mass index (BMI) of more than 40 kg/m^2, had been linked with some diseases in the elderly. These include hypertension, diabetes mellitus, osteoarthritis, sleep apnoea and cancers.[2,7] The worst form of obesity in the elderly, which is fast becoming a predominant problem associated with increased risk of death, is sarcopenic obesity, which is defined as excess fat with loss of lean body mass.[7]

Elderly people are the fastest growing population subgroup globally, especially in Nigeria, which is expected to be the only African country that will have an elderly population of more than 15 million by the year 2025.[8] Notwithstanding this, they do not constitute a health policy priority for African countries.[9] Poor nutritional status (undernutrition and overweight) is a silent, potentially serious and frequently underdiagnosed problem relating to the elderly, causing high morbidity and mortality. With poor nutritional state, the elderly present with a myriad of chronic medical illnesses concurrently, both of which can accelerate the progression of each other.[5]

Adequate knowledge presents an opportunity for preventative services, help in early diagnosis and prompt management of nutritional problems occurring in the elderly. Commonly, nutritional problems relating to the elderly are overlooked by primary care physicians and other healthcare workers in our setting due to the assumption that nutritional deficiencies are an inevitable consequence of ageing and disease, and that intervention in correcting these deficiencies has a limited effect.[2,5] Therefore, the aim of this study is to identify the factors associated with undernutrition and overweight among elderly patients presenting at the general outpatient department (GOPD) clinic, University College Hospital (UCH), Ibadan, Nigeria.

Materials and methods

Study site

The study was conducted at the GOPD, UCH, Ibadan, Nigeria. UCH is a tertiary institution, founded in 1957, and has patients who are referred from all parts of Nigeria and the West African sub-region. The GOPD serves as a gateway for most of the patients coming to UCH and functions as a primary care clinic within a tertiary hospital setting. The GOPD is run by consultant family physicians and postgraduate resident doctors in family medicine.

Study design

This was a cross-sectional descriptive study.

Study population

The study population comprised 500 elderly male and female patients aged 60 years and above who presented at the GOPD clinic, UCH, between 1 September-30 October, 2009. The age of the respondents was determined by direct recall, use of historical events, marital age, and age of their first child.

Sampling technique

The technique of convenience sampling was used to select 500 elderly respondents.

Procedure

The study involved a general medical examination and administration of a structured questionnaire. The respondents were seen and clinically examined by the leading author at the GOPD, UCH. All of them gave a detailed clinical history and underwent a thorough physical examination. Based on their health complaints, investigations including fasting plasma glucose, blood film for malaria parasites, plain radiographs of the joints and packed cell volume, were carried out for diagnostic purposes. Few of the respondents were referred to other specialty units within UCH for further assessment and diagnosis. The structured questionnaire obtained information on the respondents' socio-demographic characteristics. Their healthcare utilisation patterns were obtained by asking them their age at first hospital admission, the number of times they had been hospitalised and the total period spent in the hospital following admission. The number of outpatient hospital visits over the previous year were also recorded.

Undernutrition was assessed using the Mini Nutritional Assessment (MNA) tool, which has been shown to be 98% accurate in identifying undernutrition in the elderly.[5,10] The MNA tool comprises 18 items, which include anthropometric measurements, diet history, clinical assessment of lifestyle habits, medication, mobility, presence of dementia or

depression, and self-perception of health. The MNA assessment score was graded as undernutrition < 17; at risk of undernutrition 17-23.5; and normal 23.6-30.[10]

Whether or not they were overweight was derived from the BMI score, which was calculated from the weight in kg divided by height in m^2. The WHO anthropometric classification[11] was used to grade overweight as pre-obesity 25.-29.9 kg/m^2, grade 1 obesity 30-34.9 kg/m^2, grade 2 obesity 35-39.9 kg/m^2 and grade 3 obesity > 40 kg/m^2. The questionnaire was pre-tested in 20 elderly respondents to determine whether it was adequately clear and comprehensive enough to address the set objectives of the study. The necessary amendments were made. Respondents were examined clinically and necessary laboratory investigations, such as fasting plasma glucose, blood film for malaria parasites, plain radiographs, packed cell volume and urinalysis, were carried out to determine the various morbidities with which they were presenting.

Anthropometric measurements

Height was recorded in m with a measuring stand (stadiometre), manufactured by Seca Corporation, (Columbia, Maryland, USA). The stadiometer was positioned on a flat surface. The respondents were asked to remove their shoes, and their heels were positioned against the wall with their scapulae, buttocks and heels resting against the wall; the neck was held in a natural, non-stretched position; the heels were touching each other; the toe tips formed a 45° angle; and the head was held straight with the inferior orbital border in the same horizontal plane as the external auditory conduct (Frankfort's plane). The female patients were asked to remove their headwear, and the hair flattened temporarily with a hard, flat surface, making a perpendicular tangent to the wall. The height was measured to the nearest 0.1 cm.

Weight was measured with a scale, manufactured by Hana, China. Weight was recorded in kg to the nearest 0.1 kg. The scale was placed on a flat, horizontal surface. The patients were asked to remove bags, shoes and heavy clothing. They then stood on the scale, and the readings were taken while the researcher stood in front of the patients. The zero mark was checked after each reading for accuracy. Mid-brachial and calf circumferences were measured to the nearest 0.1 cm, using a flexible, non-elastic measuring tape.

Blood pressure was measured with a mercury sphygmomanometer, manufactured by Accoson, UK. It was calibrated and validated prior to use. Respondents were allowed to relax, and measurement commenced after five minutes of rest. Appropriate sized cuffs were used for each patient, encircling at least 80% of the arm. Blood pressure was recorded as the average of two readings, recorded two minutes apart.[12] Hypertension was staged according to the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure.[13] Stage 1 hypertension was taken as systolic blood pressure of 140-159 mmHg and diastolic blood pressure of 90-99 mmHg, while stage 2 was any systolic blood pressure > 160 mmHg and diastolic blood pressure > 100 mmHg.[13]

Ethical consideration

Approval for the study was obtained from the Head of the GOPD, UCH, Ibadan, and the University of Ibadan/ University College Hospital institutional ethics review board. Informed consent was obtained from each respondent before examination and administration of the questionnaire.

Data analysis

Administered questionnaires were checked, sorted and coded serially after each study day. SSPS (version 15) was used for data entering, cleaning and analysis. Descriptive statistics were used to describe the socio-demographic characteristics of the respondents. Chi-square statistics were used to evaluate the association between categorical variables. Significance was set at p-values ≤ 0.05. Logistic regression was used to explore the relationships between healthcare utilisation, morbidities and nutritional status.

Results

There were 324 (64.8%) females and 176 (35.2%) males in the study population. The female to male ratio was 1.8:1. The mean ± SD age of the respondents was 66.7 ± 6.6 years (range 60-90 years). Their monthly income ranged from 1 000 to 110 000 Naira ($6.67-$733.33), with a median income of 7 000 Naira ($46.67). Undernutrition was assessed with the MNA tool. The prevalence of undernutrition was 7.8%; 11.8% were at risk of undernutrition, and 80.4% were normal. Overweight was assessed by the BMI; 257 (51.4%) respondents were classified as overweight, 219 (43.8%) as normal, and 24 (4.8%) as underweight.

Undernutrition

The respondents visited the hospital on an outpatient basis on an average of 3.1 ± 0.58 times (range 1-13 times) in the past year. The prevalence of undernutrition was highest among the elderly who had been admitted to hospital on reaching, or after, the age of 60 years (26.6%). Those who were admitted to hospital before the age of 60 years had a prevalence of undernutrition of 4.5%. There was a significant association between hospital admission and the prevalence of undernutrition ($\chi^2 = 39.492$; $p < 0.001$).

Table I. Factors associated with undernutrition and healthcare utilisation pattern

	Undernutrition n = 39 (%)	At risk of undernutrition n = 59 (%)	Normal n = 402 (%)	Total N =500 (%)
Hospital admission				
Never been admitted	18 (4.8)	45 (11.9)	314 (83.3)	377 (100)
Before the age of 60 years	2 (4.5)	4 (9.1)	38 (86.4)	44 (100)
On reaching, or after, the age of 60 years	17 (26.6)	9 (14.1)	38 (59.3)	64 (100)
Cannot remember	2 (13.3)	1 (6.7)	12 (80.0)	15 (100)
$\chi^2 = 39.492$ df = 6 p < 0.001				
Number of hospital visits during the past year				
1-3	31 (9.0)	38 (11.0)	276 (80.0)	345 (100)
≥ 4	8 (5.2)	21 (13.5)	126 (81.3)	15 5 (100)
$\chi^2 = 2.609$ df = 2 p = 0.271				

Table II: Prevalence of undernutrition and morbidities

Morbidities	Undernutrition n = 39 (%)	At risk of undernutrition n = 59 (%)	Normal n = 402 (%)	Total N = 500 (%)	χ^2	p-value
Hypertension	6 (2.2)	29 (10.4)	243 (87.4)	278 (100)	30.370	< 0.001*
Diabetes	2 (3.6)	8 (14.3)	46 (82.1)	56 (100)	1.800	0.407
Malaria	5 (19.2)	3 (11.5)	18 (69.3)	26 (100)	5.021	0.081
Osteoarthritis	0 (0)	7 (50.0)	7 (50.0)	14 (100)	20.591	< 0.001*
Cataract	1 (5.0)	4 (20.0)	15 (75.0)	20 (100)	1.472	0.479
Psychosomatic disease	0 (0)	4 (66.7)	2 (33.3)	6 (100)	17.640	< 0.001*
Other morbidities	0 (0)	4 (19.0)	17 (81.0)	21 (100)	2.686	0.261

* Significant at 5% level of significance

Table III. Logistic regression of undernutrition with significantly associated factors in the respondents

	B	SE	Wald	Odds ratio (exp^{β})	p-value	Confidence interval	
						Lower bound	Upper bound
Hospital admission	0.744	0.180	17.090	2.105	0	1.479	2.996
Hypertension	-2.108	0.472	19.980	0.122	0	0.048	0.306
Osteoarthritis	-18.068	9998.318	0	0	0.999	0.000	.
Psychosomatic disease	-17.972	1589.372	0	0	0.999	0.000	.
Constant	-3.342	1.294	6.674	0.035	0.010		

Over the year, respondents who visited the hospital on an outpatient basis between one and three times (9.0%) had a higher prevalence of undernutrition than those who visited it four or more times (5.2%) (see Table I).

Table II depicts the prevalence of undernutrition and morbidities. Eighty-one (16.2%) respondents presented at the clinic during the study for routine medical checks only. The common morbidities were hypertension 278 (55.6%), diabetes 56 (11.2%), malaria 26 (5.2%), and cataracts 20 (4%). There was significant association between the prevalence of undernutrition and chronic morbidities such as hypertension (χ^2 = 30.370; p < 0.001), osteoarthritis (χ^2 = 20.591; p < 0.001) and psychosomatic disease (χ^2 = 17.640; p < 0.001).

Logistic regression was done using all the variables that showed a significant association with undernutrition. Previous hospital admission OR = 2.105 (CI = 1.479-2.996) and hypertension OR = 0.122 (CI = 0.048-0.306) were found to be the most associated with undernutrition among the respondents (see Table III).

Overweight

Table IV shows the factors associated with overweight and the healthcare utilisation pattern. Its prevalence was 53.3% among respondents who had never been admitted to hospital and 42.2% among those who were hospitalised on reaching, or after, the age of 60 years. There was no significant association between hospital admission and the prevalence of overweight (χ^2 = 6.376 df = 6 p = 0.382).

Table IV: Factors associated with body weight and healthcare utilisation pattern

	Underweight n = 24 (%)	Normal n = 219 (%)	Overweight n = 257 (%)	Total N = 500
Hospital admission				
Never been admitted	20 (5.3)	156 (41.4)	201 (53.3)	377 (100)
Before the age of 60 years	0 (0)	21 (47.7)	23 (52.3)	44 (100)
On reaching, or after the age of 60 years	3 (4.7)	34 (53.1)	27 (42.2)	64 (100)
Cannot remember	1 (6.7)	8 (53.3)	6 (40.0)	15 (100)
$\chi^2 = 6.376$ df = 6 p = 0.382				
Number of hospital visits during the past year				
1–3	20 (5.8)	148 (42.9)	177 (51.3)	345 (100)
≥ 4	4 (2.6)	71 (45.8)	80 (51.6)	155 (100)
$\chi^2 = 2.514$ df = 2 p = 0.285				

Table V: Prevalence of overweight and morbidities

Morbidities	Underweight n = 24 (%)	Normal n = 219 (%)	Overweight n = 257 (%)	Total N = 500	χ^2	p-value
Hypertension	15 (5.4)	111 (39.9)	152 (54.7)	278 (100)	3.914	0.141
Diabetes	0 (0)	26 (46.4)	30 (53.6)	56 (100)	3.184	0.203
Malaria	2 (7.7)	14 (53.8)	10 (38.5)	26 (100)	2.003	0.367
Osteoarthritis	1 (7.1)	5 (35.7)	8 (57.2)	14 (100)	0.472	0.790
Cataract	2 (10.0)	9 (45.0)	9 (45.0)	20 (100)	1.346	0.510
Psychosomatic disease	1 (16.7)	2 (33.3)	3 (50.0)	6 (100)	1.936	0.380
Other morbidities	0 (0)	7 (33.3)	14 (66.7)	21 (100)	2.594	0.273

Almost equal proportions of respondents who had visited the hospital on an outpatient basis in the past one year one to three times (51.3%) and four or more times (51.6%) were overweight.

Table V depicts the prevalence of overweight and the morbidities of the respondents. Respondents who were diagnosed with morbidities such as osteoarthritis, hypertension, diabetes and psychosomatic disease, showed a prevalence of overweight of 57.2%, 54.7%, 53.6% and 50%, respectively. However, no significant association was found between the morbidities and prevalence of overweight in this study ($p > 0.05$).

Discussion

In this study, only a few respondents (12.8%) had been admitted to hospital after they had reached the age of 60 years. Most were males. Hospital visits showed that the majority of respondents had visited on an outpatient basis one to three times during the past year. The average number of annual outpatients' visits recorded in this study, namely three visits, was similar to that reported by the US National Center for Health Statistics, which reported that on average, the elderly visited hospitals three times annually on an outpatient basis.[14] Hospitalisation of respondents on reaching, or after, the age of 60 years was significantly associated with undernutrition ($p < 0.001$). Studies have shown that pathological insults leading to hospitalisation of elderly people increased the probability of undernutrition and mortality.[5,6] Respondents who visited hospitals more frequently (four or more times annually) had a lower prevalence of undernutrition (5.2%) than those who visited one to three times annually (9.0%), without any significant difference ($p = 0.271$). The reason may be that people who visited hospital more frequently have better health awareness and are more likely to keep their follow-up consultation appointments than those who went there less frequently. Similarly, studies have shown that the undernourished elderly in Europe made more annual outpatient clinic visits and were hospitalised more than their counterparts who were not undernourished. Managing undernutrition in the elderly involves huge human and financial resources.[15] In 2007, the UK spent about £13 billion (> 10% of the total health and social care budget) to address undernutrition.[15] Comparatively, this represents more than the annual budget of most developing countries.

The respondents in this study were diagnosed with various morbidities. Hypertension (55.6%) was the major morbidity that was found, while 11.2% had diabetes mellitus. This prevalence of hypertension was higher than that reported in

south-western Nigeria by Ogunniyi et al.[16] The explanation offered for this difference was that the latter study was community based, where half of the participants did not report any health problems, compared to this study that is hospital based.[16] High blood pressure has been reported to be one of the most common causes of both morbidity and mortality in the elderly.[16] With an increasing population of individuals aged 60 years and above, hypertension thus becomes a major public health concern as blood pressure rises with age in virtually all populations.[12,13,16] The prevalence of diabetes in this study was higher than that reported in the general population (2.2%) because this investigation was hospital based, and also because of the increase in the pervasiveness of diabetes with advancing age.[17] The dominance of undernutrition was found to be significantly associated with the diagnosis of chronic morbidities like hypertension, osteoarthritis and psychosomatic disease among the respondents. The association between the prevalence of these chronic morbidities with increasing age has been reported in several studies.[12,13,16,17]

Logistic regression analysis was undertaken to assess various factors that were found to be significantly associated with undernutrition. Independent variables were previous hospitalisation, hypertension, osteoarthritis and psychosomatic disease. The dependent variable was undernutrition. Previous hospital admission and hypertension were found to be strongly associated with it. Previous hospital admission had an odds ratio of 2.105, which translated to a risk of about 2:1 for those with previous hospitalisation, compared with those who had never been admitted to a hospital before.

The highest prevalence of overweight people was found among those who had never been hospitalised before (53.3%). Repeated hospitalisation, due to a myriad of chronic morbidities, could result in reduced appetite.[7]

Conclusion

From this study, factors that predisposed respondents to undernutrition were previous hospitalisation and morbidities such as hypertension, osteoarthritis and psychosomatic disease. Healthcare workers need to routinely assess the nutritional state of elderly patients at first contact. Elderly patients need to be comprehensively examined because most of the predisposing factors to nutritional problems can be easily identified and treated.

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