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Original Review

Assessment of Nutritional Status among Elderly Hospitalized Patients in Enugu, Nigeria: A Hospital-based Study.

Ngozi Ijeoma Okoro[1], *Bruno Basil[2], Michael Chinweuba Abonyi[3].

[1]Department of Chemical Pathology, Enugu State University of Science and Technology, Enugu, Nigeria. [2]Department of Chemical Pathology, Benue State University, Makurdi, Nigeria. [3]Department of Medicine, Enugu State University of Science and Technology, Enugu, Nigeria.

Abstract

Background*:* The ageing population worldwide presents a significant challenge for healthcare systems, with malnutrition being a common problem among elderly individuals, particularly those hospitalized. Assessing nutritional status is crucial for identifying and addressing malnutrition in this population. This study aimed to assess the prevalence of malnutrition among elderly hospitalized patients in a Nigerian tertiary healthcare setting.
Methodology*:* This was a hospital-based descriptive and cross-sectional study conducted from March to June 2023, involving 122 patients aged 60 years and above. Demographic data and anthropometric measurements were collected, and the Short-form Mini Nutritional Assessment (MNA-SF) tool was used to assess nutritional status. The reliability of the MNA-SF was assessed using Cronbach's α coefficient and item-to-total score correlations.
Results*:* The mean MNA score was 14.4 ± 5.3, with 71.3% of participants classified as malnourished, 22.1% at risk of malnutrition, and 6.6% well-nourished. Significant differences were observed in the body mass index (BMI) of nourished, at-risk, and malnourished individuals respectively (23.3 ± 3.6 kg/m^2, 22.5 ± 3.8 kg/m^{2,} and 19.6 ± 2.8 kg/m^2, $p < 0.001$). The MNA-SF tool demonstrated acceptable reliability (Cronbach's α coefficient = 0.777), with significant correlations between total MNA scores and most MNA-SF questions.
Conclusion*:* The high prevalence of malnutrition among elderly hospitalized patients in this Nigerian tertiary hospital emphasizes the importance of implementing routine nutritional screening protocols and targeted nutritional interventions for improved health outcomes among the elderly.

Keywords: Malnutrition, Elderly, Hospitalized Patients, MNA-SF, Nutritional Assessment.

Correspondence: Dr. Basil Bruno, Department of Chemical Pathology, Benue State University, Makurdi. **Email:** sayhi2bruno@gmail.com

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Introduction:

The ageing population worldwide which parallels improvement in technology and survival presents a significant challenge for healthcare systems, with profound implications for public health, clinical practice, and healthcare policies.[1] Aging is a complex biological process characterized by temporal continuity and heterogeneity on cellular, somatic, and molecular levels, influencing various aspects of human physiology and health.[2,3]It is characterized by at least one of the following: structural deterioration, decreased functionality, depletion, typical phenotypic alterations or their aetiology, and an increased likelihood of mortality.[4,5]As individuals age, they undergo a myriad of physical, social, and physiological alterations, predisposing them to increased vulnerability to various health conditions.[6]

One of the critical aspects of ageing is the maintenance of adequate nutritional status, which plays a pivotal role in determining the health and well-being of elderly individuals. Nutritional assessment is a systematic process of evaluating an individual's nutritional status and is essential in identifying and addressing nutrition-related health issues that affect the elderly population.[7,8]Although commoner in children, malnutrition is a more common problem among the elderly than it is in young adults.[9] It can significantly impact health outcomes, exacerbate existing health conditions, and increase the risk of morbidity and mortality.[10,11]

In recent years, there has been growing recognition of the importance of nutritional assessment, particularly among hospitalized elderly patients. Hospitalization itself can exacerbate malnutrition risk due to factors such as decreased appetite, altered dietary intake, and underlying medical conditions.[12,13] Therefore, the systematic assessment of nutritional status among elderly hospitalized patients is vital for identifying those at risk of malnutrition and implementing timely interventions to optimize their nutritional status and overall health outcomes.

The Short-form Mini Nutritional Assessment (MNA-SF) is a widely and reliably used screening and assessment tool specifically designed for evaluating the nutritional status of elderly individuals, particularly in settings where time is limited. Unlike the Full MNA which is long, stressful on the part of the patients, and has multiple questions requiring much time to complete.[14]The MNA comprises various components, including anthropometric measurements, general assessment, short dietary assessment, and subjective assessment, providing a comprehensive evaluation of nutritional status.[15]It has demonstrated reliability and validity in clinical practice and has been recommended by national and international clinical and scientific organizations for use in assessing the nutritional status of elderly individuals.[15,16,17,18]

Despite the recognized importance of nutritional assessment, there is a paucity of data on the prevalence of malnutrition among elderly hospitalized patients in Enugu. Malnutrition in the elderly can worsen existing health conditions, prolong hospital stays, and increase mortality rates.[10,11] However, understanding the extent of this issue within the Nigerian healthcare setting is crucial for developing targeted interventions to improve health outcomes in this vulnerable population. Previous studies have indicated a high prevalence of malnutrition among elderly hospitalized patients globally, particularly in developing countries where access to adequate nutrition may be limited.[19,20,21] Considering that hospitalization is an established aggravating factor for malnutrition in this age group coupled with the limited availability of resources and infrastructure in healthcare settings like Enugu State University Teaching Hospital, it is reasonable to hypothesize that a significant proportion of elderly hospitalized patients in Enugu State University Teaching Hospital will exhibit signs of malnutrition, as assessed by the MNA-SF tool.

This study aims to assess the nutritional status of elderly patients in Enugu State University Teaching Hospital, Nigeria, using the MNA-SF tool to determine the prevalence of malnutrition among them. Also, by evaluating the nutritional status of elderly patients, this study aims to inform strategies for optimizing nutritional care and improving health outcomes among hospitalized elderly individuals in the study area.

Materials and Methods:

Ethical Considerations

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.[22] Ethical approval was obtained from the Health Research and Ethics Committee of ESUT Teaching Hospital with protocol number ESUTHP/C-MAC/RA/034/Vol.4/66. Detailed information about the study's purpose, procedures, benefits, and potential risks was provided and voluntary consent was obtained from all participants or their legally authorized representatives before enrolment in the study. The confidentiality of participants' information was ensured using unique identification codes assigned to participants, and their personal information and medical records were securely stored in locked spaces. Finally, the findings from the study were shared with the managing teams to ensure appropriate care for individuals identified with malnutrition, especially for participants whose treatment plan did not include addressing malnutrition.

Study Setting and Design

This was a hospital-based descriptive study that employed a cross-sectional design to assess the nutritional status of elderly hospitalized patients in Enugu State Teaching Hospital, Nigeria, a tertiary healthcare facility serving a large population in the southeast region of Nigeria.

The study was carried out between March 2023 and June 2023 (3months) and included elderly individuals aged 60 years and above who were admitted to the hospital for medical care during the study period. Patients with cognitive impairment, communication barriers, or those unwilling to participate were excluded from the study. Those who met the inclusion criteria were selected by random sampling technique from patients admitted to the various wards using a computer-generated random number table. The target minimum sample size of 82 was calculated using a formula for estimating proportions in a single population[23] based on an estimated prevalence of malnutrition among hospitalized elderly patients of 25.3%from previous studies,[24] a confidence level of 95%, and an adjustment of 10% for non-response rate.

Data Collection

Trained research assistants collected data using structured questionnaires and standardized assessment tools to ensure consistency and accuracy of results. Demographic information including age, gender, and medical history was obtained from participants' medical records. Anthropometric measurements were carried out using calibrated equipment such as a weighing scale with a stadiometer to measure weight and height for body mass index (BMI), while waist circumference (WC) and other body measurements were carried out using the PWT80W-Perfect Waist and Body Tape Measure.

Nutritional Assessment

The Short-form Mini Nutritional Assessment (MNA-SF) tool was used to assess the nutritional status of participants. It consists of a comprehensive set of questions and assessments covering various aspects related to nutrition, including dietary intake, weight loss, mobility, psychological stress, and neuropsychological problems. It is composed of two main sections: the first part comprises anthropometric measurements, dietary assessment, and subjective evaluation of general health, while the second part involves a global assessment by healthcare professionals. The scoring system of the MNA categorizes individuals into three groups: well-nourished (MNA score 24 – 30), at risk of malnutrition

(MNA score 17 – 23.5), and malnourished (MNA score < 17). This classification assists healthcare providers in identifying elderly patients who require nutritional support or intervention to prevent further decline in nutritional status and associated adverse health outcomes.[25]

Statistical Analysis

Data were entered into a computerized database and analyzed using Statistical Package for the Social Sciences (SPSS) version 23.0, IBM, Armonk, New York, NY, USA. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize demographic characteristics and nutritional status indicators. The prevalence of malnutrition among hospitalized elderly patients was calculated based on MNA scoring. Significant differences in the nutritional status of participants across clinical and demographic parameters were determined using Chi-square tests or analysis of variances (ANOVA). Differences in means will be compared using ANOVA while those in proportions will be done using Chi-Square. The reliability of the MNA tool was assessed using Cronbach's α coefficient and values of 0.7 or higher are considered acceptable,[26] while item-to-total score correlations were done using Spearman's correlation analysis. Statistical significance was set at $p < 0.05$.

Results:

A total of 122 participants were recruited into the study and their mean MNA score was 14.4 ± 5.3. The number of malnourished (MNA score < 17) participants in this study was 87 (71.3%), while 35 (28.7%) were not. Among all the participants, 27 (22.1%) were at risk of malnutrition (MNA score 17 – 23.5), while 8 (6.6%) were well-nourished (MNA score 24 – 30) (figure 1).

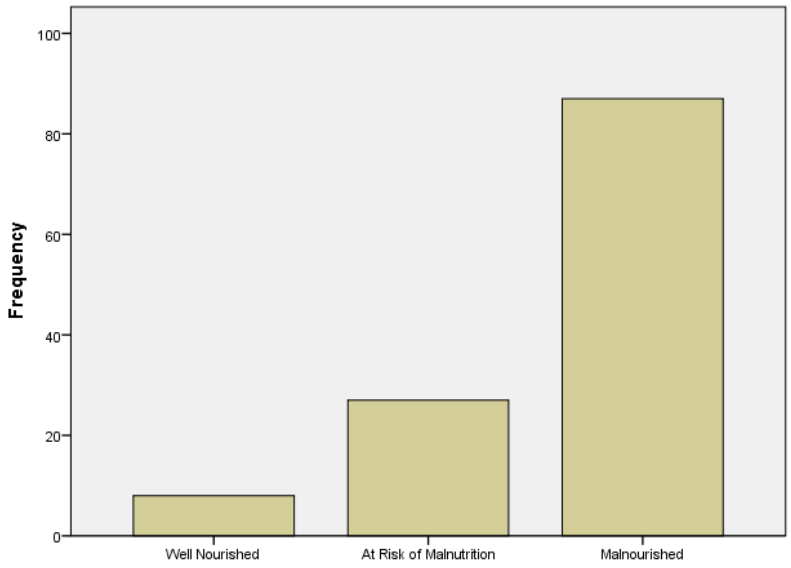

Figure 1: *Nutritional Status of the study participants*

The clinical and socio-demographic characteristics of the participants are shown in Table 1. Statistically significant differences were seen in the BMI of well-nourished, at risk of malnutrition, and malnourished individuals (23.3 ± 3.6 kg/m^2 versus 22.5 ± 3.8 kg/m^2 versus 19.6 ± 2.8 kg/m^2, $p < 0.001$) respectively and in their MNA scores (24.9 ± 0.8 versus 19.4 ± 2.8 versus 11.8 ± 3.5, $p < 0.001$) respectively. No significant differences in mean age, sex, marital status, educational status, waist circumference, and calf circumference were noted across the various nutritional states of the participants

Table 1: Clinical and Socio-demographic characteristics of study participants

Characteristics	Total (n=122) N (%) or Mean ± SD	Well-Nourished (n=8) N (%) or Mean ± SD	At Risk (n=27) N (%) or Mean ± SD	Malnourished (n=87) N (%) or Mean ± SD	p-Value
Age (years)	69.3 ± 5.0	67.1 ± 1.0	70.0 ± 5.0	69.3 ± 5.1	0.365
Sex:					
Male	75 (61.5)	5 (62.5)	21 (77.8)	49 (56.3)	0.135
Female	47 (38.5)	3 (37.5)	6 (22.2)	38 (43.7)	
Marital status:					
Single	1 (0.8)	0 (0.0)	1 (100.0)	0 (0.0)	
Married	90 (73.8)	3 (37.5)	23 (82.5)	64 (73.6)	0.057
Widow	19 (15.6)	2 (25.0)	2 (7.4)	15 (17.2)	
Widower	11 (9.0)	3 (37.5)	0 (0.0)	8 (9.2)	
Divorced	1 (0.8)	0 (0.0)	1 (100.0)	0 (0.0)	
Educational status:					
Primary	91 (74.6)	6 (75.0)	19 (70.4)	66 (75.9)	
Secondary	25 (20.5)	2 (25.0)	5 (18.5)	8 (9.2)	0.665
Tertiary	3 (2.5)	0 (0.0)	2 (7.4)	1 (1.2)	
Uneducated	3 (2.5)	0 (0.0)	1 (3.7)	2 (2.3)	
BMI (kg/m^2)	20.6 ± 3.5	23.3 ± 3.6	22.5 ± 3.8	19.6 ± 2.8	< 0.001*
Waist circumference (cm)	90.4 ± 14.8	91.6 ± 4.6	94.1 ± 20.5	89.2 ± 13.2	0.322
Calf circumference (cm)	32.8 ± 8.1	35.8 ± 1.4	33.7 ± 7.0	32.2 ± 8.7	0.394
MNA Score	14.4 ± 5.3	24.9 ± 0.8	19.4 ± 2.8	11.8 ± 3.5	< 0.001*

** p-Value significant at < 0.05*

The reliability of the MNA tool was measured using Cronbach's α coefficient and item-to-total score correlations. Significant correlations between total MNA score and MNA questions were found for all except for four questions; ability to live independently, taking more than three prescription drugs a day, consumption of protein, and consumption of fruits and vegetables. Cronbach's α coefficient was 0.777 which is deemed acceptable.[26] The correlations between total MNA score and MNA questions are summarized in Table 2.

Table 2: Correlations of Mini-Nutritional Assessment (MNA) questions to total MNA score.

MNA Question	Spearman's r	p-value
Declined food intake over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties	0.719	< 0.001**
Weight loss during the last 3 months	0.747	< 0.001**
Mobility	0.596	< 0.001**
Suffered from psychological stress or acute disease in the past 3 months	0.406	< 0.001**
Neuro-psychological problems	0.580	< 0.001**
Body mass index (BMI in kg/m^2)	0.474	< 0.001**
Lives independently (not in a nursing home or hospital)	0.143	0.116
Takes more than three prescription drugs per day	0.074	0.418
Pressure sores or skin ulcers	0.392	< 0.001**
Amount of full meals the patient eats daily	0.285	0.001*
Selected consumption markers of protein	-0.072	0.432
Consumption of two or more servings of fruits or vegetables per day	0.100	0.272
Amount of fluid consumed per day	0.541	< 0.001**
Mode of feeding	0.495	< 0.001**
Self-view nutritional status	0.555	< 0.001**
Patient perception of health status in comparison with others of the same age	0.567	< 0.001**
Mid-arm circumference (MAC) in cm	0.431	< 0.001**
Calf circumference (CC) in cm	0.410	< 0.001**

**p-value significant at< 0.01; **p-value significant at < 0.001.*

Discussion:

Our study revealed a high prevalence of malnutrition among the elderly hospitalized patients and the mean MNA score of 14.4 ± 5.3 indicates a substantial degree of malnutrition. This is consistent with previous studies indicating a high prevalence of malnutrition among elderly individuals globally and particularly in developing countries.[11,19,20,21,27]This is in contrast with the findings of a systematic review conducted in a Thai population and may be due to the availability of a more advanced healthcare system.[28]The high prevalence of malnutrition in this study has far-reaching consequences as it is associated with worsened health outcomes, prolonged hospital stays, and increased mortality rates, as evidenced by previous studies.[29] This emphasizes the critical need for effective nutritional screening and intervention strategies in this vulnerable population.

The high prevalence of malnutrition observed in our study population could be attributed to various factors, including decreased appetite, altered dietary intake, and underlying medical conditions, all of which are common during hospitalization.[10,11,13] Additionally, the limited availability of resources and infrastructure in healthcare settings like Enugu State University Teaching Hospital may contribute to inadequate nutritional support for elderly hospitalized patients, further exacerbating the risk of malnutrition.

The notable findings in this study are the statistically significant differences observed in BMI and MNA scores across different nutritional states. Well-nourished individuals and those at risk of malnutrition had higher mean BMI and MNA scores compared to those malnourished individuals. This finding emphasizes the validity of the MNA tool in assessing nutritional status and highlights the importance of BMI as a complementary indicator of nutritional status among elderly hospitalized patients. Previous studies have consistently linked lower BMIs to a higher incidence of malnutrition amongst the elderly population.[30,31,32]

The MNA-SF tool is a reliable instrument for assessing nutritional status among elderly hospitalized patients in our study setting and showed a strong correlation between MNA scores and MNA-SF questions. However, certain MNA-SF questions showed weaker correlations with the total MNA score, such as the ability to live independently, taking more than three prescription drugs a day, consumption of protein, and consumption of fruits/vegetables. A similar finding was noted in a previous study where the assessment tool was found to be reliable for all, but four questions related to neuropsychological problems, independence, skin problems, and number of meals eaten per day.[33] This shows the tendency towards variable performances when applied to different populations, hence further investigation into these discrepancies is warranted to ensure the accuracy of nutritional assessment in this population.

This study has some limitations that warrant careful consideration. Firstly, the study was conducted in a single hospital, which limits the generalizability of the findings to other healthcare settings in Nigeria. Future studies should aim to include multiple hospitals across different regions to obtain a more comprehensive understanding of the nutritional status of elderly hospitalized patients nationwide. Additionally, the cross-sectional design of the study only provides a picture of nutritional status at a specific point in time, making it difficult to establish causal relationships. Longitudinal studies would be beneficial in tracking changes in nutritional status over time and assessing the effectiveness of interventions. Furthermore, the reliance on self-reported data for some variables, such as dietary intake and health status, introduces the potential for recall bias and may affect the accuracy of the results. To mitigate this, future research could aim at developing tools that incorporate objective measures, such as food diaries or biochemical markers, to supplement self-reported data.

Despite these limitations, our study highlights the urgent need for tailored nutritional interventions for elderly hospitalized patients in Nigeria. Proper consideration should be given to the implementation of routine nutritional screening protocols for all elderly patients upon admission, the provision of nutritional education to both patients and healthcare providers, and the integration of dietitians or nutritionists into multidisciplinary healthcare teams to optimize nutritional care. Additionally, efforts should be made to improve the availability and accessibility of nutritious meals in hospital settings, especially for elderly patients with limited mobility or dietary restrictions. Finally, future research should explore the effectiveness of these interventions in improving nutritional status and health outcomes among elderly hospitalized patients in Nigeria.

Conclusion:

The high prevalence of malnutrition among elderly hospitalized patients in this Nigerian tertiary hospital emphasizes the importance of implementing routine nutritional screening protocols and targeted nutritional interventions for improved health outcomes. Also, our findings confirm the reliability of the MNA-SF tool for assessing malnutrition in this population, emphasizing its importance in guiding effective intervention strategies. Further research is needed to explore the specific factors contributing to malnutrition and to develop population-specific interventions to address the issue effectively.

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