

Factors Associated with Malnutrition Among the Elderly in Rural and Urban Communities of Plateau State: A Mixed Methods Comparative Study

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Abstract

Background

Malnutrition is a health problem that occurs in the elderly, particularly in lower and middle-income countries. It is known to be associated with several physiological, cognitive, social, and lifestyle changes that influence dietary intake and nutritional status. The study aimed to compare the differences in the economic and cultural factors associated with nutrition among the elderly in urban and rural communities of Plateau State.

Method

A comparative cross-sectional analytical study in which a mixed method of data collection was used to compare 218 female and male elderly persons aged 60 years and above living in selected communities in Jos South/Mangu LGAs in Plateau State.

Results

The analysis found that age and sex had no significant impact on the nutritional status of the elderly in both rural and urban areas. However, differences emerged between the two groups. Marital status was a significant predictor of nutritional status in urban communities, whereas in rural villages, financial support from children or others played a crucial role in determining the nutritional status of the elderly.

Conclusion

This study underscores the pivotal role of financial support and marital status in shaping the nutritional well-being of the elderly in rural and urban communities. The findings emphasize the need for a comprehensive approach to address the nutritional challenges confronting this vulnerable population and the promotion of healthy ageing, especially in Plateau State.

Introduction

Healthy ageing is how the elderly function physically, mentally, and socially throughout their lives; being able to carry out the everyday tasks of living and enjoying a purposeful and fulfilling life [1]. It can be defined as the process of developing and maintaining the functional ability that enables physical and cognitive functioning for as long as possible, delaying the rate of onset and functional decline in the elderly[1]. This can be determined by an adequate diet right from childhood [2]. Healthy ageing is associated with several

physiological, cognitive, social, and lifestyle changes that influence dietary intake and nutritional status[3]. Health status is closely related to the ageing process, with nutrition playing an important role in the rate of the ageing process [3].

The elderly population is diverse, ranging from fit, active, and healthy individuals to extremely frail and dependent individuals with chronic diseases and diverse disabilities[2]. The burden of morbidity in this group of people influences their nutritional status [4]. Malnutrition occurs in the elderly as a result of reduced nutrient intake and or defective metabolism [3]. It is also associated with several age-related complications and diseases common among the elderly [4]. Functional changes with ageing also significantly affect food intake and the severity of malnutrition in the elderly [5]. The gradual decline of physical capabilities such as movement and mobility, changes in the physiological functions in the ageing body, chronic diseases, and other age-related illnesses can lead to changes in food choices, eating habits, and dietary intake, subsequently increasing the risk of malnutrition [6]. An adequate diet and optimum nutritional status play a critical role in maintaining the immune response of the aged by promoting resistance to infection and other immune-related diseases [7]. It is, therefore, necessary that the elderly are adequately nourished and maintain the proper functional ability to improve their quality of life [8].

Many countries have witnessed rural-to-urban migration of the working-class population who are seeking better opportunities for employment in the cities rather than waiting for job creation in rural areas [9]. This has also led to the movement of some elderly persons from their usual places of abode in the rural areas to live with their children in the urban areas [9].

Factors in either rural or urban settings, such as environmental, socio-economic, demographic characteristics, lifestyle, and nutrition, among others, may affect the quality of life of the elderly generally[10]. However, their effect is more likely to be severe in those living in rural areas. Studies have shown that the social and physical health domain of the elderly in rural areas is higher than that of those living in urban areas [10]; other studies have found the reverse [11, 12]. The care and well-being of the elderly in rural communities are communal in nature due to the persistence of the extended family system: the elderly largely depend on their children and relatives for their daily needs [11]. This places a huge financial burden on their caregivers (children mostly): with a consequent inadequate provision for their nutritional and health needs [13].

Malnutrition affects up to 25% of elderly patients at home (in urban and rural communities), and more than 50% of those at rehabilitation institutions, and this constitutes a problem of public health importance [14]. Malnutrition in the elderly could be undernutrition or overnutrition; either of these increases the risk of the development of

other forms of morbidity and mortality[13]. Moreover, the nutritional requirements of this rapidly growing population group are not clearly defined or appreciated in most developing countries, making them vulnerable to increased mortality from Non-Communicable Diseases (NCDs) [4].

The prevalence of malnutrition in Europe and North America is 1–15% of the population in community-dwelling older adults and 25–60% for older adults in geriatric care facilities [15]. Between 2010 and 2050, with a predicted global increase in life expectancy, the population of the elderly will grow from 11.5% to 21.0% worldwide and from 9.0% to 19.0% in developed countries [16]. This will result in an increase in the proportion of the elderly, who are at risk of malnourishment [16].

This study, therefore, was carried out in selected communities in Plateau State. This is because there are different ethnic groups in Plateau State, and culture plays a great role in determining the nutrition and, ultimately, the health of individuals [17]. It is important to determine to what extent the culture of the elderly in this part of the country affects their nutrition.

Social factors such as lower social class and low educational level have been known to greatly affect the nutrition of the elderly [10]. The elderly living in rural and urban areas have different social factors that might affect their nutrition differently [11]. Also, factors such as marital status, living arrangement (alone or with children and relatives), and frequent contact with friends have been shown to affect the quality of nutrition in the elderly [10]. This study determined the differences in the social factors that affect the nutritional status of the elderly who live in rural and urban areas.

Economic factors such as the cost of foods rich in micronutrients can also affect the nutritional status of the elderly, especially those belonging to the lowest social class [18]. This can also affect their nutrition due to the unavailability of funds for the purchase of food items rich in the required nutrients. This study also compared the differences in the economic factors to assess how they affect the nutrition of the elderly in urban and rural communities of Plateau State.

Nutritional status is often associated with several factors that could positively or negatively affect individuals. Malnutrition is one of the health problems that occurs in the elderly and is due to several factors. These factors range from personal factors that have to do with ageing to socio-economic, psychological, and environmental factors and the interplay between them [19].

Methods and tools

Study setting

Plateau State is one of the 36 states in Nigeria, located in the north-central region. It lies between latitude 80° 32' and 100° 38' North. It is bound by Bauchi State to the northeast, Kaduna State to the northwest, Nassarawa State to the Southwest and Taraba State to the Southeast. It is about 1000km Northeast of Lagos, 400km south of Kano, 900km Northwest of Port Harcourt, and 600km SE of Maiduguri.

It has a projected population of 4,735,984 people as of 2021 [20]. The capital of the State is Jos, and the State has 17 Local Government Areas (LGAs) that are grouped into Northern, Central, and Southern senatorial districts. Of the LGAs, two are predominantly urban (Jos-North and Jos-South) while the remaining 15 are predominantly rural [21]. Each of these LGAs has people of diverse tribes and traditions. The major occupation of most of the inhabitants of the rural areas is farming, while the urban population is mostly involved in skilled and unskilled professions or engaged in the public civil service. The terrain is mostly mountainous with an unpredictable weather pattern. The state is known for its diverse cultivation of food crops, fruits, and vegetables such as Irish potatoes, grains such as millet, maize, rice, apples, mangoes, cabbage, carrots, cucumber, green beans, peas, and lettuce [20].

Study Design

The study design was a comparative cross-sectional analytical study in which a mixed method of data collection was used to compare elderly people living in the urban and rural communities of Plateau State.

Study Population

This consisted of 218 elderly persons aged 60 years and above, males and females living in selected communities in Jos South/Mangu LGAs in Plateau State. The age of the elderly was estimated through the use of historical events (like how old they were when Nigeria got independence in 1960) for those who were not sure of their exact dates of birth.

Eligibility Criteria

Inclusion Criteria

All elderly persons who had resided in the study area for a period of six months or more were considered permanent residents of the location.

Exclusion Criteria

Any disabled or severely ill elderly person who did not have a caregiver at the time of the study to assist in giving information and taking anthropometric measurements of the elderly.

Sample Size

The minimum sample size was calculated using this formula

$$n = \frac{2(Z_{\alpha} + Z_{\beta})^2 \times [p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2} \quad [22]$$

Where;

n = the minimum sample size

Z_{α} = the standard normal deviate at 1.96 corresponding to a 95% significance level

Z_{β} = the standard normal deviate corresponding to 80% power at 0.84

p_1 = prevalence of the elderly who are overweight in urban areas from a previous study that was carried out in Ibadan, Nigeria, 54.1% [16].

$q = 1 - p$

p_2 = prevalence of the elderly who are overweight in a rural area from a previous study that was carried out in Ilaro, Nigeria at 28.6% [13].

2 = design effect

$$\text{Minimum sample size} = \frac{2 (1.96 + 0.84)^2 \times [0.541(1-0.541) + 0.286(1-0.286)]}{(0.541-0.286)^2}$$

$$= 109.12$$

$$= 109 \text{ in each LGA}$$

The minimum sample size for both LGAs was 218 elderly.

Sampling Technique

Sampling for Quantitative Data Collection

The study participants were selected using a multi-stage sampling technique.

Stage 1

Selection of Urban and Rural LGAs

From the two LGAs that were predominantly urban in Plateau state, one of them (Jos South) was purposively selected to serve as the urban LGA where the study was carried out. This was because of the safety of my research assistants due to the crises and peculiarities of Plateau state in terms of security challenges. A list of all rural LGAs in Plateau State was collected from the National Population Commission (NPOPc); Mangu LGA was purposively selected to serve as the rural LGA. The Mangu Local Government Area was intentionally selected as the rural area for this study due to its predominantly rural characteristics, including dispersed settlements, limited access to health services, and a largely agricultural population. The area is representative of typical rural settings where infrastructure challenges, low socioeconomic status, and limited access to health and nutrition interventions can influence health outcomes. Furthermore, selecting the Mangu Local Government Area allows for a comprehensive assessment of the study variables within a rural context, providing valuable insights into the effectiveness and implementation of interventions in underserved communities.

Stage 2

Selection of Wards

A list of all the 20 wards (APPENDIX 1) in the Jos South LGA was obtained from NPOPc. Serial numbers were assigned to the wards on the list in alphabetical order, and simple random sampling using a computer-generated table of random numbers was used to select two wards, Du B and Gyel A, for the study. Selection of the rural wards for the study was also carried out by a simple random sampling technique, using a table of random numbers consisting of a list of the 20 wards (APPENDIX 1), Mangu LGA. Two wards from Mangu LGA, namely Gindiri 2 and Chanso, were selected to serve as the rural wards.

Stage 3

Selection of the Elderly in Households

The cluster sampling technique was used to select the elderly in the selected wards. With the help of a community guide, the centre of the ward was located, where the ward was divided into four quadrants. A computer-generated table of random numbers was used to select one of the quadrants from which to start the data collection. After the selection of one quadrant, a pen was spanned to obtain the direction to begin data collection. If a household was sampled and the elderly person there did not meet the eligibility criteria, then the next household was sampled.

Sampling for Qualitative Data Collection

The elderly in the communities were purposively selected by a Community Health Extension Worker (CHEW) who was familiar with the eligible elderly in the communities. The CHEW had spent at least six months in the communities, which ensured familiarity with the elderly and commanded respect. This helped to accelerate access to the eligible elderly in the communities; eligibility criteria included them being strong enough to get to the FGD site, having fairly good hearing and eyesight, being expressive, and able to speak either Hausa for those in the rural communities or English fluently for the urban communities.

Qualitative Data Collection

This was used to assess the factors that are associated with nutrition in the elderly, such as social support from family members, friends, and the community, dietary habits, and food choices. This was conducted to further corroborate factors that were associated with the nutritional status of the elderly in urban and rural communities of Plateau State. A pro forma was used to obtain the socio-demographics of the elderly who participated in the FGD. This was used to present the results of the qualitative data.

Sampling procedure: A total of eight FGDs were conducted, four in the rural area and four in the urban area, each consisting of 10 elderly people per FGD group. The elderly were disaggregated by gender and level of education; those with no formal education, Qur'anic education, and primary school education were grouped, while those with secondary and tertiary education were in the same FGD. Below are the groups for the FGD; Four in the urban and four in the rural LGAs.

Group 1: Male elderly with secondary school education and above

Group 2: Male elderly with a level of education less than secondary school education

Group 3: Female elderly with secondary education and above

Group 4: Female elderly with a level of education less than secondary school education

Data Collection Technique for FGD: Seats were provided and arranged in a circular fashion, and the discussion was held in a serene and quiet environment chosen by the participants. In the rural area, the discussion with the male participants took place in the town hall at Gindiri and Chanso, while for the females, it took place in one of the houses of the eldest woman in both categories. Also, for the urban area, the female group FGD took place in an open space behind the health facility, while the male discussion took place in the ward health committee chairman's house. Each of the discussions lasted for averagely 45 minutes, which ensured optimum concentration of the participants. Small, squared cardboard papers were numbered one to ten and given at random to the participants, who

were served as a form of identification that was used to identify them instead of their names. Verbal informed consent was obtained from all the participants because the session was recorded, and the procedure of the discussion was explained to the participants before the discussion started.

A moderator, tape recorder, and note-taker were stationed appropriately. The researcher moderated the session and ensured uniformity of the method of content delivery and accuracy of the recording of the responses. Introductions were made, and participants were informed that the discussion was being audio-recorded and that some pictures were taken during the discussion. The participants raised their hands when responding to the questions that were asked and stated their numbers when responding. Questions were asked, and the researcher ensured that not less than 70% - 80% of the participants responded before moving to the next question. The researcher also ensured that monosyllabic responses were probed further. Dominance of a particular participant was avoided by politely acknowledging the participant while encouraging others to voice their opinion as well. The predetermined questions were asked clearly, and efforts were made to ensure that all participants gave their opinion on all the questions. The note-taker documented the gestures and facial expressions of the participants while responding. Responses were recorded and written in a notebook concurrently during the discussion. The FGD guide was translated into Hausa from English and vice versa by a linguist who is proficient in both languages to ensure that the content of the guide was maintained.

Data Management

Quantitative data

Data collected had the responses appropriately coded, entered into a spreadsheet i.e., Microsoft Excel software and cleaned. Thereafter, the data were exported to IBM Statistical Products and Services Solution (SPSS) version 23.0 for analysis.

Qualitative data

Data was recorded using a voice recorder, and a scribe wrote down the responses of the FGD participants.

Quantitative Data Analysis

Factors associated with malnutrition for both groups were presented using frequency tables and proportions. A two-sample chi-square was used to determine the significant factors that are associated with malnutrition in the elderly. Logistic regression was used to

determine the predictors of the nutritional status among the statistically significant factors, and $p \leq 0.05$ was considered statistically significant. The findings of the FGD were used to further corroborate the quantitative findings.

Ethical Consideration

Ethical approval was obtained from the Human Research Committee of the University Hospital of Jos (JUTH), and written informed consent was obtained from all participants prior to data collection.

Results

Table 1
Factors associated with malnutrition in the rural elderly

Factors	Nutritional status based on BMI		χ^2	p-value	OR (95%CI)
	Malnutrition	Normal			
Age in years					
60-74	45(55.6)	36(44.4)	0.201	0.884	0.938(0.394-2.323)
75 & above	16(57.1)	12(42.9)			
Sex					
Male	33(50.0)	33(50.0)	2.414	0.120	0.536(0.243-1.182)
Female	28(65.1)	13(34.9)			
Marital status					
Married	45(57.7)	33(42.3)	0.333	0.564	1.278(0.554-2.948)
Widow/widower	16(51.6)	15(48.4)			
Number of children					
1-4	9(60.0)	6(40.0)	0.115	0.735	1.212(0.399-3.677)
5 and above	31(55.3)	19(44.7)			
Employment status					
Employed	4(33.3)	8(66.7)	0.126	0.090	0.351(0.099-1.245)
Non employed	57(58.8)	40(41.2)			
Pension					
Yes	7(70.0)	3(30.0)	0.508	0.348	1.944(0.475-7.958)
No	54(54.5)	45(45.5)			
Have financial support					
Yes	45(64.3)	25(35.7)	5.498	0.019*	2.588(1.158-5.781)
No	16(41.0)	23(59.0)			
Medical condition					
Present	51(54.8)	42(45.2)	0.325	0.569	0.729(0.245-2.170)
Absent	10(62.5)	69(37.5)			

From the table 1 above, personal factors such as age, marital status, and sex were not statistically significant factors associated with the nutritional status of the elderly in the rural community. There was a statistically significant association between nutritional status and children/others helping with expenses ($p = 0.019$).

Association between socio-demographics and Nutritional status (Urban)

Table 2
Factors associated with malnutrition in the urban group

Factors	Nutritional status		χ^2	p-value	OR (95%CI)
	Malnutrition	Normal			
Age in years					
60-74	53(69.7)	23(30.3)	0.101	0.751	1.152(0.481-2.760)
75 & above	22(66.7)	11(33.3)			
Sex					
Male	33(71.7)	13(28.3)	0.319	0.572	1.269(0.554-2.906)
Female	42(66.7)	21(33.3)			
Marital status					
Married	48(77.4)	14(22.6)	4.969	0.026*	2.540(1.108-5.824)
Widow/widower	27(57.4)	20(42.6)			
Number of children					
1-4	16(64.0)	9(34.0)	0.349	0.555	0.753(0.294-1.031)
5 & above	59(70.2)	25(39.8)			
Employment status					
Employed	12(75.0)	4(25.0)	0.335	0.563	1.429(0.425-4.801)
Non employed	63(67.7)	30(32.3)			
Pension					
Yes	17(73.9)	6(26.1)	0.354	0.552	1.368(0.486-3.848)
No	58(67.4)	28(32.6)			
Have financial support					
Yes	46(69.7)	20(30.3)	0.06	0.804	1.110(0.486-2.536)
No	29(67.4)	14(32.6)			
Medical condition					
Present	61(81.3)	29(85.3)	0.255	0.614	0.751(0.247-2.286)
Absent	14(18.7)	5(14.7)			

*Statistically significant

From Table 2 above, the youngest group among the elderly had the highest proportion of malnourished subject 53 (69.7%). More females had a normal nutritional status 21

(61.8%) in comparison to the males (13, 38.2%). The only factor that was statistically associated with nutritional status was marital status ($p = 0.03$).

Qualitative Data Analysis

Summary of the findings

Table 3
The summary of the findings of the FGD is in the table below.

Themes	Sub-themes
Definition of the elderly	Retirement from service
	The number of years they have spent on earth
	Inability to function as they used to before
	Their way of life
Experience concerning changing roles	Mixed feelings
	Non-participation in fun activities like before
	Inability to function like before
Sources of support for the elderly	Children
	Relatives and neighbours
	Religious groups
	Government
Food choices for the elderly	Liquids
	Depends on their state of health
	In line with the culture of the community
	Anything they get due to finances
Concerns about nutritional status	Financial support
	Deteriorating health
Suggestions about ways to improve the nutritional status of the elderly	Eating more fruits and vegetables
	Home Gardening
	Creating a home for the elderly
	Allowances for the elderly
Social support	Friends
	Formal associations
Sources of income for the elderly	Pension
	Religious groups

Themes	Sub-themes
	Self-effort
	Children

From Table 3 above, the themes and sub-themes are as follows:

Theme 1: Ways the elderly are defined

Subtheme 1: Number of years the individual had spent on earth

The majority of the participants from both rural and urban communities thought that an elderly person can be defined or known by the number of years he/she had spent on earth, although some of the ages quoted by some of the respondents were incorrect for defining the elderly, as supported by the following comments below;

“They are defined by the number of years they have lived and by their physical structure. They are looked at in terms of their age group; some of them are older, while some are younger. Some have grey hair, but in this present generation, some young children have grey hair”. **(62years, urban setting, male with tertiary education)**

“Our definition here is anyone who’s from the age of 55 years. He or she has special respect from...We can’t do anything without the cooperation or input of the old person. They are given special respect in our community”. **(80 years, rural setting, male with secondary education)**

“They are defined by their age, which is 50 years and above, and also according to the number of children the person has. Some marry very early and have big children, so when the little ones see the number of children they have and their age, they will call them old, while the one that marries late will be defined as young, although he is old”. **(60 years, urban setting, female with secondary education)**

Subtheme 2: Inability to carry out activities like they used to

A few of the participants said the elderly can be defined by a decline in activities, as evidenced by the responses below;

“Mama, even though sick, old age also plays a vital role in her inability to do much for herself. She finds it difficult to do so many things. However, she is being helped. Mama is hard-working and loves to work on the farm, but as it is now, Mama cannot do much on the farm. When she was strong, she used to work a lot; you see her sweeping all these

places, but now, with the illness and age, she can't do all of that, and even if she does, she can only do a little". (62 years, rural setting, female with secondary education)

"Old age is when a person reaches a certain age that he cannot do things by himself successfully. Such individuals need assistance from people around". (68 years, urban setting, female with primary education)

Subtheme 3: Retirement from service

A few of the participants mentioned that the elderly can be defined from the perspective of retirement from service. Such as;

"Just like they have said, I see old age from the retirement perspective. When a person reaches retirement age, he/she is old, that's why the person is retiring. Whether you're strong or healthy, your age has tagged you as an old person". (68 years, rural setting, female with tertiary education)

"The people we refer to as old people are those who are aged and are retired, tired, and just at home, but people like us are elders. Someone who is referred to as an old person is very aged and has reached the age of 100 and above". (65 years, rural setting, male with primary education)

Subtheme 4: Way of life

More of the participants from the urban communities said that the elderly can be defined by the way they live and give counsel to the younger ones.

"They are recognised by their way of life or behaviour. They behave maturely, and they serve as advisers to the upgrowing ones". (66 years, urban setting, female with primary education)

"A person who can give the information of our ancestors to the present generation for forward translation is what we mean by an average old man. We recorded many things from them that their ancestors left for them. They now give it to us to inherit". (67 years, urban setting, male with secondary education)

Theme 2: Sources of support for the elderly

The majority of the participants mentioned that sources of physical and financial support are from their children, relatives, neighbours, religious affiliations, and the government through pension. Below are some of the responses

Subtheme 1: Children

“Children that are old enough and have a means of livelihood always support their elderly physically and financially.

As regards physical support, my children are helping me. For instance, there was a time my children took me to the hospital when I was not feeling well. They also support me financially”. (78 years, rural setting, male with secondary education)

“The children support me physically and financially. They send me fertilizers, chemicals, and money to support my farm project”. (65 years, rural setting, male with primary education)

“Sometimes, our daughters can support us with one thing or another from time to time, unlike sons, who may not even support us; they don’t even think of our needs for them to support you”. (68 years, urban setting, male with primary education)

Subtheme 2: Relatives and neighbours

Relatives and neighbours have also supported the elderly, especially those that do not have children or have children that are not close to where they live.

“Relatives give support, the community too gives support. The community comes in the instance where your children are probably not around or available to run errands for you; you can easily call a neighbour’s child to help with errands. At times, they go the extra mile by cooking for the aged. Playing with the children also gives us emotional support”. (68 years, rural setting, female with secondary education).

“Some of us have our relatives and children to support us, even though they also are not finding things easy from their own end; however, they are making efforts to reach out to us in their own little ways. God provides for them. They won’t refuse supporting us if they have, and in life, we’ll not always have it the way we would want it to be, but a times it's not like we don't have, but we just don't like or enjoy what we have, but they try their best”. (86 years, rural setting, female with primary education)

“I am a pensioner, that is how I get my financial support. Also, some of my brothers from the city send me financial support too because my children are still students”. (65 years, rural setting, male with tertiary education)

Subtheme 3: Religious groups

A few of the elderly say they get financial and emotional support from their religious organizations.

"I am a retired clergyman; I get a little help from the church and also from individuals. Members, from time to time, visit and give us some tokens. I, for example, do some little farming for me not to be stranded, and life continues". **(66 years, urban setting, male with tertiary education)**

"They support us in the fellowship, for instance, the Women's Fellowship organizes visitations; special visits to help the aged amongst them. They at times get a house help to help the aged and the children pay for the services rendered". **(70 years, rural setting, female with secondary education)**

Discussion

The findings of this study highlight distinct socio-economic determinants of malnutrition among elderly populations in rural and urban communities of Plateau State, Nigeria. While age and sex did not significantly influence nutritional status in either setting, marital status emerged as a critical predictor in urban areas, whereas financial support from children or relatives was pivotal in rural communities. These results underscore the interplay of cultural, economic, and social dynamics in shaping nutritional outcomes among the elderly, reinforcing the need for context-specific interventions.

The association between marital status and nutritional status in urban areas aligns with studies from Southwest Nigeria and India, where single or widowed elderly individuals exhibited higher risks of malnutrition due to reduced social and emotional support [16, 18]. A spouse often provides companionship, encourages regular meal patterns, and shares responsibilities related to food preparation, which may enhance dietary diversity and intake [16, 23]. Conversely, widowhood or singlehood may exacerbate social isolation, leading to poor appetite and neglect of nutritional needs [18, 24]. However, this contrasts with some studies in which unmarried elderly people received greater support from children or neighbours, thereby improving their access to food [25]. The urban context of Plateau State, characterized by nuclear family structures and the migration of younger generations, may limit the availability of extended familial support for unmarried elderly people, amplifying their vulnerability. This finding calls for targeted social programs, such as community kitchens or peer support networks, to address the nutritional gaps among urban elderly living without spouses.

The study found that in rural areas, financial support from children or relatives was significantly associated with malnutrition, albeit inversely. Counterintuitively, the elderly receiving financial aid exhibited poorer nutritional status. This mirrors findings from South Africa, where financial assistance was often diverted to non-food needs, such as healthcare, debt repayment, or ceremonial obligations [28]. Rural communities in Plateau State face entrenched poverty, and remittances from migrant children may be insufficient

to cover both food and non-food expenses. Additionally, cultural practices, such as prioritizing communal obligations over individual dietary needs, might further compromise food allocation. This paradox underscores the need for holistic interventions that not only enhance economic support but also educate caregivers on prioritizing nutritional investments. Government-led initiatives, such as conditional cash transfers tied to food purchases or subsidized meal programs, could mitigate this issue.

Notably, factors like employment status, pension access, and medical conditions did not significantly correlate with malnutrition in either setting. This contrasts with studies where unemployment and chronic diseases exacerbated malnutrition [26, 27]. In Plateau State, subsistence farming in rural areas and informal sector engagement in urban settings may provide elderly individuals with alternative food sources or income streams, buffering against unemployment's impact. Similarly, the universality of poor healthcare access across both groups may have diluted the observed effect of medical conditions. These findings highlight the complex interaction of local socioeconomic structures and health systems in modulating nutritional risks.

The qualitative insights revealed that the elderly in rural areas heavily rely on communal support systems, while urban participants emphasized individualism and retirement-defined identities. Rural respondents associated ageing with physical decline and dependency, whereas urban elderly linked it to social roles (e.g., advisors). These cultural perceptions shape dietary practices: rural elderly prioritized traditional diets aligned with local produce, while urban participants' food choices were constrained by cost and accessibility. Such differences necessitate culturally sensitive nutrition education programs that respect traditional practices while promoting affordable, nutrient-dense alternatives.

This study illuminates the divergent socio-economic drivers of malnutrition among elderly populations in rural and urban Plateau State. By addressing marital support gaps in urban settings and optimizing financial aid utilization in rural areas, policymakers can foster healthier ageing trajectories. A multi-sectoral approach, integrating health, agriculture, and social welfare, is essential to mitigate malnutrition and uphold the dignity of Nigeria's growing elderly population.

Policy Implications

Rural Areas: Strengthen agricultural initiatives to enhance food security, coupled with financial literacy programs to optimize the use of remittances for nutritional needs.

Urban Areas: Develop community-based support systems for unmarried elderly, including meal delivery services and social engagement platforms.

Cross-Cutting Measures: Advocate for government policies to create youth employment opportunities, ensuring sustainable familial support for the elderly. Pension schemes should be expanded and adjusted for inflation to bolster elderly independence.

Limitations and Future Directions

This study's cross-sectional design limits causal inferences, and the sample size, though adequate, may not fully represent Plateau State's ethnic diversity. Self-reported data on financial support and marital status could introduce recall bias. Future longitudinal studies could explore temporal trends in malnutrition determinants, while mixed-methods research should delve deeper into cultural norms influencing food allocation and caregiving practices. Comparative studies across diverse Nigerian states could further elucidate regional disparities.

Declarations

Ethical Considerations

Ethical approval for this study was obtained from the Human Research Committee of the University Hospital of Jos (JUTH) (Reference No. JUTH/DCS/REC/127/XXXI/2223). And the Clinical trial number: not applicable. Permission to conduct the study was also obtained from the local government presidents of Jos South and Mangu.

The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before their inclusion in the study. Participant confidentiality was guaranteed, and their right to decline participation or withdraw from the study at any time without consequence was fully respected.

Consent to Publish declaration

not applicable.

Availability of data and materials

The datasets used and/or analyzed during this study are available upon reasonable request from the corresponding author.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

J.M.D and L.N.O performed data analysis and produced the results, and J.G drafted the manuscript. E.N has been involved in critically revising the manuscript for important intellectual content. I.I, V.N.B.F, M.S, E.O.N, and M.B contributed to the interpretation of the results and revision of the manuscript. All authors read and approved the final manuscript

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