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Unizik Journal of Educational Research and Policy Studies VOL.22 (1); ***July-December, 2026*** https://unijerps.org
2023 Impact Factor: **6.834;** 2022 ***Impact Factor***: 5.156; ***2021 Impact Factor: 5.641;***
2020 Impact Factor: 5.355. *Indexing and Impact Factor URL: http://sjifactor.com/passport.php?id=21363*

ANALYZING DEMOGRAPHICS, SOCIOECONOMICS AND BODY MASS INDEX TRENDS AMONG RESIDENTS OF AN AGRO-RURAL SETTLEMENT, SOUTH EAST NIGERIA

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ABSTRACT

The escalating prevalence of obesity and related metabolic disorders in rural and agro-based settlements presents significant public health challenges. This study investigates the complex interplay of demographics, socioeconomic factors, physical activity, meal patterns, and Body Mass Index (BMI) trends among residents of Isi-Uzo, South East Nigeria, aiming to bridge existing knowledge gaps and inform targeted health interventions. A community-based cross-sectional survey was conducted on a representative sample of 400 respondents of ages above or equal to 35 in the five towns making up Isi-Uzo in Enugu State, Nigeria. Data collection lasted for 2 months and involved a structured questionnaire and anthropometric measurements. The study revealed intriguing demographic and socioeconomic patterns, with gender, age, education, occupation, and income influencing health outcomes. Physical activity, primarily through farming, emerged as a crucial determinant of BMI, highlighting the importance of regular exercise for healthy weight management. Dietary habits showed a predominance of plant-based diets and high soft drink consumption, emphasizing the need for nutritional interventions. Notably, the study identified associations between exercise frequency, duration, intensity, and BMI outcomes, underscoring the role of diverse and moderate-intensity exercise in promoting optimal BMI. Despite no significant differences, meal frequency correlated with a normal BMI, suggesting the need for further exploration of dietary patterns. ***Conclusion:*** *This study contributes to a nuanced understanding of health dynamics in agro-rural settlements, informing evidence-based interventions tailored to the unique needs of the Isi-Uzo population and advancing rural health discourse in Nigeria and beyond.*

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Keywords: Demographics, Socioeconomics, Physical activity, Meal patterns, Body Mass Index

Introduction

The global burden of non-communicable diseases (NCDs) has witnessed a marked increase, with obesity and related metabolic disorders emerging as significant public health challenges. Nigeria, like many other countries, grapples with the escalating prevalence of obesity, particularly in rural and agro-based settlements (World Health Organization, 2000; Ijoma et al., 2019). Against this backdrop, understanding the intricate relationships between demographics, socioeconomic factors, physical activity, meal patterns, and Body Mass Index (BMI) becomes imperative for designing targeted interventions that address the unique health dynamics of such communities. Although increasing attention has been given to how demographic characteristics, socioeconomic status, physical activity, dietary habits, and Body Mass Index (BMI) influence health outcomes, there remains a significant gap in understanding how these factors interact within agro-rural communities, particularly in areas such as Isi-Uzo Local Government Area of Enugu State in South-East Nigeria.

While previous research has extensively explored these determinants in various contexts (Ijoma et al., 2019; Chukwuonye et al., 2022), there is a scarcity of comprehensive studies focusing on the intricate connections and unique dynamics of these factors within the specific agro-rural landscape of our study area. This gap hinders the development of targeted health interventions that are tailored to the distinct needs and challenges of this community, potentially leading to ineffective or generalized approaches that may not address the root causes of health disparities in such settings. Therefore, understanding the nuanced relationships between demographics, socioeconomic factors, physical activity, meal patterns, and BMI in the Isi-Uzo population is crucial for bridging this existing gap and informing context-specific health strategies.

Rural environments are characterized by distinct sociodemographic and economic characteristics that influence health outcomes. In spite of persistent constraints, including inadequate healthcare services and poor infrastructure, these communities frequently exhibit distinctive cultural practices and lifestyle patterns that significantly influence their health-related behaviors.(Adetunji et al., 2019; National Population Commission, 2019). Consequently, conducting a comprehensive assessment in the selected study area is expected to generate important evidence on the health patterns of agro-rural communities and enhance understanding of the complex factors that influence health outcomes in such settings.

Population characteristics such as age, sex, and household structure significantly influence the overall health profile of a community (Adetunji et al., 2019). In the case of our study area, a thorough exploration of age, gender distribution, educational attainment, and occupational profiles will provide a foundation for understanding the diverse sociodemographic composition of the community. These demographic insights are essential for tailoring health interventions that are sensitive to the unique needs and challenges of specific age groups

or occupational categories within the studied population.

Socioeconomic standing plays a major role in determining health outcomes, as it affects individuals' ability to obtain essential resources, utilize healthcare services, and adopt healthy lifestyle practices. Given the agro-rural context of our study area, an examination of income levels, employment patterns, and educational backgrounds will shed light on the socioeconomic disparities that may contribute to variations in health outcomes. Identifying socioeconomic determinants is crucial for developing targeted interventions that address the root causes of health inequalities within the community(Adetunji et al., 2019).

Engagement in regular physical activity is an essential lifestyle component that contributes substantially to general health and overall well-being (Ayogu, Ezeh, & Udenta, 2022; Chukwuonye et al., 2022). In a rural environment such as Isi-Uzo, opportunities for physical activity may be shaped by both enabling and limiting factors, including the nature of occupational tasks and the availability of recreational infrastructure. Examining how often, how long, and how intensely residents participate in physical activity can yield important information on how exercise influences the development or prevention of obesity-related health conditions.

Meal patterns are integral components of dietary habits, and they contribute significantly to the nutritional status of individuals (Ijoma et al., 2019; Ayogu, Ezeh and Udenta, 2022). In our study area, where traditional dietary practices may coexist with modern influences, understanding the frequency and composition of daily meals is essential. An examination of prevalent food preferences, cooking practices, and the cultural meanings attached to dietary patterns will support the design of nutrition interventions that are culturally appropriate and responsive to the unique needs of the community.

Body Mass Index (BMI) is an important measure of nutritional health and is strongly associated with the likelihood of developing numerous health conditions (World Health Organization, 2000; Amugsi, Dimbuene, & Kyobutungi, 2019). Investigating the prevalence of BMI and its correlation with physical activity and meal patterns within the Isi-Uzo population will provide a comprehensive understanding of the obesity landscape in this agro-rural settlement. Understanding BMI patterns is essential for formulating focused public health initiatives that address and reduce obesity-related health risks.

This research seeks to fill an important gap in knowledge regarding health patterns in agro-rural communities, with particular attention to the selected study area. By examining demographics, socioeconomic factors, physical activity, meal patterns, and BMI trends, this research endeavors to unravel the complex interplay of factors shaping the health of residents in this unique context. The results are anticipated to guide the development of culturally appropriate, evidence-based interventions tailored to the local context, while also enriching the wider understanding of rural health issues in Nigeria and comparable settings.

Research Method

Study area

Isi-Uzo Local Government Area in Enugu State forms a key part of the Enugu East Senatorial Zone, spanning approximately 877 km² with an estimated population of

148,415 as recorded in the 2006 census. Geographically, it is located at 6°43'50.38" N latitude and 7°41'34.58" E longitude. The area shares boundaries with Udenu Local Government Area to the north, Benue State to the northeast, Ebonyi State to the east, Enugu East Local Government Area to the south, and Nsukka Local Government Area to the west. The community is predominantly occupied by farmers and traders (Nnamonu et al., 2018; 2019).

Study Design

This study employed a community-based cross-sectional survey design, targeting a representative sample of 400 individuals aged 35 years and above from the five towns of Isi-Uzo: Eha-Amufu, Neke, Umualor, Ikem, and Mbu. Data collection was conducted over a two-month period with several research team members actively engaged in the field. Two methods were utilized: a structured questionnaire survey and anthropometric assessments. Trained personnel carried out the anthropometric measurements at the respondents' homes using standardized equipment. Questionnaires were administered directly to participants, completed on the spot, and collected immediately. The anthropometric data were used to calculate Body Mass Index (BMI), which was classified into four categories: Underweight (<18.5 kg/m²), Normal (18.5–24.9 kg/m²), Overweight (25.0–29.9 kg/m²), and Obese (30.0–34.9 kg/m²) (Anumudu et al., 2023).

Determination of body mass index (BMI)

Body Mass Index (BMI) is a widely used measure that relates an individual's weight to their height and serves as a standard method for classifying underweight, overweight, and obesity in adults. BMI is calculated by dividing weight in kilograms by the square of height in meters (kg/m²) (World Health Organization, 2000).
BMI = weight (kg)/height (m^2)

Study Population and Sample Size

The total population of the five communities was 217,952. From this population, a sample of 400 adults was selected using a random sampling technique. The sample size was determined based on the formula by Kasiulevicius, Sapoka, and Filipaviciūte (2006):
$n = N1+ N e^2$ (Where n = sample size, N = population size, e = level of precision, 0.05).

where (n) represents the sample size, (N) is the population size, and (e) is the margin of error (set at 0.05). The number of participants recruited from each community was proportional to their population size as reported by the National Population Commission: Eha-Amufu (74), Ikem (51), Mbu (94), Neke (81), and Umualor (100).

Informed Consent

All adult residents of the five communities in Isi-Uzo Local Government Area, Enugu State, were eligible for participation. Recruitment was facilitated through community leaders. Participants were fully informed about the study's objectives, and confidentiality was assured. Written informed consent was obtained from each participant prior to data collection.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics, including frequencies and percentages, were used to summarize the findings. Anthropometric

measurements were employed to calculate BMI and categorized according to WHO standards into underweight, normal weight, overweight, and obese (World Health Organization, 2000). Associations between participants' BMI and their exercise habits and meal patterns were assessed using the chi-square test.

Results

Demographic characteristics of study participants in Isi-Uzo Local Government Area

The demographic details of respondents from Isi-Uzo Local Government Area are outlined in Table 1. The study involved 400 participants, with females representing a larger share of the sample (237, 59.3%). Umualor community contributed the highest number of respondents (100, 25.0%). A significant proportion of participants were aged over 60 years (163, 40.8%), indicating a predominantly older study population. In terms of educational background, primary education was the most common level attained (137, 34.3%), followed by a notable group of individuals who had not received any formal education (115, 28.8%).

Table 1. Demographic characteristics of study participants in Isi-Uzo Local Government Area

Demographic Indices	Variables	Frequency	Percentage (%)
Gender	Male	163	40.8
	Female	237	59.3
Community	Eha-Amufu	74	18.5
	Ikem	51	12.8
	Mbu	94	23.5
	Neke	81	20.3
	Umualor	100	25.0
Educational Status	None	115	28.8
	Primary level	137	34.3
	Secondary level	90	22.5
	Tertiary level	58	14.5
Age (Years)	20 – 40	91	22.8
	41 – 60	146	36.5
	> 60	163	40.8
Total		**400**	**100.0**

Socioeconomic characteristics of study participants in Isi-Uzo Local Government Area

The results of socioeconomic characteristics of the participants (Table 2) implicated farming (243, 60.8%) as the main occupation, followed by trading (52, 13.0%). The income level per month of the majority of the participants was between ₦10,000 and ₦25,000 (144, 36.0%), while individuals who earned less than ₦10,000 monthly were second placed (117, 29.3%). The major means of transportation for the participants was trekking (294, 73.5%) with only a few using bus or car as means of commuting to and fro work (19, 4.8%). Daily feeding was thrice (3 times) for a greater preponderant of the participants (336, 84.0%) as conventional, while 25 (6.3%) of the participants reported feeding 4 times daily.

Table 2. Socioeconomic characteristics of study participants in Isi-Uzo Local Government Area

Socioeconomic Indices	Variables	Frequency	Percentage (%)
Occupation	None	4	1.0
	Farming	243	60.8
	Trading	52	13.0
	Artisan	33	8.3
	Teaching	27	6.8
	Civil service	41	10.3
Monthly Income	None	12	3.0
	≤ ₦10,000	117	29.3
	₦10,001 – ₦25,000	144	36.0
	₦25,001 – ₦50,000	80	20.0
	₦50,001 – ₦75,000	25	6.3
	₦75,001 – ₦100,000	18	4.5
	₦100,001 – ₦150,000	3	8.0
	> ₦150,000	1	0.3
Means of Commuting to Work	Bus/car	19	4.8
	Motorcycle	87	21.8
	Trekking	294	73.5
Number of Daily Meals	Once	7	1.8
	Twice	32	8.0
	Thrice	336	84.0
	4 times	25	6.3

Physical activities of the study participants in Isi-Uzo Local Government Area

The findings from the physical activities assessment of the study participants are presented in Table 3. Most of the respondents attested that they use farming to substitute exercise or physical activity (220, 55.0%), followed by individuals who reported that they also brisk-walk (154, 38.5%), and do periodic jogging (91, 22.5%). Weight-lifting and footballing were the least physical activity or exercises among the participants (2, 0.5%). Most of the participants affirmed they engaged in exercise at least 2 or 3 times weekly (198, 49.5%), lasted for almost 30 minutes per exercise (162, 40.5%), and were of vigorous intensity (208, 52.0%).

Table 3. Exercise/physical activities of study participants in Isi-Uzo Local Government Area

Exercise/Physical Activity	Variables	Frequency	Percentage (%)
Type of Exercise	Jogging	91	22.8
	Running	65	16.3
	Brisk walk	154	38.5
	Weight-lifting	2	0.5
	Farming	220	55.0
	Football	2	0.5
	Swimming	18	4.5
Frequency of Weekly Exercise	None	13	3.3

	Once	74	18.5
	2 – 3 times	198	49.5
	4 – 5 times	64	16.0
	6 – 7 times	51	12.8
Duration of Exercise	None	12	3.0
	5 – 10 minutes	63	15.8
	11 – 20 minutes	68	17.0
	21 – 30 minutes	162	40.5
	> 30 minutes	95	23.8
Intensity of Exercise	None	1	0.3
	Light intensity	59	14.8
	Moderate intensity	130	32.5
	Vigorous	208	52.0
	Highly vigorous	2	0.5

All data are presented in terms of frequencies and corresponding percentages (%).

Dietary consumption of study participants in Isi-Uzo Local Government Area

Table 4 shows the meal pattern or dietary consumption of the study participants in the study area. It was observed that their diets intakes were similar for the majority of the participants with an overwhelming proportion (> 90.0%) of them feeding on cereals, legumes, tubers, roots, meat, fish, and snacks. The participants are mostly good vegetarians too (≥ 83.8%), but mostly fruits (384, 96.0%); only about half of them (213, 53.3) take nuts. Intake of drinks by the participants mainly soft drinks (293, 73.3%), followed by local drinks prepared with cereal, legumes nuts, and milk (225, 56.3%), and alcoholic drinks (189, 47.3%). Only 12 (3.0%) of the participants reported that their only drink intake was water.

Table 4. Dietary consumption of study participants in Isi-Uzo Local Government Area

Dietary Consumption	Variables	Frequency	Percentage (%)
Diets Intake	Cereals	391	97.8
	Legumes	378	94.5
	Tubers/Roots	394	98.5
	Meat/Fish	390	97.5
	Milk products	350	87.5
	Baked products	355	88.8
	Fried products	305	76.3
	Roasted products	356	89.0
	Snacks	396	99.0
Fruits/Vegetable Intake	Vegetables	335	83.8
	Fruits	384	96.0
	Fresh/Dried nuts	213	53.3
	Fruits/Vegetables	362	90.5
Drinks Intake	Soft drinks	293	73.3
	Alcoholic drinks	189	47.3
	Natural fruit/vegetable juice	165	41.3
	Fruit/vegetable juice	86	21.5

	Cereal/legumes/nut/milk drinks	225	56.3
	None of the above-water	12	3.0

All data are presented in terms of frequencies and corresponding percentages (%).

Morphometric Characteristics of study participants in Isi-Uzo Local Government Area

Table 5 shows the mean variations of the morphometric characteristics of the study participants according to gender. It was observed that male participants' mean weight (63.33 ± 0.84 kg) and height (1.65 ± 0.01 m) were significantly higher (p < 0.0001) than their female counterparts. However, their body mass index (BMI) did not vary significantly when compared between males and females (p = 0.229).

Table 5. Mean variations of morphometric characteristics of study participants in Isi-Uzo Local Government Area according to gender

Morphometric Indices	Gender	Mean ± SE	*t*	*p*-value
Weight (kg)	Male	63.33 ± 0.84	4.673	< 0.0001
	Female	58.22 ± 0.70		
Height (m)	Male	1.65 ± 0.01	8.280	< 0.0001
	Female	1.59 ± 0.00		
Body Mass Index (kg/m^2)	Male	23.37 ± 0.28	1.206	0.229
	Female	22.92 ± 0.24		

[1]Values are reported as mean ± standard error (SE).
[2]Differences in mean values between variables were statistically significant (p < 0.0001) as determined using Student's *t*-test.

Prevalence of body mass index among the study population according to frequency, duration and intensity of exercise, and daily meals

There was a statistically significant variation in body mass index (BMI) prevalence among residents of Isi-Uzo Local Government Area based on the frequency of weekly physical activity (p < 0.0001) as shown in Table 6. Individuals who did not participate in weekly exercise recorded the highest proportion of overweight and obesity (5, 38.5%). In contrast, participants who engaged in physical activity at least once per week (54, 73.0%) and those who exercised six to seven times weekly (30, 58.8%) showed a greater proportion of normal BMI.

Similarly, BMI distribution differed significantly according to exercise duration (p < 0.0001), as presented in Table 7. Residents who reported no exercise duration exhibited a higher prevalence of both overweight and obesity (5, 41.7%). Conversely, normal BMI was more common among individuals who exercised for longer periods, particularly those who reported engaging in physical activity on multiple occasions and for durations exceeding 30 minutes.

The prevalence differences of body mass index according to intensity were highly significant (p < 0.0001). Residents with no intense exercise had more prevalence of overweight individuals (1, 100.0%), while light (34, 57.6%), moderate

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(86, 66.2%) and vigorous (144, 69.2%) intensity exercise revealed the normal body mass index to be more prevalent (Table 8). Also, underweight body mass index was more prevalent among residents with vigorous-intensity exercise (2, 100.0%).

The findings presented in Table 9 indicate that the distribution of body mass index (BMI) among residents of Isi-Uzo Local Government Area did not vary significantly with the number of meals consumed per day (p = 0.159).

Table 6. Prevalence of Body mass index among the studied population in Isi-Uzo Local Government Area according to the frequency of weekly exercise

Frequency of Weekly Exercise	Total Examined	Body Mass Index	Prevalence (%)
None	12	Underweight	1 (7.7)
		Normal	2 (15.4)
		Overweight	5 (38.5)
		Obese	5 (38.5)
Once	74	Underweight	8 (10.8)
		Normal	54 (73.0)
		Overweight	8 (10.8)
		Obese	4 (5.4)
2 – 3 times	198	Underweight	11 (5.6)
		Normal	143 (72.2)
		Overweight	41 (20.7)
		Obese	3 (1.5)
4 – 5 times	64	Underweight	3 (4.7)
		Normal	35 (54.7)
		Overweight	25 (39.1)
		Obese	1 (1.6)
6 – 7 times	51	Underweight	5 (9.8)
		Normal	30 (58.8)
		Overweight	15 (29.4)
		Obese	1 (2.0)
		χ^2 = 75.336, *df* = 12, *p* < 0.0001	

[1]Data are presented as frequencies with percentages shown in parentheses.
[2]A statistically significant difference in prevalence was observed (p < 0.0001) based on the Chi-square (χ^2) test.

Table 7. Prevalence of body mass index among the studied population in Isi-Uzo Local Government Area according to the duration of exercise

Duration of Exercise	Total Examined	Body Mass Index	Prevalence (%)
None	12	Underweight	1 (8.3)
		Normal	1 (8.3)
		Overweight	5 (41.7)

		Obese	5 (41.7)
5 – 10 minutes	63	Underweight	5 (7.9)
		Normal	47 (74.6)
		Overweight	9 (14.3)
		Obese	2 (3.2)
11 – 20 minutes	68	Underweight	10 (14.7)
		Normal	46 (67.6)
		Overweight	10 (14.7)
		Obese	2 (2.9)
21 – 30 minutes	162	Underweight	6 (3.7)
		Normal	113 (69.8)
		Overweight	43 (26.5)
		Obese	0 (0.0)
> 30 minutes	95	Underweight	6 (6.3)
		Normal	57 (60.0)
		Overweight	27 (28.4)
		Obese	5 (5.3)
		χ^2 = 80.455, *df* = 12, *p* < 0.0001	

[1]Values are presented as counts accompanied by their corresponding percentages in parentheses.
[2]The prevalence rates differed significantly ($p < 0.0001$) according to the Chi-square (χ^2) test.

Table 8. Prevalence of body mass index among the studied population in Isi-Uzo Local Government Area according to intensity of exercise

Intensity of Exercise	Total Examined	Body Mass Index	Prevalence (%)
None	1	Underweight	0 (0.0)
		Normal	0 (0.0)
		Overweight	0 (0.0)
		Obese	1 (100.0)
Light Intensity	59	Underweight	4 (6.8)
		Normal	34 (57.6)
		Overweight	13 (22.0)
		Obese	8 (13.6)
Moderate Intensity	130	Underweight	7 (5.4)
		Normal	86 (66.2)
		Overweight	36 (27.7)
		Obese	1 (0.8)
Vigorous Intensity	208	Underweight	15 (7.2)
		Normal	144 (69.2)
		Overweight	45 (21.6)
		Obese	4 (1.9)

Highly Vigorous	2	Underweight	2 (100.0)
		Normal	0 (0.0)
		Overweight	0 (0.0)
		Obese	0 (0.0)
		χ^2 = 78.241, *df* = 12, *p* < 0.0001	

[1]Values are presented as counts accompanied by their corresponding percentages in parentheses.
[2]The prevalence rates differed significantly ($p < 0.0001$) according to the Chi-square (χ^2) test.

Table 9. Prevalence of body mass index among the studied population in Isi-Uzo Local Government Area according to the number of daily meals

Number of Daily Meals	Total Examined	Body Mass Index	Prevalence (%)
Once	7	Underweight	1 (14.3)
		Normal	6 (85.7)
		Overweight	0 (0.0)
		Obese	0 (0.0)
Twice	32	Underweight	6 (18.8)
		Normal	18 (56.2)
		Overweight	7 (21.9)
		Obese	1 (3.1)
Thrice	336	Underweight	20 (6.0)
		Normal	220 (65.5)
		Overweight	83 (24.7)
		Obese	13 (3.9)
4 times	25	Underweight	1 (4.0)
		Normal	20 (80.0)
		Overweight	4 (16.0)
		Obese	0 (0.0)
		χ^2 = 13.070, *df* = 9, *p* = 0.159	

[1]Data are reported as frequencies with their respective percentages provided in parentheses.
[2]No statistically significant difference in prevalence was detected ($p > 0.05$) based on the Chi-square (χ^2) test.

Discussion

The demographic characteristics of participants from Isi-Uzo Local Government Area showed several notable patterns. Among the 400 participants, a significant majority were females, constituting 59.3% of the sample. This aligns with previous findings that have highlighted variations in health outcomes based on gender (Nnamonu et al., 2019). The higher representation of females in the study may have implications for health interventions, as it suggests a potential gender-specific focus in addressing health disparities within the community. Moreover, the dominance of elderly individuals (> 60 years) in the Umualor community (25.0%) underscores the importance of considering age-specific

health needs, consistent with the emphasis on demographics shaping health landscapes. Furthermore, the preponderance of participants with primary education (34.3%) and those with no formal education (28.8%) reflects a potential association between educational levels and health status, as established in the literature on socioeconomic determinants of health (Ijoma et al., 2019; Ayogu, Ezeh and Udenta, 2022; Chukwuonye et al., 2022). The implications of these demographic characteristics underscore the necessity for tailored health interventions that account for gender, age, and educational disparities within the Isi-Uzo population, ultimately contributing to more effective and equitable public health strategies.

The socioeconomic attributes of the study participants in Isi-Uzo Local Government Area exhibited clear patterns that help provide a broader understanding of the community's health profile. A substantial proportion of participants identified farming as their primary occupation (60.8%), aligning with the agro-rural nature of the area (Nnamonu et al., 2019). This finding supports the notion that occupational patterns in rural settings are often intertwined with lifestyle choices, potentially influencing health behaviors and outcomes (Ijoma et al., 2019; Nnamonu et al., 2019). Additionally, the dominance of farming as an occupation may correlate with the reported income levels, with the majority earning between N10,000 and N25,000 monthly (36.0%). The socioeconomic implications are evident, as individuals engaged in farming may face unique challenges related to income, access to resources, and healthcare. The prevalence of trekking as the primary means of transportation (73.5%) underscores the limited accessibility to other modes of commuting, potentially impacting physical activity levels and health outcomes, consistent with previous research on the rural environment (Akokuwebe and Idemudia, 2022). Moreover, the observed meal patterns, with a substantial majority reporting thrice-daily feeding (84.0%), align with the cultural and dietary practices of the community (Ijoma et al., 2019; Akokuwebe and Idemudia, 2022; Ayogu, Ezeh and Udenta, 2022; Chukwuonye et al., 2022; Anumudu, Nnamonu and Onyeke, 2023). The observed socioeconomic patterns underscore the complex relationships among occupation, income level, transportation practices, and dietary behaviour. These dynamics point to the importance of designing context-specific health interventions that respond to the distinctive needs and circumstances of the Isi-Uzo population, thereby enhancing the effectiveness of public health programmes.

The patterns of physical activity reported by participants further provide valuable insight into exercise behaviours within this predominantly agro-rural community. A significant proportion of respondents identified farming as a substitute for exercise or physical activity (55.0%), aligning with the predominant occupation in the area (Nnamonu et al., 2019). This finding resonates with the socioeconomic characteristics previously highlighted, emphasizing the intertwining of occupation and lifestyle choices in rural settings (Ijoma et al., 2019; Akokuwebe and Idemudia, 2022). The prevalence of brisk walking (38.5%) and periodic jogging (22.5%) as additional forms of physical activity reflects a blend of traditional and more structured exercise practices within the community. The relatively lower engagement in weight-lifting and footballing (0.5%) may be attributed to the occupational

demands of farming, where physical exertion is inherent. The reported frequency, duration, and intensity of exercise align with the cultural and lifestyle context, with a majority engaging at least 2 or 3 times weekly, lasting almost 30 minutes per session, and described as of vigorous intensity. These exercise patterns reinforce the complex relationship between occupation, lifestyle, and physical activity in rural environments, emphasizing the need for health interventions that integrate and respect the existing cultural and occupational practices of the Isi-Uzo population. Additionally, the findings underscore the potential for leveraging existing activities, such as farming, to promote health and well-being within the community.

The meal patterns and dietary habits of study participants in the designated area, revealed noteworthy trends that align with previous research (Akokuwebe and Idemudia, 2022). The majority of participants exhibited a homogenous dietary intake, with over 90.0% consuming cereals, legumes, tubers, roots, meat, fish, and snacks. Furthermore, a substantial proportion identified as good vegetarians, emphasizing a prevalent inclination towards plant-based diets. The disproportionately high fruit consumption (96.0%) contrasts with the less frequent inclusion of nuts in their diets (53.3%). This observed pattern could be influenced by cultural and geographical factors impacting food availability and preferences. The dominance of soft drinks (73.3%) as the primary beverage, followed by locally prepared drinks with cereals, legumes, nuts, and milk (56.3%), and alcoholic drinks (47.3%) resonates with previous findings on beverage preferences in the region (Ijoma et al., 2019; Nnamonu et al., 2019). The low incidence of water as the sole beverage choice (3.0%) underscores a prevalent reliance on commercially available beverages over water, a trend that has been documented in similar studies (Amugsi, Dimbuene and Kyobutungi, 2019; Osunkwo et al., 2021). These results carry important public health implications, indicating the need for focused nutritional strategies to mitigate deficiencies linked to low nut consumption and to address the health effects of high soft drink intake.

The morphometric traits of participants in Isi-Uzo Local Government Area were examined with respect to gender. The findings revealed significant gender-based variations in mean weight and height, with male participants exhibiting higher values (weight: 63.33 ± 0.84 kg; height: 1.65 ± 0.01 m) compared to their female counterparts. This aligns with prior research highlighting gender disparities in anthropometric measurements (Anumudu et al., 2023). Notably, although weight and height differed significantly between males and females, body mass index (BMI) showed no significant variation ($p = 0.229$), indicating a possible compensatory effect in BMI that balances these differences. The implications of these findings underscore the importance of considering gender-specific variations in anthropometric measurements for a comprehensive understanding of the population's health status and nutritional needs, which can inform targeted health interventions.

The distribution of body mass index (BMI) among residents of Isi-Uzo Local Government Area varied significantly according to the frequency of weekly exercise. Overweight and obesity were more common among individuals who did not engage in regular exercise (38.5%), whereas

participants who exercised at least once weekly (73.0%) or six to seven times per week (58.8%) were more likely to have a normal BMI. This aligns with the established association between regular physical activity and healthier BMI outcomes, as documented in previous research (Adeloye et al., 2021; Osunkwo et al., 2021; Tekalegn, 2021). The observed trend indicates that insufficient physical activity may be associated with increased prevalence of overweight and obesity among the participants. The implications of these findings emphasize the crucial role of regular physical activity in maintaining a healthy BMI and underscore the need for targeted interventions promoting exercise for overall health improvement in the Isi-Uzo Local Government Area.

The prevalence of body mass index (BMI) among residents of Isi-Uzo Local Government Area differed significantly based on exercise duration. Participants who did not engage in any structured exercise showed a higher occurrence of overweight and obesity (41.7%), while those who took part in at least five exercise sessions, including sessions longer than 30 minutes, were more likely to have a normal BMI. These findings are consistent with earlier studies demonstrating a link between exercise duration and BMI outcomes (Ogunlade, Asafa, & Ogunlade, 2016). The higher prevalence of overweight and obesity among inactive individuals highlights the health risks of a sedentary lifestyle and underscores the importance of regular physical activity, even in shorter sessions, for weight control and overall health improvement in this population.

In addition, BMI prevalence also varied markedly with exercise intensity, showing highly significant differences across the community. Residents who did not engage in intense exercise exhibited a higher prevalence of overweight individuals (100.0%), whereas those involved in light (57.6%), moderate (66.2%), and vigorous (69.2%) intensity exercise demonstrated a greater prevalence of normal BMI. Notably, underweight BMI was more prevalent among residents with vigorous-intensity exercise (100.0%). These findings align with established associations between exercise intensity and BMI outcomes, as highlighted in previous studies (Amugsi, Dimbuene and Kyobutungi, 2019; Adeloye et al., 2021; Osunkwo et al., 2021; Tekalegn, 2021). The greater occurrence of normal BMI among participants performing light, moderate, and vigorous exercise highlights the beneficial role of engaging in activities of varying intensities for effective weight management. However, the unexpected prevalence of underweight BMI in residents with vigorous-intensity exercise warrants further investigation into potential factors such as inadequate caloric intake or excessive energy expenditure. These findings highlight the need to encourage regular, varied, and moderate-intensity physical activity to support healthy BMI levels in the Isi-Uzo Local Government Area.

The distribution of body mass index (BMI) among residents of Isi-Uzo Local Government Area, analyzed according to the number of daily meals, showed no significant variation in prevalence. Despite the lack of statistical significance, the findings show that a normal BMI was more prevalent among residents regardless of the number of daily meals. This contrasts with earlier research emphasizing the impact of meal frequency on BMI outcomes (Ijoma et al., 2019). The absence of significant differences may be attributed to cultural or regional factors influencing dietary habits and the specific focus on BMI without

considering the quality and composition of daily meals. The implications of these findings highlight the need for a more comprehensive examination of dietary patterns, considering not only meal frequency but also the nutritional content of each meal. Further investigation into cultural and contextual factors influencing dietary choices is warranted to better understand the observed pattern in the Isi-Uzo Local Government Area.

Conclusion

Valued insights into the complex interplay of determinants shaping the health landscape of agro-rural settlements is offered in this study. The findings underscore the significance of gender, age, education, occupation, income, transportation, dietary habits, and exercise behaviors in influencing health outcomes within the community. Particularly noteworthy are the associations between regular physical activity and healthier BMI outcomes, as well as the potential impact of dietary patterns on nutritional status. These insights are crucial for informing evidence-based interventions focused to the precise needs and challenges of the Isi-Uzo population, ultimately contributing to more effective and equitable public health strategies. By addressing the identified gaps in knowledge and understanding, this research sets a foundation for targeted interventions meant for promoting health and well-being in agro-rural settings, thereby advancing the broader discourse on rural health in Nigeria and beyond.

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