Health-related Quality of Life and Anthropometric Indices in Hypertensive Patients in a Nigerian community – A Cross-Sectional Study

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ABSTRACT.

Background: Health related quality of life (HRQoL) can be negatively affected by hypertension (HTN) and its complications and by poor anthropometric indices in an individual. Evidence abounds of positive correlation between anthropometric indicators and both systolic and diastolic blood pressure. Hypertensive patients with poor anthropometric indices are at higher risk of poorer HRQoL. **Objectives**: This study aimed to determine the health-related quality of life (HRQOL), and anthropometric indices among hypertensive patients in Nnewi, Anambra State, Nigeria. **Materials and Methods**: This was a cross-sectional study design conducted among 132 adults (67.4% female) attending cardiology outpatient clinics in Nnewi. The anthropometric parameters were obtained through a routine measure, and the Short Form 12-item questionnaire was used to obtain data on HRQOL. Data was analyzed using the Statistical Package for Social Sciences (SPSS v. 26). The descriptive analysis included percentage, frequency, and mean standard deviation, while the Spearman rank order test and Mann-Whitney U tests were used to determine the correlation and influence respectively with alpha value set at 0.05. **Results**: The mean age of the participants was 68.92±9.43 years old. The results revealed low physical component scores, fairly good mental component scores, and that the majority (80.6%) were either overweight or obese. A significant negative correlation was observed between age and Physical component (PCS) ($p<0.001$). Participants who were employed recorded higher PCS ($p= <0.001$) especially Teachers ($P= 0.002$). **Conclusion**: The participants had poor physical but relatively better mental HRQOL, with significant associations observed between anthropometric indices and HRQOL.

Keywords: Quality of life, essential hypertension, PCS scores, MCS scores, HRQOL.

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INTRODUCTION

Hypertension (HTN) poses a health concern, especially in countries, like Nigeria where its prevalence is on the rise.[1] Globally one billion adults, accounting for a quarter of the world's population, suffer from this condition and projections suggest this number may increase to 1.56 billion by 2025.[2] In Africa, estimates from the World Health Organization (WHO) indicate that 46% of adults aged 25 and older are expected to have hypertension, compared to 35-40% globally.[3] Within Nigeria, Southeast Nigeria exhibits the highest crude prevalence of hypertension, reported at 33.3%,[1] and an age-standardised prevalence of 52.8%.[4] In Nnewi particularly, hypertension's crude prevalence is reported at 16.40%.[5] Hypertension-related complications contribute significantly to sickness rates, deaths and healthcare cost in Nigeria and worldwide. Managing these complications often means doctor visits, hospital stays and long-term medications, which can be physically, emotionally and financially draining for those affected as well as their families. In Nigeria, hypertension care cost make up a significant proportion of overall healthcare expenses with estimates suggesting a notable future increase specifically linked to hypertension.[1]

The health-related quality of life (HRQOL) is a factor affected by HTN influenced not just by the condition itself but also, by the side effects of antihypertensive drugs.[6] Individuals diagnosed with hypertension often encounter healthcare needs and may experience a lower quality of life compared to those, with normal blood pressure (BP) levels. This can be attributed to factors, such as the long-term nature of the condition its adverse effects on emotional and social well-being and the challenges associated with medication management.[7-9] The side effects of blood pressure medications and the difficulties in adhering to recommended treatment protocols also play a role in diminishing quality of life.[10]

The link between being overweight and hypertension is widely recognized, with being overweight posing a risk for health issues like type 2 diabetes heart disease and sleep apnea.[11-12] Persons who are obese are also reportedly at significantly higher risks of developing HTN-related complications than those who are at a healthy weight.[13,14] Lifestyle changes such as adjusting diet and increasing physical activity have been proven effective in lowering BP among individuals with HTN.[15] Considering how closely linked obesity and hypertension are, it is essential to address both conditions for better health outcome.[16] This study aimed to determine the HRQOL and anthropometric indices among persons with essential hypertension in Nnewi, and to determine what inter-relationships may exist among these variables.

Materials and Methods

Study design: This cross-sectional survey was conducted among consenting community-dwelling adults attending cardiology outpatient clinics in purposively selected hospitals in Nnewi Anambra State, Nigeria, and included 132 adults of both genders aged 18 years or older. Six specialist clinics (a public out-patient cardiology clinic at the Nnamdi Azikiwe University teaching hospital (NAUTH) and five other specialist clinics) in Nnewi were purposively selected for the purpose of recruiting persons diagnosed with hypertension.

Sample size calculation

Sample size was estimated using G*power version 3.1.10. Test family was t-tests, a minimum sample size of 126 participants has a 90% power to detect a minimal difference at a small effect size of 0.28. Alpha was set at 0.05.[17]

Instruments for Data collection

The following instruments were used for the data collection:

- Andon BPM-Model: KD-595 automated BP monitor was used to measure blood pressure.
- Inelastic measuring tape was used to measure the waist and hip circumferences.
- A Locally Fabricated stadiometer was used to measure the height of the participants.
- Weight scale (China. Camry model:9820) was used to measure the participant's weight in kilograms (kg)
- A self-structured bio-data questionnaire
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- **The English version of the Short Form 12-item survey (Version 2)**
  This is one of the most popular tools for evaluating self-reported HRQOL.[18] The SF-12 is a significantly simplified form of the SF-36 that was created by Ware and colleagues by reducing the number of items from 36 to 12.[19] A Physical component score (PCS) and a Mental component score (MCS) are produced from the SF-12 [20] The PCS score is primarily influenced by responses to the General Health {GH}, Physical Functioning {PF}, Role Functioning (physical) {RP}, and Bodily Pain {BP} domains. In contrast, the MCS score is mostly influenced by responses to the Vitality {VT}, Role Functioning (emotional) {RE}, Mental Health {MH}, and Social Functioning {SF} domains.[21] The scores range from 0 to 100, with higher scores indicating better physical and mental health functions. A score of 50 or less on the PCS of the SF-12 has been recommended as a cut-off to determine a physical condition; while a score of 42 or less on the MCS of the SF-12 may be indicative of 'clinical depression.[22,23] For study participants, scores below or above 50 for PCS and 42 for MCS indicate a larger or lesser impact of hypertension on daily function compared to the standardised population. The SF-12 has been compared to the SF-36 in various patient groups, yielding similar scores but with larger standard errors. [24] Studies have also validated the SF-12 against the SF-36 in specific conditions like congestive heart failure and sleep apnea, showing consistent results.[25] Additionally, a European study confirmed a strong correlation between SF-12 and SF-36 component summaries, supporting the SF-12's utility for large-scale assessments.[26] The SF-12 has also demonstrated responsiveness to change over time, similar to the SF-36.

Procedure for data collection

Prior to the commencement of the data collection, ethical approval (NAUTH /CS/66/VOL.16/VER.3 /57/2023/039) was obtained from the Institutional Ethics Review Committee of Nnamdi Azikiwe University Teaching Hospital Nnewi, Anambra State. Written informed consent was also obtained from each participant after the purpose and procedure for the study were explained. The procedure followed a sequential order. Firstly, the participants were asked to rest for 3-5 minutes before the BP was measured using an automated BP monitor. Participants were seated in a relaxed position with their right arm resting on an arm support, positioned at heart level. The BP monitor was aligned with the participant's heart, and two readings were taken, with the average value computed.

Subsequently, body weight was measured using a bathroom weighing scale in kilograms. Participants stood on the scale barefoot with minimal clothing and hands by their sides. Height measurement followed, with participants standing erect and barefoot while the distance from the vertex of the scalp to the foot was recorded using a stadiometer, expressed in meters. Body mass index (BMI) was then calculated using the formula weight (kg) divided by height squared (m^2). BMI cut-offs were applied for classification: 18.5 to 24.9 kg/m^2 for normal, 25 to 29.9 kg/m^2 for overweight, and over 30 kg/m^2 for obesity. Also, the waist circumference was obtained using an inelastic tape while participants stood upright, arms hanging loosely at their sides, with the landmark being the lower border of the umbilicus. Hip circumference measurement followed, using an inelastic tape at the level of the greater trochanter and mid-buttock. The waist-to-hip ratio was calculated by dividing the waist circumference by the hip circumference. Finally, the two questionnaires were administered to the participants.

Inclusion and exclusion criteria

To be eligible, participants had to have received a HTN diagnosis from a healthcare professional within the last year or prior. Those who were attending the specialist clinics for other cardiovascular diseases other than HTN like Tetralogy of Fallot (TOF) were excluded. The study also excluded pregnant women, women within 12 weeks post-partum, and individuals with mobility-related impairments as reduced physical activity could potentially affect adiposity measures

Procedure for data analysis

The data was analysed using Statistical Package for Social Science version 26. Descriptive statistics of frequency, percentage, mean and standard deviation were used to summarize participants characteristics and their QoL scores. Spearman's rank order correlation was used to analyse the relationship between age, diagnosis duration, BP and some anthropometric parameters. Mann-Whitney U tests was to analyse the influence of gender, waist circumference and Waist-Hip ration on PCS and MCS. The Kruskal Wallis test was used to analyse the influence of BMI, employment status, and occupations on PCS and MCS.

RESULTS

Socio-demographic Profile of the Study Participants

This study included 132 individuals, with females constituting the majority at 67.4%. A significant proportion (43.9%) of the participants identified as self-employed, and 34.8% identified with the occupation of trading or businesses. Also, the majority (80.6%) of the respondents were classified as overweight or obese according to the data presented in Table 1.

Frequency of variables

A significant proportion (33.3%) of the participants reported known onset of hypertension of ≤ 4 years, and a normal systolic BP of <130mmHg. Majority recorded normal diastolic BP of <85mmHg (80.3%). poor Physical Component Scores (62.9%), and good Mental Component Scores (74.2%).
Table 1

Descriptive Statistics of Participants' Characteristics

The mean age of participants was 68.92±9.43 years, while the mean BMI, WC, WHR, SBP and DBP were 30.21±6.14; 102.41±13.24; 0.97±0.11; 134.93±22.46; 84.19±17.72 respectively. Mean PCS and MCS scores were 39.88±10.65 and 49.14±10.5 respectively (Table 2).

Relationship between Age, Diagnosis Duration, and Some Health Factors

Table 3 displays the correlation matrix, indicating relationships among age, diagnosis duration, blood pressure, BMI, waist circumference, waist-to-hip ratio, and health status measures for the study participants. Notably, a significant negative correlation was found between age and physical health status (PCS) (r=-0.336, p<0.001). Additionally, a significant positive correlation was observed between mean diastolic blood pressure (DBP) and both BMI (r=0.238, p=0.006) and waist circumference (WC) (r=0.216, p=0.013), and a moderate correlation was evident between WC and waist-to-hip ratio (WHR) (r=0.435, p<0.001) among individuals diagnosed with essential hypertension.

Analyses of the influence of the participants' socio-demographic characteristics on PCS and MCS.

No significant correlation was observed between participants' gender, WC, WHR, BMI and PCS and MCS scores (p ≥0.05). Although employment status significantly influenced PCS scores (p<0.001), as the employed and self-employed individuals reported higher mean ranks, there was no significant association between employment status and MCS scores among participants as shown in Tables 4 and 5. Similarly, a significant influence of occupation on PCS scores (p=0.002), with teachers recording the highest mean rank in the PCS domain, but no significant influence was observed on MCS scores.

Table 1 Participants' Profile, Physical Health and Mental Health Scores.

Variables	Class	Frequency	Percentage
Sex	Male	43	32.60
	Female	89	67.40
Employment Status	Employed	31	23.50
	Self Employed	58	43.90
	Unemployed	43	32.60
Occupation	Traders/Business men/women	46	34.80
	Civil Servants	21	15.90
	Retired	43	32.60
	Farmers	10	7.60
	Teachers	5	3.80
	Others	7	5.40
Body Mass Index	Normal weight	25	19.40
	Overweight	42	32.60
	Obese1	35	27.10
	Obese2	27	20.90
Known year (duration)	≤ 4years	44	33.30
	5- 9years	23	17.40
	10- 14years	33	25.00
	15- 19years	10	7.60
	20- 24years	11	8.30
	25- 29years	4	3.00
Systolic BP	Normal <130	60	45.50
	High normal 130-139	28	21.20
	Grade 1 hypertension 140-159	24	18.20
	Grade 2 hypertension 160 or above	20	15.20
Diastolic BP	Normal <85	83	62.90
	High normal 85-89	14	10.60
	Grade 1 hypertension 90-99	17	12.90
	Grade 2 100 0r above	18	13.60
PCS category	Good = above 50	26	19.70
	Poor = 50 or less	106	80.30
MCS category	Good = >42	98	74.20
	Poor = 42 or less	34	25.80

Table 2 Descriptive Statistics of Participants' Characteristics

Variables	Minimum	Maximum	Mean	Standard Deviation
Age	35	86	59.37	11.32
Year of diagnosis	1964	2023	2012.71	9.82
Weight	49	141	80.62	18.16
Height	1	2	1.63	0.09
BMI	19	56	30.21	6.14
Waist circumference	75	159	102.41	13.24
Hip circumference	51	162	106.41	13.60
Waist-to-Hip Ratio	1	2	0.97	0.11
Systolic Blood Pressure	85	205	134.93	22.46
Diastolic Blood Pressure	50	185	84.19	17.72
Physical Component of QoL	15.47	61.94	39.88	10.65
Mental Component of QoL	19.06	68.05	49.14	10.55

Table 3 Relationship among Age, Diagnosis Duration, QoL and Anthropometric Indices

Variable	Age	Known year	Mean SBP	Mean DBP	BMI	WC	WHR	PCS	MCS
Age		r=-0.287 P<0.001*	r=0.045 p=0.612	r=-0.169 p=0.053	r=-0.121 p=0.169	r=-0.153 p=0.080	r=0.084 p=0.336	r=-0.336* p<0.001	r=0.007 p=0.933
Known Year (duration)			r=-0.158 p=0.070	r=0.059 p=0.498	r=-0.066 p=0.450	r=-0.049 p=0.579	r=0.140 p=0.109	r=0.046 p=0.603	r=-0.120 p=0.171
Mean SBP				r=0.699* p<0.001	r=0.135 p=0.123	r=0.132 p=0.131	r=-0.014 p=0.873	r=0.003 p=0.969	r=0.083 p=0.343
Mean DPB					r=0.238* p=0.006	r=0.216* p=0.013	r=-0.017 p=0.844	r=-0.040 p=0.646	r=0.057 p=0.519
BMI						r=0.806* p<0.001	r=0.182* p=0.037	r=-0.035 p=0.689	r=-0.065 p=0.462
WC							r=0.435* P<0.001*	r=-0.033 p=0.709	r=-0.057 p=0.516
WHR								-0.099 0.258	-0.149 0.089
PCS									0.040 0.649

p=0.05

Table 4 Analyses of the association of the participants' socio-demographics characteristics with PCS and MCS.

Variable Pair	Class	Mean rank	U	P
Gender vs. PCS	Male	67.87	1811.500	1715.500
	Female	65.09		
Gender vs. MCS	Male	69.10	0.693	0.443
	Female	63.72		
WC vs. PCS	Healthy WC	63.22	1661.500	0.531
	Unhealthy WC	67.82		
WC vs. MCS	Healthy WC	69.72	1663.500	0.538
	Unhealthy WC	65.20		
WHR vs. PCS	Healthy WHR	71.52	1379.500	0.414
	Unhealthy WHR	65.02		
WHR vs. MCS	Healthy WHR	75.08	1272.500	0.162
	Unhealthy WHR	63.98		

p=0.05

Table 5 Kruskal Wallis test of the association of BMI with PCS and MCS

Variable	Class	Mean rank	K	P
BMI vs. PCS	Normal weight	64.20	1.939	0.358
	Overweight	73.50		
	Obesity	63.10		
BMI vs. MCS	Normal weight	65.60	0.379	0.836
	Overweight	69.50		
	Obesity	65.00		
Employment status vs. PCS	Employed	75.79	15.718**	<0.001
	Self-employed	75.61		
	Unemployed	47.51		
Employment status vs. MCS	Employed	72.31	1.009	0.604
	Self-employed	63.82		
	Unemployed	65.93		
Occupation vs. PCS	Trader/business	78.37	18.790**	0.002
	Civil servants	80.02		
	Retired	47.51		
	Farmers	62.05		
	Teachers	81.80		
	Others	60.00		
Occupation vs. MCS	Trader/business	63.43	6.240	0.284
	Civil servants	68.55		
	Retired	65.93		
	Farmers	56.55		
	Teachers	64.80		
	Others	99.43		

p=0.05

DISCUSSION

This study intended to determine the health-related quality of life, anthropometric indices and their associated factors among patients with HTN in Nnewi, Anambra State, Nigeria. A similar prevalence of HTN among females is seen in previous reports in most hospital-based studies on HTN.[27,28] With a mean age of 68.92±9.43 years, the observed high prevalence in females can be linked with the decline in estrogen production after the age of 40 years leading to arteriosclerosis.[29] The female preponderance (67.4%) in this study is in tandem with previous reports of more female attendees compared with their male counterparts in most hospital-based studies on HTN.[30-34]

However, this finding may not necessarily indicate a higher HTN prevalence but rather a greater inclination among women to attend clinics than men, and several reasons may be responsible for this observation. Firstly, within traditional African-Nigerian communities, males typically serve as the primary earners for their households, often resulting in limited time for hospital visits or follow-up appointments. Secondly, women tend to exhibit superior health-seeking behaviour concerning chronic illnesses compared to men.[35] Additionally, women may have a higher likelihood of having asymptomatic HTN identified through BP checks due to increased contact with healthcare facilities during their reproductive years.[33,34]

Contrary reports however have shown an equal prevalence of HTN among males and females,[36] while others have reported a higher prevalence of HTN in men than females,[37-39] multiple factors may contribute to the disparity in HTN prevalence between genders. Study design, biological sex differences and behavioural risk factors like smoking, alcohol consumption, and physical activity are potential explanations. Moreover, women display greater interest in healthcare services, frequently report their poor health, and potentially enjoy better overall health outcomes.[37,39]

To the best of the researchers' knowledge, no comprehensive comparative study has studied the gender prevalence of HTN among this population. To provide a more comprehensive understanding of gender prevalence in HTN among this population, future research should incorporate a larger sample size and employ diverse methodological approaches. One potential methodological approach to enhance the comparison of gender prevalence in HTN could involve conducting a longitudinal study that follows a large cohort of participants over an extended period. This would allow researchers to observe changes in blood pressure and HTN prevalence over time and assess any gender differences that may emerge. Additionally, employing standardized diagnostic criteria and measurement techniques, such as ambulatory BP monitoring or home BP monitoring may provide more accurate and reliable data compared to cross-sectional studies.

The demographic distribution of participants in this study is characteristic of an elderly population (mean of 68.92±9.43 years). This observation is in agreement with findings from most studies on HTN.[40-42] This could be explained by the fact that age is a non-modifiable risk factor for HTN and cardiovascular diseases.[42] The implication of this finding is that interventions and management strategies for hypertension may need to be tailored specifically for older adults, considering their unique risk profile and the increased likelihood of comorbidities associated with aging.

Several studies have demonstrated that advancing age is often associated with a decrease in overall quality of life, with individuals scoring lower in both physical and mental domains.[43,44] Surprisingly, participants of this study exhibited significantly lower mean scores for the PCS (39.88±10.65), indicating poorer physical health, while MCS scores were relatively higher (49.14±10.55), suggesting better mental well-being. This suggests that physical aspects of quality of life may be more negatively affected by ageing and hypertension compared to mental aspects. While studies have consistently established the age-related decline in both mental and physical function, it is imperative to note that the self-report means of data collection could have influenced these findings.

Consistent with prior research,[45-54] this study found a weak inverse relationship between age and PCS scores, indicating a decline in physical health with increasing age. The mean age of study participants falls within the retirement age, and the high percentage of unemployed and retired participants in this study, comprising almost one-third of the total population, may have contributed to this finding because advancing age often brings about declines in physical health, including chronic illnesses, reduced mobility, increased pain, functional limitations, age-related cognitive decline or neurodegenerative conditions that can further impact physical functioning and overall QoL and lifestyle changes associated with ageing, such as decreased physical activity levels and increased sedentary behaviour

There was no significant correlation between known year of diagnosis and either PCS or MCS scores of the participants. These findings are similar to reports by Shah et al,[6] but are contrary to reports from other studies suggesting a correlation between known duration of HTN and QoL.[48,55] The similarity with Shah et al.[6] could be due to comparable participant characteristics or methodologies, while the differences from other studies might be attributed to variations in sample populations, cultural contexts, or different measurement tools used to assess QoL. The implication of these findings is that the duration of hypertension may not be as critical a determinant of QoL as previously thought, suggesting that other factors such as management of the condition, lifestyle modifications, and comorbid conditions may play a more significant role. This could influence how healthcare providers assess and prioritize interventions aimed at improving QoL in hypertensive patients.

Furthermore, the results revealed a positive correlation between DBP and both BMI and WC, suggesting that as BMI increased, there was a corresponding rise in DBP and WC among participants. This aligns with the findings of a study by Zhang et al,[56] which similarly observed that individuals with higher BMI ($\geq$ 30 kg/m²) had elevated diastolic blood pressure compared to those with lower BMI. They also identified an increase of 1 mmHg in DBP for every 0.135 kg/m² increase in BMI.[56] Our results were consistent with those of Ortiz, Carrillo-Larco, and Miranda, who also noted a relationship between BMI and systolic BP.[57] Additionally, the study by Mungreiphy, Kapoor, and Sinha reported a stronger correlation between BMI and diastolic BP compared to systolic BP.[58] The implication of our findings is that BMI and WC are important indicators of cardiovascular risk, particularly through their influence on diastolic BP. This re-emphasizes the need for targeted interventions focusing on weight management to help control BP and reduce cardiovascular risk.

Moving on, the majority (80.6%) of participants in this study were either overweight or obese. Previous research utilizing the SF-12 or SF-36 survey has indicated that obese individuals often exhibit reduced physical HRQoL scores compared to non-obese individuals, while mental HRQoL scores may show insignificant differences.[59-61] Therefore, obesity could potentially account for the lower scores observed in the physical component of HRQoL.

There is limited research on the effect of obesity on HRQoL in hypertensive populations, with most studies focusing on the relationship between anthropometric indices and HRQoL among general community populations. The current study revealed no influence of the different anthropometric indices (BMI, WC, and WHR) on the PCS and MCS scores of HRQoL. A study by Arrospide et al on the effect of Obesity on HRQoL of Spanish adults has shown that HRQoL decreases with decreasing BMI.[62] Some studies among the general adult population have assessed the effect of BMI on HRQoL, confirming a significant negative correlation between BMI and HRQoL.[63,64] Physical health, but not mental health, has been reported to be more vulnerable to impairment with abdominal obesity, and the impairments varied between genders.[65] Further investigations are warranted to better understand this relationship.

Employment status and occupation can significantly influence various aspects of an individual's life, including income, social interactions, and access to resources. A significant association between employment status, occupation, and participants' PCS was observed indicating that whether being employed or unemployed, can affect physical health and functioning. This may be attributed to factors such as job demands, work-related stress, access to healthcare benefits, or socioeconomic conditions.

Here, employed and self-employed individuals demonstrated better PCS scores compared to those who were unemployed, with teachers exhibiting the highest PCS scores and retirees the lowest. This suggests that retirement may coincide with declines in physical activity performance. The study by Yao et al similarly noted that employment is linked to higher HRQoL in individuals with HTN.[66] Further, different occupations entail varying levels of physical demands, job stress, and exposure to job-specific hazards. The influence of occupation on PCS scores underscores that the nature of one's work can impact their physical health and overall quality of life. For instance, occupations requiring substantial physical exertion may result in higher levels of physical strain and potential health risks, thereby affecting PCS scores in individuals with HTN.

The study's reliance on self-reported data, such as information on quality of life, and known year of HTN could have introduced recall and response bias. Participants may inaccurately recall or report their experiences, leading to potential measurement errors. The study faces the challenge of accounting for confounding variables that could influence the outcomes of interest. Future studies may explore the impact of co-morbidities, socio-economic status, lifestyle factors, or medication interactions on quality of life and anthropometric indices mong persons with HTN.

CONCLUSION

In conclusion, the participants of this study were observed to have poor physical but relatively better mental HRQOL, with significant associations observed between anthropometric indices and HRQOL. These findings highlight the broader impact of emphasising weight management as a crucial component of improving physical HRQOL in this population. Healthcare providers can utilize these findings to prioritise interventions aimed at reducing BMI and WC, thereby potentially enhancing physical health outcomes and overall quality of life for patients**.**

List of Abbreviations

HTN: Hypertension, BP: Blood pressure, DBP: Diastolic Blood Pressure, SBP: Systolic Blood Pressure, QoL: Quality of life, HRQoL: Health-related quality of life, BMI: Body mass index, WC: Waist circumference, HC: Hip circumference, WHR: Waist-hip ratio, PCS: Physical component score, MCS: Mental component score

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Authors' contribution.

IAA, MFO, UMC and FAM conceptualized the study. ENA, IRV, SJO, and MFO facilitated the data collection. IAA, SJO and PON wrote the manuscript. UMC, PON and FAM analysed the data and prepared the tables. FAM supervised the study. All authors revised and approved the manuscript for publication.

Data availability

The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

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Conflict of interests

The authors declare no conflict of interest.

Ethical approval and consent to participants

Ethical approval was obtained from the Institutional Ethics Review Committee of Nnamdi Azikiwe University Teaching Hospital Nnewi, Anambra State (NAUTH/CS/66/VOL.16/VER.3/57/2023/039) before the commencement of this study, and written informed consent was obtained from each participant.

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