



RESEARCH

Open Access

ASSOCIATION BETWEEN HEALTH-PROMOTING LIFESTYLE PRACTICES AND BLOOD PRESSURE CONTROL AMONG ADULT HYPERTENSIVE PATIENTS ATTENDING A PRIMARY CARE CLINIC IN SOUTH-SOUTH, NIGERIA

Titil Precious-Ibiye Owen,* Alali Dan-Jumbo, Chinwe Tonye Atata, Famba Famba Daniel, Janny Ikurayeke

*Correspondence: Dr. Titil Owen;

Email: titi.owen@ust.edu.ng

Abstract

Background: Health-promoting lifestyle (HPL) behaviours play a crucial role in the prevention and management of chronic diseases such as hypertension. Although these associations have been extensively documented globally, evidence from Sub-Saharan Africa remains limited. This study investigated the association between health-promoting lifestyle practices and blood pressure (BP) control among hypertensive patients attending a tertiary health centre in South-South, Nigeria.

Methods: A cross-sectional study was conducted among 272 hypertensive patients selected through systematic sampling. A structured questionnaire was used to collect sociodemographic information, while a validated short form of *Health-Promoting Lifestyle Profile (HPLP) II* was adapted to assess five lifestyle domains. Blood pressure measurements were obtained using standard procedures, and BP <140/90 mmHg was classified as controlled. Logistic regression analysis was performed to examine associations, with a significance level set at $p < 0.05$.

Results: Poor nutrition (OR = 2.3, 95% CI: 1.3–4.1), poor health responsibility (OR = 3.1, 95% CI: 1.9–5.2), inadequate physical activity (OR = 7.1, 95% CI: 0.8–61.5), and low social engagement (OR = 2.4, 95% CI: 1.1–4.9) were significantly associated with uncontrolled blood pressure. Overall, 61.7% of participants with poor HPL practices had uncontrolled BP, compared to only 5.3% of those with good HPL practices.

Conclusion: Suboptimal health-promoting lifestyle practices are strongly associated with poor blood pressure control. Incorporating structured lifestyle modification interventions into routine hypertension management could substantially improve clinical outcomes and enhance patient quality of life.

Keywords: Health-Promoting Lifestyle (HPL), Hypertension, Nigeria

Cite as: Owen TP, Dan-Jumbo A, Atata CT, Famba FD, Ikurayeke J. Association between health-promoting lifestyle practices and blood pressure control among adult hypertensive attending a primary care clinic in south-south Nigeria. *AJRMHS*. 2026; 4(1):11-18

Introduction

The World Health Organization (WHO) recognized hypertension as a major global health concern in 2013.¹ Global efforts are ongoing to reduce the burden of high blood pressure, with targets set for a 25% reduction in hypertension prevalence and a 10%–30% reduction in contributing risk factors by 2025.¹ In Nigeria, a 2017 national survey reported an age-standardized prevalence of 38.1%, with regional variations across geopolitical zones. The prevalence increased with age, and males exhibited higher rates than females, influenced by cultural, dietary, and lifestyle factors.² Similarly, a multi-ethnic study conducted in Asia found a hypertension prevalence of 31.1%, varying by ethnicity, age, sex, educational level, marital status, occupational status, and household income.³

Hypertension remains a critical global public health challenge due to its high prevalence and strong association with cerebrovascular, cardiovascular, and chronic renal diseases.⁴ Despite extensive awareness and availability of treatment options, blood pressure control remains suboptimal among hypertensive patients worldwide. Both genetic and environmental factors contribute to this burden, with dietary and lifestyle variables exerting significant influence on blood pressure regulation.⁴

There is clear evidence linking lifestyle behaviours to blood pressure control among adults with hypertension. Studies have identified overweight and obesity, physical inactivity, excessive caffeine consumption, and unhealthy dietary patterns as key determinants of poor blood pressure control.^{5, 6} However, adopting and sustaining healthy lifestyle changes remain difficult due to environmental constraints, inadequate health education, poor health literacy, and varying cultural and ethnic perceptions of lifestyle modification.⁷

Understanding these contextual factors among the Nigerian hypertensive population is essential to improving clinical management, reducing treatment costs, and lowering hypertension-related morbidity and mortality. Therefore, this study aims to provide empirical evidence on the association between health-

promoting lifestyle practices and blood pressure control among adult hypertensive patients receiving care at the Family Medicine Clinic of the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Rivers State, Nigeria.

Materials and Method

This hospital-based, descriptive cross-sectional study was conducted over four months, from May to August 2022, at the Family Medicine Clinic of Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria. A total of 272 hypertensive patients were enrolled, with the sample size determined using the Leslie Kish formula.⁸ The calculation was based on a blood pressure control rate of 22.8% reported in a similar population,⁹ with a 95% confidence level and a 5% margin of error.

Participants were selected using a systematic sampling technique. With a sampling frame of 900 hypertensive patients, a sampling interval of three was derived. The first participant was chosen by simple random sampling (ballot method) from the first three eligible hypertensive patients. Subsequently, every third hypertensive patient who attended the clinic and consented to participate was recruited until the required sample size was achieved within the study period.

A structured interviewer-administered questionnaire was used to collect data on participants' sociodemographic characteristics. Blood pressure measurements were obtained following the Joint National Committee (JNC 7) guidelines. Blood pressure readings below 140/90 mmHg were classified as controlled.

Health-promoting lifestyle practices were assessed using a validated and modified version of the Health-Promoting Lifestyle

Results

The sociodemographic characteristics of the study participants are presented in Table I. Of the 272 respondents, 63.2% were female, while 36.8% were male. The mean age of participants was 55.5 ± 11.8 years, with the majority (53.3%) falling within the 40–59 years age group. Regarding educational attainment, 194 participants (71.3%) had at least a secondary-level education. In terms

of marital status, 176 participants (64.7%) were married, while only 18 (6.6%) were single.

Table I. Socio-demographic Distribution of Participants

Variable	Unit	Frequency (n=272)	Percent (%)
Age group (years)	<40	25	9.19
	40 – 59	145	53.31
	≥ 60	102	37.5
Sex	Male	100	36.76
	Female	172	63.24
Educational Qualification	No formal education / Primary	78	28.68
	Secondary /Tertiary	194	71.32
Marital status	Single	18	6.62
	Married	176	64.70
	Separated/Divorced		
	/Widowed	78	28.68

*Distribution is statistically significant ($p < 0.05$)

Figure 1 shows that of the 272 study participants, 115 (42.3%) had BP control (<140/90mmHg), and 157 (57.7%) did not have BP control (>140/90mmHg).

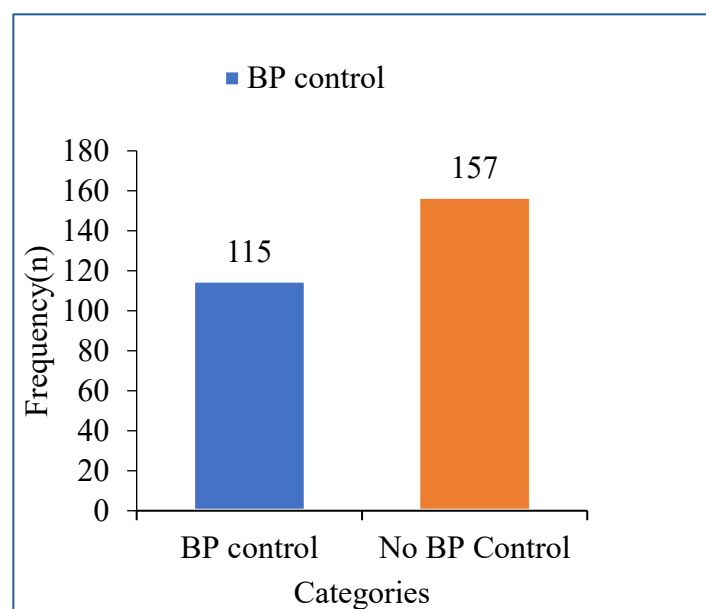


Figure 1: Proportion of adult hypertensive patients with adequate BP control

Figure 2 illustrates the distribution of good and poor scores across the various domains of the Health-Promoting Lifestyle (HPL), categorized according to Bloom's criteria (good $\geq 50\%$, poor $< 50\%$). Overall, the most commonly practiced HPL domains were social engagement and nutrition habits, while physical activity and relaxation habits were the least practiced. Among the 272 participants, 194 (71.3%) demonstrated good nutrition practices, whereas 78 (28.7%) had poor nutrition practices. Similarly, 143 (52.6%) exhibited good health behaviour practices, while 129 (47.4%) had poor health behaviour practices. In contrast, only 6 participants (2.2%) reported good physical activity practices, with the majority, 266 (97.8%), indicating poor physical activity engagement. Social engagement was relatively high, with 230 participants (84.6%) reporting good practices compared to 42 (15.4%) with poor practices. However, relaxation habits were generally poor, as only 25 participants (9.2%) demonstrated good relaxation practices, while 247 (90.8%) had poor relaxation habits.

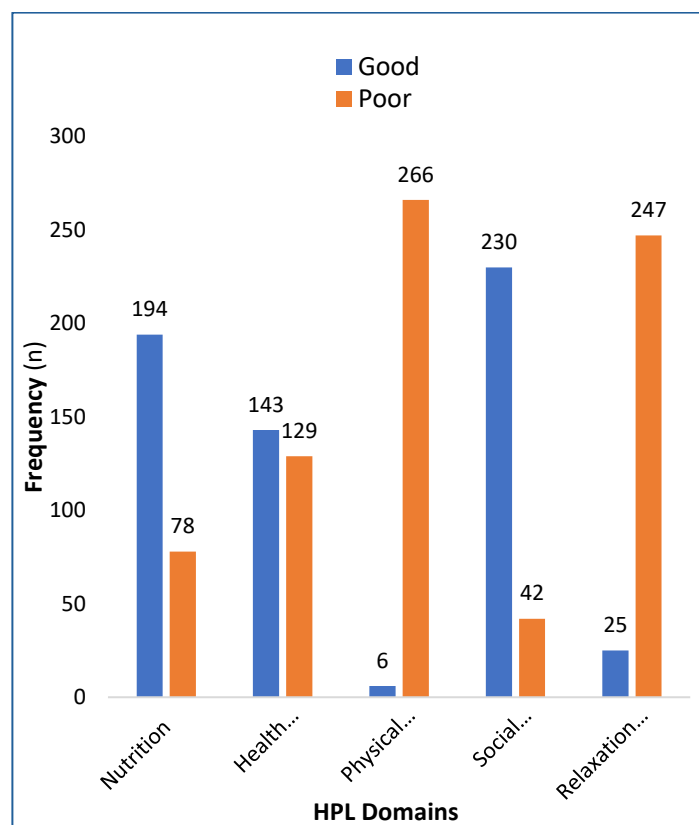


Figure 2: Distribution of HPL Categories

Table II presents the association between overall Health-Promoting Lifestyle (HPL) practices and blood pressure (BP) control among the study participants.

Among individuals with poor HPL, 3 (75.0%) had uncontrolled BP, while only 1 (25.0%) achieved BP control. In contrast, among those with moderate HPL, 153 (61.5%) had uncontrolled BP and 96 (38.6%) had controlled BP. Notably, participants with good HPL practices showed the best outcomes, with only 1 (5.3%) having uncontrolled BP, compared to 18 (94.7%) whose BP was controlled. Chi-square analysis revealed a statistically significant association between HPL and BP control ($p = 0.0001$). Uncontrolled blood pressure was significantly more prevalent among participants with poor HPL practices compared to those with moderate or good HPL scores.

Table II: Distribution of HPL and BP Control

HPL Category	BP Control		Total n, (%)	Chi-square (p-value)
	No n, (%)	Yes n, (%)		
Poor	3(75.00)	1(25.00)	4 (100.0)	23.30 (0.0001) *
Moderate	153(61.45)	96(38.55)	249 (100.0)	
Good	1(5.26)	18(94.74)	19 (100.0)	

*Distribution is statistically significant ($p < 0.05$)

Figure 3. showed that out of the 272 study participants, 249 (91.5%) had moderate HPL, 19 (7.0%) had good HPL, and 4 (1.5%) had poor HPL.

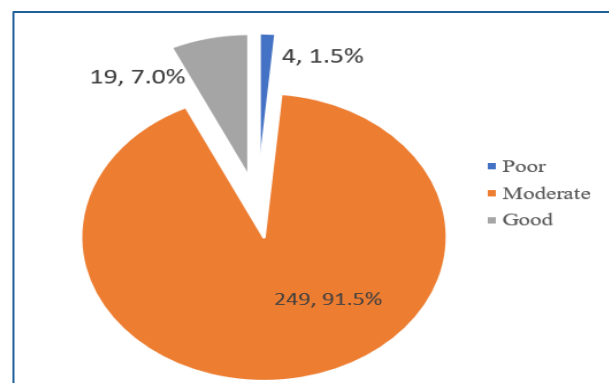


Figure 3: Health promotion classification

Table III presents the relationship between the various domains of the Health-Promoting Lifestyle (HPL) and blood pressure (BP) control among participants.

The data show that poor nutrition, poor health behaviour, poor physical activity, and low social engagement were significantly associated with uncontrolled BP. Among the 78 participants with poor nutritional practices, 56 (71.8%) had uncontrolled BP, whereas 22 (28.2%) achieved BP control. In contrast, among those with good nutritional practices, 101 (52.1%) had uncontrolled BP and 93 (47.9%) had controlled BP.

Similarly, among the 129 participants with poor health behaviour practices, 93 (72.1%) had uncontrolled BP, compared to 36 (27.9%) with controlled BP. Of those with good health behaviour practices, 64 (44.8%) had uncontrolled BP, while 79 (55.2%) had controlled BP. With respect to physical activity, 266 participants (97.8%) reported poor engagement, of whom 156 (58.6%) had uncontrolled BP and 110 (41.4%) had controlled BP. Conversely, among the six participants with good physical activity practices, only 1 (16.7%) had uncontrolled BP, while 5 (83.3%) had controlled BP.

Social engagement also showed a significant association with BP control. Among those with poor social engagement, 31 (73.8%) had uncontrolled BP, compared to 11 (26.2%) with controlled BP. Of the 230 participants with good social engagement practices, 126 (54.8%) had uncontrolled BP, while 104 (45.2%) had controlled BP. In the area of relaxation, 247 participants (90.8%) had poor relaxation practices, of whom 146 (59.1%) had uncontrolled BP and 101 (40.9%) had controlled BP. Among the 25 participants with good relaxation habits, 11 (44.0%) had uncontrolled BP, whereas 14 (56.0%) achieved BP control.

Overall, participants with poor HPL practices had a significantly higher rate of uncontrolled BP (156; 61.7%) compared to those with good HPL practices (1; 5.3% uncontrolled). Logistic regression analysis further revealed that participants with poor nutrition were 2.3 times more likely to have uncontrolled BP (95% CI: 1.3–4.1); those with poor health behaviours were 3.1 times more likely (95% CI: 1.9–5.2); those with poor physical activity were 7.1 times more likely (95% CI: 0.8–61.5); and those with

poor social engagement were 2.4 times more likely (95% CI: 1.1–4.9) to have uncontrolled BP.

Table III: Association of HPL Domains and BP Control

Unit	Uncontrolled BP (n= 157), %	Controlled BP (n=115), %	Total n=272 (%)	Chi-square (p-value)	Odds Ratio (95% C.I)
Nutrition					
Poor	56(71.8)	22(28.2)	78(100.0)	8.87 (0.003)*	2.3
Good	101(52.1)	93(47.9)	194(100.0)		(1.3 – 4.1)
Health Behaviour				20.7(<0.001)*	
Poor	93(72.1)	36(27.9)	129(100.0)		3.1
Good	64(44.8)	79(55.2)	143(100.0)		(1.9 – 5.2)
Physical Activity					
Poor	156(58.6)	110(41.4)	266(100.0)	4.23 (0.040)*	7.1
Good	1(16.7)	5(83.3)	6(100.0)		(0.8 – 61.5)
Social Engagement					
Poor	31(73.8)	11(26.2)	42(100.0)	5.26 (0.022)*	2.4
Good	126(54.8)	104(45.2)	230(100.0)		(1.1 – 4.9)
Relaxation score					
Poor	146(59.1)	101(40.9)	247(100.0)	2.12 (0.145)	1.8
Good	11(44.0)	14(56.0)	25(100.0)		(0.8 – 4.2)
Overall HPL					
Poor/Moderate	156(61.7)	97(38.3)	253(100.0)	23.03 (<0.001)*	38.9
Good	1(5.3)	18(94.7)	19(100.0)		(3.8 – 220)

*Statistically significant ($p < 0.05$)

Discussion

The findings of this study revealed a strong association between health-promoting lifestyle (HPL) practices and blood pressure (BP) control among hypertensive patients. Specifically, 75% of participants with poor HPL had uncontrolled BP, compared to 61% of those with moderate HPL and only 4.2% of those with good HPL. This association was statistically significant ($p = 0.0001$), indicating that individuals who adopt healthier lifestyle behaviours are more likely to achieve optimal BP control. These findings are consistent with previous studies that have reported significant correlations between health-promoting lifestyle behaviours and blood pressure control.^{7, 12}

The study also demonstrated that poor nutrition, inadequate health behaviours and limited social engagement significantly increased the likelihood of uncontrolled BP, with odds ratios ranging from 2.3 to 3.1. This aligns with

earlier reports identifying these factors as strong predictors of uncontrolled hypertension across diverse populations.¹³⁻¹⁶ The low levels of physical activity observed in this study may be attributed to rapid urbanization, growing insecurity, and the increasing prevalence of sedentary lifestyles in Nigeria.¹⁸ Physical inactivity has become a major modifiable risk factor for cardiovascular diseases, including hypertension. Recent studies have consistently emphasized the protective role of regular exercise in both the prevention and management of hypertension.¹⁹ The World Health Organization (WHO) recommends that national policies promoting physical activity should ensure equitable access to safe environments and infrastructure that encourage walking and cycling as non-motorized means of transport.²⁰ However, in Nigeria, most urban roadways lack pedestrian walkways and cycling lanes, compelling non-motorized

users to share roads with motor vehicles thus increasing accident risk and discouraging active commuting.²¹

Regarding the relaxation domain, only 25 participants demonstrated good relaxation practices, and among them, 56.0% achieved adequate BP control. Nevertheless, relaxation did not show a statistically significant association with BP control in this study, unlike other HPL domains. This finding aligns with previous evidence suggesting that relaxation techniques such as progressive muscle relaxation, deep breathing exercises, and mindfulness may contribute to modest short-term BP reductions. However, meta-analyses indicate that the methodological quality of existing studies is often limited, and long-term benefits remain inconsistent.²²

Overall, these findings underscore the critical role of lifestyle modification in hypertension management. Promoting healthy nutrition, regular physical activity, responsible health behaviours, and social engagement should be integral to patient education and routine clinical care for hypertensive individuals. Strengthening public health interventions and creating supportive environments that encourage sustained lifestyle changes will be key to improving BP control and reducing the burden of hypertension in Nigeria and similar settings.

Limitations of the Study

This study has some limitations. First, its cross-sectional design prevents determination of temporal or causal relationships between lifestyle practices and blood pressure control. Second, the hospital-based sample may limit generalizability to the broader hypertensive population in the community. Third, some lifestyle domains, particularly physical activity and poor HPL categories, had small subgroup sizes, which may have reduced statistical precision. Finally, lifestyle behaviours were self-reported and therefore subject to recall and social desirability

Conclusion

This study found a significant association between health-promoting lifestyle (HPL) practices and blood pressure (BP) control among hypertensive patients attending a tertiary health facility in Rivers State, Nigeria. Participants with poor nutrition, poor health behaviour, and low social

engagement were significantly more likely to have uncontrolled BP. Conversely, those who practiced good health-promoting behaviours demonstrated better BP control outcomes. These findings highlight the vital role of lifestyle modification in the prevention and management of hypertension within the Nigerian population.

Despite the availability of effective antihypertensive medications, BP control remains suboptimal among many patients, largely due to poor adherence to lifestyle recommendations. Integrating structured lifestyle education and behavioural counselling into routine hypertension care is therefore imperative.

Recommendations

Integration of Lifestyle Modification into Hypertension Care: Health facilities should incorporate comprehensive lifestyle counselling including nutrition education, physical activity promotion, and behaviour change communication into standard hypertension management protocols.

Community-Based Health Promotion: Public health authorities should implement community outreach programs emphasizing the benefits of healthy eating, regular exercise, reduced salt and alcohol consumption, and stress management.

Infrastructure and Policy Support: Government and urban planners should create safe environments that encourage physical activity, such as pedestrian walkways, parks, and recreational centres, while addressing security concerns that discourage outdoor exercise.

Patient Education and Follow-Up: Clinicians and nurses should reinforce continuous patient education and follow-up to improve health literacy, motivation, and adherence to lifestyle modification plans.

Further Research: Future studies should employ longitudinal designs to explore the causal effects of specific lifestyle interventions on blood pressure outcomes and assess the sustainability of behavioural changes over time.

Conflicts of Interest: The authors declare no conflict of interest

Ethical Approval: RSUTH/REC/2020012, 26 August 2020

Funding: The study was funded by the authors

Acknowledgement: We thank all staff of the Department of Family Medicine, Rivers State University Teaching Hospital, Port Harcourt, Barr. Owen O. Obediah, and Mr. Linus Ossai-Chidi for their assistance and cooperation.

List of Abbreviation

BP: Blood Pressure

CI: Confidence Interval

HPL: Health-Promoting Lifestyle

HPLP II: Health-Promoting Lifestyle Profile II

HPLQ: Health-Promoting Lifestyle Questionnaire

NSAIDs: Non-Steroidal Anti-Inflammatory Drugs

OR: Odds Ratio

RSUTH: Rivers State University Teaching Hospital

SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

References

1. Modey Amoah E, Esinam Okai D, Manu A, Laar A, Akamah J, Torpey K. The Role of Lifestyle Factors in Controlling Blood Pressure among Hypertensive Patients in Two Health Facilities in Urban Ghana: A Cross-Sectional Study. *International Journal of Hypertension*. 2020 Sep 7;2020:1–8.
2. Odili AN, Chori BS, Danladi B, Nwakile PC, Okoye IC, Abdullahi U, et al. Prevalence, Awareness, Treatment and Control of Hypertension in Nigeria: Data from a Nationwide Survey 2017. *Glob Heart*.;15(1):47.
3. Liew SJ, Lee JT, Tan CS, Koh CHG, Dam RV, Müller-Riemenschneider F. Sociodemographic factors in relation to hypertension prevalence, awareness, treatment and control in a multi-ethnic Asian population: a cross-sectional study. *BMJ Open*. 2019 May 1;9(5):e025869.
4. Ilori TO, Zhen A, Velani RN, Zhao R, Echouffo-Tcheugui J, Anderson CA et al. The impact of dietary and lifestyle interventions on blood pressure management in sub-Saharan Africa: a systematic review and metanalysis. *Journal of hypertension*. 2023 Jun 1;41(6):918-25.
5. Askari A, Davoodi F, Shafaei E, Nikoo S, Nemati M, Nyari SJ, Khatib A, Eshaghzadeh M, PourSadeghiyan M, Arbabi YH. Association of health-promoting lifestyle and related factors among female high school students in Iran public high school. *Journal of Education and Health Promotion*. 2025 Sep 1;14(1):413.
6. Ukpeh IE, Akpan MI, Ugbe UMJ, Enyievi PB, Osuchukwu NC, Bassey EE, et al. Predictors of blood pressure control among patients with hypertension: a cross-sectional study in a Nigerian tertiary health facility. *BMJ Open*. 2025 Mar ;15(3):e091010.
7. Hammami R, Bahloul A, Triki S, Charfeddine S, Triki F, Zakhama L, et al. Impact of overweight and obesity on blood pressure control among hypertensive patients. *Journal of hypertension* 2021 apr ;39:e339.
8. Charchar FJ, Prestes PR, Mills C, Ching SM, Neupane D, Marques FZ, et al. Lifestyle management of hypertension: International Society of Hypertension position paper endorsed by the World Hypertension League and European Society of Hypertension. *Journal of Hypertension*. 2024 Jan 42(1):23.
9. Sample Size Determination - Nurses Revision [Internet]. 2023 [cited 2025 Jul 5]. Available from: <https://nursesrevisionuganda.com/sample-size-determination/>
10. Ozumba LN, Ndukwu GU. The association between medication adherence and blood pressure control among hypertensive patients attending a tertiary hospital in south-south Nigeria. *Int J Res Med Sci*. 2021 Mar 26;9(4):965.
11. Ejechi EO. Assessment of health promotion life style of a sample of Nigerians in early old age. *International Journal of Humanities and Social Science*. 2016;6(5):172–80.
12. Ojangba T, Boamah S, Miao Y, Guo X, Fen Y, Agboyibor C et al. Comprehensive effects of lifestyle reform, adherence, and related factors on hypertension control: A review. *The Journal of Clinical Hypertension*. 2023 Jun;25(6):509-20.
13. De Blas-Zapata A, Sastre-Albiach JM, Baixauli-López L, López-Ruiz R, Alvarez-Pitti J. Emerging cardiovascular risk factors in childhood and adolescence: a narrative review. *European journal of pediatrics*. 2025 Apr 14;184(5):298.
14. Luo M, Ding D, Bauman A, Negin J, Phongsavan P. Social engagement pattern, health behaviors and

- subjective well-being of older adults: an international perspective using WHO-SAGE survey data. *BMC Public Health*. 2020 Jan 23;20(1):99.
15. Ashwini L H, Vinaykumar L H, Hanumanaik L. Exploring the relationship between nutrition, lifestyle, and non-communicable diseases. *J Popul Ther Clin Pharmacol*. 2024;31(11):180-8. 31(11), 180-188. <https://doi.org/10.53555/jk3w4n87>
16. Alali Dan-Jumbo, Paul O. Dienye, Nnenna O. Nnadi, Simon Uriah. Lifestyle practices among hypertensive patients attending the Family Medicine Clinic in a tertiary hospital in Nigeria. *GSC Adv Res Rev*. 2021 Feb 28;6(2):050–60.
17. Wake AD. The role of dietary salt and alcohol use reduction in the management of hypertension. *Expert Review of Cardiovascular Therapy* [Internet]. 2020 [cited 2025 Jul 9];19:27–40.
18. Boakye K, Bovbjerg M, Schuna Jr J, Branscum A, Varma RP, Ismail R, et al. Urbanization and physical activity in the global Prospective Urban and Rural Epidemiology study. *Scientific reports*. 2023 Jan 6;13(1):290.
19. Park JH, Moon JH, Kim HJ, Kong MH, Oh YH. Sedentary lifestyle: overview of updated evidence of potential health risks. *Korean journal of family medicine*. 2020 Nov 19;41(6):365.
20. Oldridge-Turner K, Kokkorou M, Sing F, Klepp KI, Rutter H, Helleve A, et al. Promoting physical activity policy: the development of the MOVING framework. *Journal of Physical Activity and Health*. 2022 Mar 22;19(4):292-315.
21. Esuabanga WE, Osuorji GC, Sodangi AA. Appraisal of Non-Motorized Intra-City Transport (Studied in Calabar Metropolis, Cross River State, Nigeria). 2019. [https://www.semanticscholar.org/paper/Appraisal-of-Non-Motorized-Intra-City-Transport-\(-%2C-Esuabanga-Osuorji/8a87979af3151c474234cf27c1ebcf4e4bafcf2](https://www.semanticscholar.org/paper/Appraisal-of-Non-Motorized-Intra-City-Transport-(-%2C-Esuabanga-Osuorji/8a87979af3151c474234cf27c1ebcf4e4bafcf2)
22. Dickinson HO, Campbell F, Beyer FR, Nicolson DJ, Cook JV, Ford GA, Mason JM. Relaxation therapies for the management of primary hypertension in adults: a Cochrane review. *Journal of Human Hypertension*. 2008 Dec;22(12):809-20.

Date Submitted: 31st December 2025

Date Accepted: 7th March 2026

Date Published: 31st July 2026

Author Affiliations and ORCIDs:

¹Department of Family Medicine, Rivers State University/Rivers State University Teaching Hospital, Port Harcourt, Nigeria

Owen TP: ORCID ID: 0009-0003-0238-1820