**Determinants of Self-Management Practices Among Hypertensive Patients at Northern Region Hospital: A Cross-Sectional Study**

**Abstract**

**Introduction:** Hypertension remains a leading cause of cardiovascular morbidity and mortality globally, with a growing burden in sub-Saharan Africa. In Ghana, despite policy interventions, blood pressure control rates remain suboptimal. Self-management, including medication adherence, dietary changes, physical activity, and home blood pressure monitoring, is critical for long-term control. Yet, its practice is not well understood in Northern Ghana. The study aims to assess hypertension self-management and identify factors associated with good self-management among patients at Northern Region Hospital.

**Methods:** A facility-based cross-sectional study was conducted among 285 hypertensive patients aged ≥18 years using a structured interviewer-administered questionnaire adapted from validated tools. Self-management behaviors were evaluated across six domains, and a composite score was used to classify participants as having good or poor self-management. Bivariate and multivariable logistic regression analyses were performed to identify independent predictors of good self-management. A p-value less than 0.05 is considered statistically significant.

**Results:** Only 45.3% of participants demonstrated good overall self-management. While 74.4% adhered to prescribed medications and 78.6% kept clinic appointments, adherence to lifestyle-related behaviors was much lower: 44.6% limited salt intake, 39.3% engaged in physical activity at least three times per week, and only 28.8% monitored their blood pressure at home. Multivariable analysis showed that good self-management was significantly associated with being female (AOR = 1.5, 95% CI: 1.01–2.22), having secondary (AOR = 1.9, 95% CI: 1.10–3.29) or tertiary education (AOR = 2.5, 95% CI: 1.45–4.30), possessing good knowledge of hypertension (AOR = 2.9, 95% CI: 1.90–4.40), having family support (AOR = 1.8, 95% CI: 1.20–2.70), and being a non-smoker (AOR = 0.4, 95% CI: 0.18–0.87).

**Conclusion:** Hypertension self-management in Northern Ghana is suboptimal, particularly in relation to lifestyle behaviors. Tailored interventions promoting health education, family involvement, and behavioral support, especially for men and those with lower education, are urgently needed to improve long-term outcomes.

Keywords: *Hypertension, Self-management, Ghana, Lifestyle modification, Blood pressure control, Patient behavior, Health education, Chronic disease*

**Background**

Hypertension, or persistently elevated blood pressure, is a major global public health issue and a leading contributor to cardiovascular disease, kidney failure, stroke, and premature mortality.1,2 The World Health Organization estimates that 1.28 billion adults aged 30–79 years are living with hypertension worldwide, yet nearly half are unaware of their condition, and only about 21% have it under control.3,4 The majority of those affected, approximately two-thirds, live in low- and middle-income countries (LMICs), where healthcare systems often lack the infrastructure to manage chronic diseases effectively. The global economic burden of hypertension and its complications continues to rise, with significant implications for productivity and healthcare expenditure.4

The situation is particularly alarming in sub-Saharan Africa (SSA), where the prevalence of hypertension is rapidly increasing due to demographic shifts, urbanization, changing dietary patterns, and sedentary lifestyles.5,6 Prevalence rates range from 30% to 46% in urban settings and 20% to 25% in rural populations, with estimates suggesting that fewer than 10% of individuals with hypertension achieve adequate blood pressure control.7 The region also experiences some of the lowest levels of awareness, treatment, and control globally, partly due to underfunded healthcare systems, workforce shortages, and limited integration of non-communicable disease (NCD) services into primary healthcare platforms.8,9

In Ghana, hypertension affects roughly one in four adults, with increasing prevalence in both urban and rural areas.10 Urbanization, income changes, and shifts in cultural and dietary practices have contributed to this rise.11 Despite national policy efforts to improve screening and access to antihypertensive medication, the rates of blood pressure control remain low. A nationwide study by Sarkodie et al.12 reported that while a majority of hypertensive patients were on treatment, less than 20% had controlled blood pressure. Although medication adherence tends to be higher, especially among those covered by Ghana’s National Health Insurance Scheme, engagement in lifestyle modification practices, such as reducing salt intake, increasing physical activity, and monitoring blood pressure at home, remains inadequate. 13,14

Northern Ghana faces additional contextual challenges that impede effective hypertension control. The region is characterized by high poverty rates, limited access to healthcare facilities, low literacy levels, and sociocultural beliefs that may discourage adherence to biomedical care.15 Studies have shown that hypertensive patients in many parts of Ghana often lack information about their condition, are poorly supported in implementing lifestyle changes, and face economic barriers to regular clinic visits and medication refills.15–18 These systemic and social determinants of health influence both treatment outcomes and the extent to which patients can engage in long-term self-management.

Self-management the daily activities individuals undertake to control or reduce the impact of chronic illness plays a critical role in the successful management of hypertension.19 This includes medication adherence, diet modification, physical activity, home blood pressure monitoring, attending follow-up appointments, and behavioral changes such as reducing stress, quitting smoking, and limiting alcohol.20,21 Research shows that patients who actively manage their condition experience better blood pressure control, fewer complications, and improved quality of life.21 However, in many LMIC contexts, including Ghana, self-management practices are often poorly understood and inconsistently practiced due to a combination of knowledge gaps, resource constraints, and inadequate health system support.18,22,23

Despite the importance of self-management, there is a paucity of data from northern Ghana assessing the extent of self-management behaviors among hypertensive patients and the factors influencing these behaviors. Without such data, it is difficult to tailor interventions or inform health policies. This study therefore aims to assess the self-management practices of hypertensive patients at Northern Region Hospital and to identify the sociodemographic, behavioral, and clinical determinants associated with good self-management. These insights are critical for informing culturally appropriate, community-based interventions and strengthening chronic disease management within primary care systems in northern Ghana and similar settings.

**Methods**

Study setting

The study was conducted at the Northern Regional Hospital in Tamale, a key healthcare facility in the Central Business District of the Tamale Metropolis, established in July 1929. The hospital has 186 beds across 8 wards and operates 24/7, offering services such as outpatient care, pharmacy, antenatal care, laboratory, surgical, ENT, psychiatric, and specialized care. It serves as a major referral center, admitting approximately 46,331 patients annually, with a daily average of 100 visits and an average patient stay of 2 days.

Study design

This study employed a cross-sectional analytical design to assess the self-management practices of hypertensive patients attending Northern Region Hospital and to identify factors associated with good self-management. This design is well-suited for evaluating patterns and determinants of health behaviors within a defined population. It is particularly advantageous in resource-limited settings due to its efficiency, cost-effectiveness, and practicality. Using this approach, the study provided a snapshot of current hypertension self-management practices and highlighted key areas for intervention.

Study population

The study population comprised adult hypertensive patients aged 18 years and above who were receiving care at Northern Region Hospital in the Tamale Metropolis.

Inclusion and exclusion criteria

Participants were eligible if they were 18 years or older, had been clinically diagnosed with hypertension for at least six months, were receiving follow-up care at Northern Region Hospital, and provided informed consent to participate.

Patients were excluded if they had cognitive impairments or severe medical conditions that could hinder effective communication or reliable self-reporting, or if they were critically ill at the time of data collection.

**Sampling size**

Sample size (n) =?

Variance (σ) = P (1-P)

The prevalence of northern Ghana is estimated as 22.9%.24 Thus, p =22.9% (0.229)

Thus, Variance (σ) = P (1-P)

Variance (σ) = 0.229(1-0.229)

σ = 0.1766

Margin of error (E)=0.05

The critical value (Z) at 95% Confidence Interval = 1.96

A 5.0% of the estimated sample size was added to account for noncompliance and response rate. Thus, the sample size for this study was 285.

**Sampling techniques**

The study employed a simple random sampling technique to select participants from the population of hypertensive patients attending follow-up clinics at Northern Region Hospital. A sampling frame was created using the clinic's registry of hypertensive patients scheduled during the data collection period. Each eligible patient was assigned a unique number, and participants were then randomly selected using a computer-generated list of random numbers. This method ensured that every patient had an equal chance of being selected, thereby minimizing selection bias and enhancing the representativeness of the sample.

Data Collection Tools and Techniques

Data for this study were collected using a structured interviewer-administered questionnaire specifically designed to assess hypertension self-management practices, knowledge levels, and associated sociodemographic and clinical factors. The tool was adapted from validated instruments such as the *Hypertension Self-Care Activity Level Effects (H-SCALE)*25 and guidelines from the World Health Organization (WHO)26 on non-communicable disease (NCD) surveillance. It was divided into several sections covering:

1. Sociodemographic information – including age, sex, marital status, education, employment, and income.
2. Clinical characteristics – such as duration of hypertension, presence of comorbidities, smoking and alcohol use, and medication history.
3. Self-management behaviors – comprising 19 items measuring frequency of medication adherence, physical activity, dietary behaviors, stress reduction, alcohol/smoking avoidance, and home blood pressure monitoring. Each item was assessed on a 5-point Likert scale (Always, Often, Sometimes, Rarely, Not at all), later dichotomized into adherent vs non-adherent responses for analysis.
4. Hypertension knowledge – evaluated using multiple-choice and true/false questions focused on understanding blood pressure targets, complications, treatment goals, and lifestyle modifications.
5. Family/social support – assessed through questions on the availability and influence of family or community support in managing hypertension.27

**Data Collection Technique and Process**  
Data were collected over four weeks in outpatient clinics using face-to-face interviews in English or the local language (Dagbani), depending on participant preference. Trained research assistants, fluent in both languages, conducted the interviews after undergoing a two-day training workshop on research ethics, standardized interviewing procedures, and questionnaire content. The tool was pre-tested on 20 hypertensive patients at a nearby district hospital to ensure clarity, cultural appropriateness, and reliability. Necessary adjustments were made to improve comprehension and flow.

All interviews were conducted privately within the clinic premises to ensure confidentiality and minimize bias. On average, each interview lasted between 30 and 40 minutes.

Data management and analysis

Supervisors reviewed Data from the structured questionnaires daily to check for completeness, consistency, and accuracy before entry into Microsoft Excel. The data were then imported into IBM SPSS Statistics version 26 for cleaning and statistical analysis.

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants’ sociodemographic and clinical characteristics, as well as the distribution of self-management behaviors. To assess overall self-management status, responses across six key domain medication adherence, dietary practices (salt intake and label reading), physical activity, home blood pressure (BP) monitoring, smoking, alcohol consumption, stress control, and weight management—were scored using adapted items from the Hypertension Self-Care Activity Level Effects (H-SCALE) and similar validated tools.

Each domain had specific scoring criteria based on the number of days the recommended behavior was practiced in the past 7 days or binary yes/no responses where applicable. A participant received a point for each behavior meeting the recommended standard (e.g., taking medication all 7 days, abstaining from smoking and alcohol, engaging in at least 30 minutes of physical activity on ≥5 days per week, etc.). The maximum possible score was determined by the total number of self-care domains assessed.

To categorize overall self-management status, a composite self-management score was generated for each respondent. Participants with total scores at or above the median were classified as having good self-management, while those scoring below the median were considered to have poor self-management. This method is consistent with previous studies in Ghana and other low-resource settings,28–30 allowing for context-appropriate differentiation between higher and lower self-care engagement.

Inferential statistics included bivariate logistic regression to explore associations between independent variables and good self-management. Variables with a p-value ≤ 0.20 in the bivariate analysis were entered into a multivariable logistic regression model to identify independent predictors. Adjusted odds ratios (AORs), 95% confidence intervals (CIs), and p-values were reported.

**Results**

**Sociodemographic Characteristics of Respondents**

The study recruited 285 hypertensive patients with a mean age of 56.4 years (SD = 13.8). The majority were female (60%) and married (57.9%). A significant portion had limited formal education, with 33.3% having no formal schooling and only 14.4% attaining tertiary education. Most respondents were employed in the informal sector (44.2%), while 27% were unemployed. Monthly income was generally low, with nearly 78% earning ₵1,000 or less. A substantial majority resided in rural areas (70.5%), and 81.1% were enrolled in the National Health Insurance Scheme (NHIS), while 13.3% had no health insurance (Table 1).

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| --- | --- | --- | --- |
| Table 1: Sociodemographic Characteristics of Respondents (N = 285) | | | |
| Variable | Category | Frequency (n) | Percentage (%) |
| Age (years) |  | Mean = 56.4, SD = 13.8 | |
| Sex |  |  |  |
|  | Male | 114 | 40.00% |
|  | Female | 171 | 60.00% |
| Marital Status |  |  |  |
|  | Single | 61 | 21.40% |
|  | Married | 165 | 57.90% |
|  | Divorced | 29 | 10.20% |
|  | Widowed | 30 | 10.50% |
| Education Level |  |  |  |
|  | No formal education | 95 | 33.30% |
|  | Primary | 84 | 29.50% |
|  | Secondary | 65 | 22.80% |
|  | Tertiary | 41 | 14.40% |
| Employment Status |  |  |  |
|  | Informal sector | 126 | 44.20% |
|  | Public sector | 55 | 19.30% |
|  | Private sector | 27 | 9.50% |
|  | Unemployed | 77 | 27.00% |
| Monthly Income |  |  |  |
|  | < ₵500 | 110 | 38.60% |
|  | ₵500–₵1000 | 112 | 39.30% |
|  | ₵1001–₵2000 | 46 | 16.10% |
|  | > ₵2000 | 17 | 6.00% |
| Residence |  |  |  |
|  | Urban | 84 | 29.50% |
|  | Rural | 201 | 70.50% |
| Health Insurance |  |  |  |
|  | NHIS | 231 | 81.10% |
|  | Private | 16 | 5.60% |
|  | None | 38 | 13.30% |

**Clinical and Behavioral Characteristics of Respondents**

Most had been diagnosed with hypertension for 1–5 years (46%), while 13.3% had lived with the condition for over a decade. Nearly half (46.3%) reported no comorbidities, but diabetes was common (30.2%), followed by kidney disease (8.4%) and stroke (6%). Medication adherence was relatively high, with 58.9% consistently taking their medications as prescribed, though a third (33.3%) also reported using herbal remedies. Only 37.9% engaged in regular physical activity (≥3 times/week), and 85.3% had never smoked. Alcohol use in the past month was reported by 26.7% of participants. In terms of diet, over half (54.7%) used moderate amounts of salt, while just 29.8% practiced salt restriction. Notably, 72.3% did not monitor their blood pressure at home, and only 43.2% correctly identified the target blood pressure level (Table 2).

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| --- | --- | --- | --- |
| Table 2: Clinical and Behavioral Characteristics of Respondents (N = 285) | | | |
| Variable | Category | Frequency (n) | Percentage (%) |
| Duration of Hypertension |  |  |  |
|  | < 1 year | 39 | 13.70% |
|  | 1–5 years | 131 | 46.00% |
|  | 6–10 years | 77 | 27.00% |
|  | > 10 years | 38 | 13.30% |
| Comorbidities |  |  |  |
|  | None | 132 | 46.30% |
|  | Diabetes | 86 | 30.20% |
|  | Kidney Disease | 24 | 8.40% |
|  | Stroke | 17 | 6.00% |
|  | Other (e.g., arthritis, ulcers) | 26 | 9.10% |
| Medication Adherence |  |  |  |
|  | Always (≥80% of prescribed doses) | 168 | 58.90% |
|  | Sometimes (50–79%) | 83 | 29.10% |
|  | Rarely (<50%) | 34 | 11.90% |
| Use of Herbal Remedies |  |  |  |
|  | Yes | 95 | 33.30% |
|  | No | 190 | 66.70% |
| Physical Activity (≥3x/week) |  |  |  |
|  | Yes | 108 | 37.90% |
|  | No | 177 | 62.10% |
| Smoking History |  |  |  |
|  | Current smoker | 23 | 8.10% |
|  | Former smoker | 19 | 6.70% |
|  | Never smoked | 243 | 85.30% |
| Alcohol Use (past 30 days) |  |  |  |
|  | Yes | 76 | 26.70% |
|  | No | 209 | 73.30% |
| Dietary Salt Intake |  |  |  |
|  | Always use excess salt | 44 | 15.40% |
|  | Moderate salt use | 156 | 54.70% |
|  | Salt restriction | 85 | 29.80% |
| Regular BP Monitoring at Home |  |  |  |
|  | Yes | 79 | 27.70% |
|  | No | 206 | 72.30% |
| Knowledge of Target BP (<140/90) |  |  |  |
|  | Correct | 123 | 43.20% |
|  | Incorrect or Don’t Know | 162 | 56.80% |

**Hypertension Self-Management Behavior**

While the majority adhered to medication routines (74.4%) and kept medical appointments (78.6%), adherence was lower for lifestyle-related behaviors. Only 44.6% limited salt intake, and just 33.7% checked food labels for sodium. Physical activity (39.3%), home blood pressure monitoring (28.8%), and following a heart-healthy diet (36.5%) were also notably low. On the other hand, most respondents avoided smoking (85.3%) and limited alcohol intake (72.6%). Adherence to stress reduction (53.7%), maintaining healthy weight (48.8%), and informing doctors of medication side effects (46.0%) showed moderate uptake (Table 3)

|  |  |  |
| --- | --- | --- |
| Table 3: Hypertension Self-Management Behavior Scores (N = 285) | | |
| Behavior Item | Adherent (Often/Always) n (%) | Non-Adherent (Not at all/Sometimes) n (%) |
| Take my blood pressure medicine as prescribed | 212 (74.4%) | 73 (25.6%) |
| Keep my medical appointments | 224 (78.6%) | 61 (21.4%) |
| Limit the amount of salt in my diet | 127 (44.6%) | 158 (55.4%) |
| Check food labels for sodium content | 96 (33.7%) | 189 (66.3%) |
| Maintain a healthy weight | 139 (48.8%) | 146 (51.2%) |
| Engage in physical activity at least 3 times per week | 112 (39.3%) | 173 (60.7%) |
| Avoid smoking | 243 (85.3%) | 42 (14.7%) |
| Limit alcohol intake | 207 (72.6%) | 78 (27.4%) |
| Reduce stress or practice relaxation techniques | 153 (53.7%) | 132 (46.3%) |
| Monitor my blood pressure at home | 82 (28.8%) | 203 (71.2%) |
| Get adequate sleep | 176 (61.8%) | 109 (38.2%) |
| Avoid missed doses of medications | 198 (69.5%) | 87 (30.5%) |
| Follow a heart-healthy diet (e.g., DASH diet) | 104 (36.5%) | 181 (63.5%) |
| Inform my doctor of any side effects from medications | 131 (46.0%) | 154 (54.0%) |
| Use reminders (e.g., alarms) to take medications | 91 (31.9%) | 194 (68.1%) |
| Prepare healthy meals at home regularly | 147 (51.6%) | 138 (48.4%) |
| Avoid fried and processed foods | 114 (40.0%) | 171 (60.0%) |
| Make lifestyle adjustments to control blood pressure | 161 (56.5%) | 124 (43.5%) |
| Follow healthcare provider’s advice | 217 (76.1%) | 68 (23.9%) |
| Track and record my blood pressure readings | 87 (30.5%) | 198 (69.5%) |

**Overall Self-Management Status**

Among the 285 respondents, 45.3% had good self-management practices, while 54.7% demonstrated poor self-management (Figure 1).

Figure 1: Overall Self-Management Status

**Factors Associated with Good Hypertension Self-Management**

Significant factors associated with good hypertension self-management included being female (AOR = 1.5, 95% CI: 1.01–2.22), having secondary (AOR = 1.9, 95% CI: 1.10–3.29) or tertiary education (AOR = 2.5, 95% CI: 1.45–4.30), possessing good knowledge of hypertension (AOR = 2.9, 95% CI: 1.90–4.40), having family support (AOR = 1.8, 95% CI: 1.20–2.70), and being a non-smoker (AOR = 0.4, 95% CI: 0.18–0.87) (Table 4)

|  |  |  |  |
| --- | --- | --- | --- |
| Table 4: Factors Associated with Good Hypertension Self-Management | | | |
| Variable | Categories | AOR | 95% CI |
| Age (continuous) | Per year increase | 1.02 | 1.00 – 1.04 |
| Sex | Male | Ref\* |  |
|  | Female | 1.5 | 1.01 – 2.22 |
| Education level | No formal/Primary | Ref\* |  |
|  | Secondary | 1.9 | 1.10 – 3.29 |
|  | Tertiary | 2.5 | 1.45 – 4.30 |
| Employment status | Unemployed | Ref\* |  |
|  | Employed | 1.3 | 0.87 – 1.94 |
| Duration of hypertension | Per year increase | 0.98 | 0.95 – 1.02 |
| Comorbidities | No | Ref\* |  |
|  | Yes | 0.7 | 0.45 – 1.08 |
| Hypertension knowledge | Poor | Ref\* |  |
|  | Good | 2.9 | 1.90 – 4.40 |
| Alcohol use | No | Ref\* |  |
|  | Yes | 0.65 | 0.41 – 1.02 |
| Smoking status | Non-smoker | Ref\* |  |
|  | Smoker | 0.4 | 0.18 – 0.87 |
| Family support | No | Ref\* |  |
|  | Yes | 1.8 | 1.20 – 2.70 |

**Discussion**

This study presents a nuanced picture of self-management practices among hypertensive patients at the Northern Region Hospital in Ghana, highlighting achievements and persistent gaps in chronic disease management in a low-resource setting. The study revealed that only 45.3% of hypertensive patients at Northern Region Hospital demonstrated good self-management practices. While adherence to medication (73.5%) and clinic attendance (72.7%) were relatively high, engagement in lifestyle-related behaviors such as salt reduction (44.6%), regular physical activity (39.3%), and home blood pressure monitoring (28.7%) remained low. Key factors significantly associated with good self-management included being female, having secondary or tertiary education, possessing good hypertension knowledge, receiving family support, and being a non-smoker. In contrast, variables such as employment status, alcohol use, duration of hypertension, and comorbidities showed no significant association with self-management outcomes.

The finding that only 45.3% of hypertensive patients demonstrated good self-management practices aligns with several studies that have reported suboptimal self-management among hypertensive populations. For instance, a study in Ethiopia found that just 44.8% of patients adhered to comprehensive hypertension self-care practices, including medication, diet, physical activity, and monitoring31. This suggests a persistent challenge in achieving holistic self-care among hypertensive patients in resource-limited settings. The result is consistent with regional data indicating poor integration of lifestyle modifications despite medication adherence. However, it contrasts with findings from developed countries, such as the U.S., where higher rates of comprehensive self-management (above 60%) have been documented,32 possibly due to better patient education and access to resources. The implication is that partial adherence, mainly centered on medication and clinic visits, is insufficient to control hypertension and reduce complications, highlighting a need for interventions targeting broader lifestyle behavior change.

The high rate of medication adherence (73.5%) found in this study is consistent with several studies in similar settings. For example, Sarkodie et al.12 reported 89.2% adherence among Ghanaian hypertensive patients, citing trust in medications and provider instructions as key factors. This level of adherence is also incomparable to rates in Nigeria (around 45%).33 Consistent with prior findings, structured clinic protocols and pharmaceutical access at Northern Region Hospital may benefit medication adherence. The implication is that while medication adherence is encouraging, it should be reinforced through regular follow-up and counseling and expanded to include education on complementary lifestyle changes.

The study’s finding of 72.7% regular clinic attendance is consistent with reports from other urban and peri-urban health facilities in Ghana. The high attendance rate could be attributed to the accessibility of services and continuity of care. However, this figure is higher than that of some rural studies that reported attendance below 60% due to transportation challenges and cultural perceptions.22 The consistency with urban-focused studies suggests that structural support, such as reminders and follow-ups, plays a role in facilitating attendance. The implication is that while clinic attendance is relatively satisfactory, efforts must ensure such visits are used for medication refills and reinforcing lifestyle counseling.

Only 44.6% of respondents practiced salt reduction, which is lower than desirable for hypertension management. This finding is consistent with studies from Ghana and Nigeria, where salt reduction remains one of the least practiced self-care behaviors. A study by Amoah et al.34 reported salt reduction practices in only 40.5% of hypertensive patients. Cultural dietary preferences and poor awareness about the salt-hypertension link contribute to this challenge. In contrast, studies in more developed settings such as the UK have reported salt reduction, likely due to effective public health campaigns.30 The implication is that tailored educational interventions are needed to address cultural dietary habits and promote the importance of salt restriction in blood pressure control.

The reported physical activity engagement rate of 39.3% is relatively low and aligns with several African studies that indicate physical inactivity is a growing public health issue among chronic disease patients. For instance, Amoah et al.34 found that engaging in physical activity levels for 30 minutes increases the odds of controlling hypertension. This is consistent with barriers such as urban lifestyle, lack of exercise-friendly infrastructure, and misconceptions about safe exercise. In contrast, physical activity adherence in Western countries is generally higher (over 60%) due to stronger health promotion systems and infrastructure.35 The implication is that physical activity promotion must be context-specific, involving community-based exercise programs and healthcare provider counseling tailored to patients’ abilities and environments.

Only 28.7% of patients reported engaging in home blood pressure monitoring, which is significantly lower than figures reported in high-income countries. This is consistent with a studies in Ghana, hypertensive patients owned or used a home BP monitor with cost, limited knowledge, and low provider emphasis contribute to this poor uptake (11). In contrast, studies from the U.S. and Europe report rates of 60–75% (Shimbo et al., 2020), reflecting better affordability and system support. The implication is that promoting home monitoring—potentially through subsidies or community loan programs—can empower patients and improve BP control through real-time feedback and better engagement.

The finding that female patients are more likely to engage in good hypertension self-management aligns with several studies. Research indicates that women often exhibit better health-seeking behaviors and adherence to treatment regimens compared to men. For instance, a study by Evereth et al. (2021) found that women were more proactive in managing hypertension through lifestyle modifications and regular monitoring. This consistency suggests that gender-specific interventions could be beneficial, with a focus Higher educational attainment is consistently associated with better hypertension self-management. Educated individuals are more likely to understand the importance of lifestyle modifications and adhere to treatment plans. A study by Mogre et al. (2022) supports this, showing that patients with higher education levels had significantly better self-care practices. This consistency underscores the need for targeted educational interventions for patients with lower educational backgrounds to improve their self-management behaviors.

Good knowledge of hypertension significantly correlates with effective self-management. Patients who understand the nature of hypertension and its complications are more likely to engage in beneficial behaviors. This finding is consistent with a study by Chiu et al. (2021), which found that increased knowledge led to better adherence to self-care practices. The implication is that health education programs should be integral to hypertension management strategies.

Family support plays a crucial role in hypertension self-management. Patients with supportive family members are more likely to adhere to treatment plans and make necessary lifestyle changes. This is consistent with findings from a study that highlighted the positive impact of family involvement on patient outcomes36. The implication is that involving family members in educational and management plans can enhance patient adherence and overall health outcomes.

Being a non-smoker is associated with better hypertension self-management. Smoking is known to exacerbate hypertension and hinder the effectiveness of treatment. This finding aligns with research which found that smokers had poorer adherence to hypertension management practices.37 The implication is that smoking cessation programs should be integrated into hypertension management plans to improve patient outcomes.

A major weakness of this study is its cross-sectional design, which limits the ability to establish causal relationships between the identified factors and hypertension self-management practices. Since data were collected at a single point in time, it is unclear whether variables such as educational attainment or knowledge of hypertension directly lead to better self-management, or if individuals who manage their condition well are more likely to acquire such attributes. Nevertheless, the study's strength lies in its identification of significant and diverse correlations such as gender, education level, family support, and smoking status, providing a robust evidence base for designing targeted interventions to improve hypertension outcomes in similar settings.

**Conclusion**

This study highlights that less than half of hypertensive patients at Northern Region Hospital demonstrate good self-management practices, with significant gaps observed in lifestyle behaviors such as physical activity, salt reduction, and home blood pressure monitoring. While medication adherence and clinic attendance were relatively high, the findings emphasize that effective hypertension control requires more than pharmacological compliance. Significant factors associated with better self-management included being female, having higher education, possessing good hypertension knowledge, receiving family support, and abstaining from smoking. These results underscore the importance of health education, social support, and targeted behavioral interventions to strengthen patient engagement in comprehensive hypertension self-care. Addressing these areas through community-based and health system strategies is essential for improving long-term outcomes and reducing the burden of hypertension in the region.

Recommendations

To improve hypertension self-management, health education should go beyond medication adherence to include lifestyle changes like salt reduction, physical activity, and home blood pressure monitoring, especially targeting individuals with lower education levels. Family involvement should be encouraged, as it enhances adherence to self-care practices. Tailored interventions are needed for high-risk groups such as males and less educated individuals. Integrating behavioral counseling, including smoking cessation, into routine care can further support self-management. Strengthening follow-up systems and reminders may also improve clinic attendance and self-monitoring. Lastly, longitudinal studies are recommended to explore causal relationships and evaluate intervention outcomes.

**Consent for publication**

Not applicable

**Data Availability**

Data used to support this study are available from the corresponding author upon request.

**Disclaimer (Artificial intelligence)**

Authors at this moment declare that generative AI (ChatGPT) has been used during the editing of manuscripts.

**References**

1. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. Nat Rev Nephrol. 2020 Apr;16(4):223–37.

2. Burnier M, Damianaki A. Hypertension as Cardiovascular Risk Factor in Chronic Kidney Disease. Circulation Research. 2023 Apr 14;132(8):1050–63.

3. World Health Organization. Hypertension: Key facts [Internet]. 2023 [cited 2025 Jun 18]. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension

4. Wierzejska E, Giernaś B, Lipiak A, Karasiewicz M, Cofta M, Staszewski R. A global perspective on the costs of hypertension: a systematic review. Arch Med Sci. 2020 Jan 31;16(5):1078–91.

5. Nkyi CA. Review of Hypertension in sub-Saharan Africa. Afri Jour Cur Med Res [Internet]. 2017 Jul 20 [cited 2025 Jun 18];1(1). Available from: https://myjournal.afrijcmr.org/index.php/ajcmr/article/view/8

6. Amegah AK. Tackling the Growing Burden of Cardiovascular Diseases in Sub-Saharan Africa: Need for Dietary Guidelines. Circulation. 2018 Nov 27;138(22):2449–51.

7. Ataklte F, Erqou S, Kaptoge S, Taye B, Echouffo-Tcheugui JB, Kengne AP. Burden of undiagnosed hypertension in sub-saharan Africa: a systematic review and meta-analysis. Hypertension. 2015 Feb;65(2):291–8.

8. Hussien M, Muhye A, Abebe F, Ambaw F. The Role of Health Care Quality in Hypertension Self-Management: A Qualitative Study of the Experience of Patients in a Public Hospital, North-West Ethiopia. Integr Blood Press Control. 2021 Apr 27;14:55–68.

9. Gyawali B, Khanal P, Mishra SR, van Teijlingen E, Wolf Meyrowitsch D. Building Strong Primary Health Care to Tackle the Growing Burden of Non-Communicable Diseases in Nepal. Glob Health Action. 13(1):1788262.

10. Bosu WK, Bosu DK. Prevalence, awareness and control of hypertension in Ghana: A systematic review and meta-analysis. PLoS One. 2021 Mar 5;16(3):e0248137.

11. Tay DA, Ocansey RTA. Impact of Urbanization on Health and Well-Being in Ghana. Status of Research, Intervention Strategies and Future Directions: A Rapid Review. Front Public Health. 2022 Jun 28;10:877920.

12. Sarkodie E, Afriyie DK, Hutton-Nyameaye A, Amponsah SK. Adherence to drug therapy among hypertensive patients attending two district hospitals in Ghana. Afr Health Sci. 2020 Sep;20(3):1355–67.

13. Kretchy IA, Owusu-Daaku FT, Danquah SA. Mental health in hypertension: assessing symptoms of anxiety, depression and stress on anti-hypertensive medication adherence. Int J Ment Health Syst. 2014 Jun 21;8:25.

14. Awuah RB, Anarfi JK, Agyemang C, Ogedegbe G, Aikins A de-Graft. Prevalence, awareness, treatment and control of hypertension in urban poor communities in Accra, Ghana. J Hypertens. 2014 Jun;32(6):1203–10.

15. Nyaaba GN, Masana L, de-Graft Aikins A, Beune E, Agyemang C. Factors hindering hypertension control: perspectives of front-line health professionals in rural Ghana. Public Health. 2020 Apr;181:16–23.

16. Atibila F, Ten Hoor G, Donkoh ET, Kok G. Challenges experienced by patients with hypertension in Ghana: A qualitative inquiry. Rowe R, editor. PLoS ONE. 2021 May 6;16(5):e0250355.

17. Koduah A, Nonvignon J, Colson A, Kurdi A, Morton A, Van Der Meer R, et al. Health systems, population and patient challenges for achieving universal health coverage for hypertension in Ghana. Health Policy and Planning. 2021 Oct 12;36(9):1451–8.

18. Laar AK, Adler AJ, Kotoh AM, Legido-Quigley H, Lange IL, Perel P, et al. Health system challenges to hypertension and related non-communicable diseases prevention and treatment: perspectives from Ghanaian stakeholders. BMC Health Serv Res. 2019 Dec;19(1):693.

19. Grady PA, Gough LL. Self-Management: A Comprehensive Approach to Management of Chronic Conditions. Am J Public Health. 2014 Aug;104(8):e25–31.

20. Hany A, Putra KR, Vatmasari RA, Nafis AN, Amalia AT, Khamdani E. Importance of self-management interventions in hypertension patients: a scoping review. Healthcare in Low-resource Settings [Internet]. 2024 Sep 9 [cited 2025 Jun 18];12(s1). Available from: https://www.pagepressjournals.org/hls/article/view/13034

21. Hussein H, Shamsipour M, Yunesian M, Hassanvand MS, Assan A, Fotouhi A. Prevalence and predictors of pre-existing hypertension among prenatal women: a cross-sectional study in Ghana. Iranian Journal of Public Health. 2021;50(6):1266.

22. Sambah F, McBain-Rigg K, Seidu AA, Emeto TI. A Qualitative Study on the Barriers and Enablers to Effective Hypertension Management in Ghana. Healthcare (Basel). 2025 Feb 22;13(5):479.

23. Byiringiro S, Hinneh T, Chepkorir J, Tomiwa T, Commodore-Mensah Y, Marsteller J, et al. Healthcare system barriers and facilitators to hypertension management in Ghana. Annals of Global Health [Internet]. 2024 Jul 4 [cited 2025 Jun 18];90(1). Available from: https://annalsofglobalhealth.org/articles/10.5334/aogh.4246

24. Atibila F, Hoor G ten, Donkoh ET, Wahab AI, Kok G. Prevalence of hypertension in Ghanaian society: a systematic review, meta-analysis, and GRADE assessment. Systematic Reviews. 2021 Aug 7;10(1):220.

25. Warren-Findlow J, Seymour RB. Prevalence Rates of Hypertension Self-care Activities Among African Americans. Journal of the National Medical Association. 2011 Jun;103(6):503–12.

26. World Health Organization. STEPwise approach to NCD risk factor surveillance (STEPS) [Internet]. 2024 [cited 2025 Jun 18]. Available from: https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps

27. Sherbourne CD, Stewart AL. The MOS social support survey. Social Science & Medicine. 1991 Jan;32(6):705–14.

28. Aksoy Canyolu B, Özben Sadıç B. Dietary Salt-Related Knowledge, Attitudes and Behaviors in Healthy and Hypertensive Turkish Adults from Food Choice Perspective. Foods. 2025 Jan;14(1):141.

29. Youssef’ ’Ghada Sayed. Salt and hypertension: current views [Internet]. [cited 2025 Jun 20]. Available from: https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-22/salt-and-hypertension-current-views

30. Usman JE, Morley A, Childs C, Rogerson D, Klonizakis M. Exploring Dietary Salt Knowledge, Attitude, and Practices among People of African Descent in the United Kingdom: A Qualitative Study. Healthcare (Basel). 2024 Oct 2;12(19):1969.

31. Hailu G, Yigezu M, Gutema H, Melkamu L, Kebede N, Assefa E, et al. Self-care practice and associated factors among hypertensive patients who have follow-ups in public hospitals of Bahir-Dar City, Northwest Ethiopia, a mixed study. PLoS One. 2025 May 9;20(5):e0317869.

32. Haase KR, Sattar S, Hall S, McLean B, Wills A, Gray M, et al. Systematic review of self-management interventions for older adults with cancer. Psychooncology. 2021 Jul;30(7):989–1008.

33. Adepoju AA, Vidler M, Akadri AA, Jaiyesimi E, Nwankpa CC, Odubena OO, et al. The ability and safety of community-based health workers to safely initiate lifesaving therapies for pre-eclampsia in Ogun State, Nigeria: An analysis of 260 community treatments with MgSO4 and/or methyldopa. Pregnancy Hypertension. 2021;25:179–84.

34. 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. Int J Hypertens. 2020;2020:9379128.

35. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U, et al. Global physical activity levels: surveillance progress, pitfalls, and prospects. Lancet. 2012 Jul 21;380(9838):247–57.

36. Susanto T, Hernawati S, Yunanto RA, Rahmawati I, Laras Ati NA, Fauziah W. Family Self-management Program for Hypertension Management and Sodium Consumption Adherence: A Parallel Randomized Control Trial Among Family Caregivers and People With Hypertension. J Res Health Sci. 2024 Sep 30;24(4):e00628.

37. Abza LF, Yesuf MA, Emrie AA, Belay AS, Bekele TG, Tetema MD, et al. Self-care adherence and associated factors among hypertensive patients at Guraghe Zone, 2023. Heliyon. 2024 Sep 15;10(17):e36985.