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Interpersonal Factors Influencing Hypertension Control: A Cross-Sectional Study Among Hypertensive Patients in the Ashanti Region, Ghana

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ABSTRACT

Background and Aims: Hypertension, a leading noncommunicable disease, significantly contributes to global morbidity and mortality. Despite its prevalence, managing and controlling hypertension in Ghana faces numerous challenges. This study aimed to assess interpersonal factors hindering hypertension management in Ghana's Ashanti region.

Methods: Using a pretested questionnaire, we collected quantitative data from 350 hypertensive patients receiving care at the Komfo Anokye Teaching Hospital. Descriptive and inferential statistics were used for data analysis.

Results: Medication nonadherence was prevalent (56.3%), with moderate knowledge of hypertension (49.7%) and high physical inactivity (66.6%). Patients with tertiary education (adjusted odds ratios [AOR] = 6.151, 95% CI = 1.240–30.505; $p = 0.03$), moderate (AOR = 2.540, 95% CI = 1.016–6.350; $p = 0.05$), and higher self-efficacy/ability (AOR = 2.632, 95% CI = 1.030–6.725; $p = 0.04$) had enhanced ability to manage their hypertension condition. Conversely, divorced/separated individuals (AOR = 0.073, 95% CI = 0.008–0.700; $p = 0.02$), those with a family income exceeding GHS 2000.00 (AOR = 0.081, 95% CI = 0.012–0.532; $p = 0.009$), disease duration exceeding 15 years (AOR = 0.293, 95% CI = 0.092–0.930; $p = 0.04$), adequate hypertension knowledge (AOR = 0.312, 95% CI = 0.110–0.879; $p = 0.03$), and higher perceived barriers (AOR = 0.312, 95% CI = 0.159–0.611; $p = 0.001$) had lower odds of successful management.

Conclusion: Interpersonal factors play a huge role in hypertension management in the Ashanti Region of Ghana. Targeted health education and self-management are recommended in improving medication adherence and adopting healthier lifestyles among these patients from Komfo Anokye Teaching Hospital. More qualitative research is needed to deepen understanding and inform effective intervention strategies.

1 | Introduction

Hypertension (HPT), characterized by elevated blood pressure (BP), is a significant public health concern. It imposes a substantial burden on healthcare systems, national economies, and individual wellbeing [1]. It is defined as systolic blood pressure (SBP) ≥ 140 mmHg or diastolic blood pressure (DBP) ≥ 90 mmHg [2]. HPT is the primary risk factor for various cardiovascular morbidities and mortalities [3]. The alarming rise in HPT prevalence is a global phenomenon. According to the WHO's inaugural

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report on HPT impact, one-third of adults are hypertensive, with poor control in four out of five cases [3]. This uncontrolled HPT is projected to contribute to a staggering 120 million strokes, 79 million heart attacks, and 17 million heart failures by 2050 if unchecked [3]. Reflecting this trend, global HPT prevalence has doubled from 650 million in 1990 to 1.3 billion in 2019, with a projected 30% increase by 2025 if risk factors remain unaddressed [3]. This growing burden of HPT is particularly concerning in low-and- middle-income countries (LMICs) like those in Africa, where HPT mortality is surpassing infectious diseases. This phenomenon, termed the "epidemiological transition," necessitates urgent action to prevent an estimated 76 million deaths attributable to HPT between 2023 and 2030 [3]. The African subregion faces unique challenges in tackling HPT due to widening health inequalities and racial disparities. Consequently, HPT has become a public health emergency in Ghana, characterized by rising hospital admissions [4], increasing prevalence [3], and economic losses due to absenteeism and presenteeism [5]. The estimated cumulative prevalence of HPT in Africa exceeds 30.8% [6]. In Ghana, HPT affects all demographic groups, with prevalence ranging from 30.1% among females to 34.0% among males [7]. The WHO reports that 3.1 million Ghanaian adults aged 30–70 years are hypertensive, contributing to about 190,000 deaths in 2019 [8].

The Ashanti region [A/R] is a Ghanaian region with a high HPT burden [9, 10]. Studies consistently report high HPT prevalence and poor treatment outcomes [9, 10]. For instance, national data indicates that 25.9% of individuals aged 15–49 years in the A/R are hypertensive. Notably, even among those receiving HPT medication (68.9%), nearly two-thirds (68%) have uncontrolled HPT [10]. This high level of uncontrolled HPT is a significant public health concern, potentially leading to severe cardiovascular complications.

HPT management relies on patients' self-management behaviors and practices [11]. However, existing literature suggests that various patient-level factors may negatively impact successful HPT control. These factors include knowledge of HPT, medication adherence, disease duration, physical activity levels, social support, family income, and self-efficacy [12–14]. Identifying these barriers is crucial for achieving national and global targets for HPT reduction. Prior research has explored patient-level factors influencing HPT management. Some studies identified factors associated with HPT prevalence and risk [14], while others focused on factors impacting effective control [12–14]. Additionally, exogenous factors beyond patient control, such as high pill burden, medication side effects, healthcare system issues, medication costs, and access to care, likely contribute to the rising prevalence and low control rates of HPT [15, 16]. The Pan African Society of Cardiologists (PASCAR) identified patient-level barriers that need to be addressed to achieve HPT control and meet the global target of a 25% reduction by 2025 [17]. A subsequent study investigating the integration of these findings into Ghanaian policy found shortcomings, potentially contributing to the current state of HPT management in the A/R [18]. This highlights the need to evaluate the interpersonal-level barriers impacting HPT control in the A/R.

Although prior studies have explored HPT in Ghana [19, 20] and the A/R [9, 10] to understand management complexities, this study adopts the Chronic Care Model (CCM) [21, 22]. The CCM framework will be used to evaluate interpersonal-level barriers within the A/R that hinder HPT control. This approach will help unpack patients' understandings and perceptions of current management approaches, potentially leading to a re-focusing of resources, efforts, and policies for enhanced HPT control. This study therefore aimed to assess interpersonal factors hindering HPT management in Ghana's Ashanti region.

2 | Conceptual Framework

This study nested within a larger mixed-methods project investigating progress toward HPT control in Ghana's Ashanti Region utilizes the CCM (Figure 1) by Wagner [21], as its

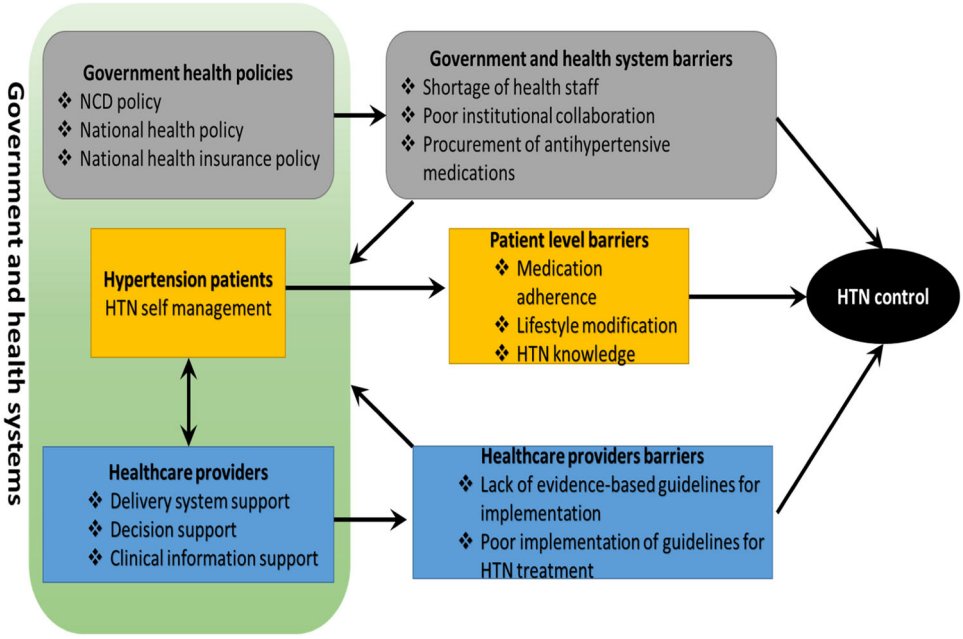

FIGURE 1 | Chronic Care Model [CCM] [21].

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guiding framework. The CCM is well-suited for this research as it examines health outcomes within the context of healthcare policies, patient self-management practices, and healthcare provider influence on chronic disease management [23]. The model's adaptability makes it relevant to studies like this one, which explores healthcare challenges in managing noncommunicable disease (NCD) in Ghana [24]. Additionally, the CCM integrates healthcare professionals' perspectives and advocates for a multidimensional assessment of preventive care methods [25]. Its validity has been established in various studies [23, 26] and applied in diverse settings encompassing Ghana [24], and populations with chronic illnesses [21, 24].

The CCM comprises six core constructs: "health system organization," "delivery system support," "decision support," "clinical information support," "self-management," and "community resources and policies" [21, 22]. This study focuses on two constructs: "self-management" and "community resources and policies." These constructs, as noted by Vallante [26], directly concern the patient. The model emphasizes the importance of productive interaction between the healthcare system, healthcare providers, and patients (e.g., HPT patients) for disease prevention, management, and control [21, 22]. Research suggests that these interactions can be hindered by inherent patient-level barriers impacting HPT control [17]. This potentially contributes to the rising prevalence and low control rates of HPT observed in Africa [6, 17] and Ghana [15].

Furthermore, this study adapts the "self-management support" component of the CCM to focus on HPT patients' disease management practices. These practices are demonstrably limited by barriers such as medication nonadherence, inadequate knowledge of antihypertensive medications, and challenges with lifestyle modifications [17, 20] (Figure 1). The present study evaluates these patient-level barriers and their potential to hinder Ghana's progress toward HPT control.

The model highlights the crucial role of patient–provider interaction in chronic disease management (Figure 1). This interaction can be influenced by individual patient characteristics such as disease severity (mild, [140–159 mmHg SBP and 90–99 mmHg DBP], moderate [160–179 mmHg SBP and 100–109 DBP], or severe [≥ 180 mmHg SBP and ≥ 110 mmHg DBP]) [27], age, gender, residence, education level, occupation, and income level. For this study, the potential challenges posed by these sociodemographic characteristics to HPT management and control in the A/R were explored.

The original CCM's outcome variable focuses on improved health outcomes [21]. In this study, the outcome variable measures the effectiveness of HPT management/control relative to the individual patient's HPT situation. For instance, a patient with severe HPT achieves an improved health outcome if the healthcare system and self-management practices help control their high BP levels. Similarly, patients with mild HPT who, through healthcare and self-management, prevent progression to severe HPT or other cardiovascular complications, also demonstrate improved health outcomes (see Figure 1).

3 | Methods

3.1 | Ethical Considerations

This study adhered to ethical principles outlined in the Declaration of Helsinki [28]. Ethical approval was obtained from three institutional review committees: the James Cook University (JCU) Human Ethics Committee (H9031), the Komfo Anokye Teaching Hospital (KATH) Ethical Review Committee (KATHIRB/AP/029/23), and the Ghana Health Service (GHS) Ethics Review Committee (GHS-ERC: 005/09/22). Additionally, approval was granted by the Ashanti Regional Health Directorate. Written informed consent was obtained from all participants after a detailed explanation of the study's objectives, confidentiality measures, and their right to withdraw at any stage without repercussions. Participants were assured that their identities would not be disclosed, and the collected information would be used solely for academic purposes.

3.2 | Study Design, Population, and Setting

This study was part of a larger mixed-methods project, employed a facility-based cross-sectional design [29] to investigate interpersonal-level factors impacting HPT management within Ghana's A/R. The study was reported based on the STROBE guidelines [30]. Data were collected from HPT patients attending the KATH Family HPT clinic (those attending the outpatient HPT clinic on follow-up visit and HPT patients admitted unto the Family medicine in-patient wards) and Internal Medicine in-patient wards (i.e. HPT patients on admission). The target population included all adult HPT patients (aged 18 years and above) diagnosed and registered for outpatient care and treatment at the KATH HPT clinics. This also included patients booked for follow-up visits and inpatients on HPT management who were alert and provided informed consent. Patients who were not registered KATH clients, in-patients who were not alert, (i.e., medical conscious) or below 18 years old were excluded. The study was conducted at KATH, located in the A/R, Ghana's most populous region [31]. The region's commercial vibrancy, fertile agricultural lands, and mineral deposits attract migrants, leading to cultural diversity (Figure 2). Situated 270 km north of Greater Accra between latitudes 6°35′ N and 6°40′ N and longitudes 1°30′ W and 1°35′ W (Figure 2), the A/R was chosen due to its documented high HPT prevalence. The 2014 Ghana Demographic and Health Survey reported a 15.3% HPT prevalence among women aged 15–49 years (third highest nationally) and an 18.1% prevalence among men in the same age group (highest in Ghana) [9]. Additionally, the survey indicated a 25.9% prevalence of HPT (sustained BP ≥ 140/90 mmHg) in individuals aged 15–49 years. KATH, the second largest hospital in Ghana, was chosen due to its role as a referral center for public and private health facilities within the region and beyond. As the only tertiary healthcare institution in the region and the primary referral hospital for NCDs exceeding the capacity of primary and secondary facilities, KATH provided an ideal setting to assess HPT patients and understand the barriers they face in managing their condition.

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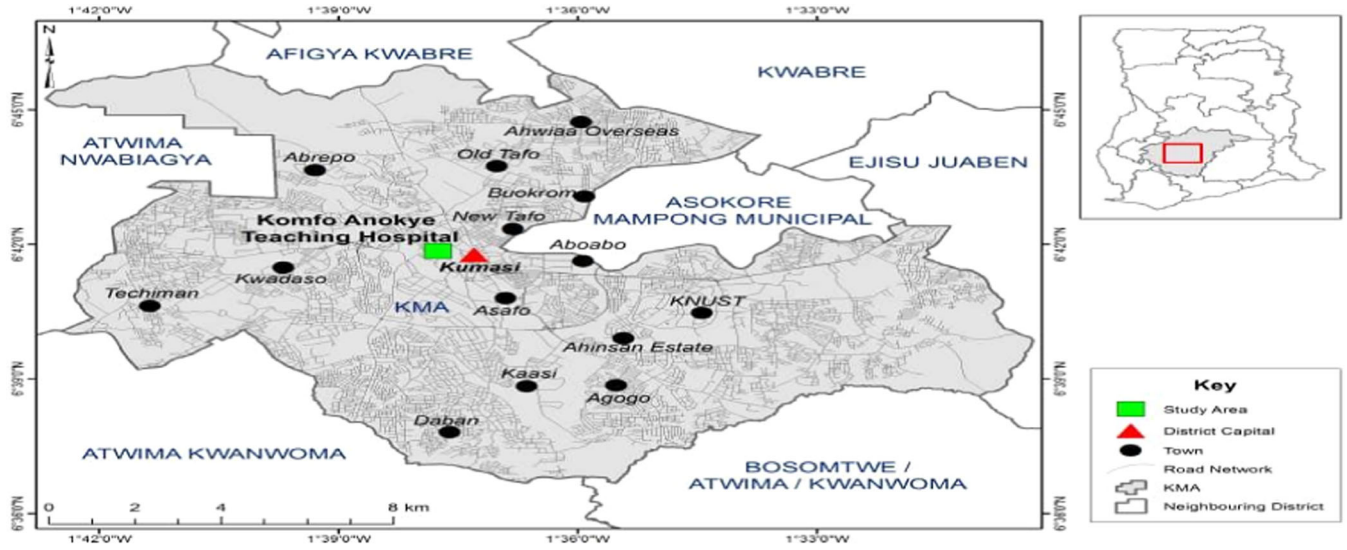

FIGURE 2 | Map of the study area.*Source:* "Cartography and Remote Sensing Unit of the Department of Geography and Regional Planning, University of Cape Coast, [UCC]."

3.3 | Sample Size and Sampling

The sample size for this study was calculated using the formula for health studies by Lemeshow [32]. We employed a prevalence of HPT in the A/R of 34.7% based on Tanor et al.'s [10] study. The formula is $n = z^2\ pq/d^2$ where n = sample size, p = prevalence of HPT in the A/R, d = level of uncertainty (5%/0.05), $z^2 = 95\%$ level of confidence, and $q = 1 - p$. With this calculation, a minimum sample size of 289 was determined. Convenience sampling was employed to recruit participants. On each data collection day, researchers obtained a list of HPT patients booked and present at KATH for their routine follow-up visits. Patients who consented to participate were recruited until the desired sample size was achieved [33]. This approach was adopted due to the accessibility of these patients.

3.4 | Data Collection and Instrument

Data were collected using a questionnaire developed based on previously validated instruments [34, 35]. Sections addressing patient-level barriers were researcher-generated based on a relevant literature review [17].

The questionnaire covered participants' background characteristics and the constructs within the adapted CCM framework (Figure 1). It included close-ended questions and Likert-type scales (see Appendix S1 for details). The questionnaire was administered in either Twi, the predominant language in the study area, or English, based on participant preference. Four trained research assistants (RAs) were recruited: two from Ghanaian universities and one from the Institute of Educational Planning and Administration, University of Cape Coast, Ghana. RAs received a 2-day training manual on ethical principles, consent procedures, and question administration. The questionnaire was pretested among 50 HPT patients at KATH prior to data collection, which occurred from May 5th to July 28th, 2023. RAs typically asked questions, interpreted them into the local dialect when necessary, and recorded responses. The average questionnaire administration time was 25 min. The pretest did not necessitate any questionnaire modifications. Internal consistency of the instruments was assessed using Cronbach's α for the HPT Patient Barrier scale ($\alpha = 0.816$), Kuder Richardson for the adherence scale (0.75), and Cronbach's α for the HPT knowledge questionnaire (0.69) [36].

3.5 | Definition of Study Variables

3.5.1 | Outcome Variable

Perceived Effectiveness of HPT Control/Management: A single survey question assessed participants' perceptions of Ghana's effectiveness in controlling HPT. Response options were: "Very effective" (coded 1), "Effective" (coded 2), "Ineffective" (coded 3), and "Very ineffective" (coded 4). These were dichotomized (i.e. division between two mutually exclusive phenomena) into "Effective/Very Effective" (coded 1) and "Ineffective/Very Ineffective" (coded 0).

3.5.2 | Explanatory Variables

Patients' HPT Self-Management Ability (Self-Efficacy): A single 5-point Likert scale item measured self-efficacy: "How well can you manage your HPT condition?" Responses ranged from 1 ("*Least Ability*") to 5 ("*Most Ability*"). This was dichotomized into "Low Ability/Self-Efficacy" (coded 0), "Moderate Ability/Self-Efficacy" (coded 1), and "High Ability/Self-Efficacy" (coded 2). Patients' HPT Knowledge: An adapted instrument from Saleem et al. [35], assessed HPT knowledge. Responses were originally scored as "Yes" (correct), "No" (incorrect), or "Don't Know." Scores were recoded as "1" for each correct answer and "0" for incorrect or "Don't Know" responses. Total knowledge scores ranged from 0 (minimum) to 15 (maximum). A cut-off of "0–5" was categorized as "Inadequate Knowledge," "6–10" as "Moderate Knowledge," and "11–15" as "Adequate Knowledge."

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Antihypertensive Medication Adherence: An 8-item scale adapted from previous studies [34, 37, 38], assessed medication adherence. The first seven items were scored 0 for "Yes" and 1 for "No." The eighth item had a 5-point scale, with "Never/Rarely" scored as 1 and other responses scored 0 (lowest possible score). Higher scores indicated better adherence.

Patients' HPT Management/Control Barriers: A 14-item scale derived from Dzudie et al. [17] identified barriers to BP control/management. Participants rated each barrier on a 5-point Likert scale ($1 = \textit{least barrier}$, $5 = \textit{high barrier}$). A mean composite score was calculated and dichotomized into "Low Barrier" (coded 0, below the mean) and "High Barrier" (coded 1, above the mean).

Background/Clinical Characteristics: Demographic and socioeconomic characteristics included age (< 50 years $= 0$, 50–59 years $= 1$, and ≥ 60 years $= 2$), gender (female $= 1$, male $= 2$), marital status (divorced/separated $= 1$, never married $= 2$, widowed $= 3$, married/living together $= 4$), educational level (No education $= 0$, primary $= 1$, JHS $= 2$, SHS $= 3$, tertiary $= 4$), religion (Christianity $= 1$, Muslim $= 2$, and Traditionalist $= 3$), ethnicity (non-Akan $= 0$, and Akan $= 1$), income level (GHS $< 500 = 1$, GHS 500–999 $= 2$, GHS 1000–1999 $= 3$, and GHS ≥ 2000), residential status (rural $= 1$, urban $= 2$), household size (< 5 persons $= 1$, 5–9 persons $= 2$, and ≥ 10 persons $= 3$), physical activity status (physically inactive $= 0$, physically active $= 1$), disease duration (< 5 years $= 0$, 5–9 years $= 1$, 10–14 years $= 2$, and ≥ 15 years $= 3$), BP reading (mild HPT $= 0$, moderate HPT $= 1$, and severe HPT $= 2$), and occupation (unskilled $= 0$, sales/services $= 1$, and skilled/professional $= 3$). These variables were included based on prior studies demonstrating their association with HPT management [12, 13, 39].

3.6 | Data Analyses

Data were analyzed employing the "Statistical Package for the Social Sciences (SPSS) version 27." Descriptive statistics (frequencies, percentages) were used to characterize the sample. Data normality was assessed using the Shapiro–Wilk test ($p > 0.05$ indicating normality). Binary logistic regression model was fitted to examine the association between the independent variables (background/clinical characteristics, HPT knowledge, medication adherence, patient-level barriers) and the dependent variable (perceived effectiveness of HPT control/management). The multicollinearity test shows no evidence of collinearity (mean variance inflation factor [VIF] = 1.25, maximum = 1.58 and minimum = 1.06). The results were presented as adjusted odds ratios (AOR) with 95% confidence intervals (CI) and the level of statistical significance was set at $p < 0.05$.

4 | Results

4.1 | Sociodemographic Characteristics

Table 1 presents the sociodemographic characteristics of the respondents. A total of 350 HPT patients participated in the study. Females comprised the majority (74.0%), and most

TABLE 1 | Sociodemographic characteristics of hypertensive patients.

Variable	Frequency	Percentage
Sex		
Female	259	74.0
Male	91	26.0
Age (years)		
< 50	60	17.1
50–59	85	24.3
60+	205	58.6
Residence		
Urban	298	85.1
Rural	52	14.9
Educational level		
No education	94	26.9
Primary	42	12.0
JHS	87	24.0
Secondary	78	22.3
Tertiary	49	14.0
Religious affiliation		
Christian	315	90.0
Muslims	21	6.0
Traditionalists	14	4.0
Marital status		
Married/cohabiting	203	58.0
Single	8	2.3
Divorced or separated	44	12.6
Widowed	95	27.1
Ethnicity		
Akan	307	87.7
Non-Akan	43	12.3
Income level GHC		
< 500	150	42.9
500–999	127	36.3
1000–1999	59	16.9
2000+	14	4.0
Occupation		
Unskilled	174	49.7
Skilled professional	124	35.4
Services	52	14.9
Household size		
< 5	216	61.7
> 5	134	38.3
Physical activity status		
Physically active	116	33.1
Physically inactive	234	66.9

Abbreviations: GHC = Ghana cedis, JHS = junior high school.

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TABLE 2 | Clinical characteristics of hypertensive patients.

Variable	Frequency	Percentage
Disease duration		
< 5 years	81	23.1
5–9 years	112	32.0
10–14 years	83	23.7
15+	74	21.1
Patients' self-efficacy/ ability		
Low self-efficacy	51	14.6
Moderate self-efficacy	150	42.9
High self-efficacy	149	42.6
Knowledge of HPT		
Inadequate knowledge	68	19.4
Moderate knowledge	164	46.9
Adequate knowledge	118	33.7
Blood pressure reading		
Mild hypertension	266	76.0
Moderate hypertension	70	20.0
Severe hypertension	14	4.0
Medication adherence		
Adherence	153	43.7
Nonadherence	197	56.3

Abbreviation: HPT = hypertension.

respondents were urban residents (85.1%). The age distribution revealed a predominance of participants over 60 years old (58.6%). In terms of religion, Christianity was the dominant faith (80.5%). Marital status indicated that the majority were married (58.0%). The majority were Akans (87.7%). Regarding education, 26.9% reported no formal education. Physical activity levels indicated that 66.6% were physically inactive. The majority (61.7%) lived in households with fewer than five members. Income distribution showed that 42.9% earned < GHS 500 monthly.

Table 2 presents the clinical characteristics of the respondents. HPT severity results show most participants had mild HPT (76.0%). In total, 32.0% of participants reported a disease duration of 5–9 years. About 42.9% had moderate self-efficacy to self-management of HPT. A total of 46.9% had moderate HPT knowledge.

4.2 | Logistic Regression Analysis: Factors Affecting HPT Management

Binary logistic regression analysis assessed the impact of patient-level factors on HPT management in Ghana's A/R (Table 3). Compared to other ethnicities, Akan participants had higher odds of effective HPT management (AOR = 3.097, 95% CI = 1.146–8.370; $p = 0.03$). Participants with tertiary education had significantly greater odds of effective HPT management compared to those with no education (AOR = 6.151, 95% CI = 1.240–30.505; $p = 0.03$). Patients with moderate (AOR = 2.540, 95% CI = 1.016–6.350; $p = 0.05$) and high self-efficacy (AOR = 2.632, 95% CI = 1.030–6.725; $p = 0.04$) for HPT management had higher odds of effective management. Compared to single participants, those who were divorced/separated had lower odds of effective HPT management (AOR = 0.073, 95% CI = 0.008–0.700; $p = 0.02$). Participants with a monthly income exceeding GHS 2000.00 had lower odds of effective management compared to those earning less than GHS 500.00 (AOR = 0.081, 95% CI = 0.012–0.532; $p = 0.009$). Participants with HPT exceeding 15 years had lower odds of effective management compared to those with < 5 years (AOR = 0.293, 95% CI = 0.092–0.930; $p = 0.04$). Participants with adequate HPT knowledge had lower odds of effective management compared to those with inadequate knowledge (AOR = 0.312, 95% CI = 0.110–0.879; $p = 0.03$). Participants experiencing higher levels of barriers to HPT management had lower odds of effective management compared to those with lower barriers (AOR = 0.312, 95% CI = 0.159–0.611; $p = 0.001$).

5 | Discussion

Employing the CCM by Wagner [21], this study investigated interpersonal barriers impacting HPT management among patients in Ghana's A/R, aimed to contribute to the national target of reducing uncontrolled HPT by 25% by 2025. About 66.6% of participants exhibited physical inactivity, potentially due to their age (over 58.6% being above 60 years old) as observed in prior European and American studies [40, 41]. Medication nonadherence was also prevalent (56.3%), jeopardizing Ghana's progress toward the national HPT control target. Compared to global estimates (27%–40%) [42], nonadherence was higher, though lower than other African studies (62.5%–65.9%) [43]. Inconsistencies with other Ghanaian studies [20, 44] highlight the influence of methodological variations. These findings underscore the need for behavioral interventions, intensified patient education on medications, and home visits by healthcare professionals to understand family-related factors impacting adherence.

Patients demonstrated adequate knowledge regarding HPT management, echoing previous findings [45, 46]. This aligns with the CCM, emphasizing that knowledge gaps hinder self-management [21, 22]. Our results are consistent with similar observations [45, 46] but differ from studies reporting lower knowledge in Ghana [19, 39]. Conversely, some studies reported high knowledge [38, 47]. These discrepancies highlight the complexity of human behavior and methodological variations, including instrument selection, settings, and population characteristics. Tailoring health promotion programs based on knowledge levels is crucial to improve interventions like medication adherence. Formal education positively impacted HPT management, aligning with previous research [37]. However, about a quarter lacked formal education. This finding emphasizes the importance of incorporating education into interventions for improved self-management of diseases like HPT, as suggested by Madela et al. [13] in South Africa. Interestingly, some studies observed no difference in control rates between those with higher education beyond secondary school and those with no education [12, 13]. While the rationale requires further

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TABLE 3 | Logistic Regression analysis to assess patient-level factors that impact on hypertension management/control in Ghana.

Variable	Odds ratio	95% CI		*p* value
		Lower	Upper	
Sex (ref = female)				
Male	0.757	0.354	1.619	0.473
Age (ref = < 50)				
50–59	1.730	0.611	4.896	0.302
60+	1.992	0.665	5.969	0.218
Religion (ref=Christianity)				
Islam	2.469	0.282	0.476	12.805
Traditionalist	0.773	0.739	0.170	3.514
Ethnicity (ref = non-Akan)				
Akan	3.097	1.146	8.370	0.026
Marital status (ref = single)				
Divorced/separated	0.073	0.008	0.700	0.023
Widowed	1.163	0.323	4.185	0.817
Married/cohabiting	0.456	0.142	1.459	0.186
Place of residence (ref = rural)				
Urban	1.033	0.418	2.556	0.944
Income level (ref = < 500)				
500–999	0.969	0.423	2.219	0.941
1000–1999	0.447	0.162	1.236	0.121
2000+	0.081	0.012	0.532	0.009
Educational level (ref = no education)				
Primary	0.543	0.186	1.588	0.265
JHS	0.891	0.338	2.352	0.816
Secondary	0.506	0.200	1.278	0.150
Tertiary	6.151	1.240	30.505	0.026
Household size (ref = < 5)				
5–9	1.419	0.709	2.840	0.323
10+	7.349	0.600	89.987	0.119
Physical activity status (ref = physically inactive)				
Physically active	1.258	0.638	2.480	0.507
Disease duration (ref = < 5 years)				
5–9 years	0.478	0.184	1.242	0.130
10–14 years	1.222	0.351	4.256	0.753
15+	0.293	0.092	0.930	0.037
Blood pressure reading (ref = mild hypertension)				
Moderate hypertension	1.533	0.692	3.396	0.293
Severe hypertension	1.155	0.224	5.952	0.863
Knowledge level (ref = inadequate knowledge)				
Moderate knowledge	0.474	0.180	1.245	0.130
Adequate knowledge	0.312	0.110	0.879	0.028
Patient perception of healthcare provider support (ref = inadequate support)				

(Continues)

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TABLE 3 | (Continued)

Variable	Odds ratio	95% CI		*p* value
		Lower	Upper	
Moderate support	1.251	0.528	2.963	0.611
Adequate support	0.669	0.281	1.592	0.364
Patients' hypertension management ability (ref = low ability)				
Moderate ability	2.540	1.016	6.350	0.046
High ability	2.632	1.030	6.725	0.043
Patient-level barrier (ref = Low barrier)				
High barrier	0.312	0.159	0.611	0.001
Medication adherence (ref = nonadherence)				
Adherence	1.082	0.556	2.104	0.817

Abbreviations: AOR = adjusted odds ratio, CI = confidence interval, ref = reference category.

exploration, it suggests education may not be the sole factor. Our study also found that longer disease duration increased the risk of uncontrolled HPT, aligning with previous research [39]. This suggests a potential link between disease duration and decreased patient motivation or perception of severity. Strategies are needed to encourage adherence to treatment and lifestyle modifications, particularly in the first year after diagnosis, as control often declines beyond 2 years [39].

The regression model shows self-efficacy was associated with HPT control confirming prior studies [48, 49]. The advantages of self-efficacy in HPT management, such as better self-management skills and greater health awareness cannot be underestimated [48]. For example, studies show self-efficacy as an indispensable determinant for HPT treatment adherence. Emphasizing that the absence of self-efficacy can derail patients' self-management of their HPT condition [50, 51]. The moderate self-efficacy may affirm the moderate knowledge (46.9%) observed in the present study. The moderate self-efficacy may be the reason for the high medication nonadherence observed in the study participants. Health education intervention should be implemented among KATH HPT patients to bolster patients' self-efficacy [52].

Higher family income was associated with lower odds of HPT control. This contradicts the expectation that higher income would facilitate better healthcare utilization and self-management. While Fernald and Adler's [53] study supports this finding, Dai et al.'s [54] study suggests lower socioeconomic status is linked to poorer HPT control. This complexity highlights the multifaceted nature of socioeconomic factors on HPT management. One possibility is that a high-income lifestyle may predispose individuals to sedentary behavior and unhealthy dietary practices, hindering HPT control efforts. Further research is needed to understand this relationship.

Lower patient-level barriers were associated with better HPT control. This suggests that patients in the A/R have developed resilience and coping mechanisms that mitigate the impact of barriers on self-management. This might explain the high prevalence of mild HPT observed in the study. While limited research exists for direct comparison, the factors identified in this study align with those reported by Dzudie et al. [17] as detrimental to HPT self-management. Further in-depth investigation is needed to refine our understanding of how specific patient-level barriers affect HPT management. This knowledge can inform the design of interventions combining pharmacological and nonpharmacological approaches to improve patient outcomes, as advocated by the CCM [21].

Sociocultural factors such as divorced/separated, and ethnicity showed lower and higher odds in HPT management respectively. This aligns with studies suggesting a lack of social support and loneliness that alienate divorcees/separated thus affecting HPT management [55, 56]. For instance, Son et al. [56] found that divorced Korean men were significantly affected by HPT management. Aside that ethnicity influenced patients HPT management which align with studies elsewhere with similar findings [57, 58]. We recommend incorporating clinical health psychologists in HPT clinics to provide tailored interventions for unmarried patients, empowering patients to cope with depressive tendencies and overcome cultural impediments to HPT control.

5.1 | Strengths and Limitations

The study's novelty lies in applying the CCM framework to identify patient-level barriers hindering HPT management in the A/R of Ghana. Additionally, to our knowledge, this is the first study to assess the factors contributing to poor HPT control identified by the PASCAR's project [17] in an African context. However, the cross-sectional nature of the study limits causal inferences. Also, caution should be exercised when interpreting the finding due to the convenience sampling method adopted, self-report bias, cultural and language impact, and confounding factors. Furthermore, the findings cannot be generalized to the entire Ghanaian HPT population due to the small sample size and the fact that the study was conducted in a single tertiary healthcare facility. To mitigate some of these limitations' strategies such as the use of trained, experienced, and culturally competent RAs were used. Also, the BP readings of the respondents were taken from the hospital cards on the day of the data collection at the hospital premises. Also, we ensured the data were collected in the language of the respondents. Multivariable analysis was also adopted to control for confounding.

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5.2 | Implications for Policy and Practice

These findings have significant implications for policy and practice in HPT management within the A/R and Ghana as a whole. First, HPT management programs should be tailored to individual educational attainment levels. Health education campaign should be organized among HPT patients to bolster their self-efficacy. Further, sociocultural factors, such as ethnicity and marital status, should be integrated into HPT control interventions. Also, public health promotion efforts should target and follow-up patients with longer disease duration to address medication adherence challenges. Community awareness campaigns can raise overall HPT knowledge. Healthcare providers should capitalize on patients' existing coping mechanisms to improve medication adherence.

6 | Conclusion

This study identifies education, self-efficacy, the duration of the disease, and barriers to HPT management as important interpersonal factors that impinge on health outcomes. These barriers need to be addressed while leveraging patient strengths in order to move the national agenda of reducing uncontrolled HPT forward. This calls for further qualitative studies to elicit deeper insights that can inform the crafting of targeted interventions.

Author Contributions

Francis Sambah: conceptualization, writing - original draft, methodology, formal analysis, data curation, writing - review and editing, investigation. **Kristin McBain-Rigg:** validation, supervision, project administration, writing - review and editing. **Abdul-Aziz Seidu:** formal analysis, data curation, writing - review and editing. **Theophilus I Emeto:** conceptualization, writing - review and editing, validation, supervision, project administration. All authors have read and agreed to the published version of the manuscript publication.

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Ethics Statement

This study adhered to ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from three institutional review committees: the James Cook University (JCU) Human Ethics Committee (H9031), the Komfo Anokye Teaching Hospital (KATH) Ethical Review Committee (KATHIRB/AP/029/23), and the Ghana Health Service (GHS) Ethics Review Committee (GHS-ERC: 005/09/22). Additional approval was granted by the Ashanti Regional Health Directorate. Patients' participation in this study was completely voluntary and confidential and no personal identifier of the participants was collected.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Transparency Statement

The lead author Francis Sambah affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

References

1. E. J. Benjamin, M. J. Blaha, S. E. Chiuve, et al., "Heart Disease and Stroke Statistics—2017 Update: A Report From the American Heart Association," *Circulation* 135, no. 10 (2017): e146–e603.

2. A. V. Chobanian, G. L. Bakris, H. R. Black, et al., "Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure," *Hypertension* 42, no. 6 (2003): 1206–1252.

3. World Health Organization, "First WHO Report Details Devastating Impact of Hypertension and Ways to Stop It," 2023, https://www.who.int/news/item/19-09-2023-first-who-report-details-devastating-impact-of-hypertension-and-ways-to-stop-it.

4. K. Nuamah, H. Affran Bonful, J. Danso Yeboah, et al., "Characteristics of Inpatient Hypertension Cases and Factors Associated With Admission Outcomes in Ashanti Region, Ghana: An Analytic Cross-Sectional Study," *International Journal of Hypertension* 2017, no. 1 (2017): 1–11.

5. L. Chaker, A. Falla, S. J. van der Lee, et al., "The Global Impact of Non-Communicable Diseases on Macro-Economic Productivity: A Systematic Review," *European Journal of Epidemiology* 30 (2015): 357–395.

6. W. K. Bosu, S. T. Reilly, J. M. K. Aheto, and E. Zucchelli, "Hypertension in Older Adults in Africa: A Systematic Review and Meta-Analysis," *PLoS One* 14, no. 4 (2019): e0214934.

7. F. Atibila, G. Hoor, E. T. Donkoh, A. I. Wahab, and G. Kok, "Prevalence of Hypertension in Ghanaian Society: A Systematic Review, Meta-Analysis, and GRADE Assessment," *Systematic Reviews* 10, no. 1 (2021): 220.

8. World Health Organization, "Hypertension Ghana 2023 Profile," 2023, https://www.who.int/publications/m/item/hypertension-gha-2023-country-profile.

9. Ghana Statistical Service, Ghana Health Service, International Children Fund,*Ghana Demographic and Health Survey* (Rockville, Maryland, USA: GSS, GHS, and ICF International, 2014), 201.

10. E. K. Tannor, O. O. Nyarko, Y. Adu-Boakye, et al., "Burden of Hypertension in Ghana–Analysis of Awareness and Screening Campaign in the Ashanti Region of Ghana," *JRSM Cardiovascular Disease* 11 (2022): 20480040221075521.

11. O. Shahaj, D. Denneny, A. Schwappach, et al., "Supporting Self-Management for People With Hypertension: A Meta-Review of Quantitative and Qualitative Systematic Reviews," *Journal of Hypertension* 37, no. 2 (2019): 264–279.

12. N. Folb, M. O. Bachmann, E. D. Bateman, et al., "Socioeconomic and Modifiable Predictors of Blood Pressure Control for Hypertension in Primary Care Attenders in the Western Cape, South Africa," *South African Medical Journal* 106, no. 12 (2016): 1241–1246.

13. S. Madela, N. Harriman, R. Sewpaul, et al., "Individual and Area-Level Socioeconomic Correlates of Hypertension Prevalence, Awareness, Treatment, and Control in uMgungundlovu, Kwazulu-Natal, South Africa," *BMC Public Health* 23, no. 1 (2023): 417.

14. O. A. Sanuade, S. Boatemaa, and M. K. Kushitor, "Hypertension Prevalence, Awareness, Treatment and Control in Ghanaian Population:

23988835, 2025, 3, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/hsr2.70519 by James Cook University, Wiley Online Library on [06/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Evidence From the Ghana Demographic and Health Survey," *PLoS One* 13, no. 11 (2018): e0205985.

15. W. K. Bosu and D. K. Bosu, "Prevalence, Awareness and Control of Hypertension in Ghana: A Systematic Review and Meta-Analysis," *PLoS One* 16, no. 3 (2021): e0248137.

16. D. T. Tebelu, T. A. Tadesse, M. S. Getahun, Y. M. Negussie, and A. M. Gurara, "Hypertension Self-Care Practice and Its Associated Factors in Bale Zone, Southeast Ethiopia: A Multi-Center Cross-Sectional Study," *Journal of Pharmaceutical Policy and Practice* 16, no. 1 (2023): 20.

17. A. Dzudie, B. Rayner, D. Ojji, et al., "Roadmap to Achieve 25% Hypertension Control in Africa by 2025," *Cardiovascular Journal of Africa* 28, no. 4 (2017): 262–273.

18. F. Sambah, B. S. Malau-Aduli, A. A. Seidu, A. E. O. Malau-Aduli, and T. I. Emeto, "Ghana's Adherence to PASCAR's 10-Point Action Plan Towards Hypertension Control: A Scoping Review," *International Journal of Environmental Research and Public Health* 20, no. 2 (2023): 1425.

19. P. Agyei-Baffour, G. Tetteh, D. Y. Quansah, and D. Boateng, "Prevalence and Knowledge of Hypertension Among People Living in Rural Communities in Ghana: A Mixed Method Study," *African Health Sciences* 18, no. 4 (2018): 931–941.

20. E. Sarkodie, D. Kwame Afriyie, A. Hutton-Nyameaye, and S. Kwabena Amponsah, "Adherence to Drug Therapy Among Hypertensive Patients Attending Two District Hospitals in Ghana," *African Health Sciences* 20, no. 3 (2020): 1355–1367.

21. E. H. Wagner, "Chronic Disease Management: What Will It Take to Improve Care for Chronic Illness?," *Effective Clinical Practice: ECP* 1, no. 1 (1998): 2–4.

22. V. J. Barr, S. Robinson, B. Marin-Link, et al., "The Expanded Chronic Care Model," *Hospital Quarterly* 7, no. 1 (2003): 73–82.

23. W. Aekplakorn, P. Suriyawongpaisal, S. Srithamrongsawadi, and P. Kaewkamjonchai, "Assessing a National Policy on Strengthening Chronic Care in Primary Care Settings of a Middle-Income Country Using Patients' Perspectives," *BMC Health Services Research* 21 (2021): 1–12.

24. H. Amu, E. K. M. Darteh, E. E. Tarkang, and A. Kumi-Kyereme, "Management of Chronic Non-Communicable Diseases in Ghana: A Qualitative Study Using the Chronic Care Model," *BMC Public Health* 21, no. 1 (2021): 1120.

25. S. Marcelli, C. Gatti, R. Rocchi, et al., "Chronic Care Model and Cost Reduction in Initial Health: A New Approach for Satisfaction and Improvement of Chronicity," *Geriatric Care* 3, no. 3 (2017), https://doi.org/10.4081/gc.2017.7066.

26. R. P. Vallente, *Chronic Care Model (CCM)*, (Salem Press Encyclopaedia of Health, 2015).

27. E. O. Evbayekha, O. E. Okobi, T. Okobi, et al., "The Evolution of Hypertension Guidelines Over the Last 20+ Years: A Comprehensive Review," *Cureus* 14, no. 11 (2022): e31437, https://doi.org/10.7759/cureus.31437.

28. General Assembly of the World Medical Association, "World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects," *Journal of the American College of Dentists* 81, no. 3 (2014): 14–18.

29. J. W. Creswell and V. L. P. Clark, *Designing and Conducting Mixed Methods Research* (Sage Publications, 2017).

30. E. V. Elm, D. G. Altman, M. Egger, et al., "The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies," *International journal of surgery* 12, no. 12 (2014): 1495–1499.

31. D. D. Sasu, *Regional Population Distribution in Ghana in 2010 and 2021* (Ghana: Statista, 2021).

32. S. Lemeshow, *Sample Size Determination in Health Studies: A Practical Manual* (World Health Organization, 1991).

33. J. K. Ogah, *Decision Making in the Research Process: Companion to Students and Beginning Researchers* (Accra: Adwinsa Publications (Gh) Limited, 2013).

34. S. Okello, B. Nasasira, A. N. W. Muiru, and A. Muyingo, "Validity and Reliability of a Self-Reported Measure of Antihypertensive Medication Adherence in Uganda," *PLoS One* 11, no. 7 (2016): e0158499.

35. F. Saleem, M. Hassali, A. Shafie, A. Awad, and S. Bashir, "Association Between Knowledge and Drug Adherence in Patients With Hypertension in Quetta, Pakistan," *Tropical Journal of Pharmaceutical Research* 10, no. 2 (2011): 125–132, https://doi.org/10.4314/tjpr.v10i2.66552.

36. J. Pallant and S. S. Manual, *A Step by Step Guide to Data Analysis Using SPSS 4th Edition* (Australia: Allen & Unwin, 2011).

37. Y. Adu-Boakye, S. Gyabaah, J. Arthur, et al., "Hypertension Clinic Registry: Blood Pressure Control Among Hypertensives in a Specialist-Led Clinic In Ghana," *Internet Journal of Cardiovascular Research* 10, no. 1 (2021), https://doi.org/10.5580/IJCVR.55734.

38. P. Okyere, E. A. Boateng, I. Okyere, et al., "Article I Editing," (2020).

39. E. Modey Amoah, D. Esinam Okai, A. Manu, A. Laar, J. Akamah, and K. Torpey, "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, no. 1 (2020): 9379128.

40. G. Lindsay Smith, L. Banting, R. Eime, G. O'Sullivan, and J. G. Z. Van Uffelen, "The Association Between Social Support and Physical Activity in Older Adults: A Systematic Review," *International Journal of Behavioral Nutrition and Physical Activity* 14 (2017): 1–21.

41. J. A. Schrack, V. Zipunnikov, J. Goldsmith, et al., "Assessing the "Physical Cliff": Detailed Quantification of Age-Related Differences in Daily Patterns of Physical Activity," *Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 69, no. 8 (2014): 973–979.

42. E. K. P. Lee, P. Poon, B. H. K. Yip, et al., "Global Burden, Regional Differences, Trends, and Health Consequences of Medication Nonadherence for Hypertension During 2010 to 2020: A Meta-Analysis Involving 27 Million Patients," *Journal of the American Heart Association* 11, no. 17 (2022): e026582.

43. J. Shin and K. D. Konlan, "Prevalence and Determinants of Medication Adherence Among Patients Taking Antihypertensive Medications in Africa: A Systematic Review and Meta-Analysis 2010–2021," *Nursing Open* 10, no. 6 (2023): 3506–3518.

44. F. Atibila, E. T. Donkoh, R. Ruiter, G. Kok, and G. T. Hoor, "Predictors of Nonadherence to Medications Among Hypertensive Patients in Ghana: An Application of the Health Belief Model," *International Journal of Hypertension* 2022, no. 1 (2022): 1418149.

45. O. A. Olowe and A. J. Ross, "Knowledge, Adherence and Control Among Patients With Hypertension Attending a Peri-Urban Primary Health Care Clinic, Kwazulu-Natal," *African Journal of Primary Health Care & Family Medicine* 9, no. 1 (2017): 1–5.

46. M. Machaalani, H. Seifeddine, A. Ali, H. Bitar, O. Briman, and M. N. Chahine, "Knowledge, Attitude, and Practice Toward Hypertension Among Hypertensive Patients Residing in Lebanon," *Vascular Health and Risk Management* 18 (2022): 541–553.

47. Q. Tahir, N. Azam, M. Imran, A. Hashmi, A. Zeb, and A. Furqan, "Knowledge, Attitudes and Practices of Patients Regarding Diabetes and Hypertension Control," *Journal of Postgraduate Medical Institute* 32, no. 2 (2018): 166–172.

48. S. M. Najjuka, T. D. Ngabirano, T. Balizzakiwa, et al., "Health Care Workers' Perceived Self-Efficacy to Manage COVID-19 Patients in Central Uganda: A Cross-Sectional Study," *Risk Management and Healthcare Policy* 15 (June 2022): 1253–1270.

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49. M. J. Lee, S. Romero, H. G. Jia, C. A. Velozo, A. L. Gruber-Baldini, and L. M. Shulman, "Self-Efficacy for Managing Hypertension and Comorbid Conditions," *World Journal of Hypertension* 9, no. 3 (December 2019): 30–41.

50. W. O. S. Asnaniar, R. Tuanany, S. Samsualam, and N. W. Munir, "Self-Efficacy In Patients With Hypertension," *Jurnal Aisyah: Jurnal Ilmu Kesehatan* 6 (2021): 109–114.

51. S. Khairy, A. Aslan, A. M. Samara, I. Mousa, A. S. Alkaiyat, and S. H. Zyoud, "Factors Associated With Self-Efficacy in Patients With Hypertension: A Cross-Sectional Study From Palestine," *Journal of Health, Population, and Nutrition* 40 (2021): 1–10.

52. J. Warren-Findlow, R. B. Seymour, and L. R. Brunner Huber, "The Association Between Self-Efficacy and Hypertension Self-Care Activities Among African American Adults," *Journal of Community Health* 37 (2012): 15–24.

53. L. C. Fernald and N. E. Adler, "Blood Pressure and Socioeconomic Status in Low-Income Women in Mexico: A Reverse Gradient?," *Journal of Epidemiology and Community Health* 62, no. 5 (2008): 8.

54. B. Dai, S. Addai-Dansoh, J. A. Nutakor, et al., "The Prevalence of Hypertension and Its Associated Risk Factors Among Older Adults in Ghana," *Frontiers in Cardiovascular Medicine* 9 (2022): 990616.

55. E. A. Jennings, C. Chinogurei, and L. Adams, "Marital Experiences and Depressive Symptoms Among Older Adults in Rural South Africa," *SSM-Mental Health* 2 (2022): 100083.

56. M. Son, Y. J. Heo, H. J. Hyun, and H. J. Kwak, "Effects of Marital Status and Income on Hypertension: The Korean Genome and Epidemiology Study (KoGES)," *Journal of Preventive Medicine and Public Health* 55, no. 6 (2022): 506–519.

57. A. Gu, Y. Yue, R. P. Desai, and E. Argulian, "Racial and Ethnic Differences in Antihypertensive Medication Use and Blood Pressure Control Among US Adults With Hypertension: The National Health and Nutrition Examination Survey, 2003 to 2012," *Circulation: Cardiovascular Quality and Outcomes* 10, no. 1 (2017): e003166.

58. Z. Haung and S. A. Hong, "Prevalence and Factors Associated With Treatment and Control of Hypertension Among Adults With Hypertension in Myanmar," *International Health* 15, no. 2 (2023): 207–215.

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