Improving Hypertension Outcomes: Assessing Caregivers' Knowledge, Attitude and Practices in Rural Malawi

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KEYWORDS

Knowledge, Attitude, and Practices (KAP); Caregivers; Hypertension;Rural Malawi

ABSTRACT

Introduction: Hypertension is a major global health issue, significantly contributing to the burden of cardiovascular diseases, particularly in low- and middle-income countries (LMICs) like Malawi. Caregivers play a crucial role in managing hypertension in these settings, yet their knowledge, attitudes, and practices (KAP) are not well-documented.

Objectives: This study aimed to assess the knowledge, attitudes, and practices (KAP) of caregivers for hypertensive patients in rural Malawi, as well as to identify any disparities in these areas.

Methods: A descriptive cross-sectional study was conducted from November 2023 to February 2024 at Lisungwi Community Hospital and Neno District Hospital in Neno, Malawi. A total of 422 caregivers were conveniently sampled, with 248 from Lisungwi and 174 from Neno. Data were collected using a validated pre-tested questionnaire, assessing KAP on hypertension. Descriptive, one-way ANOVA and linear regression statistical analyses were performed using SPSS version 22.0.

Results: In both Lisungwi and Neno hospitals, the majority of participants were female, accounting for 63.7% and 62.6%, respectively. The mean age of participants was 44.7 years (± 10.3) in Lisungwi and 45.3 years (± 9.3) in Neno, with average care durations of 4.1 years (± 3.3) and 4.2 years (± 3.2). Notably, 94.4% of caregivers at Lisungwi and 94.3% at Neno exhibited poor knowledge of hypertension; however, all caregivers maintained a positive attitude toward its prevention and management. Significant differences in practice scores were observed ($p < 0.001$), with caregivers in Lisungwi performing better. Additionally, factors such as education, age, and occupation influenced Knowledge, Attitude, and Practices (KAP) scores, while gender impacted practices alone.

Conclusions: The findings of poor knowledge highlight the urgent need for enhanced educational interventions, gender-specific support, community engagement, and a context-specific approach to improve the knowledge and practices of caregivers, which are critical for effective hypertension prevention and management in rural setting.

1. Introduction

Hypertension, commonly known as high blood pressure, is a major public health challenge worldwide, contributing significantly to the global burden of cardiovascular diseases [1]. Hypertension and its associated complications affect over one billion people worldwide, making it a significant public health concern. This condition contributes to the development of cardiovascular diseases, strokes, and premature death, highlighting the urgent need for effective prevention and management strategies [2]. An estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries (LMICs). It is a leading cause of morbidity and mortality, particularly in low- and middle-income countries where healthcare resources are limited [3].

In Malawi, the prevalence of hypertension is at 33%, posing a substantial strain on the healthcare system [4]. In Neno, programs like Screening for Health and Referral in the Community (SHARC) and Screening for Health and Referral at the Facility (SHARF) have enhanced early detection and intervention of diseases [5]. This has resulted in increased enrolment in the Integrated Chronic Care Clinic (IC3) and increased workload for the Community Health Workers (CHWs) [4]. In most LMICs,

family members of the patient often step into the role of caregivers, taking the lead in providing care for their loved ones in the absence of healthcare providers. While they may lack formal expertise in medical care, their involvement is crucial for promoting continuity of care and ensuring the well-being of the patient [6].

Caregivers play a crucial role in the management and support of hypertensive patients. Their knowledge, attitudes, and practices (KAP) towards hypertension significantly impact the health outcomes of the patients they are caring for [7]. Effective management of hypertension not only involves medical treatment but also lifestyle modifications and adherence to prescribed therapeutic regimens, all of which require informed and supportive caregivers [8].

Despite the critical role of caregivers, there is a little data on their understanding and practices regarding hypertension in rural settings like Neno, Malawi [9]. Neno, a district characterized by its predominantly rural population and limited access to healthcare facilities, presents unique challenges in the management of chronic diseases such as hypertension. Understanding the KAP of caregivers in this context is essential for developing targeted interventions to improve hypertension care and patient outcomes [10].

Knowledge, attitude, and practice (KAP) surveys are essential in health-seeking behaviour research. They identify gaps in knowledge about disease risk factors, which can lead to increased disease incidence [7]. Considering that family members who care for the patients in Malawi, there was a need to evaluate the levels of KAP of hypertensive patients' caregivers and try to identify the related factors. This study evaluated the knowledge, attitudes, and practices (KAP) of caregivers for hypertensive patients at Lisungwi Community Hospital and Neno District Hospital in Neno, Malawi. By identifying strengths and gaps in caregivers' KAP and the disparities in KAP between these areas, the research aims to inform the development of tailored educational and support programs, ultimately enhancing hypertension prevention, management, and outcomes in this rural setting.

Objectives

This study aimed to assess the knowledge, attitudes, and practices (KAP) of caregivers of hypertensive patients in rural Malawi, as well as to identify any differences in KAP toward hypertension among caregivers within these rural areas and also to identify demographic characteristics that influence the KAP.

2. Methodology

Study Design and Site

A descriptive cross-sectional study was conducted from November 2023 to February 2024 at Integrated Chronic Care Clinics located in two government hospitals: Lisungwi Community Hospital and Neno District Hospital in Neno, Malawi. These secondary hospitals serve patients from all four Traditional Authorities within the district, managing the highest patient inflow referred from thirteen primary hospitals, seven referring to Lisungwi Community Hospital and six to Neno District Hospital. Neno district has a population of approximately 140,000, with an estimated hypertension prevalence of 17% [10].

Inclusion and Exclusion Criteria

The eligibility criteria for the participants were as follows: (1) Caregivers who have been providing care for at least six months (2) age ≥18 years, and (3) those who consented to participate in the study. The exclusion criteria were as follows: (1) caregivers who have a history of hypertension or any other chronic illness, (2) who have cognitive impairments that may affect their ability to comprehend to the study questions, and (3) who have a history of psychiatric illness.

Sample Size and Sampling

The sample size was calculated using the Charan and Biswas formula (Z = 1.96 and alpha error = 0.05)

and assuming that the prevalence of KAP is at 50 %, the minimum required sample of caregivers was 384 [11]. Considering a 10% non-response rate, a total of 422 participants were selected [12]. Using convenience sampling, we invited all caregivers who escorted their patients to the clinic to be screened for inclusion and exclusion criteria. We intended to have equal participants from both Lisungwi and Neno hospitals but due to the low turn up of caregivers we ended up having 248 participants from Lisungwi community hospital and 174 participants from Neno district hospital. No monetary benefits were offered to any of the participants.

Development and Validation of the Survey Questionnaire

Following an extensive literature search, a face-to-face interviewer-administered questionnaire with demographic data and 26 questions that included yes or no answers and a Likert-scale, was prepared in English to evaluate KAP of hypertensive patients' caregivers [7, 13-18]. Later, it was translated into Chichewa (the local language) for data collection. The questionnaire was checked, validated, and approved by the Research Institute for Health Sciences questionnaire approval committee. The study questionnaire was piloted with 20 participants not included in the final study. The final questionnaire was upgraded with 23 questions taken from feedback from the pilot test. Other than demographic characteristics (age, gender education level, relationship with the patient, location/village, diagnosis date of hypertension/ duration in care, occupation, and religion), nine knowledge assessment questions (covering risk factors, signs and symptoms, complications and prevention), six attitude-related questions (covering how they feel about hypertension), and eight practice-associated questions (covering prevention and management practices) were included in the final questionnaire.

Ethical Consideration

The study was approved by the Research Institute for Health Sciences (RIHES), Chiang Mai University Ethics Committee, Thailand [Approval No.60/2023], and Malawi National Health Sciences Research Committee [Protocol # 23/10/4216]. The researchers also got permission from the Neno District Health Office to conduct the study in Neno. Before data collection, participants were briefed on the study's objectives and procedures, and written informed consent was obtained from all participants. The respondents were free to discontinue their involvement in the study at any time, as it was entirely voluntary. Additionally, they were free to decline to respond to any questions that made them uncomfortable. All their privacy was protected during the research.

Data management and Statistical analysis

KAP scores were graded using a modified Blooms cut off points in which Knowledge score <50% = poor knowledge, 50-75% score = moderate knowledge, >75% score = good knowledge. A score of >60 % indicates a positive attitude, while <60% score indicates negative attitudes. A practice score of >60% was considered good, and <60 was considered poor [17, 19]. In the knowledge section, every correct answer was granted 1 point and each wrong answer a 0 and a total of 25 points were allocated. In the attitude section, a 3-point Likert scale was adopted in which: 1 "Disagree", 2 "Not sure", and 3 "Agree" and a total of 18 points were allocated. The same with practice section, a 4-point Likert scale was adopted in which:1 "Never", 2 "Rarely", 3 "Sometimes", and 4 "Always" a total of 32 points were allocated.

The data was analysed using SPSS version 22.0, and descriptive statistics (percentages, Mean and standard deviation) of participants demographic data and KAP scores, one way ANOVA tests to compare the difference in the mean score of participants of Lisungwi and Neno, and linear regression to ascertain the association of demographic characteristics with KAP, were performed. Results were considered significant at $p < 0.05$.

3. Result and Discussion

. Social demographic characteristics of the participants

Table 1 shows that female respondents outnumbered males in both Lisungwi and Neno hospitals, with

percentages of 63.7% and 62.6%, respectively. Participants had a mean age of 44.7 years (± 10.3) in Lisungwi and 45.3 years (± 9.3) in Neno, with an average care duration of 4.1 years (± 3.3) and 4.2 years (± 3.2), respectively. Most respondents had a primary school education (62.9% in Lisungwi and 64.9% in Neno), identified as Christians, and a significant portion were farmers (57.3% in Lisungwi and 59.8% in Neno). Over half were spouses of the patients (58.1% in Lisungwi and 70.1% in Neno), and most patients had been in care for 1 to 5 years (60.5% in Lisungwi and 62.7% in Neno). Additionally, more than 85% of participants reported receiving hypertension information from healthcare providers.

Table 1. Social demographic characteristics

Variable		**Lisungwi Community Hospital (N= 248)**		**Neno District Hospital (N=174)**	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Gender	Male	90	36.3	65	37.4
	Female	158	63.7	109	62.6
Age	<35 years	38	15.3	20	11.5
	36-45 years	104	41.9	71	40.8
	>45 years	106	42.8	83	47.7
Education level	No education	8	3.2	10	5.8
	Primary school	156	62.9	113	64.9
	Secondary school	75	30.3	47	27.0
	College graduate	9	3.6	4	2.3
Patient's relationship	Child	62	25.0	47	27.0
	Spouse	144	58.1	122	70.1
	Parent	40	16.1	4	2.3
	Other	2	0.8	1	0.6
Occupation	Employed	21	8.5	14	8.1
	Farmers	142	57.3	104	59.8
	Business	70	28.2	53	30.4
	Non	15	6.0	3	1.7
Duration in care	<1 year	32	12.9	15	8.6
	1-5 years	150	60.5	109	62.7
	6-10 years	56	22.6	43	24.7
	>10 years	10	4.0	7	4.0
Religion	Christianity	248	100	174	100
Source of Information	Community Health worker	14	5.7	10	5.7
	Health Care Provider	222	89.5	160	92.0
	Internet	9	3.6	4	2.3
	Other (specify)	3 (radio)	1.2	0	0.0

KAP classification and summary of scores

Knowledge score of 0-12 (<50%) was considered poor knowledge, 13-18 (50-75%) score equals moderate knowledge, 19-25 (>75%) score equals good knowledge. On attitude, a score of 11-18 (>60 %) indicates a good attitude, while 0-10 (<60%) score indicates poor attitude. Similarly practice score of 20-32 (>60%) was considered good practices, and 0-19 (<60%) was considered poor practices. The total score thresholds for both hospitals are shown in Table 2 and Figure 1.

Table 2. Classification and summary of KAP scores.

Lisungwi Community Hospital												
% Score	**Knowledge**			**Level**	**% Score**	**Attitude**			**Practices**			**Level**
	Score	**n**	**%**			**Score**	**n**	**%**	**score**	**n**	**%**	
76-100	19-25	1	0.4	**Good**	**61-100**	11-18	248	100	20-32	242	97.6	**Good**

50-75	13-18	13	5.2	**Moderate**								
0-49	0-12	234	94.4	**Poor**	**0-60**	0-10	0	0.0	0-19	6	2.4	**Poor**
Neno District Hospital												
% Score	**Knowledge**			**Level**	**% Score**	**Attitude**			**Practices**			**Level**
	Score	**n**	**%**			**Score**	**n**	**%**	**score**	**n**	**%**	
76-100	19-25	0	0.0	**Good**	**61-100**	11-18	174	100	20-32	164	94.3	**Good**
50-75	13-18	10	5.7	**Moderate**								
0-49	0-12	164	94.3	**Poor**	**0-60**	0-10	0	0.0	0-19	10	5.7	**Poor**

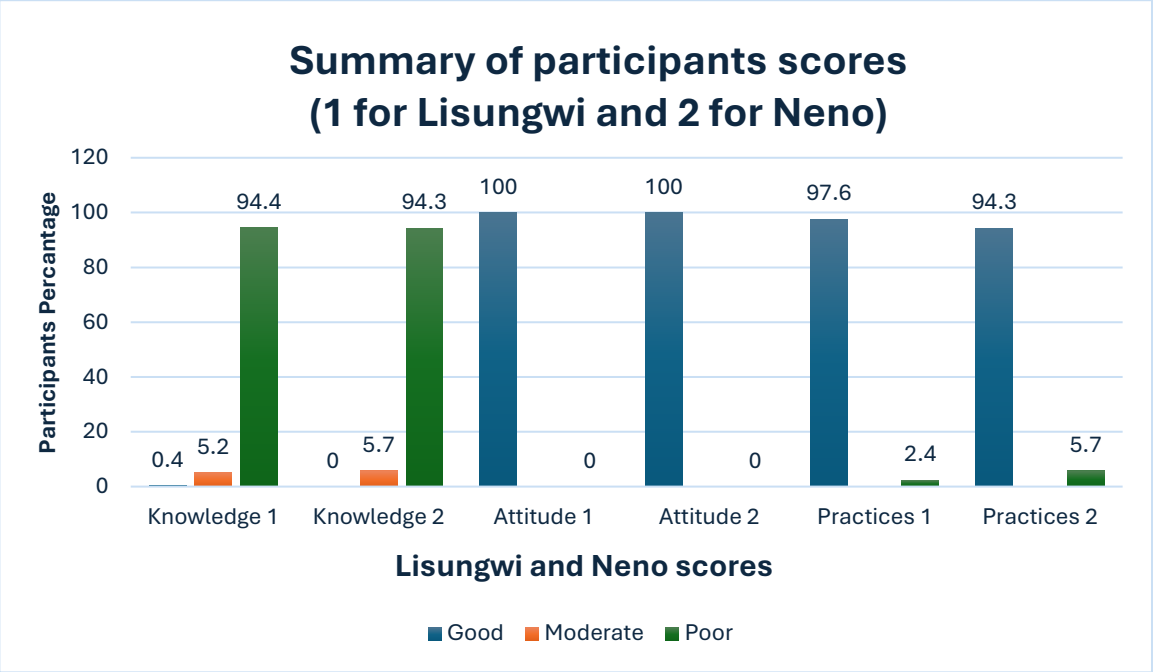

Figure 1. Percentage of participants according to their scores.

KAP scores assessment

KAP scores of both Lisungwi and Neno participants were assessed using mean, percentage and standard deviation (Table 3).

4.4 Comparison of the mean KAP score between Lisungwi and Neno hospitals

Using a one-way ANOVA, there were no significant differences in knowledge (p=0.289) and attitude (p = 0.070) scores among participants from Lisungwi and Neno. However, a significant difference was observed in practice scores between the two hospitals (p < 0.001) (Table 4).

Table 3. Mean KAP scores

	Lisungwi Community Hospital		**Neno District Hospital**	
	n	Mean (%) (SD)	*n*	mean (%) (SD)
Knowledge	248	9.6 (38.4) (2.0)	174	9.4 (37.6) (1.7)
Attitude	248	16.9 (93.4) (1.2)	174	16.6 (92.2) (1.4)
Practice	248	25.7 (80.3) (3.0)	174	24.6 (76.9) (3.1)

Table 4. Comparison of KAP scores between Lisungwi and Neno hospitals using one-way ANOVA.

Lisungwi and Neno Groups		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Knowledge	Between Groups	4.145	1	4.145	1.128	0.289
	Within Groups	1,543.353	420	3.675		

	Total	1,547.498	421			
Attitude	Between Groups	5.334	1	5.334	3.123	0.078
	Within Groups	717.493	420	1.708		
	Total	722.827	421			
Practice	Between Groups	131.720	1	131.720	14.129	<0.001*
	Within Groups	3915.626	420	9.323		
	Total	4047.346	421			

*Significant at p<0.05

Association of the KAP and the demographic characteristics

Using linear regression, the study found several factors that influenced knowledge, attitude, and practices (KAP) related to hypertension among caregivers of hypertensive patients in Lisungwi and Neno hospitals. Education level had a significant influence on knowledge in both Lisungwi (p=0.001) and Neno (p=0.018) hospitals but did not impact practices in either hospital, except for influencing attitude in Neno hospital (p=0.048). Age and occupation had a significant impact on attitude in both hospitals (p=0.005; p<0.001 and p<0.001; p<0.001, respectively), and occupation also influenced practices, but only in Lisungwi hospital. Gender only influenced practices, and this effect was seen in both Lisungwi (p=0.010) and Neno (p=0.031) hospitals. Surprisingly, duration in care only impacted knowledge and practices in Neno hospital (p=0.031 and p=0.010), and not in Lisungwi, while the relationship of the caregiver to the patient influenced practices, but only in Lisungwi hospital (p=0.006). In Lisungwi hospital, attitude and practices were associated with knowledge (p=0.039 and p<0.001, respectively), while in Neno hospital, only practices were associated with knowledge (p=0.003), and practices did not associate with attitude in either hospital (p>0.05) (Table 5).

Table 5: Linear regression to ascertain association of demographic characteristics and the KAP

Variable	**Lisungwi Community Hospital**					**Neno District Hospital**				
	Unstandardized Coefficients		**Std. Coef.**			**Unstandardized Coefficients**		**Std. Coef.**		
	B	**Std. Error**	**Beta**	**t**	**Sig.**	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
		Dependent Variable: Knowledge								
Gender	-0.235	0.267	-0.056	-0.0882	0.379	-0.229	0.277	-0.064	-0.827	0.410
Age	0.003	0.012	0.014	0.229	0.819	-0.015	0.015	-0.080	-0.997	0.320
Education Level	0.956	0.277	0.223	3.458	0.001*	0.771	0.322	0.203	2.393	0.018*
Relationship	0.324	0.248	0.078	1.302	0.194	0.244	0.303	0.064	0.805	0.422
Duration in Care	0.020	0.037	-0.033	-0.5550	0.58	0.086	0.040	0.158	2.172	0.031*
Occupation	0.517	0.287	0.123	1.802	0.073	0.249	0.316	0.070	0.788	0.432
Attitude	0.234	0.113	0.140	2.076	0.039*	0.146	0.102	0.120	1.431	0.154
Practices	0.144	0.141	0.214	3.561	<0.001*	0.125	0.041	0.225	3.069	0.003*
		Dependent Variable: Attitude								
Gender	-0.188	0.151	-0.075	-1.244	0.215	-0.108	0.210	-0.037	-0.517	0.606
Age	0.019	0.007	0.166	2.837	0.005*	0.044	0.011	0.282	3.971	<0.001*
Education Level	0.101	0.161	0.040	0.629	0.530	0.489	0.245	0.156	1.990	0.048*
Relationship	-0.129	0.141	-0.052	-0.913	0.362	0.366	0.228	0.117	1.602	0.111
Duration in Care	-0.038	0.021	-0.104	-1.823	0.070	-0.041	0.030	-0.092	-1.364	0.174
Occupation	0.956	0.152	0.381	6.296	<0.001*	0.825	0.231	0.281	3.573	<0.001*
Practice	0.043	0.023	0.107	1.834	0.068	-0.024	0.032	-0.052	-0.746	0.457
Knowledge	0.076	0.036	0.127	2.076	0.039*	0.084	0.059	0.102	1.431	0.154
		Dependent Variable: Practice								

Gender	1.064	0.410	0.171	2.598	0.010*	1.103	0.507	0.172	2.117	0.031*
Age	0.012	0.019	0.043	0.652	0.515	0.027	0.028	0.080	0.963	0.337
Education Level	0.327	0.440	0.052	0.743	0.458	-0.432	0.607	-0.063	-0.713	0.477
Relationship	1.069	0.382	0.175	2.801	0.006*	-0.009	0.563	-0.015	-0.176	0.860
Duration in Care	0.003	0.058	0.004	0.059	0.953	0.192	0.073	0.196	2.613	0.010*
Occupation	-0.941	0.445	-0.151	-2.115	0.035*	0.650	0.584	0.102	1.112	0.268
Knowledge	0.349	0.098	0.236	3.561	<0.001*	0.431	0.140	0.240	3.069	0.003*
Attitude	0.323	0.176	0.130	1.834	0.068	-0.142	0.190	-0.065	-0.746	0.457

Note: Std.: Standardized; Coef.: Coefficients; Sig.: Significant

*Significant at $p<0.05$

Discussion

This study, conducted in two secondary hospitals in Neno district of Malawi, revealed that a significant majority of participants exhibited poor knowledge but maintained a good attitude and good practices regarding hypertension. Specifically, 94.4% of participants in Lisungwi and 94.3% in Neno demonstrated poor knowledge, while 100% in both locations showed good attitude, and good practices were reported by 97.6% in Lisungwi and 94.3% in Neno. More than half of the respondents were female, with 63.7% in Lisungwi and 62.6% in Neno. The average age of participants was 44.7 years (± 10.3) in Lisungwi and 45.3 years (± 9.3) in Neno, indicating that most caregivers are middle-aged adults likely balancing caregiving responsibilities with other life obligations.

The study found no significant differences in the mean scores for knowledge and attitude between the two hospitals. Lisungwi reported knowledge scores of 9.6 ± 2.0 (38.4%) and attitude scores of 16.9 ± 1.2 (93.4%), while Neno had knowledge scores of 9.4 ± 1.7 (37.6%) and attitude scores of 16.6 ± 1.4 (92.2%). The p-values for knowledge and attitude were 0.289 and 0.078, respectively. However, there was a significant difference in practice scores between the two hospitals. Lisungwi achieved a practice score of 25.7 ± 3.0 (80.3%), while Neno had a practice score of 24.6 ± 3.1 (76.9%), with a p-value of <0.001. This pattern aligns with common findings in health-related knowledge, attitude, and practice (KAP) studies, where knowledge tends to fall behind attitudes and practices. This is reflected in other studies where caregivers, despite lacking formal knowledge, may exhibit good practices and attitudes, possibly due to cultural norms or experiential learning [20, 21].

In Neno District, Partners in Health (PIH) implements integrated screening pro-grams known as Screening for Health and Referral in the Community (SHARC) and Screening for Health and Referral at the Facility (SHARF). These initiatives aim to screen and identify various diseases both within the community and at local clinics [5]. Despite these efforts and health education sessions at IC3 clinics, caregivers demonstrated limited knowledge about hypertension. This highlights the importance of tailored educational interventions and the incorporation of health education into current screening programs. Furthermore, community mobilization and active participation are essential for effectively tackling hypertension, as its prevention and management demand substantial lifestyle changes. The study emphasizes the necessity for targeted educational initiatives to improve the low knowledge scores among caregivers. These interventions should be culturally relevant and consider the educational backgrounds of the caregivers to ensure maximum effectiveness.

Caregivers play a crucial role in improving patient outcomes in resource-limited settings like Malawi. Another study conducted in Neno examined a household-based community health worker program targeting non-communicable diseases, malnutrition, tuberculosis, HIV, and maternal health. Each community health worker was assigned to 20-40 households and received five days of training before their assignments. The results showed a 20% reduction in the default rate among patients with non-communicable diseases (NCDs). Additionally, many patients reported being able to carry out their daily activities, highlighting the importance of health education and household interventions in

combating diseases and improving disease outcomes.[5]. Implementing programs that target caregivers is beneficial, as these initiatives enhance their knowledge and enable them to provide better care for their loved ones. This increased understanding can also foster improved healthcare-seeking behaviour and encourage positive lifestyle changes for both caregivers and their patients.

The study's findings on the predominance of female caregivers in both Lisungwi and Neno hospitals (63.7% and 62.6%, respectively) align with similar studies that highlight the role of women as primary caregivers in healthcare settings, especially in rural and low-resource environments [22]. This trend is supported by research con-ducted across Sub-Saharan Africa, where cultural norms and expectations often place women in caregiving roles [23]. It is not surprising that gender emerged as a significant factor influencing practices in both hospitals, suggesting that male and female caregivers may approach hypertension prevention and management differently as women tend to interact more often with health care providers in there caregiving roles. Most women often handle household chores alongside caring for their families, therefore, continued support for these caregivers is essential. Social and financial empowerment are crucial not only for the well-being of these women but also for the health outcomes of their patients. Furthermore, the significant role of female caregivers suggests the necessity of gender-specific support in education and resource provision.

The study observed that most caregivers have a primary school education (62.9% in Lisungwi and 64.9% in Neno) reflects a broader trend seen in rural healthcare studies [20, 24]. Limited access to higher education in rural areas frequently results in lower educational attainment among caregivers, potentially impacting their health literacy and ability to provide effective care [25]. The study's findings that education significantly influences knowledge but not practices suggest that while caregivers may have limited formal knowledge, they often adhere to practices learned through experience or cultural transmission [26]. The significant influence of educational background on knowledge towards hypertension found in this study is consistent with other research emphasizing the importance of education in health outcomes [27].

The associations identified between knowledge, attitudes, and practices (KAP) and demographic characteristics reveal the complexity of health behaviour among caregivers. The impact of age and occupation on caregivers' attitudes highlights the importance of customizing health communication strategies to effectively engage different demographic segments [28]. One particularly noteworthy finding is that the duration of care significantly influenced knowledge and practices only at Neno Hospital. This observation suggests that variations in healthcare delivery or patient engagement strategies between Neno and Lisungwi facilities may play a critical role in shaping caregiver behaviour [29]. Furthermore, the relationship between the caregiver and the patient was found to affect health practices exclusively in Lisungwi. This highlights the potential for developing targeted support systems that harness familial roles in health management, thereby enhancing the effectiveness of interventions [30].

The study found no correlation between attitude and practices in either hospital, suggesting that a positive attitude alone does not necessarily lead to effective health practices. This lack of association can be attributed to the socio-economic challenges faced in the study area, including limited resources and food insecurity, which hinder individuals' ability to adopt good health practices like healthy dietary habits [4]. The revealed significant correlation between knowledge and practices in Lisungwi, contrasted with the absence of such an association in Neno, indicates that health interventions may need to be tailored to the specific context of each facility. This con-text-specific approach could ensure that health promotion efforts are more relevant and impactful, ultimately leading to improved health outcomes for caregivers and their patients [31].

Finally, Community engagement is also crucial, as the study found that healthcare providers and community health workers are the primary sources of information for caregivers. Strengthening these channels through community engagement programs could enhance knowledge dissemination and improve health outcomes [24]. Addition-ally, the differences between Lisungwi and Neno hospitals

suggest that interventions should be customized to fit local contexts, ensuring their effectiveness and sustainability [32].

Strength and limitations

While the study benefited from a large sample size that provided robust statistical power and was conducted across two different hospitals, leading to distinct results, it also had notable limitations. The use of convenience sampling introduced the potential for respondent bias, although this was somewhat mitigated by including participants from two different communities. Furthermore, the study's focus on a rural setting may limit its generalizability, however, its findings could still be relevant in other low-resource setting, like Malawi.

Further investigation is required to thoroughly explore the differences in Knowledge, Attitudes, and Practices (KAP) observed between these hospitals through random sampling. Additionally, it is essential to compare the KAP of caregivers in rural areas with those in urban settings.

4. Conclusion and future scope

The findings highlight the urgent need for enhanced educational interventions, gender-specific support, community engagement, and a context-specific approach to improve caregivers' knowledge and practices regarding hypertension prevention and management. Tailored educational programs that address the unique challenges faced by caregivers can empower them with essential skills and information, while gender-specific initiatives can cater to the distinct needs of male and female caregivers, enhancing their effectiveness. Community engagement through local organizations and support networks fosters a collaborative environment, encouraging knowledge sharing and motivation. By adopting context-specific strategies that consider cultural and socioeconomic factors, these efforts are likely to lead to better health outcomes for hypertensive patients, ensuring they receive informed and consistent support in man-aging their condition. Ultimately, empowering caregivers not only enhances their confidence and competence but also contributes to the overall well-being of patients, fostering healthier communities.

Author Contributions

Conceptualization, C.M. and K.K.; methodology, C.M., H.C., W.P. and K.K.; formal analysis, C.M. and S.T.; investigation, C.M. and S.T.; resources, K.K. and H.C.; data curation, C.M. and S.T.; writing—original draft preparation, C.M.; writing—review and editing, C.M., H.C., W.P., S.T. and K.K.; visualization, K.K. and S.T.; supervision, K.K.; project administration, S.T. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Research Institute for Health Sciences (RIHES), Chiang Mai University, Thailand [Project No.16/66, date: 5 October 2023], and Malawi National Health Sciences Research Committee [Protocol # 23/10/4216, date: 24 November 2023]. The researchers also got permission from the Neno District Health Office to conduct the study in Neno.

Informed Consent Statement

Informed consent was obtained from all participants involved in this study.

Conflicts of Interest

The authors declare no conflicts of interest

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