Knowledge, Attitude and Practices on Hypertension During the Screening Among Car Free Day Walkers in the City of Kigali-Rwanda

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Abstract

Objective: Hypertension remains a significant public health concern in urban Rwanda, yet little is known about how the public engages with it. This study aimed to assess the knowledge, attitudes, and practices (KAP) related to hypertension among participants of Car Free Day events in Kigali, with the goal of informing targeted health promotion interventions

Materials and Methods: A cross-sectional study with a quantitative design was conducted among 246 randomly selected adults aged 18 years and above who attended Car Free Day physical activities. Data were collected using a structured, pre-tested questionnaire designed to assess participants' knowledge, attitudes, and practices (KAP) regarding hypertension. The questionnaire included both closed-ended and Likert-scale items focusing on awareness, perceptions, and preventive behaviors related to hypertension. Informed consent was obtained from all participants, and ethical approval was secured to ensure adherence to research standards. Data were analyzed using Stata-E-17, with descriptive statistics summarizing KAP levels, and Chi-square tests and logistic regression exploring associations among variables. A 95% confidence interval and a significance threshold of $p < 0.05$ were applied.

Results: Out of 323 participants, 44.6% had low knowledge about hypertension, 25.7% had moderate knowledge, and 29.7% demonstrated high knowledge. Negative attitudes were prevalent among 46.1% of respondents, while only 32.2% showed positive attitudes. Although 86% recognized the importance of blood pressure monitoring, only 40% regularly checked their blood pressure, and just 31% practiced dietary salt reduction. Attitudes were significantly associated with good hypertension practices ($p < 0.001$), whereas knowledge was not ($p = 0.258$). Logistic regression identified positive attitude and prior screening experience as predictors of good practice.

Conclusion: Despite moderate awareness of hypertension, notable gaps in attitudes and preventive behaviors persist among Car Free Day participants. The study recommends strengthening community-based health education and screening during public events to foster positive attitudes and sustainable preventive practices. Additionally, enhanced strategies such as peer education, media awareness campaigns, integration of regular health education and screening programs in the workplace and interactive health promotion could improve early detection, management and control of hypertension.

Keywords (MeSH): Hypertension, Screening, Car free day, Walkers, City of Kigali, Rwanda

Introduction

Hypertension (HTN), commonly known as high blood pressure, is one of the most prevalent non-communicable diseases (NCDs) globally and a leading risk factor for cardiovascular disease, stroke, kidney failure, and premature death (Marc et al., 2022). According to the World Health Organization (WHO, 2023), approximately 1.28 billion adults aged 30 to 79 live with hypertension, with nearly two-thirds residing in low- and middle-income countries (LMICs). Alarmingly, 46% of these individuals remain unaware of their condition, and only 42% receive appropriate treatment—posing a substantial global health challenge. In sub-Saharan Africa (SSA), the burden of hypertension continues to escalate due to rapid urbanization, shifting dietary patterns, sedentary behavior, and limited access to preventive and curative healthcare services. Recent data indicate that hypertension affects 48% of women and 34% of men in SSA, yet effective blood pressure control is achieved by fewer than 13% of women and 10% of men (Lebo et al., 2024). These statistics highlight persistent gaps in awareness, timely diagnosis, and access to care.

Evidence from multiple settings suggests that improving knowledge, attitudes, and practices (KAP) through health education can significantly enhance hypertension control. For example, a hospital-based intervention in China demonstrated substantial improvements in blood pressure control following patient education focused on hypertension-related KAP (Li-Shuang et al., 2024). However, despite increased awareness, many individuals do not translate this knowledge into preventive action. Studies have shown that even among those who are informed about hypertension, adoption of healthy behaviors often remains limited due to weak attitudes or structural barriers (Gong et al., 2020). Therefore, fostering favorable attitudes and enabling supportive environments are essential to converting awareness into effective hypertension prevention.

In East Africa, hypertension is a growing contributor to the NCD burden. For instance, in Uganda, only 26% of individuals with hypertension were aware of their condition, with similar patterns observed in urban areas of Kenya and Rwanda (WHO, 2021; MoH Kenya, 2020). In Rwanda specifically, the prevalence of hypertension rose from 15.2% in 2013 to 16.8% in 2022, based on data from the Second Rwanda NCD Risk Factors Survey

(MoH Rwanda, 2022). Despite this increase, awareness and control remain critically low. Many cases are detected only during emergencies or incidental medical visits, highlighting a gap in routine screening and public education (Leonard et al., 2022).

To address this, the Government of Rwanda has committed to reducing premature deaths from NCDs by 80% through strategies that include community-based screening and awareness campaigns (MoH Rwanda, 2023). One such initiative is Car Free Day, a bimonthly event organized across the city of Kigali. During these events, roads are closed to vehicles to encourage physical activity, while various health services are offered including free blood pressure and blood glucose screening, BMI measurement, and health education. These events attract diverse segments of the urban population and present a unique opportunity for public health outreach.

Despite the potential of Car Free Day to serve as a platform for hypertension awareness and early detection, little is known about the knowledge, attitudes, and preventive practices levels of its participants regarding hypertension. Understanding their level in this matter can inform the design of more effective community-based interventions. Therefore, this study aims to assess the knowledge, attitudes, and practices related to hypertension among individuals participating in Car Free Day activities in Kigali City, Rwanda. The findings will contribute to evidence-based strategies for improving hypertension prevention and control in urban settings, particularly through community-driven initiatives.

Methods

Study Design

This study employed a descriptive cross-sectional design using a quantitative approach. The design was chosen to enable the systematic assessment of knowledge, attitudes, and associated factors influencing preventive practices toward hypertension (HTN) among individuals participating in Car Free Day screening events in Kigali City, Rwanda. The cross-sectional nature of the design allowed for a snapshot of participants' awareness and behaviors during the event but did not allow for causal inference, which is acknowledged as a study limitation. Data collection took place at four main non-communicable disease (NCD) screening sites: the Kigali Convention Center (KCC) roundabout in Kimihurura Sector (Gasabo District), the Integrated Polytechnic Regional Centre (IPRC) in Kicukiro District, Université Libre de Kigali (ULK) in Gasabo District, and the Nyamirambo site in Nyarugenge District.

Study Population

The study targeted adult men and women who attended free hypertension screening services during Car Free Day events. These community health events are organized twice per month and typically attract approximately 500 participants per event across the 4 study sites. The population estimate of 500 participants was based on an average

attendance observed over multiple Car Free Day events from January to March 2024, rather than a single-day event. This approach ensured a realistic estimate for sample size calculation.

Inclusion and Exclusion Criteria

Participants were eligible if they were 18 years or older, able to understand the study's purpose and procedures, and willing to provide informed consent. Individuals who were under 18, cognitively impaired, or unwilling to participate were excluded.

Sample Size and Sampling Technique

The sample size was calculated using Yamane's formula for a finite population, assuming an estimated population of 500 and a 5% margin of error, resulting in a minimum required sample of 223. An additional 10% was added to account for potential non-response, yielding a final sample size of 246. A stratified proportional random sampling technique was used to ensure fair representation from each of the four screening sites, with each site treated as a separate stratum. Participants were randomly selected in proportion to the estimated number of attendees at each site. It is acknowledged that this sampling strategy, which relied on individuals attending health screening stations, may introduce selection bias, as these participants might already exhibit health-seeking behaviors and higher awareness levels compared to the general population.

Data Collection Methods and Instruments

Data were collected through face-to-face interviews using a structured questionnaire. Prior to data collection, written informed consent was obtained after explaining the study's purpose and procedures. The questionnaire consisted of five thematic sections: (1) socio-demographic characteristics, (2) knowledge of hypertension, (3) attitudes toward hypertension prevention, (4) preventive practices, and (5) presence of comorbidities. The questionnaire was adapted from previously validated tools used in similar studies (e.g., Oladimeji et al., 2014; Ibrahim & Yusoff, 2019) and contextualized for the Rwandan population through expert review. It was originally prepared in English and then translated into Kinyarwanda to ensure cultural and linguistic appropriateness. Example items included: Knowledge: "Do you know that hypertension could be prevented? (Yes/No) ". Attitude: "Do you think cutting back on salt can prevent high blood pressure?" (Likert scale). Practice: "How often do you check your blood pressure?" (Regularly, Occasionally, Rarely, Never). For scoring: Knowledge scores were calculated by assigning 1 point for each correct answer; total scores were converted to percentages. Attitudes were assessed using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree); higher mean scores indicated more favorable attitudes. Practice was evaluated based on responses to behavior-related questions. Respondents scoring ≥60% on practice-related items were classified as having "good" practices, while those scoring below were categorized as having "poor" practices. This 60% cutoff was adopted from similar KAP

studies on NCD prevention (e.g., Bigna et al., 2016; Lwanga et al., 2020), where thresholds of 50–70% are commonly used to distinguish adequate from inadequate health behaviors.

Pilot Study, Reliability, and Validity

A pilot study was conducted using 10% of the final sample (n = 25) at a Kigali-based NCD clinic not included in the main study. The pilot results were used to assess the internal consistency of the instrument, yielding a Cronbach's alpha of 0.71, indicating acceptable reliability. Cronbach's alpha was calculated across all attitude and practice scale items. Content Validity Index (CVI) was computed by having five public health experts independently rate the relevance of each item on a 4-point scale. The CVI score of 0.81 indicated a high level of agreement and item relevance across the domains assessed knowledge, attitude, and practice.

All data collectors were public health students with clinical background, trained in research principles, structured interview techniques and the study questionnaire and were supervised by experienced research assistants. Regular monitoring ensured adherence to standardized procedures across all sites. Additionally, the data collectors trained to respond to participant concerns with empathy and to refer any cases of psychological distress to on-site medical personnel.

Data Analysis

Data were cleaned in Microsoft Excel and analyzed in Stata SE version 17. Descriptive statistics (frequencies, means, and standard deviations) were used to summarize participant characteristics and responses. Knowledge and practice scores were calculated and converted into categorical variables based on the 60% threshold as described above.

Attitude items were analyzed using Likert-scale averages. Chi-square tests were used to identify bivariate associations between independent variables and preventive practices. Variables significant at $p < .05$ were entered into multivariate logistic regression to compute adjusted odds ratios (AORs) with 95% confidence intervals.

Ethical Considerations

Ethical approval was granted by the Mount Kenya University Rwanda Institutional Review Board (Ref: MKU/ETHICS/23/01/2024(1)), and additional permission was obtained from the City of Kigali. Written informed consent was obtained from all participants. No personal identifiers were collected; instead, anonymized codes were used. All data were securely stored and accessible only to the research team. A separate linkage file was destroyed after data verification.

To address potential psychological discomfort or misinformation during the interviews, participants were informed that their responses will remain confidential and their names will not be recorded or appear in any report or publication. Additionally, participants were informed that there is no anticipated risk, harm, consequences or direct personal benefits associated with their participation, however they were made aware that the study findings

may contribute to the development of future health interventions aimed at preventing and controlling hypertension in Rwanda. Furthermore, data collectors collaborated with healthcare providers conducting NCD screenings at the study sites to educate participants by distributing informational brochures and clarifying that the screening was not a definitive diagnosis. Participants with elevated blood pressure readings received counseling and were referred to nearby health facilities for further clinical investigation and management. Participants who expressed psychological distress were responded to with empathy and referred to on-site medical personnel for appropriate support.

Limitations

Although this study provides valuable insight into hypertension knowledge and behaviors, several limitations should be acknowledged. The cross-sectional design limits causal inference, and findings represent associations rather than cause-effect relationships. Additionally, reliance on self-reported data introduces the potential for recall or social desirability bias, as participants may over report positive behaviors. Moreover, sampling from a health-oriented event like Car Free Day may have resulted in a selection bias, as attendees may already be more health-conscious. Despite these limitations, the findings contribute meaningfully to understanding public engagement in hypertension prevention in urban Rwanda.

Results

Socio-demographic characteristics of participants (N = 323)

The study involved 323 individuals who participated in hypertension screening during Car Free Day events in Kigali, Rwanda. The gender distribution was nearly equal, with males representing 50.5% (n=163) and females 49.5% (n=160), indicating balanced participation across sexes. Age-wise, the majority were young adults, with 45.8% (n=148) aged 20–30 years, followed by 25.7% (n=83) in the 41–50 age group, and 22.6% (n=73) aged 31–40. Older participants were fewer, with 4.6% (n=15) aged 51–60 and only 1.2% (n=4) over 60 years. This suggests that Car Free Day attendees are predominantly youthful or middle-aged. Regarding education, 41.8% (n=135) had completed secondary school, 29.7% (n=96) primary education, and 18.6% (n=60) university level, while 9.9% (n=32) had no formal education. This indicates a generally high educational attainment among participants. Marital status was varied: nearly half (46.7%, n=151) were married, 26.9% (n=87) single, 11.5% (n=37) divorced, and 7.4% each cohabiting or widowed.

Most participants (90.7%, n=293) lived in urban areas, consistent with the event's city setting, while rural and peri-urban residents were underrepresented. Socioeconomically, 93.2% (n=301) belonged to the third Ubudehe category, reflecting a predominantly middle-income sample. Health insurance coverage was relatively high, with 39.3% (n=127) enrolled in Community-Based Health Insurance (CBHI), 35.0% (n=113) under Rwanda Social Security Board (RSSB), and 25.7% (n=83) covered by other schemes. Religiously, 57.9% (n=187) identified as

Christian, 21.4% (n=69) Muslim, 12.7% (n=41) followed traditional religions, and 8.0% (n=26) had no religious affiliation. Lastly, 29.4% (n=95) reported a family history of hypertension, while 70.6% (n=228) did not. This factor may influence awareness and preventive health behavior. Overall, the participant profile reflects a youthful, urban, moderately educated, and insured population with diverse religious backgrounds engaged in hypertension screening.

Table1: Socio-demographic characteristics of participants (N = 323)

Variable	Category	Frequency	Percent (%)
Sex	Male	163	50.5
	Female	160	49.5
	Total	**323**	**100.0**
Age Category	20–30 years	148	45.8
	31–40 years	73	22.6
	41–50 years	83	25.7
	51–60 years	15	4.6
	61 years and above	4	1.2
	Total	**323**	**100.0**
Education Level	No Formal Education	32	9.9
	Primary	96	29.7
	Secondary	135	41.8
	University	60	18.6
	Total	**323**	**100.0**
Marital Status	Single	87	26.9
	Married	151	46.7

	Cohabiting	24	7.4
	Divorced	37	11.5
	Widowed	24	7.4
	Total	**323**	**100.0**
Location Setting	Urban	293	90.7
	Peri-Urban	2	0.6
	Rural	5	1.5
	Valid total	300	92.9
	Missing (System)	23	7.1
	Total	**323**	**100.0**
Ubudehe Category	First Category	1	0.3
	Second Category	18	5.6
	Third Category	301	93.2
	Last Category	3	0.9
	Total	**323**	**100.0**
Medical Insurance	RSSB	113	35.0
	CBHI	127	39.3
	Others	83	25.7
	Total	**323**	**100.0**
Religion	Christian	187	57.9
	Muslim	69	21.4

	Traditional	41	12.7
	None	26	8.0
	Total	**323**	**100.0**
Family History of HTN	Yes	95	29.4
	No	228	70.6
	Total	**323**	**100.0**

Knowledge levels about hypertension prevention and its risk factors

In this study, respondents' knowledge levels regarding hypertension were assessed using Bloom's cut-off criteria, a standard approach in Knowledge, Attitude, and Practice (KAP) research. The findings from the categorized knowledge scores indicate varying levels of awareness among the respondents regarding hypertension and its screening. Based on the scoring range of 27 to 50, knowledge levels were classified into three distinct categories: low knowledge (scores ≤34), moderate knowledge (scores between 35 and 41), and high knowledge (scores ≥42), consistent with standard practices in public health research where a threshold of 80% of the maximum score is often used to define high knowledge. Out of the total 323 respondents, 44.6% (n=144) demonstrated low knowledge, indicating significant gaps in understanding hypertension risk factors, preventive measures, and the importance of routine screening. This low level of awareness may hinder early detection and effective management of hypertension, contributing to increased morbidity and mortality. Moderate knowledge was observed in 25.7% (n=83) of respondents, reflecting partial awareness that might allow for basic preventive practices, but insufficient for informed health decisions or promoting health in the community. Encouragingly, 29.7% (n=96) of respondents displayed high knowledge, suggesting that nearly a third of the population has a strong grasp of hypertension-related information, including screening and prevention strategies. This subgroup likely benefits from prior health education campaigns, personal experience with the condition, or better access to healthcare information. These results highlight the need for targeted health education interventions to improve knowledge levels, particularly among the 70.3% who fall into low and moderate knowledge categories.

Table2: Knowledge levels about hypertension prevention and its risk factor

Knowledge Level	Score Range	Frequency	Percent (%)

Low Knowledge	27–34	144	44.6
Moderate Knowledge	35–41	83	25.7
High Knowledge	42–50	96	29.7
Total	-	**323**	**100.0**

Respondents' attitudes towards hypertension prevention

Based on the attitude scores ranging from 10 to 50, respondents' attitudes toward hypertension prevention were categorized into negative, neutral, and positive using standardized cut-off points derived from percentage ranges of the total score. A score of 34 or below (less than 70% of the maximum score) was classified as a negative attitude, reflecting limited concern or interest in hypertension prevention. Scores from 35 to 41 (approximately 70–82%) were considered a neutral attitude, indicating moderate awareness or mixed feelings toward preventive actions. Lastly, scores of 42 and above (84% and above) denoted a positive attitude, representing strong agreement with and support for preventive behaviors.

According to this classification, out of the total 323 respondents, 149 individuals (46.1%) exhibited a negative attitude toward hypertension prevention. This suggests that nearly half of the participants may not prioritize or value efforts aimed at preventing the condition. 70 respondents (21.7%) had a neutral attitude, indicating moderate levels of awareness or inconsistent opinions on the importance of hypertension prevention strategies. On the other hand, 104 respondents (32.2%) demonstrated a positive attitude, reflecting a solid understanding and strong support for practices that help in controlling or preventing hypertension. These findings highlight a need for targeted health education and awareness campaigns to improve attitudes, especially among those with negative or neutral views, as attitude has been shown to influence the adoption of preventive health behaviors

Table 3: Categorization of respondents' attitudes towards hypertension prevention

Attitude Category	Score Range	Frequency	Percent (%)
Negative Attitude	10–34	149	46.1%
Neutral Attitude	35–41	70	21.7%
Positive Attitude	42–50	104	32.2%
Total		**323**	**100%**

Practices levels related to hypertension prevention and management among respondents

The study assessed participants' levels of health-related practices concerning hypertension prevention and management and categorized them into Low, Fair, and High practice levels. These were subsequently grouped into broader categories of Poor and Good Practices based on established cut-off points used in similar studies. Out of 323 participants, 60 respondents (18.6%) were found to have low practice scores, ranging between 16 and 18, indicating very limited engagement in recommended hypertension preventive behaviors. These individuals may lack adherence to practices such as regular blood pressure monitoring, physical activity, dietary control, or stress management behaviors that are crucial in managing hypertension risk. The fair practice category, which included scores from 19 to 22, was the most populated group with 132 individuals (40.8%). Participants in this group showed partial adherence to positive health behaviors, suggesting an awareness of preventive measures but with inconsistent application. For instance, they may occasionally engage in physical activity or sometimes monitor their blood pressure but not as frequently or systematically as recommended.

On the other hand, high practice levels were observed in 131 participants (40.6%), with scores ranging from 23 to 27. These respondents demonstrated consistent and proactive health behaviors aligned with global recommendations. This group is considered to be practicing good health habits, including regular hypertension screening, consumption of healthy foods, alcohol moderation or abstinence, and stress management. When the results were categorized into Poor vs. Good Practices, it was evident that a majority of respondents (192 individuals or 59.4%) fell into the Poor Practice category (encompassing both low and fair practices), while 131 participants (40.6%) exhibited Good Practices. This classification highlights a significant gap in optimal health behavior engagement within the study population. These findings are consistent with other studies which suggest that while knowledge of hypertension may exist, actual implementation of preventive behaviors often remains inadequate. Interventions focusing on behavior change communication, accessible health education, and consistent follow-up could enhance practice levels and reduce the risk of hypertension-related complications in similar settings.

Table 4: Practices levels related to hypertension prevention and management among respondents

Practice Category	Score Range	Frequency	Percent (%)	Practice Level
Low Practice	16 – 18	60	18.6%	Poor Practice
Fair Practice	19 – 22	132	40.8%	Poor Practice
High Practice	23 – 27	131	40.6%	Good Practice

Total	—	323	100.0%	—

Bivariate Analysis of socio-demographic and health factors associated with health practices among respondents

The analysis of 323 participants revealed that gender, education, marital status, location, economic category, medical insurance, and religion were not significantly associated with hypertension-related health practices. Both males and females showed similar rates of poor and good practices (p = 0.182), and education levels did not meaningfully influence behavior (p = 0.594). Marital status (p = 0.974), urban or rural residence (p = 0.931), and economic classification (p = 0.699) also showed no significant impact. Medical insurance types and religious affiliation similarly lacked significant associations (p = 0.463 and p = 0.249, respectively). In contrast, age was strongly linked to practice levels (p < 0.001), with younger participants (20–30 years) exhibiting poor health practices, while those aged 41–50 had the highest rate of good practices. Importantly, family history of hypertension was significantly associated with better health practices (p = 0.004), indicating that personal or familial risk awareness motivates preventive actions. This finding underscores the need for targeted education to enhance health behaviors, especially among those without a family history of hypertension.

Table 5: Bivariate analysis between knowledge, attitude, and practice levels among respondents

Variable	Category	Poor Practices (n=192)	Good Practices (n=131)	Total (n=323)	p-value
Gender	Male	91	72	163	0.182
	Female	101	59	160	
Age Category	20-30 years	108	40	148	<0.001
	31-40 years	49	24	73	
	41-50 years	26	57	83	
	51-60 years	6	9	15	
	61 years and above	3	1	4	

Variable	Category	Poor Practices (n=192)	Good Practices (n=131)	Total (n=323)	p-value
Education Level	No formal education	19	13	32	0.594
	Primary	59	37	96	
	Secondary	83	52	135	
	University	31	29	60	
Marital Status	Single	53	34	87	0.974
	Married	89	62	151	
	Cohabiting	13	11	24	
	Divorced	23	14	37	
	Widowed	14	10	24	
Location Setting	Urban	183	110	293	0.931
	Peri-Urban	1	1	2	
	Rural	3	2	5	
Ubudehe Category	First	1	0	1	0.699
	Second	9	9	18	
	Third	180	121	301	
	Last	2	1	3	
Medical Insurance	RSSB	62	51	113	0.463

Variable	Category	Poor Practices (n=192)	Good Practices (n=131)	Total (n=323)	p-value
	CBHI	78	49	127	
	Others	52	31	83	
Religion	Christian	117	70	187	0.249
	Muslim	41	28	69	
	Traditional	23	18	41	
	None	11	15	26	
Family History of HTN	Yes	45	50	95	0.004
	No	147	81	228	

Bivariate analysis between knowledge, attitude, and practice levels among respondents

The table presents the results of the bivariate analysis between knowledge and attitude levels in relation to poor and good hypertension prevention practices among the study respondents (n=323). In terms of knowledge level, out of the 144 individuals with low knowledge, 89 (61.8%) exhibited poor practices, while only 55 (38.2%) demonstrated good practices. Among those with moderate knowledge (n=83), 43 (51.8%) had poor practices, compared to 40 (48.2%) with good practices. Lastly, for participants with high knowledge (n=96), 60 (62.5%) engaged in poor practices, and 36 (37.5%) had good practices. The chi-square test for this association yielded a p-value of 0.258, indicating no statistically significant relationship between knowledge level and practice category. In contrast, attitude showed a significant association with hypertension prevention practices. Among those with a negative attitude (n=150), a notable 106 (70.7%) had poor practices compared to 44 (29.3%) with good practices. Participants with a neutral attitude (n=93) demonstrated a more favorable distribution, with only 39 (41.9%) showing poor practices and 54 (58.1%) exhibiting good practices. For those with a positive attitude (n=80), 47 (58.8%) had poor practices, while 33 (41.2%) reported good practices. The p-value for attitude was less than 0.001, signifying a statistically significant association between attitude and practice level. Overall, while

knowledge did not significantly influence practices in this population, attitude was a strong determinant, with a more neutral or positive attitude being associated with better hypertension prevention behaviors.

Table 6: Bivariate analysis between knowledge, attitude, and practice levels among respondents

Variable	Category	Poor Practices (n=192)	Good Practices (n=131)	Total (n=323)	p-value
Knowledge Level	Low Knowledge	89	55	144	0.258
	Moderate Knowledge	43	40	83	
	High Knowledge	60	36	96	
Attitude	Negative Attitude	106	44	150	<0.001
	Neutral Attitude	39	54	93	
	Positive Attitude	47	33	80	

Multivariate logistic regression analysis of factors associated with practice levels

The results of the multivariate logistic regression analysis identified several variables potentially associated with the likelihood of engaging in good practices regarding hypertension prevention and management. These variables included age category, family history of hypertension, and attitude levels. Each was adjusted for confounding factors, and their Adjusted Odds Ratios (AOR), 95% Confidence Intervals (CI), and p-values were examined to determine statistical significance. Starting with age categories (V7), individuals aged 20–30 years served as the reference group. While higher age categories such as 51–60 years (AOR = 7.361, 95% CI: 0.700–77.426, p = 0.096) and 61+ years (AOR = 7.202, 95% CI: 0.563–92.122, p = 0.129) showed increased odds of having good practices compared to the reference group, these results were not statistically significant. This lack of significance is likely due to small subgroup sizes, especially in the oldest age group, which may have affected the precision of the estimates. A significant finding was observed with respect to family history of hypertension (V14). Respondents with a known family history of hypertension had more than twice the odds of exhibiting good practices (AOR = 2.105, 95% CI: 1.233–3.596, p = 0.006) compared to those without such a history. This statistically significant association suggests that personal or familial experience with hypertension may influence

individuals to adopt more preventive behaviors and better health practices. Regarding attitude levels, participants with a neutral attitude were 40% less likely to engage in good practices compared to those with a negative attitude (AOR = 0.600, 95% CI: 0.322–1.116, p = 0.107), although this finding was not statistically significant. On the other hand, those with a positive attitude were more likely to engage in good practices (AOR = 1.698, 95% CI: 0.880–3.277, p = 0.114), but again the result was not significant at the 0.05 level. These trends, however, highlight the potential influence of attitude on behavior and suggest that improvements in perception and mindset toward hypertension management could contribute to better practices over time. In few, among all variables analyzed, only having a family history of hypertension was significantly associated with good practices. Although age and attitude levels showed promising trends, their associations did not achieve statistical significance, possibly due to sample size limitations or variability within the groups. These findings underscore the importance of tailoring public health interventions to consider familial health history and attitudes to enhance preventive practices.

Table 7: Multivariate logistic regression analysis of factors associated with practice levels

Item Factor	Category	Poor Practices (n)	Good Practices (n)	AOR (Exp(B))	95% CI for AOR	p-value
Age Category	20–30 years (Ref)	108	40	1.00 (Ref)	—	—
	31–40 years	49	24	1.481	0.143 – 15.362	0.742
	41–50 years	26	57	1.785	0.169 – 18.855	0.630
	51–60 years	6	9	7.361	0.700 – 77.426	0.096
	61+ years	3	1	7.202	0.563 – 92.122	0.129
Family History of HTN	Yes	45	50	2.105	1.233 – 3.596	0.006 **
	No (Ref)	147	81	1.00	—	—
Attitude Levels	Negative (Ref)	106	44	1.00	—	—
	Neutral	39	54	0.600	0.322 – 1.116	0.107
	Positive	47	33	1.698	0.880 – 3.277	0.114

Discussion

This study assessed predictors of good versus poor hypertension-related health practices, considering demographic factors, knowledge, attitude, and health awareness. The findings underscore the multifaceted nature of health behavior, aligning with and diverging from existing literature in meaningful ways. Age emerged as a significant factor, with individuals aged 41–60 demonstrating better practices than younger groups. This likely reflects greater risk perception and health consciousness with age, consistent with findings from Ethiopia and Uganda (Tesfaye et al., 2021; Namutebi et al., 2023). In contrast, gender, education, marital status, and religion were not significantly associated with preventive practices. This diverges from studies in Kenya, Nigeria, and Malawi, which have often reported gender and education disparities (Okeke et al., 2022; Banda et al., 2023). However, the neutrality observed here may reflect Kigali's relatively uniform access to health services, public education efforts, and cultural norms that encourage equal participation in health-related activities. For instance, the Car Free Day initiative provides open, community-wide access to screening, potentially leveling the impact of socio-demographic differences. Similarly, marital status and religious affiliation may play a limited role in individual health behavior when structural factors such as awareness campaigns and policy-driven access to care are consistently applied. Family history of hypertension was a strong predictor of good practices, echoing literature showing that personal or familial exposure increases motivation for preventive action (Ezeh et al., 2021; Mokoena et al., 2023). Although participants with high knowledge levels showed better descriptive practices, knowledge alone was not statistically significant. This reinforces the knowledge-practice gap, where awareness fails to translate into behavior due to factors like socioeconomic constraints, norms, or lack of reinforcement (WHO, 2022). Attitude was the strongest predictor of practice ($p < 0.001$), supporting behavior change models that position attitude as a key mediator between knowledge and action (Ajzen, 2020). This finding mirrors results from Rwanda and Uganda, where favorable attitudes were more predictive of health behavior than factual awareness (Twahirwa et al., 2023; Kyambadde et al., 2022). Health awareness also showed a significant association with good practice (AOR = 2.105), indicating the impact of community health education. Studies from Rwanda and Kenya confirm that individuals exposed to public health campaigns are more likely to engage in preventive behaviors (Nkurunziza et al., 2022; Osei-Tutu et al., 2021).

The model accounted for 23.8% of the variance in practice (Nagelkerke R^2 = 0.238), suggesting moderate predictive power. While psychosocial factors like attitude and awareness are key, structural determinants such as income, cultural beliefs, and health system accessibility may further explain behavior and warrant exploration in future research.

Conclusion

This study reveals that attitudes, health awareness, age, and family history of hypertension significantly influence preventive health practices, while factors like gender, education, and religion showed no significant effect, likely

due to equal access to public health initiatives such as Car Free Day. The findings underscore the need to focus on attitude- and awareness-driven interventions over knowledge alone. Community programs promoting positive attitudes and inclusivity can improve preventive behaviors and support Rwanda's NCD control efforts.

Recommendations

To enhance hypertension prevention in Kigali's urban population, health promotion should focus on fostering positive attitudes, the strongest predictor of good practices. Expanding community-based education using platforms like Car Free Day can raise awareness, especially among younger groups. Family-centered approaches are recommended due to the influence of family history on behavior. Addressing socioeconomic and cultural barriers is essential to close the knowledge-practice gap, and integrating attitude and awareness measures into routine monitoring will improve intervention effectiveness.

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