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Original Research Article

Determinants of blood pressure control among hypertensive patients attending outpatient clinic at Thika Level 5 Hospital in Kiambu County, Kenya: a cross-sectional study design

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ABSTRACT

Background: In 2019, global hypertension cases exceeded 1 billion, marking a twofold increase since 1990. In Kenya, hypertension affects 24% of the population and unfortunately, its control remains suboptimal and in particular, Kiambu County. Identifying the interconnected factors impacting hypertension control is crucial for developing effective interventions. This study aimed to evaluate these factors among Thika Level 5 Hospital patients in Kiambu County.
Methods: A cross-sectional study design was used, utilizing mixed methods. The quantitative approach involved administering a structured questionnaire, while the qualitative aspect utilized a key informant interview guide. The sample size was determined using Cochran's formula. An additional 30% of the calculated sample size (385) was included, resulting in a response rate of 98.6%. Systematic random sampling was employed to meet the required sample size. The study population consisted of hypertensive patients at Thika Level 5 Hospital in Kiambu County.
Results: This study included 493 participants, with the largest proportion (32%) aged 55-65 years. The study identified a prevalence of uncontrolled hypertension at 73.6%. Factors strongly associated with uncontrolled blood pressure included respondents' level of knowledge, choice of transport, and greater distance to healthcare facilities (χ^2 (df=8), 78.67, p=0.001). The emerging theme from the key informants on patients' knowledge about hypertension was "inadequate knowledge".
Conclusions: Recognizing that patient knowledge is a predictor of uncontrolled blood pressure, healthcare providers should consistently offer patient education. Additionally, the risk of uncontrolled blood pressure rises with greater distance from healthcare facilities, necessitating increased healthcare accessibility by the Ministry of Health.

Keywords: Cardiovascular, Hypertension, Non-communicable diseases, Uncontrolled blood pressure

INTRODUCTION

Internationally, hypertension (HTN) affects 1.36 billion individuals and is accountable for at least 45% of mortalities due to heart illness, and 51% of deaths due to stroke.[1] World Health Organization(WHO) estimates that the prevalence of Hypertension is highest in the African region with about 46% of adults aged 25 years and older.[2] The prevalence of hypertension in Kenya is 24%.[3] Roughly one billion people globally are living with uncontrolled HTN.[4] About 1 in 10 patients with HTN in developing nations have their BP under control with the recommended parameters of less than 140/90 mmHg.[5] Research has indicated that older age, obesity, engaging in alcohol drinking, and high consumption of salt is strongly linked with poor control of HTN.[6,7] Individuals with uncontrolled BP are more prone to target organ failure and damage and are at a greater risk of

cardiovascular ailments as linked to individuals with controlled BP.[8] Data is inadequate concerning the level of control of BP among hypertensive patients in the country. However, in Kiambu County uncontrolled blood pressure according to the Kenya Health Information System (KHIS), in 2015 the extent was 43.3%, 48.1% in 2016, and 50.9% in 2017. Similar findings have been recorded at Thika level 5 hospital with 34.8%, 35.1%, 47.8% and 49.7% of patients seen having uncontrolled BP in 2015, 2016, 2017 and 2018 respectively.

A study done in northwest Ethiopia reported age being a factor associated with poor adherence to hypertension treatment and management.[9] In other studies, they have reported that as age increases it becomes a risk for poor control of blood pressure as adherence to pills decreases with age.[10] The role of marital status cannot be ignored when it comes to controlling blood pressure. Marital status provides a social network that serves to be supportive in controlling hypertension and enhancing better medication adherence.[11] Adequate knowledge has been indicated to enhance good health-seeking behaviour and better adherence to prescribed medications. In a study conducted among 525 hypertensive patients in 3 health care facilities, poor control of blood pressure was linked with the presence of insufficient knowledge.[12] Patients with adequate knowledge of hypertension have been linked to better blood pressure control.[8] It's indeed true that, there is a big linkage between blood pressure control and access to good health care services. Regular hypertension care from a qualified health care provider was linked to better-controlled blood pressure.[13]

Poorly controlled hypertension among patients is associated with increased cardiovascular morbidity and mortality. Unfortunately, control of hypertension remains suboptimal in Kenya and in particular, Kiambu county. A better understanding of the factors related to poor blood pressure control among hypertensive patients in Kiambu county was of utmost importance as some of these factors may be potentially modifiable, ultimately leading to improved outcome of the high blood pressure patient management in the county and country at large.

The main objective of this study was to assess the determinants of uncontrolled blood pressure among hypertensive patients attending outpatient clinic at Thika level 5 Hospital, Kiambu County. Specifically, we looked into socio-demographic, patient behavioural, nutritional, and health system factors influencing blood pressure control.

METHODS

This study was conducted from April 2021 to September 2021. Permission was granted by the Mount Kenya University- ethical review committee, National Commission for Science Technology and Innovation (NACOSTI/P/21/8194), Kiambu County Health department and Thika Level 5 Hospital. An informed consent was developed and administered to the participants. There were no invasive procedures carried out on the participants and hence no physical risks were encountered.

The study was a cross-sectional mixed method study design that was carried out at Thika Level 5 Hospital in Kiambu County. The target population were the hypertensive patients seeking care at the outpatient clinic.

Adult hypertensive patients, on anti-hypertensives treatment for at least six months prior to data collection were included in the study. Pregnant women on hypertensive treatment were excluded from the study.

The sampling frame included all hypertensive patients who were on follow up at the hospital clinic and enrolment of study participants was carried out at the beginning of each clinic day. Systematic random sampling was utilized to acquire a sample size of 385, with an additional 30% added to reach 500, achieving a response rate of 98.6%. Electronically collected data underwent thorough editing procedures to maintain consistency among respondents and identify and rectify any instances of omission based on location. Key informant interviews were conducted. Data analysis was conducted using SPSS statistical software. Descriptive statistics such as frequencies, standard deviation and means/proportions were used to summarize, organize and simplify the data collected. P value was set at 0.05. Odds Ratio (OR) was used to assess associations with confidence Interval (CI) of 95%. Thematic analysis was done for qualitative data.

RESULTS

A total of 493 participants took part in the study. Females accounted for 65.5% while males accounted for 34.2% of the total population. The highest proportion of study participants was 32%, aged between 55 and 65 years and between the age of 66-77 years, 28.5%. 70% of study participants were married, 55.4% were self-employed and a higher proportion 41% earned a monthly income of less than 10,000 Kenya shillings. The prevalence of uncontrolled hypertension was 73.6%. There was however no statistical difference between the respondent's gender χ^2 (0.05, df=1, N=493), p=0.823, marital status χ^2 (0.028, df=2, N=493) p=0.986), employment status χ^2 (5.12, df=1, N=493), (p=0.077), income χ^2 (1.064, df=3, N=493), p=0.786), age (Fisher's exact, p=0.218) and blood pressure level control among hypertensive persons attending Thika level 5 hospital.

Table 1: Socio-demographic characteristics and BP control.

Socio-demographic characteristic		Controlled		Uncontrolled		
		N	%	N	%	
Gender	Male	48	28.24	122	71.76	OR=1.119, p=0.823
	Female	84	26.01	239	73.99	
Marital status	Single	47	31.33	103	68.67	0.028(2), p=0.986
	Married	93	28.01	239	71.99	
	Divorced	3	27.27	8	72.73	
Employment status	Self-employed	64	23.44	209	76.56	OR=5.12, p=0.077
	Employed	24	25.00	72	75.00	
	Unemployed	42	33.87	82	66.13	
Income level	Less than Ksh10000	57	28.36	144	71.64	OR=1.064(3), p=0.786
	Ksh10,000-19,999	37	23.42	121	76.58	
	Ksh20,000-29,999	23	27.06	62	72.94	
	Ksh30,000-39,999	13	26.53	36	73.47	
Age group (years)	22-32	0	0.00	9	100.00	OR=1.231; p=0.218
	33 to 43	4	16.67	20	83.33	
	44 to 54	27	25.71	78	74.29	
	55 to 65	42	26.75	115	73.25	
	66-77	35	25.18	104	74.82	
	78-88	22	37.29	37	62.71	

Table 2: Respondents' level of knowledge and blood pressure control.

Knowledge level	Groups				χ^2 (df), p value
	Controlled		Uncontrolled		
	N	%	N	%	
Poor	11	7.38	138	92.6	55.6(2), p=0.0018
Moderate	105	32	219	67.59	
Excellent	14	73.6	5	26.3	

Table 1 illustrates that there was no statistical difference between the respondents' socio-demographic characteristics and blood pressure control among hypertensive patients in Thika Level Five hospital.

The highest percentage of participants among those with controlled blood pressure and their uncontrolled counterparts had moderate level of knowledge on awareness of blood pressure control (32% versus 67.59%). The category that had excellent level of knowledge had (73.6% in controlled versus 26.3% in uncontrolled). The proportion of respondents with poor knowledge was higher among those with uncontrolled BP. The respondents' level of awareness of blood pressure control was associated with blood pressure control χ^2 (df=2 (55.6, N=493), p=0.0018.

Chi-square test of independence revealed a statistical link between study participants' level of knowledge and blood pressure level control (Table 2).

The key informants in this study showed the following mixed perspectives on patients' knowledge about hypertension, and the emergent theme was "inadequate knowledge" after thematic analysis was conducted.

"They know that with drug compliance hypertension can be controlled". RESP 1

"They are aware that uncontrolled hypertension can lead to stroke/paralysis". RESP 1

"Most of them don't have adequate knowledge". RESP 2

"The learned ones understand Hypertension and the complications. A big percentage does not". RESP 2

"Majority of the patients are aged and don't have the relevant information concerning their health. Their supporters are ignorant to do follow-up". RESP 4

"Some do not know the outcome of uncontrolled hypertension". RESP 7

The highest percentage of participants in this study among the ones with controlled blood pressure and those that had uncontrolled blood pressure used public transport (PSV) as a means to accessing the facility (24.07% versus 75.93%). The choice of transport was significantly associated with blood pressure control as opposed to the distance to the health facility, cost of transport and the

duration spent in reaching the facility {χ^2 [10.52(4), N=493], p=0.015; χ^2 [5.942(3), N=493], p=0.115; χ^2 [3.88(3), N=493], p=0.275} respectively.

Table 3 illustrates that there was a statistical association between respondent's choice of transport and blood pressure control. Distance to health facility and cost of transport were not linked with control of BP.

Table 3: Health system-related factors and blood pressure control.

Distance to health facility	Groups				χ^2 (df), p value
	Controlled		Uncontrolled		
	N	%	N	%	
Less the 5 km	12	27.91	31	72.09	5.94(3), p=0.115
5-10 km	25	29.07	61	70.93	
10-15 km	33	19.76	134	80.24	
More than 15 km	60	30.61	136	69.39	
Mode of transport					
PSV	91	24.07	287	75.93	10.52(4), p=0.015
Personal vehicle	18	26.47	50	73.53	
Walking	14	50.00	14	50.00	
Boda boda	7	38.89	11	61.11	
Cost of transport					
<Ksh200	46	23.71	148	76.29	3.88(3), p=0.275
Ksh200 to 500	55	27.78	143	72.22	
Ksh500 to 1000	28	28.28	71	71.72	

DISCUSSION

The proportion of females compared to males, with uncontrolled blood pressure, was higher in females (65.5%). In all age groups the prevalence of uncontrolled high blood pressure was highest among the age group 33-43 years (83.3%) followed by 66-77 years (74.8%). The study revealed that the age groups between 44 and 77 years had the second highest prevalence of uncontrolled blood pressure above 73%. In this study, the highest proportion of participants with uncontrolled hypertension among the respondents' level of knowledge had poor knowledge. Only a small proportion of the respondents with controlled blood pressure had excellent knowledge on the control of BP. From the key informants' perspective, uncontrolled blood pressure levels could be attributed to patients' inadequate knowledge of hypertension. It was observed that a majority of study participants have limited knowledge about hypertension and as such, it complicates management.

The highest percentage of respondents in this study travelled for more than 15 kilometers to access the health services, used public transport and spent between two hundred and five hundred Kenya shillings to reach the health facility. The choice of transport and increasing distance to the health facility was significantly associated with uncontrolled blood pressure control.

The findings of this study corroborate results in a survey conducted in Indonesia where it was established that fifty-two per cent of study participants had uncontrolled blood pressure and with the highest proportion reported among females above the age of sixty- two years.[14] The significant association of age, height, weight, BMI and blood pressure control in this study, is consistent with a national cross-sectional survey in Kenya where respondents' age and body mass index were associated with the prevalence of hypertension.[15] A cross-sectional Cameroonian study reported that awareness of hypertension was found to be associated with hypertension control which is consistent with the results from this study.[16] A recent survey by Das et al found that 22.3% of study participants were non-adherent to anti-hypertensive drugs due to distance from the health facility and long waiting lines at the facilities.[17] However, in the Rural South Africa, Mee et al avers that increased travel distance may not impact treatment outcomes.[18]

Overall, the high prevalence among patients at Thika level-five hospital presents a going concern in the anticipation of non-communicable diseases (NCDs) and could indicate an increasing unreported prevalence of cardiovascular diseases among study participants. By 2030, it is projected that non-communicable diseases (NCDs) will account for three times more disability-adjusted life years (DALYs) and nearly five times more deaths compared to communicable diseases, as well as maternal, perinatal, and nutritional conditions combined in low- and middle-income countries (LMICs).[19] It is therefore imperative for the county government to implement cost-effective key interventions that would improve awareness and knowledge of hypertension and other non-communicable diseases. Upscaling the community health strategy would be a game changer. Uncontrolled blood pressure levels, according to key

informants, could be ascribed to patients' understanding of hypertension. It has been discovered that the majority of study participants had insufficient awareness regarding hypertension, which impedes care. The likelihood of having uncontrolled blood pressure increased as the distance between the health care institution and the patient grew. This calls for (Ministry of Health) MOH to increase the access of health care to the population.

The limitation of this study was that it was conducted in one specialized health care level and the results, therefore, may not be generalized to primary health care. Hence the findings may apply to settings with similar characteristics. The respondents were required to recall previous incidents such as nutrition patterns and behaviour, which could have been influenced by recall bias. In Kiambu county, there has not been a similar study conducted and therefore this will provide findings among stakeholders in the nation to plan and strategize with the end objective of meeting the third sustainable development goal (SDG).

CONCLUSION

This study significantly advances knowledge and understanding in the field by uncovering the high prevalence of uncontrolled blood pressure, particularly among individuals over 55 years old, and identifying critical factors contributing to this public health challenge. By demonstrating the essential role of patient education and awareness in hypertension management, the research highlights the need for enhanced educational initiatives. Furthermore, the study establishes a strong correlation between proximity to healthcare facilities and blood pressure control, indicating that individuals living farther from healthcare resources are more likely to experience uncontrolled blood pressure. These findings underscore the urgent need for policy changes aimed at improving healthcare accessibility and enhancing patient education. Implementing targeted interventions, such as expanding healthcare facilities in underserved areas and developing comprehensive health education programs, is essential to effectively address the pressing issue of uncontrolled blood pressure in hypertensive populations.

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