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Lifestyle modification strategies practiced in management of hypertensive patients in Imenti North Sub County, Kenya

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Abstract

Globally, the prevalence of Non-Communicable diseases such as hypertension is increasing dramatically hence a burden to countries of low income countries such as Kenya. In Kenya the prevalence of hypertension has increased gradually over the last 20 years. The objective of the study was to determine level of practice of lifestyle modification strategies among hypertensive patients in relation to management and control of hypertension. A cross-sectional study design was used to collect data. The study population consisted of hypertensive patients in Imenti North sub County of Meru County. Cluster random sampling method was used to select health facilities to be included in the study. On practice of lifestyle modification strategies, each of the five lifestyle modification strategies was significantly contributing to good control of blood pressure among the participants. When each of the strategy was analyzed on how it influenced blood pressure control, it was evident that the patients who practiced the recommended strategies had their blood pressure controlled. Generally, practice of all the recommended strategies was poor among the patients involved in this study.

Keywords: Lifestyle modification strategies, blood pressure control, hypertensive patients in Imenti North

Introduction

Hypertension (HTN), is defined as a systolic blood pressure (BP) higher than 140/90mmHg and/or diastolic blood pressure higher than 90mmHg. These are the ranges in blood pressure that a person who has them is considered to be having normal blood pressure ^[1]. Hypertension is a major contributor to non communicable disease (NCD) burden in both developed and developing countries, especially in developing countries where diagnosis is done at late stages ^[2]. Hypertension also known as high or raised blood pressure causes the blood vessels to have persistently raised pressure, thus the harder the heart works to pump blood resulting to the development of complications within the heart and to other organs like the brain. Hypertension is also known as a “silent killer” and it is mostly detected when it has caused damage to important body organs like the Heart, brain or kidneys. This will eventually result to complications such as kidney failure, stroke and heart diseases ^[3].

Lifestyle modification is non-pharmacological therapy that comprises dietary approaches to stop hypertension (DASH) diet, reduction of body weight among overweight, reduced alcoholic intake, smoking cessation, physical activity as recommended by World Health Organization. Adherence is a widespread problem in chronic conditions as hypertension, and is influenced by certain factors. These include; socioeconomic factors, health status of the individual, current therapy, cognitive factor, interpersonal relationship and personal factors ^[4]. Adherence and lifestyle modification are inseparable measure and as such, public awareness has to be increased on lifestyle modification and importance of adherence emphasized. Understanding these factors can be useful in influencing the health behavior of the population. Motivational interview have shown positive results in improving adherence and participation of intended audience. This measure can be very effective when primary health care approach is applied ^[4].

A study in Pakistan showed that out of 50 participants 20 were females and the remaining were males. This showed that male respondents were more affected than female counterparts. Out of 50 participants 84% respondents implement lifestyle modifications to maintain their blood pressure and only 16% respondents do not implement any lifestyle modification to maintain their blood pressure. A small percentage of participants, 40% do not follow any specific diet.

Only 38% participants said that they perform regular exercise as recommended. It was recommended that hypertension can be prevented and treated if people adhere to a healthy lifestyle like taking low sodium and fat diet, performing physical activities and avoiding sedentary lifestyle. Knowledge should be provided to modify their lifestyle. Controlling hypertension will also help to reduce the burden of non-communicable diseases in Pakistan [5].

A study done in Nigeria on patient understanding of their medicine & lifestyle modification for managing hypertension, showed that 60% 62% & 59% of respondents were aware of lifestyle modification in management of hypertension such as regular exercise, reduction in salt intake and eating a diet high in fruits, vegetables and low in fat. 38% were aware of avoidance of cigarette smoking and 46% were aware of reduction in alcohol intake [6].

According to a study done in Nigeria on patient related barriers to hypertension control in a Nigerian population, unawares of lifestyle modifications and failure to apply these strategies were identified patient related barriers to blood pressure control. The study further revealed disparity between the participant's knowledge and practice of relevant measures. Civil servants and those with longer duration since diagnosis were found less likely practice salt restriction. None of socio-demographic variables was associated with practice of regular exercise; however those with secondary level or formal education were less likely to attempt weight reduction [7].

In Mangalore India, a study was conducted on patient perspective about hypertension. The study revealed that 45% of hypertensive patients studied showed poor general knowledge on hypertension management while 7% had good knowledge on lifestyle modifications practice, the highest perceived barrier was lifestyle modification practices related to hypertension was lack of knowledge [8].

In a study done in Pakistan, it was revealed those patients, who are knowledgeable on lifestyle modification strategies, were more likely to practice the strategies than those who didn't know about the lifestyle modification strategies. However, in the same study most of the patients didn't take the recommended salt intake and regular exercises [5].

The relationship between high alcohol intake (typically three or more drinks per day) and elevated blood pressure has been documented in many epidemiologic studies. Trials have also reported that reductions in alcohol intake can lower blood pressure in normotensive and hypertensive men who are heavy drinkers.

In the Prevention and Treatment of Hypertension Study, which studied moderate- to-heavy drinkers, a reduction in alcohol intake lowered blood pressure to a small, not significant extent. In aggregate, available evidence supports

a recommendation to limit alcohol intake to no more than two drinks per day (men) and one drink per day (women) among those who drink [9].

Cases of hypertension remains persistently high in Imenti North Sub County despite compliance to a range of drugs administered. This may be as a result of lack or poor complementary management strategies such as lifestyle modifications and optimal health seeking behaviour. The patient's knowledge of lifestyle modification in Imenti North Sub County and how they apply complementary strategies such as lifestyle modification strategies is not documented. Hence there is need to do this study.

Methodology

The study was conducted in Imenti North Sub County in Meru County, among hypertensive patients attending outpatient services in selected health facilities. A study survey design was adopted to collect data from a sample of 212 respondents. The study population consisted of hypertensive patients of 18 years and above seeking hypertension services in health facilities of Imenti North Sub County.

A structured questionnaire which was pretested in Githongo Sub County was divided into two sections; Section A included demographic characteristics of the respondents and Section B had structured questions on practice of lifestyle modification strategies in management of blood pressure among hypertensive patients in Imenti North. The respondents were requested to give the information regarding five recommended strategies for blood pressure control. These included; knowledge on recommended dietary salt intake, the frequency of physical exercise, weight monitoring, alcohol intake and smoking effects on blood pressure. In relation to practices of the recommended strategies, the respondents were expected to give honest information on their daily practice of the recommended strategies. Practice of a recommended strategy attracted 1 score while not practising was awarded a zero score. The general practice of the participant was calculated, which was categorized as either good practice or poor practice. After responding to the questions, an average of the respondents' blood pressure was determined using the last three blood pressure findings for the current and previous clinic. Using the WHO guidelines, the researcher established those respondents with normal ranges of blood pressure and those whose blood pressure was above the normal ranges. Face and content validity was ensured through pretesting and rigorous scrutiny by peer reviewers, the pretested tool had a reliability coefficient of Cronbach's alpha of 0.815 which was considered good for the study.

Table 4.1: Reliability analysis table

Scale	Cronbach's Alpha	Number of Items
Lifestyle modification strategies practiced among hypertensive patients	0.815	10

The collected data was entered and analysed using statistical package for social science (SPSS) for windows version 23.0. Frequency tables were used to describe socio-demographic characteristics of the respondents and lifestyle modification strategies practiced among the patients. The relationship between study variables was tested using a chi-square test. Ethical clearance was sought from Chuka University ethical committee, research permit obtained from

National Council of Science technology and information (NACOSTI). An informed written consent was obtained from subjects following a detailed explanation on the nature and reasons for the research. Site approval was obtained from Imenti North Health administration before starting data collection. To avoid plagiarism all materials in this study were referenced appropriately.

Results

Response Rate

The study targeted a sample size of 212 nurses working in maternity departments from which 200 filled in and returned the questionnaires making a response rate of 88.7%. This response rate was satisfactory to make conclusions for the study as it acted as a representative. According to Mugenda and Mugenda (2003) research methodology, a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Based on the assertion, the response rate was excellent.

Demographic characteristics of the participants

The study involved patients who already diagnosed to be hypertensive. The study established that (60%) of the respondents were female. The mean age of the respondents was calculated to be 52.64 ± 2.6 years, with majority of them being above 40 years.

A considerable number of respondents, 84 (42%) were secondary education holders, followed by primary education 45 (22.5%) and 44 (22%) had a no formal education; the remaining respondents had tertiary level of education. Majority of patients 133 (66.5%) were married, with 22 (11%) single, 33 (16.5%) separated and 12 (6%) who had been divorced. The table 1 below shows a summary of the characteristics of the respondents.

Table 1: Demographic characteristics of the respondents

Variable	Category	Frequency	Percentage
Age in years	18-28	10	5
	29-39	38	19
	40-49	92	46
	Above 50	60	30
Gender	Male	80	40
	Female	120	60
Level of education	No formal education	44	22
	Primary	45	22.5
	Secondary	84	42
	Tertiary	27	13.5
Marital status	Single	22	11
	Married	133	66.5
	Separated	33	16.5
	Divorced	12	6

Practice of lifestyle modification strategies among hypertensive patients in Imenti North

The patients were rated on five items on how they practice lifestyle modification strategies. A patient who adhered to the five recommended practices was considered practicing good lifestyle modification practices. Each of the recommended practices was awarded 1 mark and those who didn't practice the recommended strategies attracted a zero mark.

Practice recommended low salt diet intake

Most of the patients 126 (63%) were taking low salt diet as advised by the health care provider. Out of these, only 28 of the patients had their blood pressure controlled. However, among the 74 (37%) patients who were talking food with salt, 2 had their blood pressure controlled. They said food tasted sweet with salt.

Therefore, knowledge on effects excess salt intake on blood pressure control was not translated into practice. This was confirmed on computation of Chi square which gave non-

significant results ($\chi^2=0.436$, $N=200$, $p=0.509$). It was evident that this was after health care provider had counseled them on the same since 146 (73%) reported to have been taught.

Actual Reduced alcohol consumption

On alcohol consumption, 101 (50.5%) of the respondents were taking alcohol. On average, the other half 99 (49.5%) were not taking alcohol. Those who were not taking alcohol were a mixture of those who ceased to consume alcohol and those who have never taken alcohol at all in their lives. Out of all those who consume alcohol only 3 had their blood pressure controlled within the previous three months, while 27 out of 99 of those who do not take alcohol had their blood pressure controlled. Majority of those who do not consume alcohol and had uncontrolled blood pressure, had other contributing factors.

On further analysis, there was a small association between alcohol consumption and blood pressure control with a Cramer's V value of 0.340. Those who consume alcohol were 1.334 more likely to have uncontrolled blood pressure compared to those who do not take alcohol while those who do not consume alcohol had a lower odds ratio of 0.109. On computation of Chi square, alcohol consumption was significantly associated with control of blood pressure ($\chi^2=23.159$, $N=200$, $p=0.000$).

In this study, the participants are aware of effects of excess consumption of alcohol, more than half of the patients were able to tell the effects. In Imenti, the patients attend health clinics, especially hypertensive clinics and are counseled on the effects of alcohol consumption on management of hypertension.

Actual Regular physical exercise

Majority of the respondents, 134 (67%) reported to do physical exercises for 30 minutes daily. This is recommended for patients suffering from hypertension. However there were those who do physical exercise for few minutes less than 30 and were classified as not doing exercise as recommended. Those who were not doing regular physical exercise or did it for less than the recommended time duration accounted for 66 (33%). Out of the 134 patients who do regular exercises, only 25 of them had their blood pressure controlled. Due to other factors, 5 of the patients who didn't adhere to the recommended duration and frequency of the exercises had their blood pressure controlled.

The patients who followed the recommended schedule for regular exercises were 1.136 more likely to have their blood pressure controlled compared to those who did not exercise regularly. Regular exercises and blood pressure control were correlated at ($Rho=0.146$) with a likelihood ratio of 4.707. On computation of Chi square, regular physical exercise was a significant predictor of blood pressure control ($\chi^2=4.259$, $N=200$, $p=0.03$).

Majority of the patients were aware of the benefits of physical exercise but were not compliant with the prescribed frequency and duration. Most of the patients reported that they did the exercises but for less than 30 minutes as recommended by the health care provider. This affected their blood pressure control significantly.

Actual Weight management practice

It was impressive to find out that 181 (90.5%) of the

respondents were able to maintain their body weight. Body Mass Index is a crucial indicator for obesity and risk factor prediction for hypertension. In this study, 32 patients who monitored their body weight had controlled blood pressure. In this study only 19 (9.5%) of the respondents who were unable to monitor and maintain their weights within the recommended range. It is worth noting that none of the patients who didn't monitor their weight had controlled blood pressure.

Weight monitoring was found to be a predictor in blood pressure control. This was after analysis of weight monitoring association with blood pressure control which was positive at Phi Cramers V value of 0.141 and a likelihood ratio of 6.995. The patients who monitored their weight were 1.215 more likely to control their blood pressure compared to those who did not monitor their weight ($\chi^2=3.999$, $N=200$, $p=0.046$).

It was evident from the study that the participants were knowledgeable on monitoring and maintaining their body weight within the recommended ranges of body mass index (BMI). However it was reported that, other than trying to maintain the weight through exercise, some of the

participants were genetically obese. This posed a challenge to such patients since they did everything as recommended.

Actual Smoking status

It was evident from the results that majority of the respondents 181 (90.5%) were not smoking. However, only 30 of them had their blood pressure controlled. Those who were not smoking included those who had stopped smoking and those who have never smoked in their lives. A small percentage of the study participants (9.5%) were involved in smoking. Among these who smoke, none of them had their blood pressure controlled, therefore, smoking greatly affects blood pressure control.

On further analysis, those patients who smoke, were 1.199 more likely to have uncontrolled blood pressure compared to those who do not smoke. There was a positive correlation of 0.176 between smoking and uncontrolled blood pressure. When chi square was computed on smoking and control of blood pressure, the results were significant ($\chi^2=3.705$, $N=200$, $p=0.049$). A summary of the practice of the recommended lifestyle modification strategies is shown in table 2 below.

Table 2: Practice of lifestyle modification strategies

Variable	Category	Frequency	Percentage
Recommended low salt diet intake	Yes	126	63
	No	74	37
Consumes alcohol	yes	101	50.5
	No	99	49.5
Regular physical exercise	Yes	134	67
	No	66	33
Maintains body weight	Yes	181	90.5
	No	19	9.5
Smoking cigarette	Yes	19	9.5
	No	181	90.5
General practice of lifestyle modification	Good practice	26	13
	Poor practice	174	87

General practice of lifestyle modification strategies

In general, only 26 (13%) practiced all the recommended lifestyle modification strategies in management of hypertension. Majority of the respondents 174 (87%) practiced a few or none of the recommended lifestyle modification strategies. If a patient missed to practice one or more of the ideal, was considered to have defaulted the practiced. Those who practiced scored 1 point while those who didn't scored zero. Therefore, a score of five meant good practice and a score of less than five poor practice. In general the patients who adhered to all the recommended lifestyle modification strategies (good practice) had their blood pressure controlled ($\chi^2=113.59$, $N=200$, $p=0.000$)

Discussion of results

This study revealed that excess alcohol consumption is a predictor of uncontrolled blood pressure. On analysis, there was a small association between alcohol consumption and blood pressure control with a Cramer's V value of 0.340. Those who consume alcohol were 1.334 more likely to have uncontrolled blood pressure compared to those who do not take alcohol while those who do not consume alcohol had a lower odds ratio of 0.109. On computation of Chi square, alcohol consumption was significantly associated with control of blood pressure ($\chi^2=23.159$, $N=200$, $p=0.000$). Those patients who reported to be involved in drinking had

they there blood pressure uncontrolled. These results concur with the results done by Murad, which also showed that excess consumption of alcohol increased the risk of developing heart complications and increased mortality and morbidity related to hypertension disorder^[5].

When the respondents were requested to give their actual practice on low salt dietary intake, they reported that sometimes they try to but others reported to use salts regardless of the systemic effects. Those patients, who reported to be adding salt to their meals to make it sweet, had their blood pressure uncontrolled. However, it was not specifically known if the uncontrolled pressure was due to salt intake. On computation of Chi-square, Intake of the recommended low salt diet was significantly associated with control of blood pressure ($\chi^2=13.932$, $N=200$, $p=0.000$). Those patients who take excess salt in their diet were 1.251 more likely to have uncontrolled blood pressure compared to those who take the recommended low salt diet.

High quality evidence in non-acutely ill adults shows that reduced sodium intake reduces blood pressure and has no adverse effect on blood lipids, catecholamine levels, or renal function, and moderate quality evidence in children shows that a reduction in sodium intake reduces blood pressure. Lower sodium intake is also associated with a reduced risk of stroke and fatal coronary heart disease in adults. The totality of evidence suggests that most people will likely

benefit from reducing sodium intake [10]. The study findings revealed that despite the fact that the respondents had the knowledge on effects of smoking, they still smoked. Some reported that it was hard to quit smoking since it was addictive. On binary regression analysis, those patients who smoke, were 1.199 more likely to have uncontrolled blood pressure compared to those who do not smoke. There was a positive correlation of 0.176 between smoking and uncontrolled blood pressure. When chi square was computed on smoking and control of blood pressure, the results were significant ($\chi^2=3.705$, $N=200$, $p=0.049$). In the current study, it was evident that the patients who do not smoke had their blood pressure controlled. The few participants who were reported to be smoking had their blood pressure uncontrolled. Smoking releases nicotine which stimulates the sympathetic system. Once the sympathetic system is stimulated, it releases epinephrine and nor-epinephrine hormones which are associated with increase in blood pressure. This was evidenced in a study on lifestyle modifications in hypertension management [11]. Weight monitoring was found to be a predictor in blood pressure control. Those patients, who were to have increased their body weight from their previous weight, had their blood pressure higher than the normal ranges. Those patients who had maintained their body weight within normal ranges had their blood pressure controlled. This was after analysis of weight monitoring association with blood pressure control which was positive at Phi Cramers V value of 0.141 and a likelihood ratio of 6.995. The patients who monitored their weight were 1.215 more likely to control their blood pressure compared to those who did not monitor their weight ($\chi^2=3.999$, $N=200$, $p=0.046$). Sedentary life and increase in body weight increases the work load for the heart. The heart muscle strains to pump blood in narrowed blood vessels and these effects of straining heart are revealed as increased blood pressure. It is evident from the research that increase in weight contributes to increase in blood pressure; these results are congruent with results in a study by Murad *et al.* that also noted increase in weight to have led to increase in blood pressure [5]. There were a group of patients who practiced regular exercise, and had their blood pressure controlled. Most of

the respondents reported irregular frequency in doing their exercise; others reported not have done the exercise at all. Those patients who had irregular frequency in exercising were considered not practicing. The patients who followed the recommended schedule for regular exercises were 1.136 more likely to have their blood pressure controlled compared to those who did not exercise regularly. Regular exercises and blood pressure control were correlated at ($Rho=0.146$) with a likelihood ratio of 4.707. On computation of Chi square, regular physical exercise was a significant predictor of blood pressure control ($\chi^2=4.259$, $N=200$, $p=0.039$). These results shows that regular exercise done as recommended can markedly lower blood pressure to within normal blood pressure ranges. They are in line with those found by Marfo *et al.* in Ghana, which also revealed that exercise is paramount in management of blood pressure [6]. In general, it was evident that the level of knowledge on management of hypertension was above average and health care providers were cited as the source of the information. The respondents reported that they have support groups in which they attend hypertensive clinics, during these clinics they are taught on various modalities of managing hypertension. The level of knowledge was assessed as poor, average and good. Specific questions were answered under level of knowledge in which a mark was awarded for the correct response. After analysis it was found that the level of knowledge among the respondents was above average. In this study majority of the participants uses a variety of lifestyle modification strategies, however, they do not practice all of the lifestyle modification strategies. A participant can be taking low salt diet and does exercise but also smokes; this affects the general practice of lifestyle modification strategies. In general, out of the five recommended practices, a patient might have followed at least four of them and failed to adhere to one. This contributed to poor practice of the recommended lifestyle modification strategies. These findings are in line with the findings in a study on lifestyle modification practice and associated factors among diagnosed hypertensive patients in selected hospitals South Ethiopia where participants never practiced all the lifestyle modification strategies [12].

Table 3: Association between practice of recommended lifestyle modification strategies and blood pressure control

Variable	Category	Controlled blood pressure		df	P value
		Yes	No		
Do you take the recommended low salt diet	Yes	28	98	1	P=0.00 $\chi^2=0.436$
	No	2	72		
Do you consume alcohol currently	Yes	3	98	1	P=0.00 $\chi^2=23.159$
	No	27	72		
Do you practice regular physical exercise as recommended	Yes	25	109	1	P=0.039 $\chi^2=4.259$
	No	5	61		
Do you maintain the recommended body mass index (BMI)	Yes	31	149	1	P=0.046 $\chi^2=3.999$
	No	1	19		
Do you smoke cigarette currently	Yes	1	19	1	P=0.049 $\chi^2=3.705$
	No	30	150		

Conclusion

Practice of the lifestyle modification strategies was assessed, and the study revealed that most patient practices some lifestyle modification strategies and do not practice others. For those patients who managed to practice all the recommended lifestyle modification strategies had their blood pressure controlled within the normal ranges. Majority of the patients knew that they need to do regular

physical exercise; but were not sure on how long to exercise per session. Some patients had a challenge that they do physical exercise but not as per the recommended time duration and frequency. On weight monitoring, other than diet and exercise; it was evident that some patients had genes for obese in their families. In such case it was difficult for them to maintain their weight within the normal ranges.

Recommendation

The Government of Kenya through the Ministry of Health should engage the county government to carry out intensive campaigns on practice of lifestyle modification strategies in management of hypertension to reduce the burden on drug procurement and promote good health of her citizens.

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