

## Original Research Article

# Lifestyle modification advice provided by health care professionals in the treatment and management of hypertension in Kenya

Teresia Mbogori\*

Department of Nutrition and Health Sciences, Ball State University, Indiana, USA

**Received:** 27 March 2020

**Revised:** 25 April 2020

**Accepted:** 28 April 2020

**\*Correspondence:**

Dr. Teresia Mbogori,

E-mail: [tnmbogori@bsu.edu](mailto:tnmbogori@bsu.edu)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Hypertension is one of the main modifiable risk factors for cardiovascular disease morbidity and mortality. Pharmacological and lifestyle modification approaches are used in the treatment and management of hypertension. The purpose of this study was to identify lifestyle modification advice provided to the general population and to those diagnosed with hypertension by health care providers (HCP) in Kenya.

**Methods:** A secondary data analysis of cross-sectional data collected among 4500 Kenyans participating in the 2015 Kenya stepwise approach to surveillance study was conducted. Questions related to the consumption of salt, sugar, fat, fruits and vegetables as well as physical activity and weight management were evaluated.

**Results:** Among all the participants, only 12.5%, 20.7%, 12.2%, 10.7%, 10.3% and 11.6% were advised to either reduce salt intake, eat 5 or more servings of fruits and vegetables, reduce fat intake, reduce intake of sugary beverages, lose or maintain weight and start or do more physical activity respectively. Of those diagnosed with HTN, 37% were advised to increase intake fruits and vegetables, 37%, 27% and 25% were advised to reduce, salt, fat and sugary beverages intake respectively, 21% and 22% were advised to start or do more physical activity and maintain a healthy body weight or lose weight respectively.

**Conclusions:** Majority of Kenyans had not received dietary modification advice from HCP despite this being a policy recommendation in Kenya. Policy makers need to work closely with HCP to develop appropriate policy implementation strategies.

**Keywords:** Diet, Exercise, Hypertension, Lifestyle

### INTRODUCTION

In 2016, 71% of all the deaths worldwide were attributed to non-communicable diseases (NCD)s with the majority of those deaths observed in low and middle income countries (LMICs) especially in sub-Saharan Africa (SSA).<sup>1</sup> The double burden of disease exists in SSA where communicable diseases such as malaria and tuberculosis and NCDs such as CVDs and diabetes coexist.<sup>2,3</sup> In some LMICs, morbidity and mortality from NCDs has surpassed that of infectious diseases. Currently, cardiovascular diseases account for the highest

deaths associated with NCDs and studies have indicated that the prevalence of chronic diseases especially cardiovascular diseases will continue to rise.<sup>4</sup>

Hypertension is the main modifiable risk factor for cardiovascular disease morbidity and mortality. Prevalence of hypertension in LMIC has shown an increasing trend whereas in high income countries, prevalence of hypertension has been steady or decreasing.<sup>5-7</sup> The World Health Organization (WHO) estimates that 1.13 billion people live with hypertension globally with two thirds living in the low and middle

income countries.<sup>8</sup> According to the Kenya stepwise approach to chronic disease risk factor surveillance study (STEPs) conducted in 2015, more than half (56%) of Kenyans had not been screened for hypertension and 24% of Kenyans were either on treatment for hypertension or had elevated blood pressure (<140 mmHg systolic and or <70 mmHg diastolic). The study also concluded that only 15% of those with hypertension were aware of their status, only 8% with hypertension were on treatment, and only 4.6% of those on treatment had their blood pressure well controlled. Treatment of hypertension involves both pharmacological approach and lifestyle modification. Modification of lifestyle factors can delay onset of hypertension, contribute to lowering of blood pressure in treated patients and in some cases abolish need for antihypertensive medications.<sup>9</sup> The modifiable risk factors for hypertension include smoking, alcohol intake, obesity, excessive salt intake, physical inactivity, high fat diet, inadequate intake of fruits and vegetables and excessive intake of sugar sweetened beverages.<sup>10-12</sup> Even though lifestyle modification has been identified as an approach that can modulate development of chronic diseases, the extent to which messages related to lifestyle changes are communicated to the public, especially in many sub-Saharan African countries is not documented.

Kenya is one of the countries in Africa that is experiencing a rapid economic development and an increase in the prevalence of chronic diseases. In a bid to encourage primary prevention of non-communicable diseases, the Kenyan government launched the national NCD strategic plan in 2015. One of the main tenets of the plan was to promote healthy lifestyles by implementing interventions to reduce intake of unhealthy diets and physical inactivity among others. Currently, there are limited studies that document the implementation of such interventions. Therefore, the purpose of this study was to determine the proportion of individuals diagnosed with high blood pressure that were provided with lifestyle modification advice by a health care professionals to either, reduce salt intake, increase vegetable intake, reduce fat intake, increase physical activity, maintain healthy body weight, reduce intake of sugary drinks and, to identify the factors associated with the likelihood of receiving advice such as residence (rural/urban), age, gender, wealth status and education level.

## **METHODS**

This study analyzed cross-sectional data collected among 4500 Kenyan adults (18- 69 years) participating in the 2015 Kenya STEP wise approach to surveillance study (STEPs) sponsored by the World Health Organization (WHO).<sup>13</sup> The overall aim of the STEPS study was to provide estimates on the indicators of non-communicable diseases among adults (18-69 years). This was the first and only nationwide survey on the risk factors for chronic diseases in Kenya.

## **Sampling and data collection**

The study utilized the National Sample Surveys and Evaluation Program (NASSEP V) sampling frame that was developed and is maintained by the Kenya Bureau of Statistics (KNBS), using the enumeration areas generated from the 2009 population and housing census. Participants were recruited using multistage stratified sampling that allowed national estimates by sex (male/female) and residence (rural/urban). Inclusion criteria was individuals aged 18-69 years who were willing and able to provide informed consent. Data was collected from April 2015 to June 2015. Detailed information on sampling procedure and sample size determination are available in the STEP report.<sup>13</sup> Data were collected using a structured questionnaire adapted from the WHO STEP tool with modifications to suit the Kenyan context.

## **Measures**

The demographic data collected included age, sex, marital status, education, and occupation. The behavioral data included information on lifestyle advice which was assessed using the following question: "During any of your visits to a doctor or other health worker in the past 12 months, were you advised to do any of the following? a) Eat at least five servings of fruit and/or vegetables each day, b) Reduce fat in your diet c) Reduce sugary beverages in your diet d) Start or do more physical activity e) Maintain a healthy body weight or lose weight" The participants answered yes or no. History of high blood pressure diagnosis was determined by the response to the question, "Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension?" to which the participants responded yes or no.

## **Statistical analysis**

Complete data were available for 4495 participants and were analyzed using IBM SPSS statistics 26. Descriptive statistics were analyzed using means and percentages. Chi square statistics were used to determine the proportion of the population advised to adapt lifestyle behaviors according to various demographic and behavioral characteristics.

## **RESULTS**

Majority of the participants were female (60%) had primary education and higher (58.8%) and were below 45 years old (71.1%) as shown on Table 1. The sample was stratified for wealth status and residence hence equal representations under the two categories. Almost half of the participants (2218; 49%) reported that they had a health worker check their blood pressure in the past.

**Table 1: Demographic characteristics by screening and diagnosis of hypertension.**

Demographic characteristics		% all participants (n=4500)	% screened for HBP (n=4500)	% diagnosed with HBP (n=2218)
<b>All</b>		100	49	21.8
<b>Age (in years)</b>	18-29	33.3	29.7	18.4
	30-44	38.1	38.1	29.5
	45-59	19.4	21.5	33.1
	60-69	9.2	10.7	19
<b>Sex</b>	Female	60	73.9	75.8
	Male	40	26.1	24.2
<b>Residence</b>	Rural	51.2	43.9	47.1
	Urban	48.8	55	52.9
<b>Wealth status</b>	Poorest	20	13.5	11.6
	Second	20	16.4	16.1
	Middle	20	21.4	24
	Fourth	20	22.3	22.5
<b>Education level</b>	No formal schooling	16.8	13.9	15.9
	Primary incomplete	24.5	21.4	21.7
	Primary complete	31.7	30.8	30.4
	Secondary+	27.1	33.9	32
	Richest	20	26.4	25.8
<b>BMI (Kg/m<sup>2</sup>)</b>	<18.4	10.9	8.6	4.8
	18.5-24.9	53.4	48.3	36.1
	25-29.9	20.8	26.9	32.6
	>30	10.6	16.2	26.6

**Table 2: Percentage advised to reduce salt intake among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics	All			Hypertension			
	%	X <sup>2</sup>	P value	%	X <sup>2</sup>	P value	
<b>Total</b>	12.5			36.8			
<b>Age (in years)</b>	18-29	25.5	44.8	<0.001	9	20.77	<0.0001
	30-44	35.6			30.3		
	45-59	23.4			34.8		
	60-69	15.4			25.8		
<b>Sex</b>	Male	31.4	19.8	<0.0001	24.2	0	0.995
	Female	68.6			75.8		
<b>Residence</b>	Rural	48.2	2.3	0.12	46.1	0.122	0.727
	Urban	51.8			53.9		
<b>Wealth status</b>	Poorest	11.5	31.9	<0.0001	9.6	2.54	0.637
	Second	20			15.2		
	Middle	21.6			23.6		
	Fourth	23.9			25.8		
	Richest	22.9			25.8		
<b>Education level</b>	No schooling	11.5	16.8	0.001	14.6	8.5	0.036
	Primary incomplete	23			15.7		
	Primary complete	34			36.5		
	Secondary+	31.4			33.1		
<b>BMI</b>	<18.4	7.1	55.6	<0.0001	3.5	4.87	0.072
	18.5-24.9	48.3			31.2		
	25-29.9	27.4			34.7		
	>30	17.1			30.6		

Men, individuals without any formal schooling, individuals from the poorest wealth status, those residing in the rural areas, and those within the 60-69 years' age range were less likely to have had their blood pressure previously checked by a health professional (Table 1). Among those who had been checked for HTN, 484 (21.8%) reported that they were told to have had HTN by the health care provider. Lifestyle modification advise to all participants (n=4495) and those diagnosed with HTN (n=484).

### Reduce salt intake

Only 12.5% of all the participants had been advised to reduce their salt intake. Significant differences between demographic characteristics and likelihood of receiving advice to reduce salt intake are summarized in Table 2.

Men were less likely than women to report being advised to reduce salt intake ( $X^2=19.8$ ;  $p<0.0001$ ). Similarly, those underweight ( $X^2=55.6$ ;  $p<0.0001$ ), of poorer wealth status ( $X^2=31.9$ ,  $p<0.0001$ ), with no formal schooling ( $X^2=16.8$ ;  $p=0.001$ ) and those between 18-25 years old ( $X^2=44.8$ ;  $p<0.0001$ ) were less likely to report that they were told to reduce salt intake. Among participants who had been diagnosed with hypertension (n=484), 36.8% had been advised to reduce their intake of salt. In this

case, those between 18-25 years old ( $X^2=20.7$ ;  $p<0.0001$ ) and only those with no formal schooling ( $X^2=8.5$ ;  $p<0.36$ ) reported that they had not been advised to reduce their salt intake as shown on Table 2.

### Eat at least five servings of fruit and/or vegetables each day

About a fifth (20.7%) of the participants had been advised to eat 5 or more servings of fruit and vegetables a day as shown on Table 3. Significant differences were found among various demographic characteristics namely weight status ( $X^2=34.8$ ;  $p<0.0001$ ), wealth status ( $X^2=86.1$ ;  $p<0.0001$ ), rural/urban residence ( $X^2=8.3$ ;  $p=0.004$ ), education level ( $X^2=92.8$ ;  $P<0.0001$ ) and gender ( $X^2=73.4$ ;  $p<0.0001$ ).

About 37% of the participants diagnosed with HTN reported that to had been advised to consume 5 or more servings of fruits and vegetables a day. Those who lived in rural areas were less likely to report that they had been advised to consume more fruits and vegetables ( $X^2=4.6$ ;  $p=0.03$ ). Similarly, more of those in the poorest wealth status category also reported that they were not advised to consume more fruits and vegetables as compared to the other wealth categories ( $X^2=10.7$ ;  $p=0.03$ ). See Table 3

**Table 3: Percentage advised to consume 5 servings or more of fruits and vegetables among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics	All			Hypertension			
	%	$\chi^2$	P value	%	$\chi^2$	P value	
<b>Total</b>	20.7			36.6			
<b>Age years</b>	18-29	32	1.9	0.603	14.1	5.4	0.144
	30-44	38.1			28.8		
	45-59	19.7			33.9		
	60-69	10.2			23.2		
<b>Sex</b>	Male	27.7	73.4	<0.0001	19.2	3.75	0.053
	Female	72.3			80.8		
<b>Residence</b>	rural	47	8.3	0.004	40.7	4.6	0.03
	Urban	53			59.3		
<b>Wealth status</b>	Poorest	9.7	86.1	<0.0001	6.2	10.7	0.03
	Second	20.4			14.7		
	Middle	21.5			23.2		
	Fourth	24.9			26.6		
	Richest	23.5			29.4		
<b>Education level</b>	No Schooling	6.6	92.8	<0.0001	12.4	7	0.072
	Primary incomplete	24.9			17.5		
	Primary complete	36.3			33.9		
	Secondary+	32.2			36.2		
<b>BMI</b>	<18.4	8	34.8	<0.0001	4.7	4.339	0.222
	18.5-24.9	53.4			30.8		
	25-29.9	24.4			33.1		
	>30	14.2			31.4		

**Table 4: Percentage advised to reduce fat intake among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics		All			Hypertension		
		%	X <sup>2</sup>	P value	%	X <sup>2</sup>	P value
<b>Total</b>		12.2			27.1		
<b>Age years</b>	18-29	28.7	11.3	0.01	8.4	15.497	0.001
	30-44	38.7			27.5		
	45-59	20.9			38.9		
	60-69	12.4			25.2		
<b>Sex</b>	Male	28.5	34	<0.0001	17.6	4.29	0.038
	Female	71.5			82.4		
<b>Residence</b>	rural	45.5	8.4	0.004	45	0.3	0.578
	Urban	54.5			55		
<b>Wealth status</b>	Poorest	10.2	40.5	<0.0001	6.9	4.366	0.359
	Second	20.7			16.8		
	Middle	21.5			26.7		
	Fourth	23.8			24.4		
	Richest	23.8			25.2		
<b>Education level</b>	No schooling	5.8	56.1	<0.0001	12.2	4.16	0.245
	Primary incomplete	25.3			21.4		
	Primary complete	37.6			36.6		
	Secondary+	31.3			29.8		
<b>BMI</b>	<18.4	6	53.6	<0.0001	4	14.131	0.001
	18.5-24.9	50.5			24.8		
	25-29.9	25.9			33.6		
	>30	17.5			37.6		

**Table 5: Percentage advised to reduce intake of sweetened beverages among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics		All			Hypertension		
		%	X <sup>2</sup>	P value	%	X <sup>2</sup>	P value
<b>Total</b>		10.7			25		
<b>Age years</b>	18-29	29	29.8	<0.001	8.3	13.99	0.003
	30-44	33.5			29.8		
	45-59	22.2			35.5		
	60-69	15.3			26.4		
<b>Sex</b>	Male	34.6	6.5	0.01	26.4	0.455	0.5
	Female	65.4			73.6		
<b>Residence</b>	Rural	48.4	1.7	0.191	44.6	0.39	0.528
	Urban	51.6			55.4		
<b>Wealth status</b>	Poorest	13	20.4	<0.001	10.7	1.48	0.83
	Second	21.5			19		
	Middle	19.9			22.3		
	Fourth	24.8			24		
	Richest	20.7			24		
<b>Education level</b>	No schooling	10.6	21.1	<0.0001	16.5	2.09	0.553
	Primary incomplete	22.6			17.4		
	Primary complete	34			33.9		
	Secondary+	32.9			32.2		
<b>BMI</b>	<18.4	6.9	23	<0.0001	3.4	1.405	0.704
	18.5-24.9	53.8			33.9		
	25-29.9	24.2			33.1		
	>30	15.1			29.7		

About 12% of all the participants reported to have been advised to reduce their dietary fat intake. As shown in Table 4, significant differences were found among BMI categories ( $X^2=53.6$   $p<0.0001$ ), residence ( $X^2=8.44$ ;  $p=0.004$ ), education level ( $X^2=56.1$ ;  $p<0.0001$ ), gender ( $X^2=34.0$ ;  $p<0.0001$ ), wealth status ( $X^2=40.5$ ;  $p<0.0001$ ), and age group ( $X^2=11.3$ ;  $p=0.01$ ). Among those diagnosed with HTN, about 27% had been advised to reduce their fat intake. Those less likely to report that they had been advised to reduce their fat intake were male ( $X^2=4.29$ ;  $p=0.038$ ), 18-25 years old ( $X^2=15.5$ ;  $p=0.001$ ), and underweight ( $X^2=14.3$ ;  $p=0.003$ ).

#### **Reduce sugary beverages in your diet**

Approximately 11% of the all the participants reported that they had been advised to reduce intake of sugary beverages in their diet (Table 5). Those more likely to report that they had not been told to reduce their intake of sugary beverages were 60-69 years old ( $X^2=30.0$ ;  $p<0.0001$ ), male ( $X^2=6.5$ ;  $p=0.01$ ), poorest wealth category ( $X^2=20.4$ ;  $p<0.0001$ ), with no formal schooling ( $X^2=21.1$ ;  $p<0.0001$ ) and underweight ( $X^2=23.0$ ;  $p<0.001$ ). Twenty-five percent of those diagnosed with HTN reported to have been advised on reducing intake of

sugary beverages. As shown on Table 5, significant differences were only found in the age group category where those 18-25 years being less likely to report that they had been told to reduce intake of sugary drinks as compared to the other age categories ( $X^2=14.0$ ;  $p=0.003$ ).

#### **Start or do more physical activity, and maintain a healthy body weight or lose weight**

About 12% of the participants reported that they had been advised to begin or do more physical activity (Table 6). Similarly, only about 10% of all the participants reported that they had been advised to lose weight or to maintain a healthy body weight (Table 7). There were significant differences ( $p<0.005$ ) between all the demographic characteristics assessed and the likelihood of being advised to start or do more physical activity as well as maintain or lose weight except for age groups as shown in Tables 6 and 7.

Among those diagnosed with HTN, those from the poorest wealth status, with no formal schooling and underweight were less likely to report that they had been advised to start or do more physical activity or lose of maintain a healthy weight status (Table 6 and Table 7).

**Table 6: Percentage advised to lose or maintain weight among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics		All			Hypertension		
		%	$X^2$	P value	%	$X^2$	P value
<b>Total</b>		10.3			20.9		
<b>Age years</b>	18-29	31.5	1.3	0.72	11.9	5.89	0.117
	30-44	37.7			27.7		
	45-59	20.8			41.6		
	60-69	10			18.8		
<b>Sex</b>	Male	29.1	25.4	<0.0001	24.8	0.023	0.879
	Female	70.9			75.2		
<b>Residence</b>	Rural	42.5	15.7	<0.0001	38.6	3.695	0.055
	Urban	57.5			61.4		
<b>Wealth status</b>	Poorest	7.4	90.3	<0.0001	5.9	15.657	0.004
	Second	15.4			9.9		
	Middle	18.9			18.8		
	Fourth	29.1			29.7		
	Richest	29.3			35.6		
<b>Education level</b>	No Schooling	5.2	72.8	<0.0001	8.9	15.1	0.002
	Primary incomplete	23.4			14.9		
	Primary complete	31.5			29.7		
	Secondary+	39.9			46.5		
<b>BMI</b>	<18.4	4.8	115.8	<0.001	1	35.5	<0.0001
	18.5-24.9	45.3			19.8		
	25-29.9	26.1			30.2		
	>30	23.8			49		

**Table 7: Percentage advised to start or do more physical activity among all participants (n=4495) and those diagnosed with HTN (n=484).**

Demographic characteristics		All			Hypertension		
		%	X <sup>2</sup>	P value	%	X <sup>2</sup>	P value
<b>Total</b>		11.6			21.9		
<b>Age years</b>	18-29	34.6	0.6	0.89	16	2.286	0.515
	30-44	37.9			25.5		
	45-59	18.7			37.7		
	60-69	8.8			20.8		
<b>Sex</b>	Male	31.7	16.6	<0.0001	24.5	0.009	0.923
	Female	68.3			75.5		
<b>Residence</b>	Rural	42.5	18	<0.001	43.4	0.75	0.386
	Urban	57.5			56.6		
<b>Wealth status</b>	Poorest	7.5	75.9	<0.0001	5.7	15.4	0.004
	Second	18.8			10.4		
	Middle	19.6			19.8		
	Fourth	27.7			32.1		
	Richest	26.3			32.1		
<b>Education level</b>	No schooling	4.2	111.6	<0.0001	7.5	14.8	0.002
	Primary incomplete	19.2			17		
	Primary complete	34.6			30.2		
	Secondary+	41.9			45.3		
<b>BMI</b>	<18.4	4.5	76.9	<0.0001	3	17.74	<0.0001
	18.5-24.9	49.6			25.7		
	25-29.9	46			28.7		
	>30	19.4			42.6		

## DISCUSSION

The purpose of this study was to identify lifestyle modification advice related to the treatment and management of hypertension provided by health care providers to the general population and to those diagnosed with hypertension in Kenya. Unfortunately, only a small proportion of the population in this study reported to have received these messages despite the wealth of evidence linking lifestyle and chronic diseases. In addition, those from more vulnerable categories such as those from poor wealth status and those with no formal of schooling were more likely to report that they had not received such advice. Lifestyle modification has been identified to be effective in the prevention, treatment and management of hypertension. One example of lifestyle modification that has shown positive outcomes with hypertension is the use of DASH (Dietary approaches to stop hypertension) eating plan. This plan emphasizes high consumption of fruits, vegetables and whole grains, and encourages limiting intake of saturated and trans fats, sugar sweetened beverages and sodium.<sup>14</sup>

There is a great amount of literature that supports the beneficial effects of the DASH diet in the prevention and management of hypertension.<sup>15-17</sup> Therefore, most dietary recommendations around the world on the prevention of hypertension are adopted or are similar to the DASH

eating plan including the Kenyan healthy diets and physical activity recommendations.<sup>18</sup>

The Ministry of Health in Kenya through the Nutrition and Dietetics unit developed comprehensive guidelines for healthy diets and physical activity.<sup>18</sup> These guidelines were similar to the DASH eating plan with some modifications to fit the Kenyan context. They recommend intake of 5 servings of vegetables per day (1/2 cup cooked or 1 cup raw), use of iodized salt sparingly and avoiding foods and condiments high in salt as well as adding salt after cooking, limited solid fat use and use of fortified oils instead, limit intake of sugar sweetened foods and drinks and 150 minutes of physical activity per week that can be accumulated from doing normal chores and walking. In addition to recommendation of particular foods, these guidelines provide an implementation framework and collaborative opportunities with other sectors of the government to ensure that the guidelines are received by the intended audience. Prior to formation of these guidelines, healthy eating and active lifestyle were promoted through National Nutrition Action plan (2012-2017) based on the Food and Nutrition Security policy implemented in 2011.<sup>19,20</sup> Considering the presence of policies and guidelines to ensure Kenyans have a healthy lifestyle to prevent chronic disease development, it is imperative then to assess whether these messages are getting to the general population and especially those who

already have been diagnosed with hypertension hence the purpose of this study. Only a small proportion of the general population had received lifestyle modification advice while a slightly higher proportion of those who had been diagnosed with hypertension reported to have received these messages. This observation indicated that there is still very low awareness among the general population on the importance of lifestyle modification on the prevention and management of hypertension which may indicate that this information is not being provided by health care providers. Similar studies in Africa could not be identified. However, one study using the NHANES dataset (2015-2016) found slightly higher proportions of individuals diagnosed with hypertension reporting to have received lifestyle modification advice such as to exercise more, reduce fat and calories intake, and control or lose weight (49.7%, 41.1%, and 41.3% respectively) in the united states.<sup>21</sup>

Studies among health care providers in African countries have indicated a low adherence by health care providers on providing lifestyle modification recommendations. One study among 16 South African doctors found that they all considered lifestyle modification as an important aspect in the management of hypertension but only half of them recommended lifestyle modification to their patients.<sup>22</sup> In another study, 450 medical records on hypertensive patients in four hospitals in rural South Africa were evaluated for documentation on lifestyle modification advice recommended by physicians. Results showed that the rate of recommending physical activity (31.2%) and dietary modification (46.5%).<sup>23</sup> In contrast, an online study on primary care physicians practicing in USA found that majority of the doctors reported providing lifestyle modification advice such as healthy diet consumption (92.2%), reduction in salt intake (96.1%), maintaining healthy weight (94.4%) limiting alcohol (74.4%) and being physically active (94.4%).<sup>24</sup> Findings from the health care provider's perspective may imply that more individuals are provided lifestyle modification advice by health care providers but do not report it as so. Therefore, suggesting a need for more than one exposure to these messages.

There were obvious disparities in receiving lifestyle modification advice especially on the general population as well as on those diagnosed with hypertension. These disparities were related to gender, wealth status, education level, BMI status, age group and residence (rural/urban). Unfortunately, the most vulnerable in the population such as those with poor wealth status, not had formal schooling also reported that they did not receive information on lifestyle modification. However, it is important to note that individuals in this category also reported to not have been screened for hypertension implying they might have not had an encounter with health care professionals. Many studies have indicated that disparities in general management of healthcare around the world especially along the racial, ethnic and social economic status and educational attainment.<sup>25</sup>

This study had several strengths. First, this was the first and only study to evaluate diet and chronic diseases in the whole population. Also, this nationally representative study used validated study materials and controlled for rural urban and wealth status variations through the cluster sampling design. The main limitation of this study was that the responses were self-reported and therefore may have introduced bias.

## CONCLUSION

Results from this study showed that majority of those diagnosed with hypertension had not received lifestyle modification advice from health care providers and very few in the general population had received this advice. This was despite the fact that Kenya has policies in place that recommend dietary modification in the management of chronic diseases. Results also showed that the most vulnerable in the population had also not received this information such as those with no formal schooling and of poorest wealth status. These findings imply that the current policy may need to be modified so as to reach the most vulnerable in the population such as increasing free hypertension screening in community health centers and using community health workers to provide this information. It is also a possibility that some people had received this information but could not remember which indicates that multiple exposures to lifestyle modification advice from health care professionals may be needed.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Bennett JE, Stevens GA, Mathers CD. NCD Countdown 2030: worldwide trends in non-communicable disease mortality and progress towards sustainable development goal target. *Lancet*. 2018;392(10152):1072-88.
2. Fox A, Feng W, Asal V. What is driving global obesity trends? Globalization or "modernization"? *Globaliz Health*. 2019;15(1):32.
3. Seedat Y, Ali A, Ferdinand KC. Hypertension and cardiovascular disease in the sub-Saharan African context. *Annals Translat Med*. 2018;6(15):297-9.
4. Ogah OS, Rayner BL. Recent advances in hypertension in sub-Saharan Africa. *Heart*. 2013;99(19):1390-7.
5. Addo J, Smeeth L, Leon DA. Hypertension in sub-Saharan Africa: a systematic review. *Hypertension*. 2007;50(6):1012-8.
6. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. *JAMA*. 2010;303(20):2043-50.
7. Kastarinen M, Antikainen R, Peltonen M. Prevalence, awareness and treatment of

- hypertension in Finland during 1982-2007. *J Hypertens*. 2009;27(8):1552-9.
8. The World Health Organization. Hypertension. Available at <https://www.who.int/news-room/fact-sheets/detail/hypertension>. Published 2019. Accessed on 12 December 2019.
  9. Collier SR, Landram MJ. Treatment of prehypertension: lifestyle and/or medication. *Vasc Health Risk Manag*. 2012;8:613-9.
  10. Yoo MG, Park KJ, Kim HJ, Jang HB, Lee HJ, Park SI. Association between alcohol intake and incident hypertension in the Korean population. *Alcohol*. 2019;77:19-25.
  11. Viridis A, Giannarelli C, Neves FM, Taddei S, Ghiadoni L. Cigarette smoking and hypertension. *Current Pharmaceut Design*. 2010;16(23):2518-25.
  12. Eckel RH, Jakicic JM, Ard JD. AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. *J Am College Cardiol*. 2014;63(25):2960-84.
  13. Ministry of Health. Kenya STEP wise survey for non-communicable diseases risk factors. 2015.
  14. National Heart, Lung and Blood Institute. Description of the DASH eating plan. Available at <https://www.nhlbi.nih.gov/health-topics/dash-eating-plan>. Accessed 24 February 2020.
  15. Saneei P, Abargouei SA, Esmailzadeh A, Azadbakht L. Influence of dietary approaches to stop hypertension (DASH) diet on blood pressure: a systematic review and meta-analysis on randomized controlled trials. *Nutr Metab Cardiovasc Dis*. 2014;24(12):1253-61.
  16. Schwingshackl L, Chaimani A, Schwedhelm C. Comparative effects of different dietary approaches on blood pressure in hypertensive and pre-hypertensive patients: a systematic review and network meta-analysis. *Critical Rev Food Sci Nutr*. 2019;59(16):2674-87.
  17. Bricarello LP, Poltronieri F, Fernandes R, Retondario A, Trindade EBS, Vasconcelos AG. Effects of the dietary approach to stop hypertension (DASH) diet on blood pressure, overweight and obesity in adolescents: a systematic review. *Clin Nutr*. 2018;28:1-11.
  18. Ministry of Health. National Guidelines for Healthy Diets and Physical Activity. In. Nairobi. Government of Kenya. 2017.
  19. Republic of Kenya. National Nutrition Action plan 2012-2017. Calverton, Maryland: KNBS and ICF Macro, 2012. Available at [scalingup nutrition.org/wp-content/uploads/2013/10/Kenya-National-Nutrition-Action-Plan-2012-2017-final.pdf](http://scalingupnutrition.org/wp-content/uploads/2013/10/Kenya-National-Nutrition-Action-Plan-2012-2017-final.pdf). Accessed on 12 January 2020.
  20. Government of Kenya. Food and Nutrition Security Policy. Government printers, Nairobi. 2011.
  21. Grabovac I, Smith L, Stefanac S. Health care providers' advice on lifestyle modification in the us population: results from the NHANES 2011-2016. *Am J Med*. 2019;132(4):489-97.
  22. Parker A, Nagar B, Thomas G, Badri M, Ntusi NBA. Health practitioners' state of knowledge and challenges to effective management of hypertension at primary level. *Cardiovasc J Africa*. 2011;22(4):186-90.
  23. Adedeji AR, Tumbo J, Govender I. Adherence of doctors to a clinical guideline for hypertension in Bojanala district, North-West Province, South Africa. *African J Primary Health Care Family Med*. 2015;7(1):776.
  24. Hung OY, Keenan NL, Fang J. Physicians' health habits are associated with lifestyle counseling for hypertensive patients. *Am J Hypertens*. 2013;26(2):201-8.
  25. Omotoso KO, Koch SF. Assessing changes in social determinants of health inequalities in South Africa: a decomposition analysis. *Int J Equity Health*. 2018;17(1):181.

**Cite this article as:** Mbogori T. Lifestyle modification advice provided by health care professionals in the treatment and management of hypertension in Kenya. *Int J Community Med Public Health* 2020;7:2018-26.