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Knowledge, Perceived Seriousness and Lifestyle Risk Factors of High Blood Pressure, Ethiopia

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Abstract

Background: Poorly controlled hypertension has serious health and economic consequences. Patient's proactive engagement with improved knowledge, perceived seriousness and behavior regarding drug compliance and lifestyle modification remains the most effective strategy to control high blood pressure. This study tried to produce evidence on knowledge and perceived seriousness of hypertension, as well as lifestyle modification measures among patients with high blood pressure. Evidence of this study informs the ministry of health to design appropriate strategy on modifiable risk factors against hypertension.

Methodology: A facility based cross-sectional study was conducted in February 2017 among sample of 423 adult patients with high blood pressure who visited hypertension follow up clinics of six purposely selected health centers with high caseload in Addis Ababa. Data on socio-demographic, general health status, knowledge, perceived seriousness and lifestyle modification were collected using structured interviewer-administered questionnaire, and analyzed using SPSS version 20 software for windows to describe findings and examine possible associations through logistic regression.

Result: 242 (57%) hypertensive patients had good knowledge of hypertension, with mean score of 14 (SD ± 3) out of nineteen questions; 189 (44.7%) had favorable perceived seriousness towards hypertension with mean score of 8.2 (SD ± 1.5) out of ten questions; and 192 (45%) had favorable lifestyle related to hypertension risk factors with mean score of 2.5 (SD ± 0.9) out of six questions. Educated patients were two times more likely to have good knowledge about hypertension than those with no formal education. Housewives were 79% more likely to have good knowledge than farmers, daily laborers and the unemployed. Moreover, those who received counseling from health care providers were two times more likely to have good knowledge about life style risk factors than those who didn't receive counseling. When looking at the relationship between perceived seriousness and patients' knowledge of hypertension, those who perceived that high blood pressure could disable or kill were three times more likely to have good knowledge about lifestyle risk factors compared to those who did not perceive the seriousness of high blood pressure. Patients less than forty years of age were 39% and 24% more likely to have good lifestyle modification compared to age group between 41-60 and over 60 years, respectively. Those who were married and living together were 60% more likely to have good lifestyle modification than those who were divorced or widowed. Patients who accessed information from other sources were 1.5 times more likely to have good lifestyle modification than those who didn't access information. Family history of hypertension was positive predictor for good knowledge at bivariate level but lost its significance at multivariate analysis.

Conclusion: The overall perceived seriousness towards hypertension and practice related to modifying lifestyle risk factors was inadequate, though knowledge on hypertension was relatively better. Level of knowledge did not significantly associate with level of perceived seriousness. Even when patients perceived the seriousness of their disease, appropriate lifestyle modification was not evidenced. Health care providers' counseling was found to predict level of knowledge, perceived seriousness and lifestyle modification.

Background

There were approximately 80 million adults with hypertension in sub-Saharan Africa in 2000 and by 2025 this figure is expected to rise to 150 million [1,2]. Hypertension is the seventh contributor to premature death in developing countries [3]. In Ethiopia, the prevalence of hypertension was estimated at 19.6% in 2014 [4]; with higher prevalence reported in urban setting ranging from 28.3% to 30.3% [5,6].

Studies showed the importance of patients' awareness about their condition, as well as improved knowledge, favorable perceived seriousness and good lifestyle modification for the management of hypertension [7-13]. Good knowledge and favorable perceived seriousness are likely to result in positive lifestyle modifications, a higher compliance with medication and follow-up [14-19]. Maintaining normal body weight, reducing dietary sodium intake,

adequate physical activity and limiting alcohol consumption to the moderation were reported to reduce high blood pressure [20,21]. On the other hand, cessation of smoking is evidenced for overall cardiovascular risk reduction. The effects of implementing these modifications are dose and time dependent [22].

A study done in Nigeria documented that hypertensive patients were aware of salt restriction (87.1%), optimal weight attainment (65.3%), smoking cessation (44.6%) and regular exercise (12.9%) as an approach to control hypertension respectively [23]. Another Nigerian study reported that 67.3% of patients did not know that exercise is important for hypertension control [24]. In a study done in South Africa, 77% and 96% of patients believed that exercise and balanced diet is important to controlling high blood pressure, respectively. Furthermore, 93%, 80% and 75% of patients believed that too much salt, alcohol drinking and smoking respectively influence blood pressure level, but only 36% said they had been informed by a medical professional on the dangers of smoking [25].

Negative health effects of alcohol was reported by 63% of patients in a Ghanaian study, while 72% knew the benefits of physical activity and 87% about the benefits of salt restriction in hypertension management and control [26]. Similarly, another Ghanaian study showed that 73.8%, 72.8% and 53.8% of patients knew that stress, high fat/sodium diet and sedentary lifestyle lead to hypertension, respectively [27]. A study done in Tanta revealed that 62.4%, 58.4% and 82.2% of hypertensive patients were aware that family history of hypertension, smoking and excessive salt intake increased the likelihood of developing hypertension, respectively; while 42.8%, 51.5%, 63.4% of them had wrong understanding about overweight, inactivity and stress as risk for developing hypertension, respectively. On the other hand about 66.3% of hypertensive patients were not aware that drinking alcohol could increase risk of hypertension [27].

An Indian study documented that 33% and 15% of patients were aware of vegetable and fruit intake as preventive factor while 84% were aware of smoking and alcohol consumption as risk factor for hypertension [28]. Hermant documented that 83.4% of patients had poor level of knowledge, and 69.1% and 73.2% patients exhibited unfavorable attitude and practices, respectively [29].

A study done in Iran reported that 56.6% of patients perceived hypertension as serious health problem, and 42.3% believed that type of diet influences the level of blood pressure while close to half knew that avoiding stress, quitting smoking, losing weight and good level of exercise are important modifiable lifestyle that help to control high blood pressure [30].

It has long been an established fact that good patient-provider interaction and provision of counseling to patients on the disease, its management as well as lifestyle –both risk and protective factors – could help patients to adopt modifiable lifestyle. The important role of health care managers in building a fertile ground to facilitate provider-patient interaction to enable optimal counseling has been reported by Ciccone et al. [31].

Materials and Methods

A cross-sectional facility-based quantitative study was conducted in February 2017 among sample of 423 adult hypertensive patients in Addis Ababa, Ethiopia. Six health centers with high case load of hypertension in the six months prior to the study were purposely selected. The study assessed knowledge and perceived seriousness towards hypertension as well as lifestyle modification among the study participants. Until the required sample size was obtained, consecutive patients who satisfied the inclusion criteria, i.e., adult hypertensive patients who were willing to participate, mentally clear and those who were not in acute pain were invited to participate in the study. The sample size of 423 was determined assuming knowledge of hypertension among patients to be 50% taking 95% level of significance, 5% margin of error (d), design effect of 1.5 to account for inter-facility variability, and 10% upward adjustment for non-response rate. The calculated sample size was allocated to the six health centers proportional to the load of patients on the register.

Ethical clearance and approval for the study was obtained from the Addis Ababa University, College of Health Sciences and School of Public Health Research Review Board. All patients were fully informed about the purpose of the study, confidentiality of information, and willful participation. Verbal informed consent was obtained prior to interview.

Instrument

Data were collected through face to face interviews using a structured questionnaire adapted from previous similar studies [32]. The study variables included basic socio-demography, knowledge about hypertension, perceived seriousness of high blood pressure, alcohol use, tobacco smoking, exercise, body weight, height and blood pressure measurements.

Data analysis

There were nineteen items for the knowledge, two for perceived seriousness, and six for lifestyle modification outcomes constructed using a five point Likert's scale. Composite scores for knowledge about hypertension, perceived seriousness and lifestyle modification (outcome variable) were calculated whenever items included in the score had an acceptable level of internal consistency. This was measured using the reliability coefficient, Crumbach's alpha equal to or greater than 0.7. Proportion with good and poor level was determined first by computing composite scores of items that are under each of the three outcome constructs – knowledge, perceived seriousness and lifestyle modification. Then items were summed up within the construct and composite mean scores calculated; the proportion above the mean was considered as good/favorable outcome.

Descriptive statistics (e.g. means, standard deviations, correlations) were computed for socio- demographic and general health status. Odds ratios (ORs) were computed by binary logistic regression to determine association at $p < 0.05$ and using a 95% CI. Those factors found to be significant at a bivariate level were included in the multivariate logistic regression model and an adjusted significant association was declared if $p < 0.05$ and 95% CI.

Results

The study sample consisted of 423 hypertensive patients of which 281 (66.4%) were females, 226 (53.4%) were married, 194 (45.8%) were housewives and 116 (27.4%) employed by government/private/NGO/self. The mean age was 60 (SD ± 13) years. Almost all (99.5%) participants resided in Addis Ababa, and 248 (58.6%) attended formal education. The median monthly income was 26 USD with interquartile range of 7–37 USD.

General health status & medical care provided

Family history of hypertension was reported by 129 (30.5%) and the median duration of illness was 4 years with interquartile range of 2 and 9 years. In 148 (35%) cases, diagnosis of hypertension was made by a physician. The average median systolic blood pressure was 147 mm of Hg with interquartile range of 140-160 mm of Hg. The average median diastolic blood pressure was 90 mm of Hg with interquartile range of 80-96 mm of Hg. Majority (89%) were taking antihypertensive medications, and 238 (56.2%) measured their blood pressure every month. Only 367 (86.7%) reported to have received counseling during follow up visits. Comorbidity with diabetes, and diseases of joint and bone were reported by 55 (13%) and 51 (12%), respectively.

Major sources of information about hypertension were mass media for 201 (47.5%) patients, other patients for 105 (24.8%) and health promotional materials for 53 (12.5%) patients. One hundred twenty two patients (28.8%) were overweight, 69 (16.3%) were obese and 217 (51.3%) had normal BMI. The mean BMI ± SD = 25.514 ± 5.821 Kg/m^2.

Knowledge about hypertension

Only 118 (28%) knew the level of raised systolic blood pressure. 267 (63.1%) mentioned that high blood pressure commonly presents with symptoms. Regarding hypertension related organ complications, 355 (84%) mentioned heart, whilst 354 (83.7%) equally cited eyes and the brain, and 326 (77.1%) mentioned the kidneys to be involved.

Knowledge on the possible role of lifestyle risk factors of hypertension

385 (91%) mentioned physical activity and 283 (67%) agreed that eating fruits and vegetables help to control hypertension; while 401 (94.8%) said eating food with high fat content brings hypertension. In terms of risk factors, 374 (88.4%) cited drinking more than two cups of coffee per day, 321 (76%) smoking, 307 (72.6%) chat chewing, 408 (96.5) too much salt intake, 376 (89%) drinking alcohol, 384 (90.8%) gaining weight, and 393 (93%) stress as factors predisposing to hypertension. When asked about options of management, 338 (80%) mentioned lifestyle modifications can help control hypertension.

241 patients (57%) were found to have good knowledge about hypertension and mean knowledge score calculated from 19 knowledge questions was 14 (SD ± 3). Level of knowledge correlated with basic socio-demographic characteristics, general health status and perceived seriousness of hypertension. Those educated were two times more likely to have good knowledge about hypertension than those with no formal education (AOR=2.11, 95% CI, 1.35-3.32). Housewives were 79% more likely to have good knowledge than farmers, daily laborers and the unemployed. Moreover, those who received counseling by health care providers were two times more knowledgeable than those who didn't receive counseling (AOR=2, 95% CI, 1.07-4.00) at P<0.001. Patients who perceived hypertension could disable or kill them were three times more likely to have good knowledge about hypertension compared to those who did not perceive hypertension was serious (AOR=3.00, 95% CI, 1.49-6.00), at P<0.001 (Table 1).

Demographic characteristics	Level of knowledge		COR	AOR
	Poor	Good		
Sex				
Male	57(40)	85(60)	1	
Female	125(44.5)	156(55.5)	0.84(0.55;1.26)	
Age group				
less than or equal 40 years	21(45.7)	25(54.3)	1	
41-60 years	70(38.3)	113(61.7)	1.3(0.70;2.60)	
Above 60 years	91(47)	103(53)	0.95(0.49;1.81)	
Marital status				
Married living together	93(41.2)	133(58.8)	1	
Divorced / Separated Widowed	83(46.4)	96(53.6)	0.80(0.54;1.20)	
Single & Never Married	6(33.3)	12(66.7)	1.39(0.50;3.86)	
Educational status				
No formal education	97(55)	79(45)	1	1
Any level of formal education	85(34.4)	162(65.6)	2.34(1.57;3.47)*	2.11(1.35;3.32)*
Occupational status				
Housewife	84(43.3)	110(56.7)	1	1
Employee (government/private /NGO/self)	40(34.5)	76(65.5)	1.45(0.90;2.33)	1.12(0.66;1.91)

Retired	23(33)	47(67)	1.56(0.87;2.77)	1.27(0.68;2.34)
Farmer, daily laborer, unemployed	35(81.4)	8(18.6)	0.17(0.07;0.39)*	0.21(0.09;0.50)*
Comorbidity				
No	108(40)	163(60)	1	
Yes	74(48.7)	78(51.3)	0.70(0.46;1.04)	
Family history of hypertension				
No	128(45) 54(39)	157(55) 84(61)	1	1
Yes			1.69(1.08;2.70)*	1.21(0.77-1.91)
Duration since diagnosed				
Less than one year	49(53.3)	43(46.7)	1	1
More than one year	133(40.2)	198(59.8)	1.69(1.06;2.70)*	1.23(0.73-2.10)
Who received counseling by care provider				
No	37(66)	19(34)	1	1
Yes	145(39.5)	222(60.5)	2.98(1.65;5.38)*	2.07(1.07;4.00)*
Who access information from other source				
No	75(45)	92(55)	1	
Yes	107(41.8)	149(58.2)	1.13(0.76;1.68)	
BMI				
Normal	105(45.3)	127(54.7)	1	
Overweight	52(42.6)	70(57.4)	1.11(0.71;1.73)	
Obese	25(36.2)	44(63.8)	1.45(0.83;2.53)	
Hypertension is serious and could disable or kill me				
No				
Yes	32(69.6)	14(30.4)	1	1
	150(39.8)	227(60.2)	3.45(1.78;6.69)*	3.00(1.49;6.00)*
* P-value ≤ 0.05				

Table 1: Association of predictor variables to level of knowledge, 2017.

Perceived seriousness towards hypertension

Concerning perceived seriousness of hypertension, 398 (94%) and 390 (92.4%) said they could die and could become disabled from their high blood pressures, respectively. Mean score calculated from two questions that assessed perceived seriousness (hypertension could disable, and hypertension could kill) was 8.2 (SD ± 1.5), that showed that 189 (44.7%) patients with high blood pressure were found to have favorable perceived seriousness towards hypertension. Although occupation, duration of illness and counseling received from health care providers appeared to influence level of perceived seriousness in bivariate analysis, no statistically significant influencer was found to predict perceived seriousness in multivariate analysis (Table 2).

Practices related to life style risk factors

Cigarette smoking, alcohol drinking and dietary habit were assessed. 46 (10.9%) patients smoked cigarettes and 122 (28.8%) drank alcohol. 106 (25%) did not add salt with their food, while 276 (65.2%) added some salt when preparing food. About 10% did not attempt decrease dietary salt intake at all after being told that they have high blood pressure. With regards to fruit intake, 199 (47%) rarely ate fruits, 182 (43%) ate fruits occasionally and 42 (9.9%) ate fruits regularly. Likewise, 66 (15.6%) participants rarely ate vegetables, 203 (48%) ate vegetables occasionally and 111 (26.2%) ate vegetables regularly.

Demographic characteristics	Level of perceived seriousness		COR	AOR
	Unfavorable	Favorable		
Sex				
Male	81(57)	61(43)	1	
Female	153(54.4)	128(45.6)	1.11(0.74;1.66)	
Age group				
less than or equal 40 years	26(56.5)	20(43.5)	1	
41-60 years	102(55.7)	81(44.3)	1.03(0.53;1.98)	
Above 60 years	106(54.6)	88(45.4)	1.07(0.56;2.06)	
Marital status				
Married living together	127(56.2)	99(43.8)	1	
Divorced / Separated Widowed	100(56)	79(44)	1.01(0.68;1.50)	
Single & Never Married	7(39)	11(61)	2.01(0.75;5.38)	
Educational status				
No formal education	100(56.8)	76(43.2)	1	
Any level of formal education	134(54.3)	113(45.7)	1.11(0.75;1.63)	
Occupational status				
Housewife	118(60.8)	76(39.2)	1	1
Employee (government/private /NGO/self)	67(57.8)	49(42.2)	1.13(0.71;1.81)	1.0(0.66-1.72)
Retired	33(47)	37(53)	1.74(1.00;3.02)*	1.72(0.98-2.99)
Farmer, daily laborer, unemployed	16(37.2)	27(62.8s)	2.62(1.32;5.18)*	2.06(0.99-4.22)
Comorbidity				
No	159(58.7)	112(41.3)	1	
Yes	75(49.3)	77(50.7)	1.45(0.97;2.17)	
Family history of HT				
No	158(55.4) 76(55)	127(44.6) 62(45)	1	
Yes			1.01(0.67;1.52)	
Duration since diagnosed				
Less than one year	41(44.6)	51(55.4)	1	1
More than one year	193(58.3)	138(41.7)	1.74(1.09;2.77)*	0.66(0.40-1.08)
Who received counseling by care provider				
No	23(41)	33(59)	1	1
Yes	211(57.5)	156(42.5)	1.94(1.09;3.43)*	0.66(0.36-1.21)
Who access information from other source				
Less than one year	101(60.5)	66(39.5)	1	

More than one year	133(52)	123(48)	1.41(0.95;2.10)	
BMI				
Normal	129(55.6)	103(44.4)	1	
Overweight	68(55.7)	54(44.3)	1.03(0.66;1.61)	
Obese	37(53.6)	32(46.4)	1.09(0.63;1.88)	
* P-value ≤ 0.05				

Table 2: Association of predictor variables to level of perceived seriousness, 2017.

Level of practices related to life style risk factors

Mean lifestyle modification score calculated from six related questions was 2.5 (SD ± 0.9), that showed that 192 (45.4%) patients with high blood pressure had good lifestyle modification for blood pressure control. Logistic regression was performed to examine possible association of socio-demographic and health status variables with level of lifestyle modification. Patients less than forty years of age were 39% (AOR=0.39, 95% CI, 0.91-0.82) and 24% (AOR=0.24, 95% CI, 0.11-0.53) more likely to have good level of lifestyle modification compared to age group between 41-60 and over 60 years, respectively.

Those who were married and living together were 60% more likely to have good level of lifestyle modification than those who were divorced or widowed. (AOR=0.60, 95% CI, 0.39-0.94). On the other hand those who received counseling from a health care provider were 2.3 times more likely to have good level of lifestyle modification (AOR=1.33, 95% CI, 1.24-4.38) than those who didn't receive counseling from health care providers. Those who accessed information from sources other than health care providers were 1.53 times more likely to have good level of lifestyle modification than those who didn't access other information. (AOR=1.53, 95% CI, 1.00-2.34) (Table 3).

Demographic characteristics	Level of lifestyle modification		COR	AOR
	Poor	Good		
Sex				
Male	87(61.3)	55(38.7)	1	
Female	144(51.2)	137(48.8)	1.50(0.99;2.28)	
Age group				
less than or equal 40 years	14(30.4)	32(69.6)	1	1
41-60 years	99(53.6)	85(46.4)	0.37(0.19;0.75)*	0.39(0.19;0.82)*
Above 60 years	119(61.3)	75(38.7)	0.27(0.13;0.55)*	0.24(0.11;0.53)*
Marital status				
Married living together	112(49.6)	114(50.4)	1	1
Divorced/Separated/widowed	111(62)	68(38)	0.60(0.40;0.89)*	0.60(0.39;0.94)*
Single & Never Married	8(44.4)	10(55.6)	1.22(0.46;3.27)	0.82(0.29;2.33)
Educational status				
No formal education	105(59.7)	71(40.3)	1	
Any level of formal education	126(51)	121(49)	1.42(0.96;2.10)	
Occupational status				
Housewife	108(55.7)	86(43.3)	1	1
Employee (government/private /NGO/self)	63(54.3)	53(45.7)	1.05(0.66;1.67)	0.70(0.42-1.17)
Retired	45(64.3)	25(3.7)	0.96(0.39;1.22)	07.0(0.38-1.29)
Farmer, daily laborer, unemployed	15(34)	28(65.)	2.32(1.17;4.56)*	1.60(0.99-3.38)

Comorbidity				
No	154(58.8)	117(43.2)	1	
Yes	77(50.3)	75(49.3)	1.28(0.86;1.91)	
Family history of HT				
No	157(53.3) 79(57.2)	133(46.7) 59(42.8)	1	
Yes			0.85(0.56;1.28)	
Duration since diagnosed				
Less than one year	42(45.7)	50(54.3)	1	
More than one year	189(57)	142(43)	0.63(0.39;1.00)	
Who received counseling by care provider				
No	20(35.7)	36(64.3)	1	1
Yes	211(57.5)	156(42.5)	2.43(1.35;4.36)*	2.33(1.24;4.38)*
Who access information from other source				
No	104(62.3)	63(37.7)	1	1
Yes	127(49.6)	129(50.4)	1.67(1.12;2.49)*	1.53(1.00;2.34)*
BMI				
Normal	130(56.8)	99(43.2)	1	
Overweight	68(56.7)	52(43.3)	1.00(0.64;1.56)	
Obese	30(43.5)	39(56.6)	1.70(0.99;2.93)	
Hypertension is serious, could disable or kill me				
No	20(43.5)	26(56.5)	1	
Yes	21156)	166(44)	0.60(0.32;1.12)	
* P-value ≤ 0.05				

Table 3: Association of predictor variables to level of lifestyle modification, 2017.

In this study no statistically significant association was established between level of knowledge and level of perceived seriousness or level of practices related to life style risk factors. Likewise, no statistically significant association was established between level of perceived seriousness and level of practices related to life style risk factors.

Discussion

A quantitative epidemiological systematic literature review selected nine publications on population based studies on hypertension in Ethiopia published between January 2000 and April 2015 involving over 13,327 participants. The study documented a high prevalence of hypertension among urban residents and differential risk factors to high blood pressure such as family history of hypertension, age, sex, alcohol consumption, physical inactivity, infrequent vegetable diet, salt use, obesity, higher education and vigorous recreational activities [33,34].

In this primary health care based study, one in four patients (28%) knew the correct level of raised systolic blood pressure. A higher proportion had correct response in other tertiary care level studies. The reason for this difference may be because hypertensive patients in the tertiary hospital settings are likely to be referred to these setups with complications, thus being more health conscious [35,36].

Encouraging proportion of participants knew the major lifestyle risk factors of hypertension compared to reports of other African studies [37]. Although the effect of coffee is not well described, majority (88.4%) believed drinking more than two cups of coffee per day affects blood pressure. The figure was high compared to the 27.7% report in an Egyptian study [33]. The important sources of knowledge in this study were attending health professionals and the media. The fact that participants had more knowledge on lifestyle risk factors than other parts of knowledge questions implies most of the information transfer was on this regard.

About 63% of our study participants stated that high blood pressure commonly presents with symptoms. Although this finding was encouraging compared to the report of a Ghanaian study (82.1%), this means patients mostly present late to health care facilities, often with hypertension related complications. On the other hand, majority

agreed hypertension affected major body organs. The accuracy of the information concerning this differed according to the source of information patients had, from personal experiences or experiences observed in other hypertension patients [25-27,32].

After adjusting for co-founders, socio-demographic factors that positively associated with level of knowledge in this study were educational level, occupation, duration of the hypertension, family history of hypertension and being counseled by health care provider. Other Ethiopian study indicated education, living in urban setting, and family history of hypertension to have a positive influence on level of knowledge on hypertension. The association of educational level with knowledge of hypertension was also established in an Indian report [16,29].

In this study, majority of the participants strongly agreed that there is a possibility of death and disability from hypertension respectively. The finding is comparable with the Nigerian study where 90.7% participants perceived that hypertension is a serious health condition that leads to stroke and may threaten life. No significant relationship was established between the overall level of knowledge and level of perceived seriousness in our study; similar to the findings of Khoor in Iran [30].

In this study lifestyle modification was cited as an important management approach to hypertension by 42% of patients, which was higher than reported by Awotidebe et al. in Nigeria [24]. In this study only 2.1% of the participants were currently smoking cigarette, which is much lower than the 17.9% and 41% findings in South African studies [25]. About 42% of patients in this study were currently drinking alcohol, most of which were social drinkers. This was comparable to the two Nigerian studies that reported 40.7% and 32.3% as drinking alcohol [23]. Arguably, there could be some degree of under-reporting of smoking and drinking among the participants, not necessarily because of their disease or associated medical risk but for cultural reasons or social desirability bias.

This study documented about three quarters reduced salt while preparing food to decrease the risk of acquiring hypertension as well as to reduce complication. The finding is comparable with the 75% reported by Vanitha in India [28], and 64.5% by Okwuonu in Nigeria [23]. Moreover, regular fruit intake, vegetable intake and exercise were positive for 9.9%, 26.2% and 6% respectively in our study. A study done by Godfrey showed participants had regular intake of fruit (13%), vegetables (21.3%) while 9.3% exercised regularly. However, higher figures were reported in Ghana [25]. Although fruits and vegetables are not traditionally preferred diet in our study population, most of the participants who knew of their importance can't afford to regularly purchase and use them. The majority of our patients did not know the recommended physical exercise for blood pressure control which may be the reason why they did not follow the recommendations.

When adjusting confounders, age, marital status, occupation, whether patients received counseling from health care professionals and having other sources of information about hypertension were found to significantly relate to level of lifestyle modification in this study. Although this was not evidenced in this study, Busari et al. in their report stated women had healthier lifestyle than men [34]. Sources of information other than health care provider sometimes gave unreliable information which negatively affected lifestyle modification [28]. A study done in Ghana showed those who were retired were more likely to lead sedentary lives. What was found to be a challenge for the

working class on the other had was making time to prepare healthy food [26].

Limitation

Recruitment of consecutive patients in purposively selected health centers may lead to under or over estimation of the knowledge and practice related to lifestyle risk factors. Moreover, the study could have been more of informative if medical records' reviews were used instead of limiting data source from only questionnaire that.

Conclusion

Despite the limitations, this study provides an insight on the knowledge about and overall level of perceived seriousness towards hypertension, and level of practice related to lifestyle risk factors. Hypertensive patients in our setting were found to have inadequate knowledge and practice related to lifestyle risk factors to high blood pressure. The study established a positive relationship between health care providers' counseling and level of knowledge, perceived seriousness and lifestyle modification; hence education and counseling to patients should be promoted in the health care settings.

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