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PREVALENCE, KNOWLEDGE AND PREVENTIVE PRACTICES AGAINST HYPERTENSION AMONG POLICE OFFICERS IN IBADAN

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ABSTRACT

Background: **Hypertension is a major global health problem. Armed forces personnel are at increased risk of hypertension due to the nature of their occupation as early responders. There is dearth of data on knowledge and prevalence of hypertension among police officers in Ibadan, Nigeria. This study was conducted to address this gap in knowledge.**

Methods: **A total of 170 police officers participated in the study. A questionnaire was used to document demographic profile, knowledge and practices to prevent hypertension. Abdominal circumference and blood pressure were measured among study participants. A digital Omron HEM 8712 blood pressure monitor was used to assess BP and a non-stretchable measuring tape was used to determine waist circumference. Hypertension was assessed by ≥140/90 mmHg and abdominal obesity by ≥80cm for female and ≥94cm for male.**

Results: **Mean age of respondents was 36.7±8.4 years; more than half (64.7%) were males. Majority (47.6%) had fair knowledge of hypertension. The prevalence of abdominal obesity and hypertension were 51.7% and 17.5% respectively. About a tenth (11.4%) were both hypertensive and obese. More females than males' respondents had abdominal obesity (p=0.00); while more males (19.3%) than females (14.0%) were hypertensive (p=0.39). About two-third (68.2%) reported involvement in unhealthy preventive practices including consumption of alcohol, foods high in salt and fat content, and tobacco smoking. Older, married and senior officers were significantly at higher risk of being hypertensive than younger, never married, and junior officers.**

Conclusion: **Police officers have adequate knowledge of hypertension, but many in this group are hypertensive. Clinical and educational interventions are recommended to address the problem.**

INTRODUCTION

Hypertension is a major public health problem.[1] It is the main risk factor for cardiovascular complications such as coronary heart disease, myocardial infarction, stroke or renal insufficiency. It affects approximately one billion people worldwide (that is 4.5% of the current global disease burden). Hypertension causes 7.1 million annual global preventable premature deaths.[2,3,4] Overall, global prevalence of hypertension among adults was estimated to be 26.6% in men and 26.1% in women[2]. The number of adults with hypertension in 2025 has been predicted to increase by 60% to a total of 1.56 billion adults.[2,5]

Occupation is one of the important risk factors of hypertension. Emergency responders, including fire fighters and police officers, have the second highest prevalence of hypertension (26%) among occupational groups, yet they have some of the lowest rates of awareness (51%), treatment (79%) and control (48%) interventions.[6] There are several physical, behavioural and psychological factors that predispose emergency responders to hypertension. For example, the strenuous work circumstances associated with this occupation may elevate the blood pressure among this population which in turn triggers the occurrence of coronary disease. Their work schedule also involves long stretches of relative inactivity, followed by unpredictable and stressful bursts of high intensity events that demand urgently responding to life threatening emergencies.[7] This produces adrenergic rush and higher demands on cardiovascular systems.[7]

Several studies have confirmed a trend toward increasing cardiovascular risk factors among military personnel.[8,9,10] Al-Asmary *et al.,* in a community based screening among military active duty personnel in

Saudi-Arabia, reported prevalence of undiagnosed hypertension of 17.5% and a combined prevalence of overweight/obesity of 66.8 %.[11] In Brazil, prevalence of overweight/obesity among young military personnel was estimated at 36%.[12] Another study in Sudan reported prevalence of undiagnosed hypertension and overweight/obesity as 69.9% and 49.2%, respectively among the police.[13] In Nigeria, Aliyu *et al.*, studied the prevalence of undiagnosed hypertension among military personnel.[14] However, there are limited studies about this subject among police officers despite their occupational risk to hypertension. Among emergency responders, police officers are particularly vulnerable[15] because of poor nutrition (sometimes attributable to limited opportunities for healthy food), long hours of duty, shift duty, sleep deprivation, exposure to noise from siren, post-traumatic stress disorder (PTSD) and inadequate knowledge of preventive measures.[16] We present in this article findings from a research designed to determine prevalence of hypertension among police officers in Ibadan, Nigeria. Findings from this descriptive cross-sectional study is needed because it will serve as a basis for developing appropriate hypertension prevention and treatment interventions in this population.

MATERIALS AND METHODS

Study area and site:

Ibadan is the capital of Oyo state and a metropolis in South west Nigeria with a population of about 3.2million. The inhabitants of the city are predominantly of the Yoruba ethnic group; the city is divided into five local government areas for administrative purposes.

Study population and sampling procedures

The study population consisted of both male and female police officers from the rank of constable to that of Chief Superintendent of Police who worked in Ibadan in 2018 when the study was conducted. The estimated sample size was calculated to be 147 using Cochran's formula (1963) with the prevalence of hypertension among firefighters in River state, Nigeria to be 9.6%.[17]

Eligible participants were selected through a two-staged sampling technique. In the first stage, seven divisions were randomly selected from the 33 in the metropolis. A convenience method was used to select respondents in each of the divisions because not all the officers were always on ground; some were on patrol, others were controlling traffic and on special duties. Of the 200 invited to participate in the study, 170 consented, giving a response rate of 85%.

Data collection procedure

A 68-item validated semi-structured self-administered questionnaire was used for data collection. The instrument had five components focusing on demographic profile, knowledge about hypertension, preventive practices, blood pressure (BP) assessment and waist circumference. Each consenting officer was given a copy of the questionnaire which was collected immediately after its completion. The questionnaire was pretested for clarity and comprehension of the items among twenty (20) police officers in one of the divisions not included in the study. The reliability co-efficient measure obtained from the pre-test was 0.798.

Blood pressure measurements

All those who completed the questionnaire also had their blood pressure assessed. A nurse conducted the BP on the left upper arm using a digital Omron HEM 8712 Blood Pressure monitor. The BP was taken only two times with intervals of five days instead of three times with interval of 3 to 4 days in order to confirm the presence of the condition.[18] The measurements were taken in the sitting position with exposed outstretched left arm on a table after the respondent had rested for at least 5 minutes. Blood pressure was measured twice for each person in the same sitting position with at least two minutes interval in-between measurements.[30] The average of the two measurements was estimated as the BP of the participant. For those with initial elevated BP, two additional BP measurements were made at least a week apart. Hypertension (HTN) was defined as average of two measurements of systolic and/or diastolic BP that is $\geq$140/90 mmHg.[15]

Waist circumference measurements

Waist circumference was measured to determine abdominal obesity, a condition associated with cardiovascular-related morbidity and mortality.[19,20] It was measured using a flexible, non- stretchable tape with the respondent standing erect with relaxed abdominal muscles (expiration), arms at the side and feet together and the measuring tape wrapped around the participants' abdomen horizontally and positioned at the level of the umbilicus. Instructions were given to the participant to relax and breathe normally and with the tape measure aligned together horizontally. Measurement was then taken from zero line of tape at the end of expiration when the diaphragm is in neutral position.[21]

Data analysis

Data were entered into IBM SPSS software version 21. A 24-point knowledge scale was used to categorize

knowledge of hypertension; knowledge score (KS) ≥75% was rated 'good', KS of ≥50% <75% was considered 'fair', <50% was rated as 'poor' knowledge. A 13-point practice scale was used to classify hypertension preventive practices; practice score <75% are considered 'unhealthy' while practice score ≥75% are categorized as 'healthy'. The data were analysed using descriptive and inferential statistics at P<0.05 level of significance. The analysis involved descriptive statistics such as mean, standard deviation, frequency and inferential statistics including Chi-square; regression analyses were performed to identify predictors of hypertension and abdominal obesity.

Ethical approval

The University of Ibadan/University College Hospital (UI/UCH) Ethics Review Committee approved the protocol for the study prior to its implementation. In addition, the Oyo state Police command gave permission for the study. Written informed consent was obtained from each respondent after the purpose of the study was explained. Potential respondents were informed that participation in the study was voluntary. Confidentiality of the information was ensured because identifiers were not included in the questionnaire. Respondents who were confirmed to have hypertension after the second visit were provided with important information about the condition and referred to the Police Medical centre for care.

RESULTS

Socio-demographic characteristics of respondents

The profile of the study participants is summarized on Table 1 which shows that majority 110(64.7%) of the respondent are males; their mean age was of 36.7±8.4 years. Majority 121 (71.2%) of the respondents belonged to the Christian faith, 44 (25.9%) practiced Islam. About a third 119 (70.0%) were currently married. They were predominantly of the Yoruba ethnicity. Most 53 (31.2%) of the respondents were within the rank of Sergeant, with the least being 1(0.6%) Superintendent of police.

Knowledge of hypertension

About half 81(47.6%) of the respondents had fair knowledge scores, 44 (25.9%) had good knowledge score while 45 (26.5%) had poor knowledge score on the definition, causes, preventive measures, health implications, symptoms and treatment of hypertension.

Table 1: Socio-demographic information of respondents (N=170)

Socio-demographic variables	Responses	Number	(%)
Sex	Male	110	64.7
	Female	60	35.3
Age	21-30	46	27.0
	31-40	70	41.2
	41-50	46	27.1
	51-50	8	4.7
Religion	Christianity	121	71.1
	Islam	44	25.9
	Traditional	4	2.4
	Atheism	1	0.6
Level of Education	Secondary	77	45.3
	Tertiary	81	47.6
	Postgraduate	12	7.1
Marital Status	*Not currently married	51	30.0
	Currently married	119	70.0
Ranks	**Junior ranked staff	95	55.9
	***Senior ranked staff	75	44.1
Ethnic Group	Yoruba	127	74.8
	Igbo	15	8.8
	Hausa	13	7.6
	****Others	15	8.8

**Not currently married: Single, divorced, widowed and separated*

***Junior ranked officers: Constable, Corporal and Sergeant*

****Senior ranked officer: Inspector, Assistant Superintendent of Police, Deputy Superintendent of Police, Superintendent of Police and Chief Superintendent of Police*

***** Others: Ijaw, Efik, Urhobo, Nwas, Idoma, Edo, Afemai, Ogoja, Ibibio, Igala, Egun*

Table 2: Association between socio-demographic characteristics and prevalence of abdominal obesity (N=170) and prevalence of hypertension (N=166).

Variables	Prevalence of visceral obesity			Df	X^2	p-value
	Yes (%)	No (%)	Total			
Sex						
Male	38(34.5)	72(65.5)	110(100.0)	1	37.010	0.000*
Female	50(83.3)	10(16.7)	60(100.0)			
Age (years)						
21-30	14(30.4)	32(69.6)	46(100.0)	2	15.872	0.000*
31-40	36(51.4)	34(48.6)	70(100.0)			
Above 40	38(70.4)	16(29.6)	54 (100.0)			
Marital status						
Not currently married****	23(45.1)	28(54.9)	51(100.0)	1	1.297	0.255
Currently Married	65(54.6)	54(45.4)	109(100.0)			
Rank						
Junior ranked officers**	42(44.2)	53(55.8)	95(100.0)	1	4.921	0.027*
Senior ranked officers***	46(61.3)	29(38.7)	75(100.0)			
	Prevalence of Hypertension					
	Yes (%)	**No (%)**	**Total**			
Sex						
Male	21(19.3)	88(80.7)	109 (100.0)	1	0.710	0.399
Female	8(14.0)	49(86.0)	57(100.0)			
Age (years)						
21-30	3(6.5)	43(93.5)	46 (100.0)	2	13.027	0.001*
31-40	9(13.2)	59(86.8)	68(100.0)			
Above 40	17(32.7)	35(67.3)	52 (100.0)			
History of hypertension						
Yes	17(47.2)	19(52.8)	36(100.0)	1	29.223	0.000
No	12(9.2)	118(90.8)	130(100.0)			
Marital status						
Not currently married****	3(6.3)	45(93.8)	48(100.0)	1	5.896	0.015*
Currently married	26(22.0)	92(78.0)	118 (100.0)			
Rank						
Junior ranked officer**	10(10.9)	8289.1)	92 (100.0)	1	6.236	0.013*
Senior ranked officer***	19(25.7)	55(74.3)	74 (100.0)			

**Significant (P<0.05)*

***Junior ranked officers: Constable, Corporal and Sergeant*

****Senior ranked officer: Inspector, Assistant Superintendent of Police, Deputy Superintendent of Police, Superintendent of Police and Chief Superintendent of Police*

*****Not currently married: Single, divorced, widowed and separate*

Preventive practices against hypertension

Overall, more than two-third 116(68.2%) of the respondents had unhealthy practice score while 54(31.8%) had healthy practice. In the six months preceding the study, less than two-third 102(60%) of the respondents had gone for medical checkup, while 121(71.2%) and 141(82.9%) of the participants had taken diets rich in fruits and vegetables in the month preceding the study, respectively.

Prevalence of hypertension and abdominal obesity

The prevalence of hypertension and abdominal obesity are 17.5% and 51.7% respectively. About a tenth (11.4%) were both hypertensive and abdominally obese, however, this is not statistically significant (P=0.090). More than half 17(58.6%) of the respondents with hypertension reported having a family history of hypertension (p=0.000).

Significant associations were found between sex, age, rank and prevalence of abdominal obesity (Table 2). For example, significantly more females (83.3%) than males (34.5%) had abdominal obesity (p=0.000). The socio-demographic variables that are significantly associated with hypertension are age, marital status and rank (Table 2). Older respondents (aged 40 years and above) were found to be more hypertensive (32.7%) than younger ones (19.7%) (p=0.001). Respondents with tertiary and post-graduate education had superior knowledge on hypertension than those with secondary education (p=0.013) (Table 2). There was no association

Table 3: Association between socio-demographic characteristics of respondents and knowledge of hypertension (N=170); Association between prevalence of hypertension, abdominal obesity by knowledge of hypertension (N=170)

Variables	Knowledge				Df	X^2	p-value
	Poor (%)	Fair (%)	Good (%)	Total			
Level of education#							
Secondary	27(35.1)	39(50.6)	11(14.3)	77(100.0)	2	12.079	0.013*
Tertiary	15(18.5)	37(45.7)	29(35.8)	81(100.0)			
Postgraduate	3(25.0)	5(41.7)	4(33.3)	12(100).0			
Prevalence of hypertension							
Yes	6(20.7)	11(37.9)	12(41.4)	29(100.0)	2	3.996	0.136*
No	36(26.3)	69(50.4)	32(23.4)	137(100.0)			
Total	42 (46.9)	80(87.9)	44(64.8)	166(100.0)			
Prevalence of Abdominal obesity							
Yes	21(25.6)	43(52.4)	18(22.0)	82(100.0)	2	1.754	0.416*
No	24(27.3)	38(43.2)	26(29.5)	88(100.0)			

#Fisher's exact test **Significant (P<0.05)*

between knowledge of hypertension when cross tabulated against prevalence of hypertension and abdominal obesity (Table 3). Tables 4 and 5 present information on the regression analysis on significant associations. Female officers are 9 times more likely to have abdominal obesity than their male counterparts (Table 4). Senior officers are 3 times more likely to have hypertension than the junior ones (Table 4). Married police officers are 4 times more likely to have hypertension than those never married (Table 4). Respondents older than 40 years are 7 times more likely to have hypertension than those within age group 21-30 years (Table 4).

Table 4: Logistic regression analysis between respondents' sex, age and rank against prevalence of abdominal obesity; respondents' age, rank and marital status against prevalence of hypertension.

Variables	OR	95% CI OR	p-value
Sex			
Male**	9.474	4.323-20.760	0.000*
Female			
Age(years)			
21-30**			
31-40	2.420	1.105-5.299	0.027*
Above 40	5.429	2.302-12.799	0.000*
Rank			
Junior rank**	2.002	1.081-3.707	0.027*
Senior rank			
Age			
21-30**			
31-40	2.186	0.559-8.557	0.261
Above 40	6.962	1.886-25.698	0.004*
Rank			
Junior rank**	2.833	1.225-6.552	0.015*
Senior rank			
Marital status			
Not currently married**	4.239	1.218-14.754	0.023*
Currently married			

***Reference category*
**Significant (P<0.05)*

Table 5: Logistic regression analysis between respondents' level of education and knowledge of hypertension.

Knowledge /	Level of education	OR	95% CI OR	p-value
Poor knowledge**				
Fair knowledge	Secondary	0.867	0.191-3.935	0.484*
	Tertiary	1.480	0.313-6.987	0.621*
	Postgraduate**			
Good	Secondary	0.306	0.059-1.596	0.160*
Knowledge	Tertiary	1.450	0.287-7.338	0.653*
	Postgraduate**			

***Reference category* **Not Significant (P>0.05)*

DISCUSSION

The preponderance of males in our sample is due to the nature of the job of policing which requires strength and tenacity; and this result is similar to the study in Ethiopia where majority (79.5%) of the respondents were males[22]. The age range of respondents in our study is also comparable to the findings from a similar study.[22]

The majority of the respondents had fair knowledge on hypertension. Although literature is scarce on the knowledge of hypertension among police officers, an assessment of knowledge of hypertension among adult African-Americans by Twum-Asante revealed limited knowledge about hypertension and other related disease [23]. We found a positive relationship between level of education and knowledge on hypertension. However, good knowledge was not related to prevalence of hypertension, implying that acquisition of knowledge alone may not be sufficient in hypertension prevention and treatment interventions. There is concern that many participants reported several unhealthy practices. About one-third of the police officers had not done any physical exercise and about half had not checked their body weight in the month preceding the study. Police officers are known to live sedentary lives and have irregular eating habits due to limited choice of food while on duty. Irregular diet combined with sedentary lifestyle may lead to hypertension and obesity in this population[15]. Consistent with findings of Sen *et al.* among policemen in Kolkata, India[15] majority of the respondents in the current study reported they are always exposed to stress and suffer from sleeplessness due to shift work schedule as most of them run 24 hours shift four times in a week.

The prevalence of abdominal obesity was 51.7% and this condition is more prevalent among females than males which was also reported by Aduroja *et al.,* Raimi *et al.,* and Mogre *et al.,* in their studies.[24,25,26] Women are more vulnerable than men to abdominal obesity because of postpartum weight gain in women of child bearing ages and those experiencing menopause.[27,28] Although we did not find significant relationship between abdominal obesity and hypertension in the current study, Aduroja and colleagues reported that those with abdominal obesity have an odd of more than two times likelihood of developing hypertension compared to those who do not have abdominal obesity[24]. However, people with abdominal obesity are prone to cardiovascular diseases such as diabetes, ischemic heart disease, coronary artery disease and stroke[32].

We found prevalence of hypertension to be 17.5% which falls within the range of the findings of Tesfaye who reported a prevalence of 17.8%[22] and comparable to the 14.9% reported by Fikenzer, Koch and Falz, in a study among young police officers in Germany[29]. By contrast, prevalence of hypertension in this study is higher than the prevalence of 9.6% reported by Douglas and Oraekesi among firefighters in Rivers state, Nigeria[17] and lower than 32.5% found among police officers in Kolkata, India.[15] These differences may underscore diversity of exposure to risk factors of hypertension in different settings.

Older police officers had higher prevalence of hypertension than their younger colleagues. Risk of hypertension is known to increase with age as reported by other authors.[15,30] We also found a significant positive relationship between rank of Police officers and prevalence of hypertension. As the rank of police officers increases, greater responsibilities are given to them, elevating their risk of exposure. The burden of these job responsibilities and increased family responsibilities, increases the level of stress, resulting in higher risk of hypertension among senior officers[31]. Police officers are known to retire with some stress-related disorders, even though many may have entered the profession in good health.[15]

About one-fifth of the Police officers reported family history of hypertension and significantly more persons with family history of hypertension were confirmed to have this condition in the current study. Respondents

who have family history of hypertension are 9 times more likely to have hypertension than those who do not have such history (OR= 8.798, CI: 3.636-21.289), Ajayi and Oyeniyi have reported similar findings[30]. Marriage was a predictor of hypertension with married police officers being four times more likely to be hypertensive than their counterparts who aren't currently married which was still significant after adjusting for age. Family responsibilities combined with the stress on the job could be a likely reason for this finding.

We acknowledge two limitations of our study. The preventive practices against hypertension are self-reported and cannot be verified. The data reported in this study may not be generalized to all police officers in Ibadan metropolis let alone for the entire state.

Implications for prevention and control interventions

The findings of the study have implications for planning and implementation of cardiovascular wellness activities for police officers. Two interventions are recommended to promote cardiovascular wellness activities for the rank and file of persons working in the police force. First, there is need for the police administration to develop a policy that will encourage all personnel undertake routine medical check-up and screening including blood pressure assessment. Screening will enable detection of health conditions in their asymptomatic stage not just for hypertension but also other non-communicable diseases including diabetes. All persons with elevated blood pressure and other conditions should be provided with care which can be organized through the Police Medical Center. The policy should also optimize the collective workload of police officers by limiting the number of 24-hour shifts that a Police officer can work as well as recruitment of more personnel on a regular basis to reduce the workload of serving officers. Second, there is need for education on the importance of adopting healthy behaviors that lower risk of cardiovascular diseases including healthy diet, routine exercise, and abstinence from smoking of tobacco products. A workshop may be organized to achieve this goal. In addition, the social media such as WhatsApp can be easily used to disseminate important messages on the need for routine check-up and adoption of healthy behaviors to prevent cardiovascular diseases.

CONCLUSION

The prevalences of abdominal obesity and hypertension are high, knowledge of the disease is fair, and healthy practice of prevention is low among police officers in this study, an important group of emergency responders in Ibadan metropolis. We recommend appropriate cardiovascular wellness programme for this population.

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