Hypertension Knowledge and Willingness of Government Officials in a Southwestern Nigerian City to Self-Monitor Blood Pressure

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Abstract

Self-monitoring of blood pressure (BP) is indispensable for the prevention and management of hypertension. Attitude and willingness to self-monitor BP have not been well investigated in Nigeria. This study investigated hypertension knowledge, attitude, and willingness of government officials in a southwestern Nigerian city to self-monitor BP. The study was a descriptive cross-sectional survey and 280 respondents completed a pretested, semistructured questionnaire. Data were analyzed using descriptive statistics and χ^2 test. Mean age was 35.7 ± 10.6 years, 57.5% were women and 72.1% had tertiary education. Majority (65.7%) had poor knowledge about hypertension, only 1.8% recognized its symptomless nature. Majority (77.9%) had positive attitude toward being trained to self-monitor BP, while 82.1% were willing to buy self-monitoring devices. Hypertension knowledge was associated with age and marital status ($p < .05$), while attitude was associated with willingness to self-monitor BP ($p < .05$). Population-wide, educational interventions should be intensified to improve hypertension knowledge and enhance skills to self-monitor BP.

Keywords

hypertension, self-monitoring blood pressure, hypertension, attitude, willingness

Introduction

Hypertension is a growing public health challenge in countries experiencing an epidemiological transition from communicable to noncommunicable diseases.[1,2] Hypertension is the leading preventable risk factor for the global burden of diseases with a greater population burden in developing than developed countries.[3] According to global statistics on raised blood pressure (BP), adults with hypertension increased from 594 million in 1975 to 1.13 billion in 2015 with more of the increase occurring in low-income and middle-income countries.[4] In sub-Saharan Africa, the burden of hypertension is increasing in epidemic proportion.[5] According to findings from a systematic review of published studies on hypertension in Nigeria, the overall crude prevalence ranged from 2.1% to 47.2% among adults aged 18 years and older with higher values in men than women. Furthermore, the review showed geographic variations with a prevalence ranging from 17.5% to 51.6% in urban areas and 4.6% to 43% in rural areas.[6] Hypertension is linked to several health conditions, it has been identified as the primary cause of stroke, coronary heart disease, heart failure, blindness, diabetes, and renal morbidity.[1,7] Hence, hypertension and its related complications are major public health issues not only in Nigeria but globally.

Hypertension is largely due to an interaction of behavioral, environmental, and genetic factors.[1] Although the genetic factors are largely unknown, most of the associated environmental, behavioral, and social factors are well known.[8,9] The increasing burden of hypertension and other cardiovascular diseases is linked with sociodemographic attributes which include the aging population and urbanization and modifiable behavioral factors such as sedentary lifestyles, harmful alcohol use, and excessive salt intake.[1]

Knowledge of the risk factors for hypertension is essential in its prevention, management, and control[7]; however, studies in Oyo State have revealed the low awareness and

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knowledge among urban and rural dwellers.[10,11] Successful hypertension management is linked with three critical factors specifically awareness (*whether individuals have been told by their physicians that they have hypertension*), treatment (*whether individuals report using a prescribed medication to control their hypertension*), and control (*whether they are maintaining their average systolic BP at less than 130 mm Hg and their diastolic BP at less than 80 mm Hg, and report currently using an antihypertensive medication*).[12] These factors influence adequate BP control and compliance, which is an issue of public health concern in hypertension management in Nigeria.[6] For instance, a study in Nigeria revealed that only 67.5% of adults with uncontrolled high BP (HBP) are aware of their condition.[13] Furthermore, only one fifth of those undergoing treatments have their problems being absolutely managed[10] resulting in increased cardiovascular morbidity and mortality and use of health care resources.

Regular BP monitoring is an important aspect of the diagnosis and management of hypertension. Self-monitoring of BP (SMBP) is a process whereby individuals measure their own BP, usually in a home environment, and this is an increasingly common part of hypertension management with a potential to improve BP control.[14] SMBP is a key strategy which provides an opportunity for hypertensive patients to participate in the management of their disease and this can also be adopted as a preventive strategy by nonhypertensives. SMBP may increase adherence to pharmacological and nonpharmacological interventions with a potential to decrease the incidence of fatal health outcomes such as stroke, myocardial infarction, heart failure, and renal dysfunction.[15,16] Furthermore, the World Health Organization-International Society of Hypertension Guidelines proposes use of self-measurement of BP at home as an important means to evaluate the response to antihypertensive treatment to improve the compliance with therapy and, most importantly, as an alternative for ambulatory BP.[17]

In spite of its importance, the knowledge of SMBP is still suboptimal in most developing countries,[18] and studies on the knowledge, attitudes, and willingness of individuals to be taught to self-monitor BP are sparse. The aim of this study therefore is to investigate the hypertension knowledge, and attitudes and willingness of government officials to self-monitor BP.

Methodology

Study Design and Scope

A descriptive cross-sectional design was used. The study was conducted at the Local Government Secretariat located at Ibadan North West Local Government Area (LGA).

Study Area

Ibadan North West LGA is one of the five major LGAs in Ibadan metropolis, Nigeria. The Local Government is predominantly urban with a population of about 152,834 according to the 2006 National Population Census.[19] It is divided into 11 wards, and the inhabitants include Yoruba, Hausa, Ibo, and other tribes who engage in trading, farming, artisanship, and civil service. Service statistics and report from the health facilities in the LGA during the period of the research showed an increasing trend in the diagnosis of hypertension, especially among staff working in the Local Government Secretariat.

Sample Size Determination and Sampling Technique

The sample size used for the study was 280, and this was above the minimum sample size required for the study. Sample size was calculated with Epi-Info at 80% power, 95% confidence level and 27% prevalence which is the proportion of people with inadequate knowledge on hypertension risk factors according to a study conducted in a Nigerian workplace.[20] The sample population were selected using a three-stage sampling technique which involved proportionate determination of the number of participants to be picked from each department; proportionate determination of the number of men and women to be picked form each department, and the final random selection of the respondents. The local government secretariat has 488 staff and comprises eight departments (administration/general service, finance and supplies, environmental service, works, land and survey, educational service, primary health care, agriculture, budget planning, and research and statistic). Table 1 outlines the departmental distribution of staff in the local government secretariat and the number selected to participate in the study.

Instrument for Data Collection

A semistructured, self-administered questionnaire was used to collect the data (respondents with no or limited education were guided by the trained research assistants to self-complete the questionnaires). The questionnaire had close-ended questions on knowledge, attitude, and willingness to be taught to self-

Table 1. Proportionate Determination of Number of Respondents to Be Selected From Each Department.

Department	Number of Staff	Number proportionately selected
Administration/general service	46	26
Finance and supplies	57	33
Environmental service	59	34
Agriculture	65	37
Works, land, and survey	77	44
Educational service	75	43
Primary health care	59	34
Budget planning, research and statistic	51	29
Total	488	280

monitor BP, barriers to the adoption of the practice, and few open-ended questions. The instrument was validated through a review of related literature from reliable sources and salient variables relating to attitude, knowledge, and willingness of career officers to be taught to self-monitor their BP was teased out from them for the questionnaire development. It was also revised by experts from the Department of Health Promotion and Education of the Faculty of Public Health, University of Ibadan. The questionnaire was pretested in a similar population, and errors were corrected before the final questionnaire was produced and used for the research. Measure of internal consistency was determined using the Cronbach's α coefficient method and .728, .8, and .75 values were obtained for hypertension knowledge, attitude, and willingness to self-monitor BP which showed that the instrument had a high degree of reliability.

Data Collection and Analysis

Data were collected in March 2017 and coordinated by two research assistants who had been trained on the objectives of the study and procedure for obtaining informed consent. The coded responses of the respondents were entered into SPSS Version 20 and analyzed using descriptive statistics and inferential statistics (χ^2). Hypertension knowledge was assessed using a 56-item scale, and scores $\geq$28 were regarded as good. Attitudes were assessed on a 13-point scale, and scores $\geq$7 were categorized as positive. Willingness was also assessed on a 4-point scale, and scores $\geq$2 were categorized as willing.

Ethical consideration. Ethical approval was granted by Oyo State Ministry of Health, Nigeria (AD 13/479/503). The study was conducted based on ethical guidelines; informed and voluntary consent was obtained from all participants.

Results

Sociodemographic Characteristics of the Respondents

A total of 280 staff participated in the study. The age of respondents ranged from 17 to 58 years with a mean of 35.7 $\pm$ 10.6 years. Over a third (39.3%) fell between 31 to 45 years age-group. Most of the respondents (57.5%) were women. Majority (72.1%) of the respondents were Christians and had tertiary level education (86.8%). Most of the respondents (51.4%) were married, and the dominant ethnic group was Yoruba (90.4%) (details in Table 2).

Table 2. Sociodemographic Characteristics of the Respondents ($N = 280$).

Variable	Frequency	%
Age (in years)		
≤30	109	38.9
31–45	110	39.3
46–60	61	21.8
Sex		
Male	119	42.5
Female	161	57.5
Marital status		
Married	144	51.4
Single	131	46.8
Widowed	3	1.1
Separated	1	0.4
Divorced	1	0.3
Religion		
Christianity	202	72.1
Islam	77	27.5
Traditional	1	0.4
Highest level of education		
No formal education	3	1.1
Primary	2	0.7
Secondary	32	11.4
Tertiary	243	86.8
Ethnic group		
Yoruba	253	90.4
Igbo	24	8.6
Hausa	3	1.0

Knowledge of Hypertension and Risk Factors

Mean knowledge score obtained by the respondents was 28.8 $\pm$ 6.1. Most of the respondents (53.6%) described HBP as high level of stress or tension, while 22.5% reported that it was a force of blood pushing against blood vessels walls. When asked what the normal BP should be, 66.8% said it should be less than or equal to 120/80 mmHg. Majority of the respondents (66.4%) reported that headache, dizziness, and general tiredness are symptoms of HBP. Very few (1.8%) of the respondents claimed there are no symptoms (details in Table 3). According to the respondents, risk factors for HBP included family history (47%), alcohol use (43.6%), tobacco use (32.9%), and consumption of foods high in fats (36.1%) (details in Table 4).

Most reported that HBP can be prevented through lifestyle changes (88.9%), medication (65.3%), and leisure physical exercise (86.1%) (details in Table 5). Majority (82.5%) reported correctly that HBP is extremely dangerous, of which 44.3% of them claimed it can lead to death, while 12.3% said it can lead to some other deadly illnesses (details in Table 5).

Attitude Toward SMBP

Some of the respondents (24.6%) reported that SMBP cannot prevent HBP because it is an evil attack. Few (23.2%) of the respondents reported self-monitoring devices to be inconvenient and time wasting. Some of the respondents (43.2%) also expressed some fatalistic views stating that if an individual is destined to have HBP, they will become hypertensive even if they always self-monitor their BP. The fear of knowing that they may be hypertensive prevented 21.4% of the respondents from self-monitoring their BP,

Table 3. Knowledge of the Concept of High Blood Pressure ($N = 280$).

Variable	Frequency	%
Meaning of HBP		
High level of stress or tension	150	53.6
Rapid breathing or rising blood looking for a way out	26	9.3
Force of blood pushing against blood vessels walls	63	22.5
I don't know	41	14.6
Normal blood pressure reading		
Less than 130/80	187	66.8
Greater than 130/80 but less than or equal to 139/89	13	4.6
Greater than 139/89 but less than or equal to 160/100	11	3.9
I don't know	6	2.1
No response	63	22.5
Symptoms of HBP		
Headache and general tiredness	186	66.4
Tense feeling in the chest	56	20.0
There are no symptoms	5	1.8
I don't know	33	11.8
Persons with HBP never or rarely feel symptoms		
Strongly agree	27	9.6
Agree	91	32.5
Strongly disagree	61	21.8
Disagree	101	36.1
There is a difference between hypertension and HBP		
Strongly agree	53	18.9
Agree	114	40.7
Strongly disagree	33	11.8
Disagree	80	28.6

Abbreviation: HBP, high blood pressure.

and 25.4% of the respondents stated that the self-monitoring devices for BP are costly and a waste of resources (details in Table 6).

Factors That Prevent SMBP

When asked about factors that can prevent them from SMBP, 41.4% stated that they did not have the required knowledge on how to use the instrument even if they can afford it. Over a third (31.8%) of the respondents reported that they do not have money to get the required devices, while 27.5% expressed fatalistic views stating that, *what you don't know cannot kill* (details in Table 7).

Respondents' Willingness to Self-Monitor BP

Majority (89.6%) of respondents reported that they will be willing to start self-monitoring of their BP. Majority (90.0%) of the respondents are willing to be trained to self-monitor their BP. About 82.1% of the respondents are willing to buy self-monitoring devices for monitoring their BP.

Table 4. Respondents' Knowledge of Risk Factors for High Blood Pressure ($N = 280$).

Variable	Frequency	%
Consumption of diet rich in salt		
Yes	228	81.5
No	52	18.5
Being overweight or obese		
Yes	227	81.0
No	53	19.0
Anxiety, stress, or anger		
Yes	252	90.0
No	28	10.0
Alcohol		
Yes	122	43.6
No	158	56.4
Smoking		
Yes	92	32.9
No	188	67.1
Consumption of food high in fat		
Yes	101	36.1
No	179	63.9
Diabetes		
Yes	74	26.4
No	206	73.6
Thinking/worrying		
Yes	6	2.1
No	274	97.9
Increasing chronological age		
Yes	84	30.0
No	196	70.0
Family history		
Yes	132	47.0
No	148	53.0
Ethnicity		
Yes	18	6.4
No	262	93.6
Occupation		
Yes	63	22.5
No	217	77.5

Test of Hypotheses

The results of the test of hypotheses showed that the age and marital status of the respondents was associated with hypertension. Over half of the respondents in the 46 to 60 years age-group (59%) had good level of knowledge on hypertension compared with 24.5% of those aged 31 to 45 years and 30.3% of those aged 30 years and younger ($p = .000$). Furthermore, 41% of married respondents had good level of knowledge compared with 27.2% of unmarried respondents ($p = .15$). However, there was no significant association between respondent's level of knowledge on hypertension and their gender, ethnic group, and religion (details in Table 8).

Table 5. Respondents' Knowledge of Prevention and Complications of HBP ($N = 280$).

Variable	Frequency	%
Do you think HBP is preventable		
Yes	263	93.9
No	17	6.1
Can HBP be prevented through lifestyle changes		
Yes	249	88.9
No	31	11.1
HBP can be reduced by making changes in your diet		
Yes	247	88.2
No	33	10.8
Leisure physical exercise prevents HBP		
Yes	241	86.1
No	39	13.9
The use of home remedies prevents hypertension		
Yes	227	81.1
No	53	18.9
HBP can cause stroke		
Yes	263	93.9
No	17	6.1
HBP can cause heart failure		
Yes	263	93.9
No	17	6.1
HBP can cause diabetes		
Yes	175	62.5
No	105	37.5
HBP causes cardiovascular diseases		
Yes	208	74.3
No	72	25.7
How dangerous do you think HBP is?		
Extremely	231	82.5
Somewhat	13	4.6
Not at all	12	4.3
If extremely or somewhat dangerous, explain how($N = 244$)		
It can lead to death	108	44.3
It is very dangerous	13	5.3
It can lead to some other deadly illness	30	12.3
It comes little by little and get into the body system	3	1.2
If one consumes food rich in fat, it will result to HBP and heart attack	4	1.6
I have seen a relative suffer from it before and I don't like the outcome(collapse after intense pain in the chest)	1	0.4
It weakens the person	1	0.4

Abbreviation: HBP, high blood pressure.

Table 6. Respondents Attitude Toward Self-Monitoring of Blood Pressure ($N = 280$).

Attitudinal statements	Agree	Disagree
SMBP cannot prevent HBP because it is an evil attack	69 (24.6%)	211 (75.4%)
SMB devices are not convenient and waste time	65 (23.2%)	215 (76.8%)
If someone is meant to have HBP, they will get it even if they always self-monitor their blood pressure	121 (43.2%)	159 (56.8%)
I don't want to self-monitor my blood pressure because I don't want to know I may be dying from HBP	60 (21.4%)	220 (78.6%)
Self-monitoring devices for blood pressure are costly and a waste of resources	71 (25.4%)	209 (74.6%)
It will scare me that I may really have HBP	59 (21.1%)	221 (78.9%)
I think if someone has HBP, it is already too late to start self-monitoring of the blood pressure and get treated	62 (22.1%)	218 (77.9)
It will be difficult because I cannot learn how to use the devices on my own	81 (28.9%)	199 (71.1%)
When people see the devices used to self-monitor, they will think I have HBP already so I can't self-monitor	65 (23.3%)	215 (76.7%)
No family history of hypertension	80 (28.6%)	200 (71.4%)

Abbreviations: HBP, high blood pressure; SMBP, self-monitoring of blood pressure.

There was a significant association between respondents' attitude toward SMBP and their willingness to self-monitor; 95.9% of respondents who had a positive attitude toward SMBP were willing to self-monitor BP compared with 88.7% who had a negative attitude ($p = .40$) (details in Table 9).

Discussion

This study has assessed the hypertension knowledge, attitudes, and willingness of government officials to self-monitor their BP. Findings revealed a low level of knowledge on hypertension but a favorable attitude and willingness to self-monitor BP. This is premised on the availability of training opportunities to enhance their knowledge and skills as well as the provision of BP measuring devices to support the adoption of this positive health behavior.

In this study, there was significant variation in the definition of hypertension, only two thirds of the respondents knew the normal cut-off for hypertension. The initial onset of hypertension is asymptomatic,[21] and a high proportion of participants showed low level of knowledge about the asymptomatic nature of HBP similar to a qualitative study conducted in Nigeria.[22] These showed the knowledge gaps on the appropriate cut-off for hypertension and its asymptomatic nature, and these have grave implication on their health-seeking behaviors. Similar to findings of a systematic review of studies on hypertension knowledge and risk factors which was conducted among workers in Nigeria and other West African countries,[23] majority of the respondents could not recognize the risk factors for hypertension. These justify the need for population-wide, educational interventions on

Table 7. Factors That Prevent Respondents From Self-Monitoring of Blood Pressure ($N = 280$).

Variable	Frequency	%
Lack of trust in the instrument, the doctors and their treatment		
Agree	39	13.9
Disagree	225	80.4
Undecided	16	5.7
No money to get the required instruments and devices		
Agree	89	31.8
Disagree	152	54.3
Undecided	39	13.9
No knowledge on how to use the devices even if I can afford to buy it		
Agree	116	41.4
Disagree	136	48.6
Undecided	28	10.0
No time for self-monitoring blood pressure		
Agree	49	1 7.5
Disagree	216	77.1
Undecided	15	5.4
Fear of what the result may be, that is why I can't self-monitor my blood pressure		
Agree	36	12.9
Disagree	227	81.1
Undecided	17	6.0
Belief that what is not known cannot kill		
Agree	77	27.5
Disagree	194	69.3
Undecided	9	3.2
Other factors that can prevent self-monitoring of blood pressure		
Illiteracy/ignorance	32	11.4
I am not a doctor, only doctor can prescribe or treat HBP	37	13.2
Someone in detention or prison with no freedom to go to the clinic or consult a doctor	2	0.7
Nothing	7	2.5
Work and other activities	1	0.4
Prayer	13	4.6

Abbreviation: HBP, high blood pressure.

Table 8 , Association Between Respondents' Level of Knowledge and Demographic Characteristics and Age.

Sociodemographic characteristic	Poor knowledge no. (%)	Good knowledge no. (%)	χ^2	*df*	*p*
Age (in years)					
≤30	76 (69.7)	33 (30.3%)	21.969	2	.000
31–45	83 (75.5)	27 (24.5)			
46–60	25 (41.0)	36 (59.0)			
Marital status					
Currently married	99 (72.8)	37 (27.2)	5.883	1	0.11
Not currently married[a]	85 (59.0)	59 (41)			

[a]This include those single, separated, divorced, or widowed.

Table 9. Association Between Respondents' Attitude and Willingness to Self-Monitor Their Blood Pressure.

Attitude	Not willing no. (%)	Willing no. (%)	χ^2	*df*	*p*
Poor	7 (11.3)	55 (88.7)	4.596	1	.032
Good	9 (4.1)	209 (95.9)			

hypertension and its risk factors as a prevention strategy for HBP and other cardiovascular diseases.

According to Musinguzi, 2018, an individual's perception of hypertension and its severity influences health-care-seeking behaviors.[24] According to the findings of this study, majority of the respondents opined that HBP is dangerous and it can cause stroke, diabetes, and heart failure, which are in line with the findings from the previous studies in Nigeria.[20] The sociocultural perception and beliefs about the causation and preventive behaviors for hypertension were reflected in the findings. For instance, almost a quarter of the respondents opined that self-monitoring BP cannot prevent hypertension since it is an evil attack. In addition, almost half of the respondents expressed fatalistic views stating that self-monitoring BP cannot prevent hypertension if an individual is destined to have. These sociocultural perception and beliefs have been documented in previous studies,[22,25,26] and this justifies the continued need for tailored behavior change interventions to correct wrong misconceptions and promote appropriate health-care-seeking behaviors.

Lifestyle modification is an effective public health approach for successful treatment and control of HBP; it has been recommended that all individuals, particularly hypertensives and those at risk, should adopt appropriate lifestyle practices.[27] It is interesting to note that most of the respondents recognized that HBP can be prevented through lifestyle changes. Most of them also reported that HBP can be reduced by diet modifications and leisure physical exercise. This is similar to what was reported by the previous studies.[23]

Self-BP monitoring at home results in better BP control[15,16] and greater achievement of BP targets than standard care practices of BP monitoring in the health-care system.[28] Interestingly, majority of the respondents reported that self-monitoring of BP can help to prevent HBP and that it was important in order to prevent heart diseases. This is in tandem with the findings of a study conducted in a cardiology clinic in Nigeria.[18]

Fear that they may have HBP prevented a fifth of the respondents from self-monitoring their BP, while the same proportion reported that self-monitoring devices are not

convenient, waste a lot of time, and will be difficult to learn how to use. Similarly, a quarter of the respondents stated that self-monitoring devices are costly and a waste of resources. A little below average claimed that they did not have the required knowledge on how to use the instrument even if they can afford it and that will definitely prevent them from self-monitoring their BP. These align with the findings by Rahman et al.[29] and Hu et al.[30] who reported that cost, perceived complexity of the procedure, lack of knowledge and skills to use the BP monitoring devices, belief that pressure readings may be inaccurate, and anxiety from being diagnosed with hypertension/a constant reminder of their conditions and the financial burden that may be imposed by HBP management are factors militating against SMBP.[29,30] The poor attitude toward self-monitoring of the BP may be due to inadequate educational programs, especially as it relates with the prevention of hypertension.[31] These findings are grave and indicate an urgent need for more educational interventions to improve the attitude and self-efficacy of respondents toward SBPM.

Majority of the respondents reported that they will be willing to buy BP devices and start self-monitoring their BP. This high enthusiasm may be as a result of the fact that majority of the respondents are young and educated because a previous study reported that people with a higher education level, higher income, and younger age were more likely to adopt self-monitoring BP.[30] Most of the respondents had favorable attitude and were willing to be trained to self-monitor their BP. This is also in line with the findings by Carter et al.[32] Training is important to equip individuals with skills to be able to measure the BP readings correctly. According to Fung et al.,[33] training programs on SMBP provided in the primary care setting have the potential to contribute to improvement in the BP readings of hypertensive patient and prevent HBP.[33]

The study has some limitations; almost all the questions were close ended, and this may have limited our ability to deeply explore respondents' hypertension knowledge as well as attitude and willingness to self-monitor BP. Subsequent studies with similar objectives should consider the complementary use of qualitative methods of data collection. Furthermore, the collection of data from only one of the 33 government secretariats located in urban, semi-urban, and rural areas in Oyo State may have limited the generalizability of the findings. Nonetheless, the findings from this study are relevant and form a good basis to develop interventions to address the low level of hypertension knowledge among government officials and motivate and empower individuals to self-monitor blood.

Conclusion

The study has demonstrated that most of the respondents had a poor knowledge about HBP. The findings indicate the need to develop and implement health education programs to improve knowledge on hypertension and prevention practices. Efforts should therefore be geared toward improving the levels of knowledge on hypertension and healthy lifestyles and transfer of skills on SBPM through behavioral change communication and training programs.

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