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Prevalence of Hypertension and Associated Risk Factors among Nurses in Six Public Hospitals of Sokoto, Sokoto State, North-Western Nigeria

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ABSTRACT

This study analyzed the prevalence of hypertension, and associated risk factors among nurses in six public hospitals in Sokoto State, Nigeria. The study involved nurses n=215 selected by systematic random sampling, and data on socio-demographic characteristics (age, and sex disaggregation), lifestyle habits, anthropometric measurements, blood pressure, and lipid profiles were collected. The results showed a high prevalence of these conditions among nurses, with hypertension (16.3%) and dyslipidemia (TG Dyslipidemia, 49.3% and VLDL-C Dyslipidemia, 37.7%) more prevalent among females (33.5% and 38.1%), than males (8.8% and 14.4%), overweight and obesity being more prevalent among females (18.6% and 16.3%). The study concluded that regular screening, health education, and lifestyle modification interventions are needed to reduce this population's risk of cardiovascular diseases.

INTRODUCTION

Hypertension is a global public health concern with a high prevalence, accounting for up to 1.28 billion deaths in 2019. [1] It is a key risk factor for stroke, chronic heart disease, and coronary heart disease, leading to peripheral vascular disease [1, 2], heart failure, renal impairment, retinal hemorrhage, and visual impairment. [3] Nurses are at a higher risk of hypertension due to work-related stress, long sitting hours, and specific nursing positions. Factors such as age, urbanization, sedentary lifestyles, alcohol consumption, and salt intake contribute to hypertension becoming a non-communicable disease in developing nations. [4, 5, 6]

As healthcare professionals, nurses are at a higher risk due to factors such as stress, lifestyle, lack of sleep, and irregular eating habits. [7, 8] They are middle-income and exposed to Western culture, making them vulnerable to cardiovascular problems. Factors such as obesity, sedentary lifestyle, poor physical exercise, increased salt intake, and fast-food intake also contribute to hypertension. [9] Studies have shown varying prevalence rates of hypertension among nursing staff, with percentages ranging from 28.96% to 42.2% depending on the population studied and the guidelines used for evaluation. [10, 11] The stressful nature of the nursing profession, combined with shift work, can worsen hypertension. [12]

Nurses and doctors in India have a 20% incidence of hypertension, linked to factors such as age, gender, occupation, sleep, smoking, and alcohol consumption. [13] Studies in India and Nigeria reveal similar rates, with hypertension, overweight/obesity, and dyslipidemia being prevalent among nurses. [14, 15, 16] They

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reported that hypertension, overweight/obesity, and dyslipidemia are commonplace among nurses, with rates of 13.52%, 16.90%, and 21.73%, and hypertension, overweight/obesity, and dyslipidemia are prevalent among nurses. 15.1% had high blood pressure, 63.1% were obese, 5.7% had abnormal triglyceride, and 4.9% had high cholesterol, respectively. A paucity of research specifically focused on nurses in North-Western, Nigeria. This study therefore aims to determine the prevalence and characteristics of hypertension among nurses working at public hospitals in Sokoto State. Understanding the prevalence of these conditions among specific populations, such as nurses, is crucial for developing targeted health interventions and improving overall public health outcomes.

METHODOLOGY

Study Design

The present cross-sectional study included nurses from six public hospitals in Sokoto State, Nigeria. Aged 18–68, they were recruited for the research. We collected the data for this project between February and May 2023.

Study area

Sokoto State, located in Nigeria's extreme northwestern region, is home to several hospitals, including the Specialist Hospital in Sokoto, the Infectious Diseases Hospital in Amanawa, Maryam Abacha Women and Children Hospital in Sokoto, Noma Children Hospital in Sokoto, Orthopedic Hospital in Wamakko, and Women and Children Welfare Clinic in Sokoto. The study area includes Sokoto, Amanawa, and Wamakko, with an average temperature of 28.3°C.

Eligibility criteria

The study required healthcare workers over 18 years old to work in hospitals like Specialist Hospital Sokoto, Maryam Abacha Women and Children Hospital, Noma Children Hospital, Women and Children Hospital, Infectious Diseases Hospital, Amanawa, and Orthopedic Hospital. Pregnant and lactating women, sick people, and study decliners were mutually exclusive.

Ethical approval

The study adheres to the Declaration of Helsinki's ethical guidelines and has received approval from the Ministry of Health (SKHREC/068/2022), Sokoto, and Specialist Hospital, Sokoto (SHS/SUB/133/Vol.1 2022). Before granting written informed consent, participants were informed about the purpose, research process, rights, and contact person.

Sample size and sampling

The appropriate sample size (n=215) was estimated using Taro Yamane’s formula:

$$\mathbf{n= N/(1+Ne^2).}$$

Where n is the sample size, N is the population size, and e is the margin of error (5%). N=1192, e=0.05 (5%). n was calculated to be 215 participants, and 10% (22 participants) was added to care for the expected participant’s failure rate. This makes the total sample size 237.

Sampling Procedure

A total of 237 participants were systematically selected from the staff lists of the six Hospitals. However, 63 participants declined to participate. Hospitals were systematically selected from their respective registers. The six hospitals (out of twenty-six) were selected by a purposive sampling technique (this technique was chosen because of armed banditry, kidnappings, and cattle rustling in the rural local government areas).

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Data Collection (WHO STEP-wise questionnaire)

A face-to-face interview was conducted, and informed consent was obtained from all the participants. The adapted World Health Organization (WHO) STEP-wise questionnaire was uploaded onto Google Forms (linked attached to this paper). This was downloaded by trained research assistants and administered to each participant. The participant's response was sent to a central computer. The questionnaire included gender, age, race, marital status, level of education, monthly income, and behavioral characteristics (physical activity, dietary intake of fruit and vegetables, adding salt to cooked meals, tobacco use, and alcohol consumption). Additionally, information about anthropometric measurements (weight, height, waist and hip circumference), and blood pressure measurement was also included. Capillary blood and venous samples were obtained after overnight fasting (8-10 hours).

To ascertain the validity of the instrument, a pilot study was performed on 20 participants (who were not included in the study).

Assessment of overweight

Participants were weighed barefoot and height was measured using a beam balance. BMI was calculated and categorized into normal, overweight, and obese according to WHO standards [18]. Underweight was 18.5-24.9 kg/m², normal was 25.0-29.9 kg/m², and obese was ≥ 30.0 kg/m². The study aimed to understand the effects of weight and body composition on health.

Diagnosis of Type 2 Diabetes (T2D)

A capillary blood sample was taken after an overnight fast (of at least 8 h) and measured using a glucometer. The diagnosis of T2D was confirmed using the American Diabetic Association criteria [19], categorizing participants as normal (fasting blood glucose level ≤ 5.6 mmol/L) or diabetic (fasting blood sugar level ≥ 7.0 mmol/L).

Measurement and definition of Blood Pressure

The study used an automated upper arm blood pressure monitor to measure blood pressure, with patients resting for five minutes before measurement. Hypertension screening and diagnosis were defined according to the American Heart Association's guidelines [20]. Participants were categorized into three groups based on their blood pressure: normal (<120 mm Hg and DBP <80 mm Hg), pre-hypertension (120-139 mm Hg and DBP 80-89 mm Hg), and hypertension (SBP ≥ 140 mm Hg and DBP ≥ 90 mm Hg) [21].

Socio-demographic characteristics

The study collected socio-demographic data through personal interviews using a WHO questionnaire [17]. Age was considered a continuous variable. Three self-reported factors were assessed: education level, profession, and marital status. Education was recorded as Diploma, Bachelor's degree, or Postgraduate degree. Marital status was recorded as single, married, or divorced. Physical activity levels were measured and categorized based on WHO recommendations [22]. Dietary intake was obtained through the 24-hour recall method, describing adherence to the Westernized diet, rich in saturated fats, refined grains, sugar, and salt, with reduced consumption of fruits and vegetables [23].

Data Analysis

The study used SPSS version 16.0 to analyze data on hypertension and socio-demographic factors. The unadjusted odds ratio was used to calculate the association. Multivariate regression analysis was conducted between diabetes and hypertension, with significance tested at 95% and $p < 0.05$ as significant. All responses (n=215) were thoroughly reviewed for consistency and completeness.

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RESULTS

Socio-demographic characteristics

The study involved 215 participants, with 69% females and a mean age of 35.4 years. Most were Muslim (92%), married (71%), and single (29%). 86% had a certificate or diploma, 13% had a bachelor's degree, and 1% had a postgraduate degree. The majority had basic nursing qualifications, with smaller percentages having post-basic specialties (Table 1).

Table 1: Socio-demographic characteristics of study participants (n=215).

Gender	Frequency	Percentage
Female	149	69%
Male	66	31%
Total	215	100%
Religion		
Islam	197	92%
Christian	18	8%
Total	215	100%
Marital Status		
Married	153	71%
Single	62	29%
	215	100%
Qualification		
Certificate/Diploma	184	86%
Bachelor	29	13%
Postgraduate	2	1%
	215	100%
Specialty		
Basic Nursing	192	89%
Post Basic A&E	1	0%
Post Basic Nephrology	1	0%
Post Basic Pediatric	5	2%
Post Basic Theater	2	1%
Registered Midwife	14	7%
Total	215	100%

Prevalence of Behavioral/Modifiable Risk Factors

Prevalence of behavioral risk factors for Hypertension among participants (n = 215).

Table 2 shows the prevalence of risk factors for hypertension among 215 individuals, categorized by sex. Alcohol consumption was highest among females (2.3%) than males (1.4%), while smoking was lowest among males (29.3%). Physical inactivity was highest among females (45.6%) and males (17.7%). Salt addition to food was higher among females (7.1%), (Table 2) than males (7.0%). Inadequate consumption of fruit and vegetables was higher among females (45.1%) than males (28.8%). A strong connection was found between family history of hypertension and gender, with females having a higher prevalence (23.3%) than males (11.2%). Family history of diabetes was highest among females (23.3%) than males (5.6%). No significant differences were found in alcohol use, cigarette smoking, physical exercise, or fruit and vegetable consumption. However, significant associations were observed in salt addition to food and gender, with a higher prevalence among females.

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Table 2: Prevalence of risk factors for Hypertension among study participants (n=215)

Variable	Sex (n = 215)			X^2	p-value
	Male n (%)	Female n (%)	Total n (%)		
Alcohol Consumption					
Yes	3 (1.4)	5 (2.3)	8 (3.7)	0.181	0.703
No	63 (29.3)	144 (67.0)	207 (96.3)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Smoke Cigarette					
Yes	0 (0.0)	1 (0.5)	1 (0.5)	0.445	1.000
No	66 (30.7)	148 (68.8)	214 (99.5)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Physical Exercise					
Yes	28 (13.0)	51 (23.7)	79 (36.7)	1.322	0.284
No	38 (17.7)	98 (45.6)	136 (63.3)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Add Salt to Food					
Yes	15 (7.0)	16 (7.4)	31 (14.4)	5.328	0.034
No	51 (23.7)	133 (61.9)	184 (85.6)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Fruit and Vegetable intake					
Yes	22 (10.2)	34 (15.8)	56 (20.6)	0.696	0.546
No	62 (28.8)	97 (45.1)	159 (74.0)		
Total	84 (39.1)	131 (60.9)	215 (100.0)		
Family History of Hypertension					
Yes	24 (11.2)	78 (36.3)	102 (47.4)	15.408	0.000
No	22 (10.2)	57 (26.5)	79 (36.7)		
I do not know	20 (9.3)	14 (6.5)	34 (15.8)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Family History of Diabetes					
Yes	12 (5.6)	50 (23.3)	62 (28.8)	21.156	0.000
No	33 (15.3)	87 (40.5)	120 (55.8)		
I do not know	21 (9.8)	12 (5.6)	33 (15.3)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		

Prevalence of Hypertension among study participants by gender

The study found that 13.5% of males and 27.0% of females have normal blood pressure, with a significant difference between genders (p=0.040), AOR= 3.000, CI: (1.054 to 8.542). Pre-hypertension was present in 23.3% of males and 20.0% of females, with a highly significant difference (p=0.000), AOR=2.489, CI: (2.489 to 19.558). Hypertension was present in 14.0% of females, with only 2.3% of males having hypertension. However, data for chi-square, AOR, and p-value are not available for this category (Table 3).

Table 3: Prevalence of hypertension among study participants by gender (n=215)

Variables	Category	Male n (%)	Female n (%)	χ^2/Fisher Exact test	OR (CI 95 %)	*P* value
Hypertension	Normal	29 (13.5)	58 (27.0)	18.668	3.000 (1.054 to 8.542)	0.040
	Pre-hypertension	50 (23.3)	43 (20.0)		2.489 (2.489 to 19.558)	0.000
	Hypertension	5 (2.3)	30 (14.0)		NA	NA.
	Total	84 (39.1)	131 (60.9)			

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Prevalence of Metabolic Risk Factors for Hypertension

Prevalence of weight classes between genders among the participants

The study found that 8 (2.3%) of male and 12 (5.6%) female participants were underweight, while 52 (24.4%) of males and 57 (26.5%) of females had normal weight. 21 (9.8%) of males and 38 (17.7%) of females were overweight, the overall prevalence was 27.4%. 6 (2.8%) of males and 16 (8.4%) of females having obesity class I, 0 (0.0%) of males and 2 (0.9%) of females having obesity class II, and 4 (1.9%) of females having obesity class III, the overall prevalence was 13.0% (Figure 1).

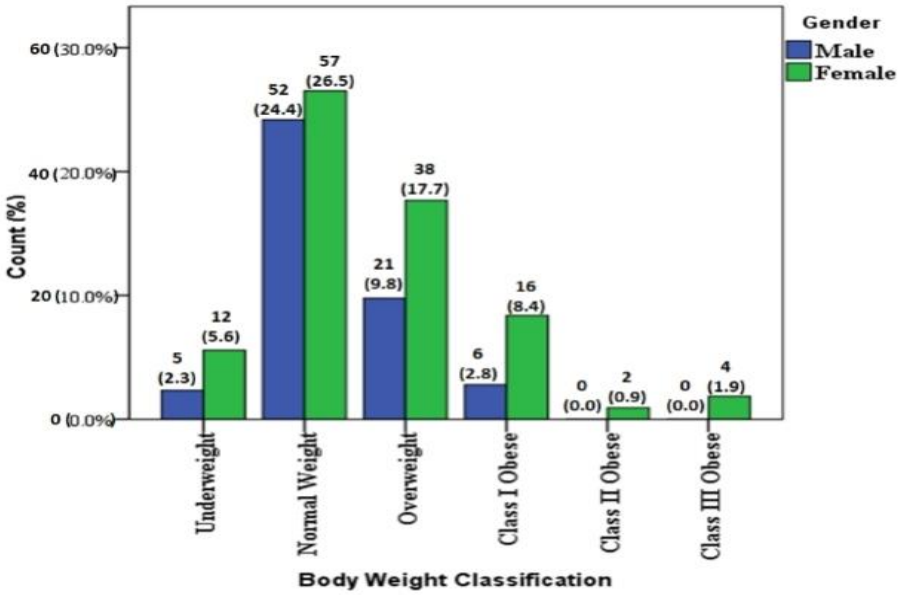

Figure 1: Prevalence of obesity between genders among the study participants (n=215)

Prevalence of biochemical risk factors for hypertension among the participants stratified by sex (n = 215).

Table 4 shows the prevalence of biochemical risk variables for hypertension in 215 participants stratified by sex. Only 0.9% of males and 2.3% of females had increased total cholesterol, no significant difference between sexes. Elevated triglycerides (TG) were higher among females (31.2%) than males (16.3%). HDL levels were higher in one female, with no significant difference between the sexes. Elevated FBG was higher in females (62.3%) than in males (27.4%). All p-values are greater than the standard threshold of 0.05, indicating no significant differences in these biochemical risk variables between genders.

Table 4: Prevalence of biochemical risk factors for hypertension among the Participants (n=215)

Variable	**Sex (n = 215)**			X^2	**p-value**
	Male n (%)	**Female n (%)**	**Total n (%)**		
Raised T CHOL (mmol/l)					
No	64 (29.8)	144 (67.0)	208 (96.7)	0.015	1.000
Yes	2 (0.9)	5 (2.3)	7 (3.3)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Raised TG (mmol/l)	35 (16.3)	67 (31.2)	102 (47.4)	1.193	0.302
No	35 (16.3)	67 (31.2)	102 (47.4)		
Yes	31 (14.4)	82 (38.1)	113 (52.6)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		
Raised HDL (mmol/l)					
No	66 (30.7)	148 (68.8)	214 (99.5)	0.445	1.000
Yes	0 (0.0)	1 (0.5)	1 (0.5)		

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Total	66 (30.7)	149 (69.3)	215 (100.0)		
Raised FBG (mmol/l)					
No	59 (27.4)	134 (62.3)	193 (89.8)	0.014	1.000
Yes	7 (3.3)	15 (7.0)	22 (10.2)		
Total	66 (30.7)	149 (69.3)	215 (100.0)		

Relationship between gender, hypertension, and various risk factors among the participants (n=215).

The study examined the relationship between gender, hypertension, and various risk factors among 215 participants. The results showed a significant association between gender and normal blood pressure (χ^2 =18.668, OR=3.178, CI 95% (1.065 to 9.484). χ^2=18.668, p = 0.038). 13.5% of male and 27.0% of female participants were normotensive, and 23.3% of the male, and 20.0% of female participants were pre-hypertensive. There was a significant association between gender and pre-hypertension (AOR = 6.672, CI 95%: (2.291 to 19.434), p = 0.001). 2.3% of the male and 14.0% of the female participants were hypertensive. Additionally, 14.9% of male participants had a family history of hypertension, while 29.8% of female participants reported a family history of hypertension. No significant association was found with a family history of hypertension (χ^2 =15.250, CI 95%: (0.464 to 0.149), p = 0.440). Similarly, 9.3% of male participants reported a family history of diabetes, while 17.7% of female participants reported a family history. No significant association was found with a family history of diabetes (χ^2 =12.478, CI 95%: (0.358 to 0.129), p = 0.992).

Also, the study revealed a significant correlation between gender and underweight (AOR = 2.400, CI 95%: (0.846 to 6.812), p = 0.022)), obesity class I (AOR = 3.000, CI 95%: (1.191 to 7.558), p = 0.029)), and obesity class II (AOR = 1.617 (0.000 to 0.000), p = 0.020)) of the participants. Females were more underweight (5.6%) than males (2.3%), while more females had normal weight (26.5%) than males (24.2%). Gender also significantly influenced obesity class I, with 2.8% of males and 8.4% of females having this class. No significant association was found between gender with, normal weight, overweight weight, and obesity class III (χ^2 =10.224, AOR = 1.096, CI 95: (0.753 to 1.596), p = 0.100)), (χ^2 =1.809, AOR = 1.809, CI 95: (1.062 to 3.083), p = 0.632), and (χ^2 =10.224, AOR = 0.000, CI 95: (0.000 to 0.000), p = 0.999 respectively)) (Table 5).

Table 5: This table examines the relationship between gender, hypertension, and various risk factors among the participants (n=215).

Variables	**Category**	**Male n (%)**	**Female n (%)**	**χ^2/Fisher Exact test**	**OR (CI 95 %)**	***P* value**
Hypertension	Normal	29 (13.5)	58 (27.0)	18.668	3.178 (1.065 to 9.484)	0.038
	Pre-hypertension	50 (23.3)	43 (20.0)		6.672 (2.291 to 19.434)	0.001
	Hypertension	5 (2.3)	30 (14.0)			.
	Total	84 (39.1)	131 (60.9)			
Family History of Hypertension	Yes	32 (14.9)	64 (29.8)		15.250 (0.464 to 0.149)	0.440
	No	27 (12.6)	55 (25.6)		1.239 (0.439 to 0.156)	0.234
	I do not know	25 (11.6)	12 (5.6)		0 (0.337 to 0.342)	1.031
	Total	84 (39.1)	131 (60.9)			
Family History of Diabetes	Yes	20 (9.3)	38 (17.7)		12.478 (0.358 to 0.129)	0.992
	No	42 (19.5)	82 (38.1)		0.928 (0.343 to 0.127)	0.127
	I do not know	22 (10.2)	11 (5.1)		0.926 (0.223 to 0.315)	0.218
	Total	84 (39.1)	131 (60.9)			
Body weight classification	Underweight	5 (2.3)	12 (5.6)	10.224	2.400 (0.846 to 6.812)	0.022
	Normal Weight	52 (24.2)	57 (26.5)		1.096 (0.753 to 1.596)	0.100
	Overweight	21 (9.8)	38 (17.7)		1.809 (1.062 to 3.083)	0.632
	Obesity Class I	6 (2.8)	18 (8.4)		3.000 (1.191 to 7.558)	

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						0.029
	Obesity Class II	0 (0)	2 (0.9)		1.617 (0.0 to 0.0)	0.020
	Obesity Class III	0 (0)	4 (1.9)		0.0 (0.0 to 0.0)	0.999
	Total	84 (39.1)	131 (60.9)			

Prevalence of Dyslipidemia and glycemia among the study participants

Table 6 shows the prevalence of dyslipidemia and glycemia among 215 participants. Most have normal total cholesterol, with only a small fraction having dyslipidemia (0.9%). Dyslipidemia in triglycerides affects 49.3% of participants. Most have normal HDL-C levels (99.1%), with a prevalence of LDL-C dyslipidemia of 2.8%. 37.7% of participants have VLDL-C Dyslipidemia, a risk factor for cardiovascular disease. Nearly one-third of participants have hyperglycemia, indicating potential glucose metabolism issues. The majority have normal levels of total cholesterol, HDL-C, and LDL-C, but dyslipidemia in triglycerides and VLDL-C.

Table 6: Prevalence of Dyslipidemia and glycemia among the study participants (n=215).

Lipids	**Category**	**Frequency**	**Percent**
TC	Normal	213	99.1
	TC-Dyslipidemia	2	0.9
	Total	215	100.0
TG	Normal	109	50.7
	TG-Dyslipidemia	106	49.3
	Total	215	100.0
HDL-C	Normal	213	99.1
	HDL-Dyslipidemia	2	0.9
	Total	215	100.0
LDL-C	Normal	209	97.2
	LDL-Dyslipidemia	6	2.8
	Total	215	100.0
VLDL-C	Normal	134	62.3
	VLDL-Dyslipidemia	81	37.7
	Total	215	100.0
Glycaemia	Normoglycemia	143	66.5
	Hyperglycemia	72	33.5
	Total	215	100.0

DISCUSSION

Hypertension is a leading cause of death globally, and nurses are the single largest professional healthcare group in the Nigerian healthcare sector. This study aimed to determine the prevalence of hypertension and its associated factors among nurses in public hospitals in Sokoto State, North-Western Nigeria.

The findings of this study revealed a prevalence of hypertension of 35 (16.3%); (5 (2.3%) males, 30 (14.0%) females)), pre-hypertension had a prevalence of 93 (43.5%) (50 (23.3%) males, 43 (20.0%) females)). The prevalence of TG and VLDL-cholesterol dyslipidemia was 106 (49.3%) and 81 (37.7%) respectively. The prevalence of overweight was 59 (24.7%); 21 (9.8%) males and 38 (17.7%) females. The prevalence of obesity was 24 (11.2%); 6 (2.8%) males and 16 (8.4%) females had obesity class I. They had a family history of hypertension was 96 (44.7%); 32 (14.9%) males and 64 (29.8%) females. They also had a family history of diabetes of 58 (27.0%); 20 (9.3%) males and 38 (17.7%) females. The prevalence of physical inactivity was 136 (63.3%); 38 (17.7%) males, and 98 (45.6%) females. 31 (14.4%) of the participants add salt to cooked food; 15 (7.0%) males and 16 (7.4%) females. Of the participants, 159 (74.0%) did not consume fruit and vegetables.

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Socio-demographic characteristics

The majority of participants were females (69.0%), which is similar to previous studies [7, 8, 24, 25], 66.35% females, 94.9%, 94.3%, 35.5% respectively. The mean age of the participants was 35.4 (± 9.9) years, which is lower than in previous studies (39.3) years and 39.3 years respectively. with a mean age of 39.3 ± 9.0 years, 39.3 ± 7.4 years, 41.5 ± 9.4, 32.8 ± 7.5 years respectively.

Nonmodifiable risk factors

Prevalence of hypertension

The prevalence of hypertension was 16.3%, and pre-hypertension was 43.5%. This is lower than that reported by other studies. However, the prevalence of pre-hypertension in this study of 43.5% is worrisome, as they are potential hypertensives if adequate measures are not taken to address this group of participants. Females were found to have a higher prevalence (22.8%) than males (15.8%), which was higher than that reported by Egbi et al., [26], who found pre-hypertension in 21.3% of the participants. The participants were healthcare workers and not nurses only, this may explain the difference in the prevalence.

A study conducted on nurses and para-health professionals in Bangladesh [27] reported a prevalence of hypertension of 41.0%, which may be due to high levels of physical inactivity, low fruit/vegetable intake, excessive salt addition, and more females than males among the participants. Other studies have reported low findings, such as Obiebi et al., [28] 36.2%, %, Sumaila et al., [25] 35.4%, and Owolabi et al., [29] 20.1%. This difference in the prevalence may be attributed to the difference in geographical location, ethnicity, and diverse group of health workforce not nurses alone.

A significant difference was found between genders and the prevalence of hypertension, with more females having a higher prevalence (p=0.040). This highlights the need for better interventions to address hypertension among healthcare workers in Nigeria.

Prevalence of Overweight and Obesity

The study found a prevalence of overweight and obesity among healthcare professionals in Nigeria, with a prevalence of 27.4% and 13.0%, respectively. This is lower than previous studies, which reported a prevalence of 44.7% [24] and 70.0% [8], respectively. The study's participants were older and from the Igbo and Yoruba ethnic groups. In a tertiary hospital in South-South, Nigeria [26] the prevalence of overweight was 35.5%, higher among male participants (36.9%) than female participants (34.7%). The prevalence of obesity was 23.8%, with female participants being more obese (32.0%) than males (9.5%). This may be partly due to the higher number of male participants (68.6%) and the region of Nigeria (South-South). Females were also stouter than males in that region.

Furuque et al., [27] reported a prevalence of overweight and central obesity of 42.6% and 83.5% among nurses and para-health professionals in Bangladesh, possibly due to the higher age of the participants and their ethnicity. Younis et al., [30] in the Gaza Strip, found a prevalence of overweight and obesity of 65%, with male participants being affected more (43.4%) than females (21.6%). Another Indian study found a prevalence of overweight of 33.3% and obesity of 8.3% [31]. Ethnicity, geographical location, and the smaller sample size (120) may account for the differences in results.

The study revealed a significant correlation between gender and underweight (P=0.022), gender and obesity class I (P=0.029), and gender and obesity class II (P=0.020). A family history of hypertension was found in 47.4% of participants, with females having a higher prevalence (p=0.000).

Family history of hypertension

The study found that 47.4% of participants had a family history of hypertension, with females having a higher prevalence (36.3%). This difference may be due to the study's region (South-East) and the fact that participants were healthcare professionals, not nurses. Nwoga [32] reported a higher prevalence of 29.3%, possibly due to

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genetic differences and the fact that the study participants were not nurses. Obiebi et al. [28] reported a higher prevalence of 74.4%, possibly due to genetic differences and the fact that the participants were healthcare professionals.

A strong association was found between family history of hypertension and gender, with females having a higher prevalence (p=0.040). These findings highlight the need for further research on the prevalence of overweight and obesity among healthcare professionals in Nigeria.

Family history of diabetes

This study revealed a family history of Diabetes among nurses 28.8% (higher in females 23.3% and in males 5.6%). This was higher than 17.2% reported among the staff of a medical school in Enugu, Nigeria [32]. This may be due to genetic susceptibility and the geographical/regional differences between the North-West and South-East regions of Nigeria. Obiebi et al., [28] reported a family history of diabetes among healthcare professionals in Delta (South-South, Nigeria) of 43.4%. Again, this may be due to genetic differences between the two studies' participants.

A strong association was found between family history of diabetes and gender (p=0.000), with females having a higher prevalence.

Behavioral/modifiable risk factors

Physical inactivity

The prevalence of physical inactivity in this study was 36.7%, with female participants being more physically inactive (23.7%) than males (13.0%). Buremoh et al. [8] reported a prevalence of physical inactivity of 47.4% among nurses in Ibadan. The higher prevalence may result from better awareness among the participants in a tertiary hospital. However, Nwoga [32] reported a prevalence of physical inactivity of 80.0% which was also similar to the findings by Iwuala et al., [24] in Lagos (79.2%). The two studies were from South-East and South-West of Nigeria and in tertiary hospitals respectively. These hospitals were busier than the secondary hospitals in this study, which may make it more difficult for the participants to indulge in physical exercise. Two studies in India and Bangladesh by Kargekhar et al., [33] and Faruque et al., [27] reported a prevalence of physical inactivity of 77.4% and 86.9% respectively. The higher prevalence they reported may be due to the ethnicity (Asian) and older age of the study participants.

Fruit and Vegetable Intake and Adding salt to cooked food

Fruit and vegetable intake was inadequate, with females consuming 45.1% more than males (28.8%). This could be due to the attitude of not practicing what healthcare providers advocate. Ahmed, et al., (2018) reported a higher prevalence of low fruit (65%), and low vegetable (95%) intake among their study participants. Similarly, Faruque and colleagues [27] reported a prevalence of inadequate fruit and vegetable intake of 56.3%. Likewise, Kargekhar, et al., [33] low fruit and vegetable intake of 78.0%. These findings may be explained by inadequate awareness and the high cost of fruits and vegetables. 14.4% of the participants added extra salt to cooked food, which was higher in females (7.4%) and males (7.0%). However, Nwoga, et al., [32] reported a prevalence of adding salt to food of 20%, this may be due to cultural differences between the study participants. Similarly, Faruque, et. al., (2021) and Kargekhar, et al., [33] reported a prevalence of adding salt to the food of 35.6% and 87.3% respectively. This may be explained by the ethnicity and Geographical location of the participants.

Alcohol consumption and Tobacco use

The study found a prevalence of alcohol consumption of 3.7% among participants, with females at 2.3% and males at 1.4%. Tobacco use has a prevalence of Tobacco use of 0.5% involving a female participant. This may be due to the culture and religion (Hausa and Islam) of the participants. Differences, such as Hausa and Islam. A higher prevalence of alcohol consumption of 21.9%, and tobacco use of 20.9% was observed among nurses.

[8] Similarly, Nwoga [32] reported a 27.9% prevalence of alcohol consumption and Tobacco use of 9.3%, possibly due to cultural and religious differences. Kargekhar, et al. [33] reported a 17.0% prevalence of alcohol consumption in India, possibly due to ethnicity, culture, geographic location, and religion of the participants.

In conclusion, the study highlights the importance of addressing family history of diabetes, physical inactivity, and dietary intake in healthcare settings. By addressing these factors, healthcare professionals can better support their patients and promote overall well-being.

CONCLUSION

The study found a high prevalence of pre-hypertension (43.5%), a prevalence of hypertension of 16.3%, a prevalence of TG Dyslipidemia, and VLDL-C Dyslipidemia of 49.35 and 37.7% respectively. Risk factors included physical inactivity, obesity class I and class II, abnormal cholesterol, and triglyceride. Factors like occupation and sedentary tendencies contributed to these risks. These factors could negatively impact health and healthcare performance.

RECOMMENDATION

The study suggests hospitals should implement local programs to prevent and control obesity among health workers, particularly nurses, focusing on factors linked to obesity, wellness, fitness, and physical activity. Regular blood pressure checks and continuous healthy diet education campaigns are also recommended.

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Limitation

This study's cross-sectional methodology, self-reported data, and sample from six public hospitals may limit its applicability and generalizability. Additionally, the survey's use of average blood pressure recorded twice on the same day may lead to false-positive diagnoses.

Data availability

The WHO STEP-Wise questionnaire can be found in this link:

https://docs.google.com/forms/d/e/1FAIpQLSdOJ9vntC5zGGY5YFIz8fi165t-K23K-D3yUZBUkMB5xz66YA/viewform?usp=pp_url

The dataset used in this study is available from the corresponding author on reasonable request.

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