A Comparative Assessment of High Blood Pressure and Its Dietary Risk Factors among Teaching and Non-Teaching Staff of University of Lagos, Nigeria

Uchendu Florence N.[1*] and Odukoya Oluwakemi O.[2]

[1]*Department of Public Health, Faculty of Health Sciences, National Open University of Nigeria, Jabi, Abuja, Nigeria. Email: uchendu_flo@yahoo.com; Phone number: +2348037065874*

[2]*Department of Community Health & Primary Health Care, College of Medicine, University of Lagos, Lagos, Nigeria.*

***Corresponding author**: uchendu_flo@yahoo.com; +2348037065874*

ABSTRACT

***Background**: High-blood-pressure is a silent-killer and one of the leading causes of death globally.*

***Objective:** This study assessed and compared high-blood-pressure and its dietary-risk-factors among teaching-and non-teaching staff of University of Lagos, Nigeria.*

***Methods:** A three-stage sampling-technique was used to select 978 respondents from 9 out of 12 University faculties/Senate-building. Respondents' socio-demographic-information and HBP dietary-risk-factors were collected using an adapted pre-tested version of WHO-STEPwise-questionnaire. Blood-pressure was measured using an automatic blood-pressure monitor, sphygmomanometer. Data was analysed using descriptive-statistics, student-t-test and binary-logistic-regression at $p<0.05$.*

***Results:** Mean ages were teaching (TS) 48.9±8.56years and non-teaching-staff (NTS) 41.8±9.40years. Systolic-BP was 127.1±13.44 mmHg and 123.6±16.15mmHg for TS and NTS respectively; Diastolic-BP 79.6±7.68mmHg and 78.6±9.57mmHg for TS and NTS respectively. HBP was 24.2% and 22.9% for TS and NTS using 2003-JNC7 while 2017-guideline was 64.7% and 51.1% for TS and NTS respectively. Fruits were consumed ≥3days/week by TS (68.1%) and <3days/week by NTS (50.2%). Vegetables were consumed ≥3days/week by TS (60.5%) and NTS (52.4%); Alcohol: 1-2 days/week 12.6% and 19.5% for TS and NTS; Addition of extra salt to meals always 2.6% and 3.3% by TS and NTS. Processed-foods consumed always 9.7% and 15.6% by TS and NTS. Statistically significant association existed between dietary-risk-factors and HBP ($p<0.05$). HBP-odds among teaching-staff increased with low-consumption of vegetables (<3 days/week) (OR = 1.88; 95% CI: (1.17-3.03); $p=0.009$) and high-consumption of vegetable-oil (OR = 1.74; 95% CI: (1.08 - 2.80); $p=0.022$).*

***Conclusion:** Hypertensive non-teaching-staff consumed more of dietary-risk-factors of HBP than teaching-staff. Workplace nutrition-education and awareness campaign is very crucial.*

Keywords: High-blood-pressure, risk-factors, teaching-staff, non-teaching staff, nutrition-education

INTRODUCTION

High blood pressure (HBP) is a silent-killer and a global public health problem (1). Globally, an estimated 1.4 billion adults aged 30 -79 years have high blood pressure with two-third of the population living in low-and middle-income countries (2-3). Painfully, an estimated 46 % of adults with high blood pressure are unaware that they have the condition and only 1 in 5 adults with HBP have it under control (2). One of the global targets for non-communicable diseases is to reduce the prevalence of high blood pressure by 33 % between 2010 and 2030 (2).

Differences in job prescription and responsibilities might contribute to the variation in disease

exposure and HBP among staff (4). Studies have reported high prevalence of HBP among employees of Universities ranging from 18.2 % - 50.0 % (5-11).

HBP is a public health problem in Nigeria (12). A prevalence of 34.9 % comprising of 20.1 % teaching and 14.8 % non-teaching staff was reported in Obafemi Awolowo University (4); 33.0 % made up of 23.8 % junior and 38.9 % senior staff in Ambrose Ali University, Ekpoma (13); 36.1 % out of which 32.9 % senior and 40.4 % junior staff) in University of Maiduguri (14) and many others (15-18). HBP has no obvious or visible symptoms especially in the early stages and so, many people go undiagnosed (19-20).

Some modifiable risk factors such as excessive alcohol drinking, high salt intake, low fruit and vegetable consumption have been linked to HBP (12, 20-23). The consumption of fruits and vegetables among the employees of Riyadh Saudi University were 12.4 % (7) and College of Health Sciences, University of Ghana (40.0 %) (11). The use of vegetable-oil as cooking-oil among the staff of University of Ibadan was 96.0 % (14). Dietary Approaches to Reduce Hypertension (DASH) diet rich in fruits increases the consumption of many micronutrients associated with decrease in BP (24). International and national guidelines recommend an adoption of healthy lifestyle by all individuals and DASH-diet for effective management of BP (25-26). DASH-diet lowers systolic and diastolic blood-pressures by an average of 5.5 and 3.0 mmHg respectively (26). Hence, DASH-diet may offer an alternative to drug-therapy in hypertensive patients (25). Prevalence of alcohol drinking in some Universities were University of Ibadan (32.0 %) & 5.1 % (13-14) and (53.6 %) University of Brasilia (28). Teaching profession has been associated with many stresses (29). Teachers also seem to be overwhelmed with ever increasing administrative task demands (30). Few comparative studies have been carried out on HBP and its risk factors among staff of Universities in Nigeria (16). This study assessed and compared the prevalence of HBP and its dietary-risk-factors among teaching and non-teaching staff of University of Lagos, Nigeria.

2. Materials and Methods

This study was a descriptive, cross-sectional comparative study aimed at assessing and comparing the HBP and its dietary-risk-factors among teaching and non-teaching staff in University of Lagos, Nigeria. The study population was teaching and non-teaching staff of the university, aged 18 years and above.

Inclusion criteria

Apparently healthy staff of age ≥ 18 years, free of obvious disabilities and full-time workers of the University were eligible to participate in the study.

Exclusion criteria

Causal workers, pregnant women, staff of UNILAG Medical Centre, Akoka and the Faculties housing medical health professionals were excluded as they are often considered knowledgeable in the field of HBP.

Determination of sample size

The sample size of 489 was calculated using 95 % confidence-interval (1.96) standard normal deviation ($Z\alpha$), power of the study (1-β) (Z_β), prevalence of HBP among teaching and non-teaching staff (p), 10 % non-response similar to (31). Equal sample size was used for both teaching and non-teaching staff totaling 978 respondents.

Sampling Technique

A three-stage sampling technique was used to select teaching and non-teaching staff in their various faculties/Senate building, departments and then among them. Lists of faculties, departments, service-units and staff strength of teaching and non-teaching staff were collected from the Registrar's Office at UNILAG, Akoka. Probability-proportionate to size technique was used to select the number of respondents from each department similar to (32).

Blood-Pressure Assessment

Blood-pressure of respondents was measured using an automatic blood-pressure monitor, sphygmomanometer (Omron IntelliSense M2 Basic, Japan) according to recommended procedures (8, 33-34). High BP was defined as systolic and diastolic BP according to 2003 7th Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of HBP as ≥ 140 or ≥ 90 mmHg and 2017 Guideline for high blood pressure in adults as Systolic BP ≥130 or ≥ 80 mm Hg respectively (34-35). The 2017 guideline doubled the US HBP of the population from 32.0 % to 46.0 % (36).

Participants were regrouped as hypertensive and not-hypertensive.

Dietary History Assessment

Alcohol intake was classified as current drinkers and non-drinkers. Fruits and vegetable consumption pattern were categorized as adequate if fruits and vegetables were taken ≥3 days/week and inadequate if fruits were taken <3 days/week and none. Addition of extra salt to food was grouped as always, sometimes and never. Summary of salt consumed was graded as too much, right amount, too little (21). Fats and oil intake were categorised as used and not used while Fast/processed food intake were grouped as always, sometimes and never.

Statistical analysis

Data was collated, cleaned and entered into Excel sheet and then analysed using SPSS version 20 statistical software. Result was presented as frequencies, mean and standard deviation (SD). Bivariate analysis (Chi-square, t-test) and binary logistic regression analyses were carried out. Odds ratios (OR) with 95% confidence intervals (CI) were calculated at p-values <0.05 significant level.

3. Results

Table 1 shows the socio-demographic characteristics of respondents. Mean age of staff was teaching (48.9±8.56 years) and non-teaching staff (41.8±9.40 years).

Table 1: **Socio-demographic characteristics of respondents**

Socio-demographic characteristics	Teaching (n=476)	Non-teaching (n=476)	Total (N=952)		
	Freq(%)	Freq(%)	Freq(%)	χ^2	p-value
Age as at last birthday (yrs)					
18-29	17 (3.6)	43 (9.0)	60 (6.3)	141.73	<0.001
30-39	45 (9.5)	172(36.1)	217(22.8)		
40-49	165(34.7)	153(32.1)	318(33.4)		
50-59	201(42.2)	87(18.3)	288(30.3)		
60+	48(10.1)	21 (4.4)	69 (7.2)		
Mean (SD)	**48.9±8.56**	**41.8±9.40**			
Gender					
Male	319(67.0)	262(55.0)	581(61.0)	14.34	<0.001
Female	157(33.0)	214(45.0)	371(39.0)		
Marital status					
Single	37 (7.8)	91(19.1)	128(13.4)	29.02	<0.001
Married	420(88.2)	366(76.9)	786(82.6)		
Divorced/separated	17 (3.6)	13 (2.7)	30 (3.2)		
Widowed	2 (0.4)	6 (1.3)	8 (0.8)		
Level of educational					
≤Secondary education	0(0.0)	142(29.8)	142(14.9)	589.41	<0.001
Tertiary education	14(2.9)	241(50.6)	255(26.8)		
Post-graduate edu.	462(97.1)	93(19.5)	555(58.3)		
Total	**476(100)**	**476(100)**	**952(100)**		

Table 2 shows the dietary history of some selected foods that are risk factors of HBP. Teaching staff consumed fruits ≥3 days/week more than non-teaching staff (68.1 % vs. 47.7 %: p= 0.001). Also, vegetables were consumed ≥3days/week by teaching staff more than non-teaching staff (60.5 % vs. 52.4 %: p= 0.042).

Table 2: Dietary history among teaching and non-teaching staff

Dietary pattern	Teaching staff n=476 Freq(%)	Non-teaching staff n=476 Freq(%)	Total N=952 Freq(%)	χ2	p-value
Fruits/week					
<3 days per week	148(31.1)	239(50.2)	387(40.6)	40.01	<0.001
≥3 days per week	324(68.1)	228(47.9)	552(58.0)		
None	4 (0.8)	9 (1.9)	13 (1.4)		
Vegetables/week					
<3 days per week	186(39.1)	224(47.2)	410(43.1)	6.35	0.042
≥3 days per week	288(60.5)	249(52.4)	537(56.5)		
None	2 (0.4)	2 (0.4)	4 (0.4)		
Addition of extra salt to meals					
Always	13 (2.7)	19 (4.0)	32 (3.4)	5.85	0.053
Sometimes	72 (15.1)	49(10.3)	121(12.7)		
Never	391(82.2)	408(85.7)	799(83.9)		
Perceived quantity of salt consumed					
Too much	4 (0.8)	8 (1.7)	12 (1.3)	11.68	0.003
Right amount	412(86.6)	372(78.1)	784(82.3)		
Too little	60(12.6)	96(20.2)	156(16.4)		
Processed foods					
Always	67(14.1)	56(11.8)	123(12.9)	1.37	0.503
Sometimes	180(37.8)	192(40.3)	372(39.1)		
Never	229(48.1)	228(47.9)	457(48.0)		
Type of cooking-oil used					
Vegetable oil	276(58.0)	244(51.3)	520(54.6)	4.34	0.044
Not used	200(42.0)	232(48.7)	432(45.4)		
Palm oil	305(64.1)	299(62.8)	604(63.4)	0.16	0.753
Not used	171(35.9)	177(37.2)	348(36.6)		
Power oil	94(19.7)	97(20.4)	191(20.4)	0.05	0.872
Not used	382(80.3)	379(79.6)	761(79.9)		
Butter/ Margarine	6 (0.4)	9 (1.1)	15 (0.7)	0.61	0.604
Not used	470(99.6)	467(98.9)	937(99.3)		
Alcohol use					
Current-drinker	60(12.6)	93(19.5)	153(16.1)	8.48	0.005
Non-drinker	416(87.4)	383(80.5)	799(83.9)		
Alcohol use for current-drinkers	**(n=60)**	**(n=93)**			
1-2 days per week	31(51.7)	52(10.9)	83(54.2)	7.95	0.539
3-7days per week	9(15.0)	10(2.1)	19(12.5)		
< once a month	4 (6.7)	13(2.7)	17(11.1)		
1-3 times per month	16(26.6)	18(3.8)	34(22.2)		
Total	**476(100)**	**476(100)**	**952(100)**		

Table 3: Prevalence of high blood pressure among respondents using the 2003-JNC and 2017-ACC/AHA blood-pressure cut-off points

Blood pressure (mm Hg)		2003-JNC cut-off points Teaching n=476	Non-teaching n=476	Total N=952			Blood-pressure (mm Hg)		2017-ACC/AHA cut-off points Teaching n=476	Non-teaching n=476	Total N=952		
SBP range		**Freq(%)**	**Freq(%)**	**Freq(%)**	**χ2**	**p-value**	**SBP range**		**Freq(%)**	**Freq(%)**	**Freq(%)**	**χ2**	**p-value**
<120		126(26.5)	197(41.4)	323(33.9)	24.64	<0.001	<120		126(26.5)	197(41.4)	323(33.9)	24.64	<0.001
120-129		161(33.8)	132(27.7)	293(30.8)			120-129		161(33.8)	132(27.7)	293(30.8)		
130-139		109(22.9)	77(16.2)	186(19.5)			130-139		109(22.9)	77(16.2)	186(19.5)		
≥140		80(16.8)	70(14.7)	150(15.8)			≥140		80(16.8)	70(14.7)	150(15.8)		
Mean (SD)		127.05 ±13.44	123.64 ±16.15				**Mean (SD)**		127.29 ±13.47	123.88 ±16.14			
t = 3.540, p< 0.001							**t = 3.540, p< .001**		t = 3.540, p< .001				
DBP range							**DBP range**						
<80		203(42.6)	245(51.5)	448(47.1)	18.16	0.001	<80		203(42.6)	245(51.5)	448(47.1)	18.16	0.001
<80		236(49.6)	175(36.8)	411(43.2)			<80		236(49.6)	175(36.8)	411(43.2)		
80-89		32 (6.7)	43 (9.0)	75 (7.8)			80-89		32 (6.7)	43 (9.0)	75 (7.8)		
≥90		5 (1.1)	13 (2.7)	18 (1.9)			≥90		5 (1.1)	13 (2.7)	18 (1.9)		
Mean (SD)		79.62 ±7.68	78.56 ±9.57				**Mean (SD)**		**79.83 ±7.68**	**78.81 ±9.56**			
t =1.882, p=0.060							t =1.795, p=.073						
Not-hypertensive		361(75.8)	367(77.1)	728(76.5)	0.21	0.702	Not hypertensive		168(35.3)	233(48.9)	401(42.1)	18.20	<0.001
Hypertensive		115(24.2)	109(22.9)	224(23.5)			Hypertensive		308(64.7)	243(51.1)	551(58.9)		
Category	**BP range**						**Category**	**BP range**					
Normal	<120/ <80	95(20.0)	167(35.1)	262(27.5)	30.95	<0.001	Normal	<120 & <80	94(19.7)	173(36.3)	267(28.0)	34.38	<0.001
Pre-HBP	120-139/ 80-89	266(55.9)	200(42.0)	466(48.9)			Elevated	120-129 & < 80	74(15.5)	60(12.6)	134(14.1)		
Stage1 HBP	140-159/ 90-99	101(21.2)	89 (18.7)	190(20.0)			Stage1 HBP	130-139 or 80-89	210(44.1)	152 (31.9)	362(38.0)		
Stage2 HBP	≥160/ ≥100	14 (2.9)	20 (4.2)	34 (3.6)			Stage2 HBP	≥140 or ≥90	98(20.6)	91 (19.1)	189(19.9)		

Table 3 showed the comparism of prevalence of HBP using the 2003 JNC7 and 2017 AHA classifications of HBP among the respondents. The prevalence of HBP among teaching and non-teaching staff based on the 2003 JNC7 standard was 24.2 % for teaching staff and 22.9 % for non-teaching staff. The prevalence of HBP using 2017 AHA cut-off point was 64.7 % for teaching staff and 51.1 % for non-teaching staff. With the 2017 AHA cut-off point, there was a statistically significant difference between the prevalence of HBP in the teaching and non-teaching staff ($p<0.001$).

Table 4 indicates that weekly consumption of vegetables ($\chi2=9.64$: $p=0.008$) and the use of vegetable-oil ($\chi2 =5.89$: $p=0.016$) as cooking-oil were statistically associated with HBP in only the non-teaching-staff and not the teaching-staff. The teaching staff who were hypertensive consumed more fruits (62.6 %) regularly (≥3 days per week) than their hypertensive non-teaching (45.9 %) counterparts. They also consumed more vegetables (69.6 %) regularly (≥3 days per week) than the hypertensive non-teaching (65.1 %). The vegetable consumption history of the non-teaching staff was statistically significant ($p=0.008$). Hypertensive non-teaching staff (3.3 %) added extra salt to their meals more than the hypertensive teaching staff (2.6 %). Also non-teaching staff (15.6 %) consumed processed foods always more than the teaching staff (9.6 %).

1. They also consumed more vegetable oil (61.5 %), butter/margarine (1.8 %) and drank more alcohol (21.1 %) than the hypertensive teaching staff did: vegetable oil (60.9 %), butter/margarine (0.9 %) and alcohol (16.5 %). Hypertensive teaching staff (67.8 %) consumed more palm-oil than the non-teaching staff who were hypertensive (65.1 %) while the reverse was the case for low cholesterol oil which was consumed more by the non-teaching staff (14.7 %) than the teaching staff (13.9 %).

In Table 5, the binary logistic regression revealed the common dietary predictors of HBP among teaching and non-teaching staff as vegetables consumption (OR =1.88; 95% CI: (1.17-3.03); p= 0.009) and vegetable-oil consumption (OR = 1.74; 95% CI: (1.08-2.80); p= 0.022) only. Teaching-staff who consumed vegetables <3 days per week were 1.88 times more likely to be hypertensive than those who consumed vegetables ≥3 days per week. Also, those who used vegetable-oil for cooking were 1.74 times more likely to develop HBP than those who did not cook with vegetable-oil.

4. Discussion

The teaching-staff had higher mean age than the non-teaching staff (48.9±8.56 vs. 41.8±9.40 years). The prevalence of HBP among the respondents was higher among the teaching than the non-teaching staff (24.2 % vs. 22.9 %). This finding was similar to that of their colleagues in other Universities such as Riyadh Saudi University (7); Julius Centre University, Malaysia (8); Quassim University, Saudi Arabia (9) and Khaja Bandanawaz Institute of Medical Sciences (KBNIMS), India (10); University of Ibadan (13) and University of Port Harcourt Medical School (15). The respondents' blood pressure were higher than that of their counterparts in Obafemi Awolowo University, Ile-Ife (4). The respondents had lower prevalence of HBP compared to that of the employees of the King Faisal Saudi University (5); University of Ghana (11); University of Brasilia, Brazil (27) and Ambrose Ali University, Ekpoma (16). The comparism of prevalence of HBP among the study population with the 2017-ACC/AHA and the 2003-JNC7 HBP guidelines found that the 2017-ACC/AHA guideline had a doubling-effect on the proportion of teaching and non-teaching staff that were hypertensive. The teaching and non-teaching staff who were hypertensive increased from 24.2 % vs. 22.9 % to 64.7 % vs. 51.1 %. A similar doubling-effect was reported among those who were hypertensive in USA from 32.0 % to 46.0 % (35). The 2017-ACC/AHA guideline promotes early detection of HBP or "white-coat hypertension" than the 2003-JNC 7 guideline thereby preventing incidences of heart attack, stroke and sudden death.

Dietary history is very important in the management of HBP. Certain foods if not consumed adequately such as fruits and vegetables or consumed, will predispose the consumer to HBP. Dietary risk factors of HBP to be avoided include processed foods (foods containing saturated fats, fried foods, junk foods), excessive consumption of salt, sugar and alcohol-based foods. The teaching-staff had adequate consumption of fruits and vegetables (≥ 3 days/week (68.1 % vs. 60.5 %) more than the non-teaching staff who consumed fruits and

Table 4: Association between dietary pattern risk factors and high blood pressure prevalence among the respondents

Dietary pattern	Teaching staff* Not- HBP n=361 Freq(%)	HBP n=115 Freq(%)	Total N = 476	Non-teaching staff* Not-HBP n=367 Freq(%)	HBP n=109 Freq(%)	N = 476 Total
Fruits/week						
None	66(18.3)	28(24.3)	94(19.7)	126(34.3)	35(32.1)	161(33.8)
<3 days	43(11.9)	15(13.0)	58(12.2)	24(22.0)	56(51.4)	87(18.3)
≥3 days	252(69.8)	72(62.6)	324(68.1)	178(48.5)	50(45.9)	228(47.9)
	$\chi2$ =2.38 p=0.304			$\chi2$ =1.32 p=0.515		
Vegetables/week						
None	97(26.9)	20(17.4)	117(24.6)	94(25.6)	16(14.7)	110(23.1)
<3 days	56(15.5)	15(13.0)	71(14.9)	94(25.6)	22(20.2)	116(24.4)
≥3 days	208(57.6)	80(69.6)	288(60.5)	179(48.8)	71(65.1)	250(52.5)
	$\chi2$ =5.60 p=0.061			$\chi2$ =9.64 p=0.008		
Perceived quantity of salt consumed						
Too little	46(12.8)	14(12.1)	60(12.6)	75(20.4)	21(19.3)	96(20.2)
Right amount	312(86.4)	100(87.0)	412(86.6)	285(77.7)	87(79.8)	372(78.1)
Too much	3 (0.8)	1 (0.9)	4 (0.8)	7 (1.9)	1 (0.9)	8 (1.7)
	$\chi2$ =0.02 p=0.987			$\chi2$ =0.59 p=0.742		
Addition of extra salt to meals						
Never	138(82.1)	253(82.1)	391(82.1)	200(85.8)	208(85.6)	408(85.7)
Sometimes	25(14.9)	47(15.3)	72(15.1)	22 (9.4)	27(11.1)	49(10.3)
Always	5 (3.0)	8 (2.6)	13 (2.7)	11 (4.7)	8 (3.3)	19 (4.0)
	$\chi2$ = 0.067 p= 0.967			$\chi2$ = 0.931 p=0.628		
Processed foods						
Never	170(47.1)	59(51.3)	229(48.1)	171(46.6)	57(52.3)	228(47.9)
Sometimes	135(37.4)	45(39.1)	180(37.8)	157(42.8)	35(32.1)	192(40.3)
Always	56(15.5)	11(9.6)	67(14.1)	39(10.6)	17(15.6)	56(11.8)
	$\chi2$ =2.58 p=0.275			$\chi2$ =4.70 p=0.095		
Type of cooking-oil used						
Vegetable-oil						
Yes	206(57.1)	70(60.9)	276(58.0)	177(48.2)	67(61.5)	244(51.3)
No	155(42.9)	45(39.1)	200(42.0)	190(51.8)	42(38.5)	232(48.7)
	$\chi2$ =0.51 p=0.516			$\chi2$ =5.89 p=0.016		
Palm-oil						
Yes	227(62.9)	78(67.8)	305(64.1)	228(62.1)	71(65.1)	299(62.8)
No	134(37.1)	37(32.2)	171(35.9)	139(37.9)	38(34.9)	177(37.2)
	$\chi2$ =0.92 p=0.373			$\chi2$ =0.32 p=0.652		
Low cholesterol oil						
Yes	78(21.6)	16(13.9)	94(19.7)	81(22.1)	16(14.7)	97(20.4)
No	283(78.4)	99(86.1)	382(80.3)	286(77.9)	93(85.3)	379(79.6)
	$\chi2$ =3.25 p=0.081			$\chi2$ =2.83 p=0.105		
Butter/Margarine						
Yes	5 (1.4)	1 (0.9)	6 (1.3)	7 (1.9)	2 (1.8)	9 (1.9)
No	356(98.6)	114(99.1)	470(98.7)	360 (98.1)	107(98.2)	467(98.1)
		$\chi2$ = 3.72 p=0.054		$\chi2$ = 0.02 p =0.887		
Alcohol use						
Current-drinker	41(11.4)	19(16.5)	60(12.6)	70(19.1)	23(21.1)	93(19.5)
Non-drinker	320(88.6)	96(83.5)	416(87.4)	297(80.9)	86(78.9)	383(80.5)
Total	**361(100)**	**115(100)**	**476(100)**	**367(100)**	**109(100)**	**476(100)**
	$\chi2$ =0.18 p=1.000			$\chi2$ =0.002 p=1.000		

* Not-HBP = Not-hypertensive; HBP = hypertensive

Table 5: Binary logistic regression for dietary risk factors associated with high blood pressure among respondents

	Teaching-staff			Non-teaching staff		
Variables	**OR**	**95% CI**	**p**	**OR**	**95% CI**	**p**
Vegetables consumption						
<3 days	1.88	1.17 - 3.03	0.009	1.43	0.86 - 2.37	0.162
≥3 days	1		1			
Vegetable-oil consumption						
Yes	1.74	1.08 - 2.80	0.022	1.08	0.67 - 1.74	0.728
No	1			1		

vegetables less frequently, <3 days/week (47.7 % vs. 47.5 %). This might-be one of the reasons why vegetable consumption was statistically significant with HBP among the non-teaching staff but not the teaching-staff ($p<0.05$). This result was higher than that cited among the employees of Riyadh Saudi University (12.4 %) (7) and University of Ghana (40.0 %) (11). DASH-diet which has the ability of lowering BP is recommended for this study population (25-26). The drinking pattern showed that the current-drinkers were higher among the non-teaching than the teaching staff (19.5 % vs. 12.6 %). This drinking history was lower than that reported among the employees of University of Ibadan (13); University of Brasilia, Brazil (5) but higher than the percentage found among the same employees of the University of Ibadan in another study (14).

Higher percentage of hypertensive non-teaching staff (3.3 %) added extra salt to their meals than the hypertensive teaching-staff (2.6 %). Non-teaching staff (3.2 %) always consumed processed foods more than the teaching-staff (2.3 %). Most of the salts in our foods come from consumption of packaged/processed foods (22). Foods should be consumed as cooked without adding extra salt. Teaching-staff (58.0 %) used vegetable-oil as cooking-oil more than the non-teaching staff (51.3 %). Addition of extra salt, consumption of processed foods and use of vegetable-oil are risk factors of HBP. Vegetable-oil is a rich source of cholesterol which is a risk factor of HBP. The use of vegetable-oil was lower than the 96.0 % reported among the staff of University of Ibadan (14). Use of vegetable-oil as a cooking-oil was also significantly associated with HBP among non-teaching staff and not the teaching-staff. Also, those who used vegetable-oil for cooking were 1.74 times more likely to develop HBP than those who did not cook with vegetable-oil.

5. Conclusion

The prevalence of HBP was found to be higher among the teaching staff than the non-teaching staff. Even though the teaching-staff who were hypertensive had adequate consumption history of fruits, vegetables and lower consumption of salt, alcohol, butter, vegetable-oil and other processed foods than the non-teaching staff, they still had higher prevalence of high blood pressure. This might imply that there may be other factors predisposing them to HBP other than their diet. Hypertensive non-teaching-staff consumed more of dietary-risk-factors of HBP than the teaching-staff.

6. Recommendation

This study recommends creation of institution-based HBP prevention and awareness strategies and periodic blood-pressure screening for this study population. Also, further study might be required to dig deep into the other causative factors of high HBP among the University staff especially the teaching staff bearing in mind the nature of their job.

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Conflict of interest

The authors declare no conflict of interest.

Ethics approval

Approval of this study was obtained from Health, Research and Ethics Committee (HREC) of Lagos University Teaching Hospital. The health research

committee assigned number was ADM/DCST/HREC/APP/1715. Written consent was obtained from all the participants.

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