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Health Screening among Pharmacists in a Teaching Hospital in South-Western Nigeria

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

Abstract
Background: Routine health screening is very vital and should be done regularly for early disease diagnosis, which is a major factor in disease progression.
Objectives: To assess the prevalence of diabetes, hypertension, overweight and obesity and to evaluate risk factors for diabetes or hypertension.
Materials and Methods: A cross-sectional study conducted among 63 pharmacists in the Department of Pharmacy, University College Hospital, Ibadan, using a pretested questionnaire. The study lasted for three months. Participants' blood pressure, blood glucose and anthropometric measurements were determined using appropriate methods. Data was analyzed for descriptive and inferential statistics using SPSS version 20 at $p \leq 0.05$.
Results: The response rate was 94.0 % (63/67). The prevalence of overweight, obesity, hypertension, prediabetes and diabetes were 42.9 %, 30.2 %, 15.9 %, 7.9 % and 1.6 % respectively. Most of the hypertensive participants were not aware of this prior to the study. Majority of the participants engaged in regular intake of fruits and vegetables, however, a lot of them (28; 49.5 %) were involved in consumption of sugar-based drinks. Their mean sleeping hours was 6.2 ± 1.0.
Conclusions: The health screening was done to assess prevalence of overweight, obesity and hypertension. There is need to create awareness for the necessity of regular medical checkup as well as avoidance of risk factors for diabetes mellitus and hypertension among the participants.
Keywords: Hypertension, diabetes, obesity, health screening, risk factors, pharmacists

INTRODUCTION

Non communicable diseases (NCDs) are on the rise globally especially in the low and middle income countries where initially it was assumed the burden of these diseases was uncommon (WHO, 2006). Among the most common types of NCDs are diabetes and hypertension. In a number of African countries these chronic diseases contribute to a larger number of adult medical admission and death compared to infectious disease like HIV/AIDS or tuberculosis (Aikins *et al*., 2010; Mbuya *et al*., 2014). According to World Health Report, NCDs accounted for 22 % of the total deaths in the region in the year 2000; cardiovascular disease alone accounted for 9.2 % of total deaths, killing even more than malaria (WHO, 2001).

Hypertension is regarded as a major public health problem (Murray and Lopez, 1997). Emerging evidence identifies hypertension as a major cause of morbidity and mortality globally including sub Saharan Africa (Cooper *et al*., 1997; Cappucio *et al*., 2004). Hypertension is the most common single risk factor for cardiovascular related events and death

worldwide (Lim *et al.,* 2012) and it is an increasingly important medical and public health issue (Addo *et al.,* 2007).

Type 2 diabetes mellitus has clear modifiable risk factors. The most important of the modifiable factors is overweight or obese. Also inclusive are poor diet and lack of physical activity (Weinstein *et al.,* 2006; Weinstein *et al.,* 2010). The National Institute for Health and Care Excellence states that providing structured lifestyle intervention in high risk adult populations can prevent or delay the onset of type 2 diabetes (NICE, 2012). In 2005, the World Health Organization reported that the prevalence of obesity in the sub-Saharan African countries was in the range of 3.3 % and 18.0 %, and that obesity had become a leading risk factor for diabetes mellitus and cardiovascular diseases in the urban areas of Africa (WHO, 2005).

Overweight and obesity are complex health problems that affect more than two-thirds of U.S. adults (Ogden *et al.,* 2014). There are many health conditions associated with overweight and obesity including hypertension, coronary heart disease, and type 2 diabetes (Pi-Sunyer, 1993). A major risk factor of diabetes is excessive adiposity, which is often a consequence of poor diet and physical inactivity. The risk for developing diabetes increases as weight increases. Compared to a healthy weight person, an overweight individual is 3 times more likely to develop diabetes within 10 years (Fields *et al.,* 2004). According to the third report of the National Cholesterol Education Program, individuals with diabetes are also at an increased risk of developing coronary heart disease (Conti, 2002). Lifestyle interventions with an emphasis on behavior modification and weight reduction have been effective in lowering the incidence of diabetes (Tuomilehto, 2009).

Assessment for presence of risk factors that could predispose to some chronic diseases such as diabetes and hypertension should be a regular practice. Regular health screening affords early disease diagnosis and improves disease progression. The study therefore aimed at carrying out routine medical screening for pharmacists in the University College Hospital, Ibadan with a view to identifying participants with abnormal blood glucose, blood pressure and also to identify risk factors that could predispose to the chronic diseases.

METHODOLOGY

Study Design

The study was a cross-sectional survey of pharmacists working at the Department of Pharmacy, UCH, Ibadan. The study was carried out for a period of three months.

Study Area and Population

The study was carried out among 63 registered pharmacists working at the Department of Pharmacy, University College Hospital (UCH) Ibadan.

Inclusion Criteria

Registered post-National Youth Service Corps pharmacists who were not pregnant and also not posted to outstations during the study period, and who gave informed consent were recruited for this study.

Exclusion Criteria

All registered pharmacists in the hospital who did not give informed consent to participate in this study, all intern pharmacists, all pregnant pharmacists, pharmacists on study leave outside Oyo state and all pharmacist in outstations outside Ibadan.

Sampling Size Determination

A total sampling of the pharmacists who met the inclusion criteria in the hospital was done.

Data Collection Instrument

The major instrument for data collection was questionnaire consisting of three sections: Section A evaluated socio-demographic characteristics, section B clarified behavioral risk factors such as diets, smoking, exercise, sleep duration and section C assessed clinical details such as presence of a chronic disease, current medication and family history. Participants' weights were measured in kilograms using Hanson® weighing scale. Participants' heights were measured in meters using SECA® height scale. Body mass index (BMI) was calculated for all participants using the formula: BMI = Weight (kg)/Height(m)^2).

The materials used for the study were: Hanson® weighing scale, Seca® height meter, tape rule, Littman's stethoscope, Accoson® mercury sphygmomanometer, Accu-Check® active digital glucometer and strips, lancets, methylated spirit, cotton wool and latex gloves.

Generalized obesity was defined as BMI of greater than or equal to 30 kg/m^2, participants with BMI of 25.0 to 29.9 kg/m^2 were considered overweight. Those participants with BMI between 18.5 and 24.9 kg/m^2 were considered as having normal weight. The waist circumference (WC) and hip circumference (HC) were taken using a measuring tape. Both the WC and HC were measured in centimeters. Waist

circumference cut offs used were 88 cm for females and 102 cm for males. Abnormal WC was defined as greater than 102 cm for males and greater than 88 cm for females. The waist-hip ratio (WHR) was calculated by dividing WC by HC.

The blood pressure (BP) of participants was taken using Accoson® mercury sphygmomanometer in a sitting position after at least ten minutes of rest. Blood pressure classification was based on JNC V11 classification (Chobaniam *et al*., 2003). Hypertension is defined as BP > 140 mmHg systolic and/or > 90 mmHg diastolic, after two readings, prior diagnosis of hypertension or use of antihypertensive medications.

The fasting blood glucose (FBG) was measured using a digital glucometer (Accu-Check® Active) after an overnight fast. Diabetes was defined as FBG > 125 mg/dL and prediabetes as FBG of 100 – 125 mg/dL, while normal reading was < 100 mg/dL (ADA, 2016). The measurements were carried out by a competent pharmacists who was adequately trained. Also the risk for the development of diabetes (Table 1) among the study population was assessed by using the modified diabetes risk questionnaire of the Finnish Medical Association which was adapted for this study (Lindström and Tuomilehto, 2003).

Validation of Data Collection Tool

The questionnaire was pretested among 5 hospital pharmacists for face validity while content validity was done by two lecturers in the Department of Clinical Pharmacy and Pharmacy Administration, University of Ibadan.

Table 1: Type 2 Diabetes Risk Assessment Score Chart

Diabetic Risk Assessment Variables and Assigned Values		
1. Age		
0	< 45 years	
2	45-54 years	
3	55-64 years	
4	≥ 65 years	
2. Body mass index (kg/m^2)		
0	<25.0	
1	25.0-29.9	
3	≥ 30.0	
3. Waist Circumference (cm)	**Men**	**Women**
0	< 95	< 80
3	95-102	80-88
4	>102	> 88
4. 30 minutes of daily physical activity		
0	Yes	
1	No	
5. Current hypertensive medication		
0	No	
2	Yes	
6. Frequency of vegetable consumption		
0	Everyday	
1	Not everyday	
7. Previous incidence of high blood glucose		
0	No	
2	Yes	
8. Family history of diabetes		
0	No	
5	Yes	

Key

< 7: Low risk, 7-11: Slightly elevated risk, 12-14: Moderate risk, 15-20: High risk, >20: Very high risk

(Adapted from the Finnish Medical Association)

Data Analysis
Descriptive statistics including frequency counts, percentages, means ± standard deviations were used to summarize data. Inferential statistics such as Chi-square and Fischer's exact test were used to evaluate association between categorical variables such as gender and some anthropometric measurements, family history of chronic disease and blood pressure category, with $p \leq 0.05$ considered significant.

Ethical Consideration
Verbal informed consent was obtained from participants. Ethical approval was obtained from the University of Ibadan/University College Hospital Ethics Committee with registration number of NHREC/05/01/2008a.

RESULTS

Socio-demographic Characteristics
The response rate was 94 %: a total of 67 questionnaire was distributed, but 63 was retrieved for analysis. Eleven (17.5%) participants were single, 50 (79.4%) were married and 2 (3.2%) were widowed. The mean age of the participants was 39.2 ± 6.3 years, with the age range being 30 to 56 years. Details is shown in Table 2.

Table 2: Demographic characteristics of study participants

Variable		n (%)
Sex	Female	40 (63.5)
	Male	23 (36.5)
Age	< 45	48 (76.2)
	≥ 45	15 (23.8)
Years in service	< 10	39 (61.9)
	10-20	17 (27.0)
	>20	7 (11.1)
Grade/Level	Grade 1	19 (30.2)
	Senior Pharmacist	23 (36.5)
	Chief Pharmacist	10 (15.9)
	Assistant Director	11 (17.5)
Academic Qualification	B. Pharm only	23 (36.5)
	B. Pharm & FPCPharm	17 (27.0)
	B. Pharm & M. Sc.	17 (27.0)
	B. Pharm & MBA	1 (1.6)
	B. Pharm, FPCPharm and M. Sc.	5 (7.9)

Key
B. Pharm: Bachelor of Pharmacy
FPCPharm: Fellow of the West African College of Pharmacists
M. Sc.: Master of Science
MBA: Master of Business Administration

Behavioural Risk Factors of Participants

The details of the participants' last medical check-up is presented in Table 3. All the participants had never smoked. Out of the 63 participants 48 (76.2 %) had never consumed alcohol, 5 (7.9 %) were ex-drinkers and 10 (15.9 %) consumed alcohol occasionally.
Sleeping hours of participants was as follows: 3 (4.8 %) sleep for 4 hours per day, 10 (15.9 %) sleep for 5 hours per day, 26 (41.3 %) sleep for 7 hours per day and 6 (9.5 %) sleep for 8 hours per day and the mean sleeping hours was 6.2 ± 1.0.

Ten (15.9 %) participants had knowledge of their calorie consumption per day. Also, 11 (17.5 %) participants had a meal time table. Twenty-seven (42.9 %) participants had a deliberate meal plan to factor in a balanced diet. Details of frequency of exercise, fruit consumption, vegetable consumptions and consumption of sugar-based drinks is presented in Table 3. Details of the results of the diabetes risk assessment is presented in Table 4.

Table 3: Some Behavioural Risk Factors of Participants

Variables		Frequency (%)
Last medical check-up (years)	0-5	42 (66.7)
	6-10	5 (7.9)
	> 10	1 (1.6)
Frequency of exercise	Daily	10 (15.9)
	2-3 days per week	11 (17.5)
	Weekly	13 (20.6)
	Monthly	6 (9.5)
	Occasionally	9 (14.3)
	Never	11 (17.5)
Duration of exercise (minutes)	< 30	21 (48.8)
	30-60	21 (48.8)
	> 60	1 (1.6)
Frequency of fruit intake	Daily	5 (7.9)
	2-3 days per week	33 (52.4)
	Weekly	14 (22.2)
	Monthly	3 (4.8)
	Occasionally	8 (12.7)
Frequency of vegetable intake	Daily	4 (6.6)
	2-3 days per week	35 (57.4)
	Weekly	19 (31.1)
	Monthly	3 (4.9)
Frequency of consumption sugar-based drinks	Daily	19.7
	2-3 days per week	26.2
	Weekly	39.3
	Monthly	14.8

Table 4: Risk of developing Diabetes Mellitus

	Participants		Total
	Male	Female	
Risk	n=23	n=40	n=63
Low	15 (65.2%)	15 (37.5%)	30 (47.6%)
Slightly Elevated	6 (26.1%)	21 (52.5%)	27 (42.9%)
Moderate	2 (8.7%)	3 (7.5%)	5 (7.9%)
High	----	1 (2.5%)	1 (1.6%)

Key
< 7: Low risk, 7-11: Slightly elevated risk, 12-14: Moderate risk, 15-20: High risk, >20: Very high risk
(Adapted from the Finnish Medical Association)

Clinical Details

In this study population, based on self-report, 5 (7.9 %) of the participants had previous diagnosis of a chronic disease by a physician 4 (6.3 %) of whom were hypertensive and one (1.6 %) hypertensive and diabetic, 58 (92.1 %) had no such prior diagnosis. Five (7.9 %) of the participants were on medications e.g. 4 (6.3 %) of whom were on antihypertensive drugs e.g. Lisinopril and one (1.6 %) participant on antihypertensive and antidiabetic drugs e.g. Amlodipine and Metformin, while 58 (92.1 %) were not on any medications for hypertension and diabetes.

Thirty (47.6 %) of the participants had a family history of chronic disease, while 33 (52.4 %) had no family history of chronic disease. Three (4.8 %) of the participants had a family history of diabetes mellitus, 21 (33.3 %) hypertension and 6 (9.5 %) diabetes mellitus and hypertension.

In this study population, 25 (39.7 %) knew their body mass index. Eleven (17.5 %) participants knew their waist-hip ratio. Out of the 40 female participants 4 (10 %) had previous history of pre-eclampsia and in only one of them did the pre-eclampsia not resolve after giving birth and 36 (90 %) had no history of pre-eclampsia. However only one (2.5 %) of the participants had a previous history of gestational diabetes mellitus which resolved after giving birth.

The last routine check of participants' blood pressure and fasting blood sugar is as follows: 45 (78.9 %) did it within the past six months, 8 (14.1 %) 7 – 12 months, 1 (1.6 %) 13 – 18 months, 2 (3.2 %) 19 – 24 months and 1 (1.6%) over 24 months for blood pressure, while for fasting blood sugar, 18 (42.9 %) did it within the past six months, 13 (31.0 %) 7 – 12 months, 1 (2.4 %) 13 – 18 months, 7 (16.7 %) 19 – 24 months and 3 (7.2 %) over 24 months.

Clinical Parameters of Participants

A total of 23 (84.1 %) of participants had blood pressure of systolic < 120 mmHg and diastolic < 80 mmHg values while 30 (47.6 %) had prehypertensive blood pressure of 120 – 139 mmHg systolic and 80 – 89 mmHg diastolic, while 10 (15.9 %) were hypertensive. Based on the blood pressure measurements done during this study and self-reported diagnosis of hypertension as well as participants on antihypertensive medication, the prevalence of hypertension was 15.9 %. Fifty-seven (90.5%) participants had normal fasting blood glucose values, 5 (7.9 %) were prediabetic and 1 (1.6 %) diabetic. Based on the fasting blood glucose measurement, self-reported diagnosis of diabetes by participants and use of antidiabetic medications, the prevalence of diabetes was 1.6 %.

The prevalence of overweight, obesity and truncal obesity were 42.9 %, 30.2 % and 79.4 % respectively. Thirteen (20.6 %) participants had normal waist-hip ratio while the rest had abnormal waist-hip ratio. Details of the anthropometric measurements is presented in Table 5. Associations between categorical variables is presented in Table 6.

Table 5: Anthropometric measurements for participants

Measurement	Range	Mean ± Standard deviation
Weight (Kg)	47 - 125	75.9 ± 14.4
Height (m)	1.5 – 1.84	1.66 ± 0.9
Waist circumference (cm)	61 – 124.5	90.96 ± 11.9
Hip circumference (cm)	71.1 cm - 160.4	107.5 ± 14.7
Body mass index	Range	Frequency (%)
Normal	18.5 – 24.9	17 (27.0)
Overweight	25.0 – 29.9	27 (42.9 %)
Obese	≥ 30.0	19 (30.2 %)

DISCUSSION

Only one-third of the participants had only Bachelor of Pharmacy (B. Pharm.) degree. This is very notable in that 40 (63.5 %) of the participants had gone beyond B. Pharm. which is in contrast to the findings of Adje and others in 2013, where majority of the Nigerian hospital pharmacists surveyed had no additional qualifications other than their B. Pharm.

The mean sleeping hours of the participants was low. Sleep duration of 7–8 hours a night is associated with a lower risk of obesity, diabetes, high blood pressure, myocardial infarction, and cerebral vascular accidents as well as reduced risk for injuries and errors (Colten and Altevogt, 2006). Recent research has shown that skipping a full night sleep even by 20 minutes, impairs performance and memory the next day which is associated with health problems including diabetes, obesity cardiovascular diseases (Kripke, 2011) and higher rates of death.

Over three-quarters of the participants had no knowledge of their calorie consumption per day. This may result in consuming more than the daily quota of calories which may lead to being overweight and eventually obese. Over three-thirds of the participants had no knowledge of their waist-hip ratio (WHR) and most of the participants had abnormal WHR; also, two-thirds of the participants had no knowledge of their body mass index (BMI) and about three-quarters

had abnormal BMI. Lack of knowledge of BMI in this population could be a factor responsible for overweight and obesity in this study population which is in line with the findings of Dotavall *et al*., 2004 where patient BMI was related to patient knowledge of their BMI.

The prevalence of overweight and obesity, using body mass index calculation were 42.9 % and 30.2 % respectively. However, the prevalence of truncal obesity was 79.4% The marked difference of about 40% in the prevalence of obesity detected using the BMI and WHR calculation is expected since BMI is a suboptimal marker for total body fat percentage and less suitable to assess body fat distribution whereas WHR is more useful in this regards as reported by Ersin in 2007.

Participants in this study showed good knowledge of certain behavioral risk factors for hypertension and diabetes, as shown in the results. No participant in this study would request for extra salt when eating out; fruit consumption was also regular. Daily consumption of fruits and vegetables is associated with a lower hazard of diabetes (Lydia *et al.,* 2008; Dyson *et al.,* 2011; Cooper *et al.,* 2012). However, the consumption of sugar-based drinks such as Coke® in this study population was rather high and could be attributed to the work schedule of the participants. The inability to excuse themselves from their duty post to go and eat proper food make them resolve to sugar-based drinks to keep them going. This is a considerable risk factor for diabetes.

Only a little above one-tenth of the participants do exercise on a daily basis. This is not unexpected in that exercising on a daily basis requires dedication and time, which majority of the participants in the population may not have. This lack of daily physical exercise in the majority of the population is a risk factor for hypertension and diabetes. The American Heart Association recommends a minimum of 150 minutes per week of moderate intensity physical exercise. In addition to lowering blood pressure, physical activity can strengthen the heart muscle and may reduce arterial stiffness which happens as people age but is often accelerated by type 2 diabetes mellitus (William, 2008).

The self-reported prevalence of hypertension in this study population was 7.9 %. However, the actual prevalence was 15.9 %, this is in line with the study by William in 2008 where a high prevalence of hypertension was found among health workers whereby a significant proportion was undiagnosed and complicated.

Ulasi and others in 2011 reported low awareness in spite of high prevalence of hypertension among traders in Nigeria, this situation may not be much different among elites, literates and high income groups (Momin *et al.,* 2011) and based on the result obtained in this study. A meta-analysis of prevalence of hypertension from population-based studies in South-Western Nigeria from 1990 to 2009 reported a prevalence ranging from12.4 % to 34.8 % (Ekwunife *et al*, 2011).

The risk assessment for developing diabetes in the next ten years in this study is remarkable. Two-thirds of the male population had a low risk of developing diabetes in the next ten years while only one-third of the female population had a low risk of developing diabetes in the next ten years. This could be due to the fact that the greater proportion of those with abnormal body mass index and abnormal waist hip ratio were females. This finding is similar to that of a study where the risk for developing diabetes mellitus was higher in females than in males (Busari *et al.*, 2008). This trend has been attributed to increasing prevalence of obesity and sedentary lifestyle (Lindsay *et al.,* 2000).

One-sixth of the participants who had a family history of chronic disease were already on medications. This shows that family history of hypertension and diabetes is a strong predisposing factor for hypertension which is a major risk factor for stroke, heart failure and kidney disease making it a key priority (Mc Gavok *et al.,* 2006; Ogbenekaro *et al.,* 2015). It is imperative that health care workers be sensitized to encourage them go for routine medical checkup since an appreciable proportion of the hypertensive participants in this population had no previous diagnosis.

The study is not without limitations. The self-reported nature of the questionnaire for the behavioral risk factor is subjective and is only as accurate as what was reported by the participants. Also, the glycated hemoglobin method of glucose level determination would have been preferred over the fasting blood glucose method. This is because we can neither ascertain that each participant did not eat on the day of the test, nor that they deliberately over-fasted before the test. It could also have been preferred to determine the fasting lipid profile of the participants, being that it is a major risk factor for both diabetes and hypertension. This could have made it possible to carry out a 10-year cardiovascular risk assessment using the Framingham calculation.

Table 6: Association between categorical variables

Sex versus Blood Pressure Category				
	Blood Pressure category			
Sex	Normal	Hypertensive	Fisher's	P value
Female	37(92.5%)	3(7.5%)		
Male	16(69.6%)	7(30.4%)	5.752	0.016
Total	53	10		
Sex versus Body Mass Index				
Sex	Body Mass Index			
	Normal	Abnormal	χ^2	P value
Female	7(17.5%)	33(82.5%)		
Male	16(69.6%)	7(30.4%)	5.002	0.025
Total	23	40		
Sex versus Waist-Hip Ratio				
	Waist-Hip Ratio			
Sex	Normal	Abnormal	Fisher's	P value
Female	2(5%)	38(95%)		
Male	11(47.8%)	12(52.2%)	16.354	< 0.001
Total	13	50		

Family History of Chronic Disease versus Blood Pressure Category				
	Blood Pressure Category			
Family History of Chronic Disease	Normal	Hypertensive	Fisher's	P value
No	31(93.9%)	2(6.1%)		
Yes	22(73.3%)	8(26.7%)	4.997	0.025
Total	53	10		
Family History of Chronic Disease versus Body Mass Index				
	Body Mass Index			
Family History of Chronic Disease	Normal	Abnormal	χ^2	P value
No	13(39.4%)	20(60.6%)		
Yes	4(13.3%)	26(86.7%)	7.254	0.04
Total	17	46		
Family History of Hypertension/Diabetes versus Body Mass Index				
	Body Mass Index			
Family History	Normal	Abnormal	χ^2	P value
Diabetes	1(33.3%)	2(66.7%)		
Hypertension	1(4.8%)	20(95.2%)		
Diabetes and Hypertension	13(39.4%)	20(60.6%)	8.027	0.045
Total	15	42		

CONCLUSION

Health screening of the study population was done. Risk factors for diabetes and hypertension was evaluated. The prevalence of overweight, obesity, hypertension and diabetes were evaluated.

There is need for regular health screening among the study population so as to afford early diagnosis and also to reveal risk factor that could predispose to diabetes and/or hypertension.

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