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Medical Examination Findings among Workers in a Pharmaceutical Industry in Nigeria, West Africa.

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ABSTRACT

Most workplaces in Nigeria do not have proper medical examination policy, hence ill-health conditions are not detected early enough for appropriate management which result in high morbidity and mortality. This research illustrates the need for proper medical examination in a pharmaceutical industry with a view to assisting in promoting, maintaining and restoring the health of the employee. All the 750 workers of the pharmaceutical industry presented for medical examination after individual consent and institutional ethical approval was obtained. The process of medical examination involved medical history and physical examination, with particular reference to blood pressure, height and weight. All the subjects had fasting blood sugar and urinalysis. A total of 750 staff was examined. Four hundred and thirty-five (58%) were female while 315 (42%) were male. The male to female ratio was 0.7:1.0. Age of subject ranged from 22 – 61 years. The mean age was 39.25 ± 9.8 . Majority, 605 (80.7%) were junior staff. Most of them 368 (49.0%) had secondary education with more than one year post employment. One hundred and eighty-eight (25.0%) had normal blood pressure while 360 (48.0%) were hypertensive, with female 223 (29.7%) more than male 137 (18.3%). Of the hypertensive 227 (63.1%) were in stage 1, while 133 (36.9%) were in stage 2. There were more hypertensive in age group 31 – 35 years 80 (22.2%). Six (1.7%) of the hypertensive were below 25 years. Moreover, 496 (66.1%) had normal blood sugar while 128 (17.0%) had elevated fasting blood sugar. Four hundred and ninety-seven (66.2%) had normal body mass index. Sixty one (8.2%) were underweight, 135 (18%) were overweight while 57 (7.6%) were obese. Hypertension was prevalent among the workers and was associated with diabetics and increase body mass index, hence, the need for increase awareness, health education and effective treatment among the workers.

Keywords: Medical examination findings, workers, pharmaceutical industry, Nigeria, West Africa

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INTRODUCTION

Medical examination is succinctly defined as a thorough study or examination of the health of an individual [1]. It could be pre-employment, periodic, pre-placement, return to work, pre-leave, post-leave or pre-retirement overall, the periodicity and type of examination will depend to a greater extent on the nature of job and work hazards [2]. It is designed to ensure that the workman is fit for employment and that he remains perfectly in that state of fitness throughout his period of employment [3].

The aim of medical examinations should be to place a worker in a vocation for which he/she is best suited in terms of mental, social, and physical wellbeing. It should not be to disqualify a worker. In cases where special fitness and physique are required, medical examination may reveal a situation, whereby the physician will advise the worker to seek alternative form of vocation or work.

The importance of medical examinations involves the detection and enumeration of work related diseases which may include well recognized occupational diseases and unrecognized adverse effect related to work. Besides, from the benefit to the individual in early diagnosis and treatment of ailments, it is a source of data for evaluation and interpretation to characterized trends and identifies new pattern or clusters of disease or injury [4].

Although medical examinations are routine practice in several countries, it's poorly supported by scientific evidence in the majority of the population. A 2012 Cochrane review did not find any benefit, with respect to the risk of death or poor outcomes related to disease in those who receive them. The possible advantages include detection and subsequent prevention or early treatment for conditions such as high blood pressure, alcohol abuse, smoking, unhealthy diet, obesity and various cancers. Moreover, they could improve the patient-physician relationship and decrease patient anxiety. Some employers require a mandatory medical examination before hiring a candidate. Most surgeons will ask a patient for his or her recent medical examination results before proceeding with the surgery [5]. Possible harms includes over diagnosis, overtreatment, distress or injury from invasive follow-up test, distress due to false positive test positive test results, false reassurance due to false negative test results, possible continuation of adverse health behaviors due to negative test results, adverse psychosocial effects due to labeling, and difficulties with getting insurance. It also includes the time and money that could be wasted [6].

Mock introduced health examinations for industrial employees in 1909 and the American Medical Association as early as 1925 published a manual of procedures for such examinations [7]. Medical examination is important for pharmaceutical workers because it leads to promotion of health and reduction in morbidity and mortality and the consequent reduction in man hours and economic drain. Extremely long working hours increase the risk of sudden death from too much occupational stress. A study in Japan depicted a U-shaped relationship between mean monthly working hours and the risk of acute myocardial infarction, hence the need for improved level of medical checkup among the working population [8].

With regards to gender, the prevalence of hypertension ranged from 7.9% to 50.2% and 3.5% to 68.8% in men and women, respectively [9]. A study of the prevalence and patterns of hypertension in South Western Nigeria, demonstrated that with a cut-off value of $\geq 140/90$ mmHg for the diagnosis of hypertension. In all the studies, the most likely determinant of blood pressure and presence of high blood pressure was age. Blood pressure was shown to increase steadily with age irrespective of gender.¹⁰ In Nigeria, the overall prevalence of hypertension was 18.4% compared with a prevalence of 10.35% for Ethiopia and 23.0% for Ghana [10].

Primary essential hypertension, which constitutes the great majority of cases, usually has a long asymptomatic course [11]. Although asymptomatic, it has been shown to significantly increase the risk of morbidity and mortality from coronary heart disease, cerebrovascular disease, and renal failure [12]. Adequate treatment of hypertension will reduce the risk of these complications. The lag time between the onset of hypertension and development of vascular damage is not precisely known, however, the risk of complications increases directly with both the degree and duration of hypertension [13].

The mercury sphygmo-manometer is the standard method of diagnosing hypertension [14]. It is a quick, reliable determination as long as the proper size cuff is used. A single screening value should always be confirmed at subsequent times before a definite diagnosis is made. Hypertension, BMI, Obesity meet all the criteria to warrant periodic screening. It is a major risk factor of ischemic heart disease and stroke. All adults should have blood pressure checked every two years. Though arbitrary this frequency is based on evidence that the vascular damage is proportionate to the degree and duration of hypertension.

METHODS

This study was conducted at a pharmaceutical industry in Ilorin, Kwara State which was established in the year 1996 and commissioned on 2nd of June, 2005. Presently, it produces more than eighty different pharmaceutical products, all duly registered and numbered by NAFDAC. With this, the company distinguished itself as the largest pharmaceutical company in Northern Nigeria. It has more than 22 depots across the federation. The company employed more than 800 workers of various cadres.

This study was conducted among all the 750 workers in the employment of the Pharmaceutical Company in Ilorin, Kwara State, Nigeria, after individual consent and institutional ethical approval was obtained.

Two or more blood pressure measurement separated by a two-minute interval, with the patient either supine or seated, and after standing for at least 2 minutes was taken. Verification in the contralateral arm was done. The following classification of blood pressure was used.

BP = Normal	≤ 120	Pre-hypertensive	$120 - 139$	Stage 1	$140 - 159$	Stage 2	≥ 160
	< 80		$80 - 89$		$90 - 99$		100

Body weight was measured with subjects bare-footed and expressed in kilograms (kg) to the nearest 0.1kg and the corresponding height expressed to the nearest centimeters. The international classification of body mass index (BMI) (kg/m²) was used as follows; <18.5 underweight, 18.5 – 24.99 normal weight, 25 – 29.99 overweight and ≥30 obesity.

Statistical analysis was done using the statistical pack for social sciences (SPSS) version 16.0 software program for frequency distribution and cross tabulations. Test for statistical significance were done by the chi-square test for categorical data and the student t-test for quantitative data using bivariate correlation to determine the significance of between factor changes. Significant value was taking as ≤ 0.05.

RESULTS

Table shows that a total of 750 staff was examined. Four hundred and thirty-five (58%) were female while 315 (42%) were male. The male to female ratio was 0.7:1.0. Age of subject ranged from 22 – 61 years. The mean age was 39.25 ± 9.8. Majority, 605 (80.7%) were junior staff. Most of them 368 (49.0%) had secondary education with more than 1 year of employment.

Table 1: Demographic characteristics of the respondents

Variable	n	%
Sex		
Female	435	58.0
Male	315	42.0
Age		
≤ 25	136	18.1
26 – 30	232	30.9
31 – 35	127	16.9
36 – 40	68	9.1
41 – 45	61	8.1
46 – 50	59	7.9
≥ 5.1	67	8.9
Cadre		
Junior staff	605	80.7
Senior staff	145	19.3
Level of education		
None	102	13.6
Primary	191	25.4
Secondary	368	49.0
Tertiary	89	11.0
Years on employment		
< 1 year	200	26.7
1 -2 years	302	40.3
3 – 4 years	161	21.4
> 5 years	87	11.6

Figure 1 displays the stages of hypertension among the respondents. Only 188 (25.0%) had normal blood pressure. Two hundred and two (26.9%) were in the pre-hypertensive stage. Majority, 227 (20.3%) were in stage 1 while 133 (77.4%) were in stage 2.

Figure 1: Stages of Hypertension among the Workers

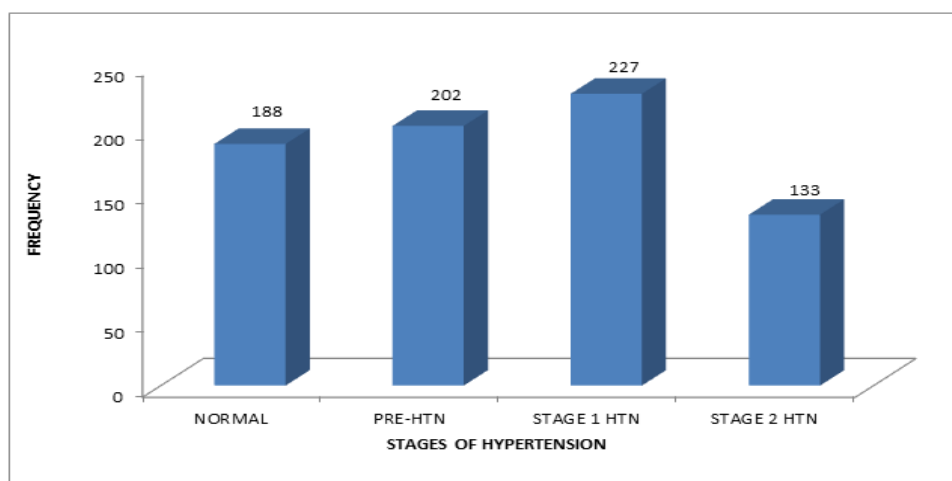


Table 2 shows that 188 (25.0%) had normal blood pressure while 360 (48.0%) were hypertensive, with female 223 (29.7%) more than male 137 (18.3%). Of the hypertensive 227 (63.1%) were in stage 1, while 133 (36.9%) were in stage 2. There was more hypertensive in age group 31 – 35 years 80 (22.2%). Six (1.7%) of the hypertensive were below 25 years. The result was statistically significant.

Table 2: Association between gender, age groups and blood pressure

Variables	Blood Pressure Groups				Total(100.0)	p-value
	Normal	Pre-HTN	Stage1HTN	Stage2HTN		
Gender						
Male	95 (30.2)	83 (26.3)	99 (31.4)	38 (12.1)	315	0.000
Female	93 (21.4)	119(27.4)	128 (29.4)	95 (21.8)	435	
Age Groups						
≤ 25	65 (47.8)	65 (47.8)	5 (3.7)	1 (0.7)	136	0.000
26 – 30	82 (35.3)	106(45.7)	41 (17.7)	3 (1.3)	232	
31 – 35	23 (18.1)	24 (18.9)	72 (56.7)	8 (6.3)	127	
36 – 40	12 (17.6)	4 (5.9)	45 (66.2)	7 (10.3)	68	
41 – 45	4 (6.6)	2 (3.3)	35 (57.4)	20 (32.8)	61	
46 – 50	2 (3.4)	0	20 (33.9)	37 (62.7)	59	
≥ 51	0	1 (1.5)	9 (13.4)	57 (85.1)	67	

Table 3 shows that 496 (66.1%) had normal blood sugar while 128 (17.0%) had elevated fasting blood sugar. This was statistically significance. Similarly, age group greater than fifty years had the highest fasting blood sugar.

Figure 2 shows fasting blood sugar of the respondents. Majority, 586 (78%) had normal fasting blood sugar of between 2.5 – 5.0 mmol/l. Thirty-six (5%) had blood sugar level less than 2.5. Significantly, 128 (17%) had fasting blood sugar above the normal 5.0 mmol/l.

Figure 3 shows the body mass index of the subjects. Four hundred and ninety-seven (66.2%) had normal body mass index. Sixty one (8.2%) were underweight, 135 (18%) were overweight while 57 (7.6%) were obese.

Table 3: Association between gender, age groups and fasting blood sugar

Variables	Fasting blood sugar			Total(100.0)	p-value
	≤ 2.4	2.5 – 5.0	≥ 5.1		
Gender					
Male	19 (6.0)	257 (81.6)	39 (12.4)	315	0.000
Female	17 (3.9)	239 (75.6)	89 (20.5)	435	
Age Groups					
≤ 25	12(8.8)	109(80.1)	15(11.0)	136	
26 – 30	13(5.6)	204(87.6)	15(6.5)	232	
31 – 35	5 (3.9)	115 (90.6)	7 (5.5)	127	
36 – 40	3 (4.4)	58 (85.3)	7 (10.3)	68	
41 – 45	1 (1.6)	50 (82.0)	10 (16.4)	61	
46 – 50	1 (1.7)	28 (47.5)	30 (50.8)	59	
≥ 51	1 (1.5)	22 (32.8)	44 (65.7)	67	0.000

Figure 2: Fasting Blood Sugar among the Respondents

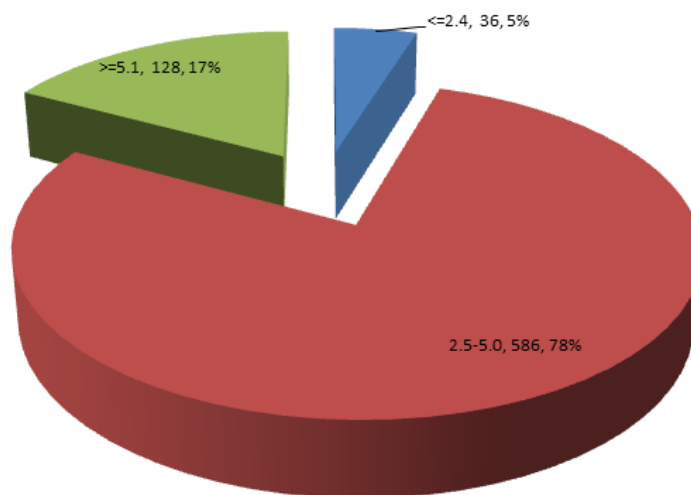


Figure 3: Body Mass Index among the Respondents

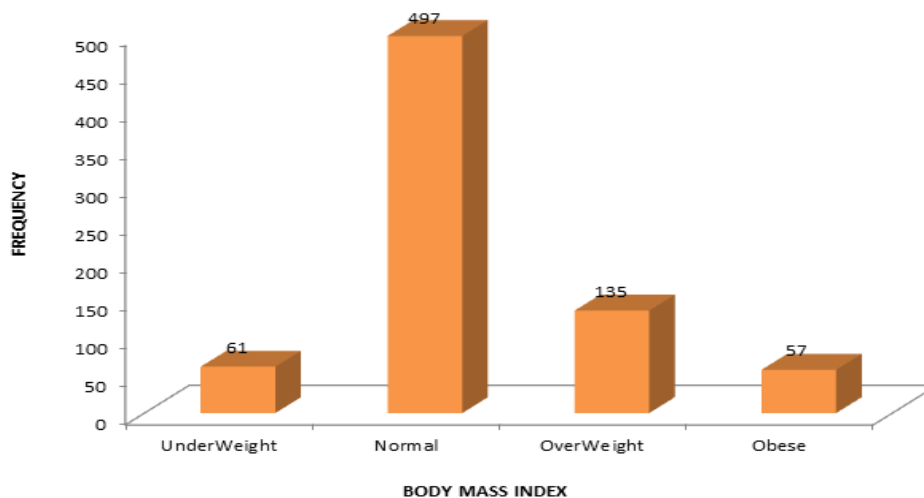


Table 4 shows the association between blood pressure, fasting blood sugar and body mass index among the subjects. Ninety one (68.4%) with stage 2 hypertension had the highest fasting blood sugar. Similarly, 12 (21.1%) who were stage 2 were obese. Hypertension was strongly associated with fasting blood sugar and body mass index.

Table 4: Association between Blood Pressure, Fasting Blood Sugar and Body Mass Index

Variables	Blood Pressure				P – Value
	Normal	Pre-hypertensive	Stage 1	Stage 2	
Fasting Blood Sugar					
≤ 2.5	16 (8.5)	12 (5.9)	7 (3.1)	1 (.8)	0.00
2.5 – 5.0	159 (84.6)	173 (85.6)	41 (30.8)	41 (30.8)	
≥ 5.1	13 (6.9)	17 (8.4)	7 (3.1)	91 (68.4)	
Body Mass Index					
Underweight	18 (29.5)	21 (34.4)	13 (21.3)	9 (14.8)	0.05
Normal	129 (26.0)	135 (27.2)	155 (31.2)	78 (15.7)	
Overweight	29 (21.5)	37 (27.4)	35 (25.9)	34 (25.2)	
Obese	12 (21.1)	9 (15.8)	24 (42.1)	12 (21.1)	

DISCUSSION

This research is presented to illustrate the importance and need to conduct proper medical examination for workers especially in a busy setup like a pharmaceutical industry and to assure compliance with federal and state regulations which request medical monitory of workers [15], and also 22.6% reported in African sub-urban religious community [16].

In this study, 359 (47.8%) were hypertensive. This was in agreement with 8% to 46.4% reported in previous studies [17-19]. It also revealed a higher prevalence than 11% overall crude prevalence for Nigeria, 12.4% prevalence reported for urban Nigeria, 9.3% and 9.8% reported for rural Nigeria [17-19]. and also higher than the prevalence of 10.35% for Ethiopia [15], and 23.0% for Ghana [15].

Female 223 (29.7%) were more hypertensive than male 137 (18.7%). This was in agreement with the recent survey in Benin [20]. But differs from another study with male preponderance [21]. Hypertensive prevalent rose with age in both sexes. This was more noticeable from the third decade and above. The remarkable higher prevalence in this study could be due to increasing psychological stress and inclusion of those previously regarded has having borderline hypertension. Previous studies were done with hypertension referred to as blood pressure $\geq 160/95$ mmHg [22]. In this study, hypertension was taken to be blood pressure $\geq \frac{140-159}{90-99}$. Hypertension is the number one risk factor for cardiovascular diseases (CVDs) such as myocardial infarctions, strokes and renal failures among others in Africa. Consequently, CVDs have taken over as number case of death in Africa. The new epidemic of hypertension and CVDs is not only an important public health problem but also have a big economic impact as a significant proportion of the productive population becomes chronically ill or die, leaving their families in poverty.

Ninety-eight (13.0%) of the respondents were having elevated blood sugar. It has long been recognized that hypertension is more common amongst diabetic patient.

Epidemiologically, there is a correlation between blood glucose and blood pressure [23]. A number of hypotheses have been put forward to explain this, which include insulin-induced changes in sodium and potassium distribution across vascular smooth muscle cells or insulin-induced sodium retention [24]. Thirty-six (4.8%) were obese. Obesity is frequently co-morbid condition associated with hypertension and type-2 diabetes mellitus [25].

CONCLUSION

Hypertension is a silent killer that in general has no specific physical complaints, so it can only be detected by having one's blood pressure measured on a regular basis. Therefore, at the stage of the epidemic of hypertension and CVDs, the most important thing is to raise awareness about the important and urgency of knowing one's blood pressure among the factory workers and emphasizing that prevention through standardized guidelines for hypertension management is more effective in health and financial terms than treatment of complications in hospitals. Numerous indirect cost related to hypertension complication include the loss of productive workers struck by stroke, heart failure and ischemic heart diseases.

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