ASSESSMENT AND OCCUPATIONAL HEALTH IMPLICATIONS OF BODY MASS INDEX OF ADMINISTRATIVE STAFF OF THE UNIVERSITY OF PORT HARCOURT, NIGERIA

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ABSTRACT

BACKGROUND: *Health problems associated with abnormal weight are becoming common among various professionals and non-professionals- including administrative staff. This can be objectively assessed using the Body Mass Index (BMI) and routine assessment of BMI is not only cheap but easy!This study was to assess the BMI of administrative staff of the University of Port-Harcourt.*

MATERIALS AND METHODS: *This studydescriptive cross-sectional study conducted in the University of Harcourt, Choba involved 162 administrative staff of the institution selected by multi-stage sampling technique. Study instruments included weighing scale, measuring tape, and pre-tested structured close-ended self-administered questionnaire. Data generated were entered into and analyzed using the Statistical Package for Social Sciences [SPSS] version 20.0, and descriptive and analytical statistics.*

RESULTS: *Of the 192 questionnaires administered to consenting respondents, 178 were retrieved (86.9% response rate). The prevalence rate of overweight was 48.5% with 29.4% rate of obesity. Female respondents had a higher average BMI than male respondents (29.8 and 26.8 ±4 respectively).*
CONCLUSION: *The prevalence of overweight and obesity was high among the administrative staff of the University of Port Harcourt. Efforts should be made to increase awareness through public health education and the provision of functional gymnastic centre into the staff club of the university.*

KEY WORDS: *Body Mass Index, weight*

INTRODUCTION

The Body Mass Index (BMI), or Quetelet index, is a measure of relative weight based on an individual's mass and height (the individual's body mass divided by the square of their height) – with the value universally being given in units of kg/m^2. While the BMI is a useful measurement, it is not an all-encompassing measure of health and should not be used that way. It is healthy for women to have a higher percentage of body fat than men at any given weight, which will affect how a BMI is read. BMIs may also be inaccurate for athletes with a lot of muscle. Muscle is heavier than fat, and can increase an individual's weight, therefore increasing the BMI, without adding any health risks.[1]

Among non-communicable diseases are underweight, overweight and obesity. Unlike underweight, overweight and obesity is commoner amongst the older (20 years and above) populations. There are several classifications and definitions of obesity; however, the one commonly adopted is the definition by the World Health Organization (WHO), which defines obesity as a body mass index (BMI) of 30 kg/m2 or more; of less than 18.5 as underweight, while a BMI greater than 25 is considered overweight.[2] In 2008, more than 1.4 billion adults were overweight, and of these over 200 million men and

nearly 300 million women were obeseand now increasingly more pronounced in Africa![3,4] The major diseases associated with obesity include hypertension, diabetes mellitus, and atherosclerosis, as well as certain types of cancer with attendant direct and indirect cost. Studies have shown that energy imbalance (energy intake nutrition) exceeding energy expenditure (physical activity) is an increasing problem at worksites. Work environment such as inflexible work hours, and access to unhealthy food and unhealthy snacks are also contributors to this imbalance. Physical inactivity at worksite (seen amongst officeworkers) and consumption of, and availability of abundant unhealthy food (increased energy intake) lead to a positive energy balance, which will eventually result in overweight. Research by the National Institute of Occupational Safety and Health (NIOSH) indicate that job stress increases the risk for development of back and upper- extremity musculoskeletal disorders (MSD).[5] Job stress is also directly related to over eating and consequently over weight and obesity.[6]

Although it used to be regarded as a disease of industrialized countries, obesity is assuming an epidemic dimension globally[22] and risk factors include diet, energy expenditure, socio-economic status, ethnicity, marital status and life style. Based on measured weight and height, the prevalence of obesity in the United States was found to be 30.5% in a survey conducted from 1999 to 2000 while in the United Kingdom, the prevalence is 23% among men and 24% among women[7-9]. In the West African countries of Ghana and Republic of Benin, obesity is found in 13.6% and 18% respectively among adults[10-13] while Abubakari et al reported a prevalence of 10% in the West African sub-region with the risk of being obese being 3.2 among urban women compared to men[14]. Also a study in Maiduguri found the overall crude prevalence rates of overweight and obesity as 27.1% and 17.1%, respectively
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Category	BMI range(kg/m^2)
Very severely underweight	less than 15
Severely underweight	from 15.0 to 16.0
Underweight	from 16.0 to 18.5
Normal (healthy weight)	from 18.5 to 25
Overweight	from 25 to 30
Obese Class I (Moderately obese)	from 30 to 35
Obese Class II (Severely obese)	from 35 to 40
Obese Class III (Very severely obese)	over 40

Attitude towards obesity differs between the developed and the developing world. Obesity is perceived as a sign of prosperity or good living in most cultures of the developing countries especially Nigeria. But obesity is frowned at in the developed countries and considered disfiguring, stigmatizing and a known cause of low self-esteem and social isolation (WHO, 2008)[15-17]. This ill cultural attitude towards obesity in the developing world is sure to influence the prevalence of obesity in these countries, especially Nigeria.[18-20]This study was to assess the Body Mass Index of administrative staff of the University of Port-Harcourt.

METHODS
Study Area: This study was conducted at the University of Port-Harcourt a second generation federal tertiary institution located in Choba, outskirts of Port Harcourt City. University of Port-Harcourt has three (3) campuses located adjacent to each other at the intersection of the East-West road and NTA-Mgbuoba road. The campuses are: the Choba Park (the take-off campus), Delta Park, and the University Park (the permanent site).[72] As at 2013, the university has an undergraduate student population of about 35,000, three thousand eight hundred and fifty (3,850) graduate students, with a staff strength exceeding 3,800. This study is focused on Administrative staff (Non-teaching staff) of the

University of Port-Harcourt.

Study Population: The University of Port-Harcourt has two broad categories of staff: Academic staff and Non-academic staff. Non-academic staff constitutes a huge part of the staff strength of the university. The administrative staff include Administrative (core) staff, Secretarial staff (confidential secretaries), Executive Officers, and Finance/Accounting Officers (Bursary) who work in various units viz Bursary/Internal Audit, Personnel/ Human Resources, Admissions Office, Students Records, Academic Division, Legal Unit, Exchange and Linkage, Registry, Vice-Chancellor's Office, Deputy Vice-Chancellors' Office, Council and General Administration, among others. These units are headed by Bursar, Directors, and the Registrar where applicable. The typical working hours is from 8am-4pm on week days except on Pubic holidays. The staff are of various ethnic groups/tribes and religious backgrounds.

Study Design/Sampling: This descriptive cross-sectional study recruited 192 consenting identity card carrying administrative staff at least 20 years old and had worked for at least 2 years in the University of Port-Harcourt. This multistage sampling included a clustering of the main administrative units into 10 viz: Registry, Personnel Office, Bursary/Internal audit, Exams and Records, Admissions, Academic Division, Council and General Administration, Legal Unit, Vice-Chancellor's Office and Deputy Vice-Chancellor's Office. Subsequently, a stratified sampling technique using the sample frame as guide was used to allocate number of subjects to each sub-unit by simple proportion. Thereafter, subjects were randomly selected using simple random sampling technique to arrive at 192 including non response.

Study Instruments: This included an Axion bathroom scale, a metric height measuring instrument and a pretested self administered semi structured questionnaire which probed socio-demographics, past medical history, occupational history and knowledge, attitude and practice as

regards BMI by the respondents. These were administered by all members of the research team.

Data Management: The questionnaires were delivered in two batches per day- morning (8-10 am), and afternoon (2-4 pm), to cover for those who were not on their duty posts or were indisposed as at the time of data collection. Having obtained an informed consent from each respondent, he/she was expected to fill and submit the questionnaire within 30 minutes (for those who are less busy), while provisions were made for those who were very busy, to fill and submit theirs later (but not exceeding 48 hours). Moreover, both weight and height of each respondent were measured and recorded simultaneously at the point of questionnaire collection. This process lasted for about fourteen (14) days. The data were subjected to descriptive and analytical statistics using the Statistical Package for Social Sciences (SPSS) version 20.0. The information obtained from the data analysis were summarized and presented in tables.

Ethical Consideration: Following ethical approval from the University of Port Harcourt Teaching Hospital, a formal permission was obtained from the Deputy Vice-Chancellor (Administration) and the Registrar of University of Port-Harcourt, to allow for enrolment of administrative staff into this study. Also, signed informed consents were obtained from each study participant. Study participants were assured confidentiality during and after the study. There was also health education on weight control, benefits of optimum Body Mass Index and routine BMI assessment of respondents.

Limitations: Apprehension of some respondents with respect to their job security but they were reassured that this was an academic service which finding may help in general weight control.

RESULTS

A total of 192 questionnaires were administered to respondents out of which 178 were retrieved.

Table 1: Socio-demographic Characteristics of Respondents

Variables	Frequency(178)	Percentage (100%)
Age (years)		
20-29	13	7.3
30-39	58	32.7
40-49	70	39.3
50-59	33	18.5
60 and above	4	2.2
Gender		
Male	91	51.1
Female	87	48.9
Marital status		
Single	27	15.1
Married	142	79.8
Divorced	1	0.6
Widowed	5	2.8
Others	2	1.1
No response	1	0.6
Religion		
Christian	177	99.4
Others	1	0.6
Have a child		
Yes	139	78.1
No	37	20.8
No response	2	1.1

Table 2: Past Medical/Occupational History of Study Respondents

Variable	Frequency (178)	Percentage (100%)
Diagnosed with a Chronic Health Condition		
Yes	19	10.7
No	158	88.8
No Response	11	0.5
Duration of Service (years)		
2-10	106	59.6
11-20	40	22.5
>20	30	16.8
No Response	2	1.1
Subunit of Service		
Registry	33	18.5
Personnel	13	7.3
Exams and Record	9	5.1
Legal Unit	3	1.6
Bursary/Internal unit	67	37.6
Administrative	16	9
Academics	5	2.8
Admission	1	0.6
Others	30	16.9
No Response	1	0.6

Table 3: Knowledge of Body Mass Index (BMI) by respondents

Variable	Frequency	Percentage(100%)
Heard of BMI?		
Yes	67	37
No	79	44.4
Not Sure	29	16.3
No Response	3	1.7
Total	**178**	
Can Abnormal BMI Cause Disease?		
Yes	93	52.2
No	9	5.1
Not sure	68	38.2
No Response	8	4.5
Total	**178**	
What is the Ideal BMI?		
Underweight	30	16.9
Normal Weight	92	51.7
Overweight	10	5.6
Obese	5	2.8
No idea	41	23.0
Others	0	0
Total	**178**	

What is Responsible for Overweight/Obesity?

Genetic Inheritance	47	19.3
Excessive Food Intake	97	39.8
Lack of Exercise	90	36.9
Spiritual	5	2.0
No Idea	2	0.8
Others	3	1.2
Total	**244**	

What is Responsible for Underweight?

Starvation	58	23.8
Sickness	91	37.3
Stress	76	31.1
Spiritual	8	3.3
No Idea	9	3.7
Others	2	0.8
Total	**244**	

Table 4: Attitude and practice of routine BMI checks by respondents

Variable	Frequency	Percentage (100%)
Making Conscious Efforts to Check Weight?		
Yes	144	80.9
No	34	19.1
Total	**178**	

What are You Doing to Check Your Weight?

Exercise	101	56.1
Diet	71	39.4
Medication	5	2.8
Others	3	1.7
Total	**180**	

Do You Regularly Check Weight?

Yes	95	53.4
No	77	43.3
No Response	6	3.4
Total	**178**	

How Often Do You Check Your Weight?

Daily	4	2.2
Weekly	13	7.3
Monthly	67	37.6
Yearly	14	7.9
No Response	80	44.9
Total	**178**	

Table 5: Average BMIs of selected variables

Variables	Average BMI
Sex	
Male	**26.8**
Female	**29.8**
Age(years)	
20-29	**27.0**
30-39	**28.2**
40-49	**29.0**
50-59	**27.0**
60 and above	**29.6**
Birth History	
Females with children	**30.4**
Females without children	**27.3**
Past Medical History	
Respondents with chronic illness	**29.3**
Respondents without chronic illness	**28.1**
Working Experience(years)	
2-10	**28.5**
11-20	**28.4**
>20	**27.4**
Subunits	
Registry	**29.7**

Personnel	**26.1**
Exams and Records	**28.5**
Legal Unit	**26.3**
Bursary/Internal Audit	**28.9**
Administrative	**27.8**
Academics	**26.5**
Others	**26.8**

Knowledge of BMI

Respondents that previously heard of BMI	**28.1**
Respondents that had not heard of BMI	**28.4**

Practice of Weight Control

Respondents making efforts	**28.5**
Respondents not making efforts	**27.5**

Ways of Weight Control

Exercise only	**28.6**
Diet only	**28.7**
Exercise and diet	**28.5**

Table 4.6: Body Mass Index categories of respondents

Variable	Frequency (177)	Percentage (100%)
Underweight (16.0-18.4)	1	0.6
Normal Weight (18.5-24.9)	43	24.3
Overweight (25-29.9)	81	45.8
Obese Class i (30-34.9)	37	20.9
Obese Class ii (35-39.9)	12	6.8
Obese Class iii (≥40)	3	1.7

DISCUSSION

The bulk of the study respondents fell within the 30-39 years and 40-49years age categories. This showed that majority of the administrative staff of the University of Port-Harcourt were within the young and early middle ages - considered the peak of productivity.The average Body Mass Index showed a slight increase with age; at 27.0 for those in the 20-29years category, and 29.6 for those who have attained the age of 60. This suggests that age may have an influence on the BMI of individuals-since younger individuals tend to be more body image-conscious and more physically active than older individuals, hence are more likely to have relatively lower BMIs than their older colleagues.The male population of the respondents stood at 91, while females were 87. This agrees with the general population distribution of the country (Nigeria), according to the 2006 National Population and Housing Census which put the population of males and females at 51.2% and 48.8% respectively.[17]

From the results, females posted a higher average BMI (29.8) compared to males (26.8). This can be attributed to hormonal factors, psychological factors, and strong influence of local tradition. Aside the influence of the female hormone (oestrogen) in fat retention, most females deliberately abstain from vigorous physical activities in a bid to maintain their feminine (non-muscular) physique. Also, most local cultures in the Niger Delta region of Nigeria encourage females to add weight (especially the married ones) as a way of portraying personal well-being (example of such is the so-called "fatting room"). All these add-up to encourage higher BMIs among females compared to their male colleagues.

The result showed that respondents with children had a higher average BMI compared to their colleagues without children. Many factors could be responsible for the disparity, among which are marital factors and the influence of age. When it is understood that those respondents who are older and married, tend to be the ones with children, then it becomes obvious that age and marital status both have a positive (increases) influence on average BMI. In addition to the above factors, most married individuals (especially those with children) in this region tend to lose their self image-consciousness that enables them watch their weight, pointing more to psychological factors.

Only about one tenth of the study respondents had been diagnosed with a chronic health condition prior to the study. The results however showed that those diagnosed with chronic illnesses prior to the study had a higher average BMI compared to that of their colleagues who were not. This shows a positive correlation between abnormal BMI and the probability of being diagnosed with chronic illnesses. Hence it can be seen that the farther the BMI is from the normal range, the higher the probability of being diagnosed with a chronic illness- such as hypertension, diabetes mellitus and cancers.Out of the 19 respondents that have been diagnosed with chronic health condition, hypertension was the major culprit, followed by diabetes mellitus with other chronic health conditions contributed less. The above is in agreement with the complications/sequelae of abnormal Body Mass Index as contained in the literature review that hypertension and diabetes mellitus (Type2) remain major contributors to morbidity among those in the Overweight/Obese category.[8]

A larger percentage of the respondents have put-in 2-10years in service as administrative staff, while a fewer percentage of them have put-in greater than ten (10) years. The average BMI for those who have spent 2-10 years in service is 28.5, while that of those that have spent 11-20 years in service is 28.4. Those who have spent at least 21 years in service have their average BMI as 27.4. This reveals that BMI tend to show a downward trend as duration of service increases. Various factors could account for this, among which are physiological changes associated with increasing age, chronic stress from

office work, other co-morbid conditions (aside those stated above) associated with increasing age, and perhaps death from complications of overweight/obesity. It is therefore arguable that those with very high BMI values are out of service before the 20 years mark.Sub-units such as Bursary/Internal Audit and Registry accounted for the bulk of the respondents. The remaining subunits such asPersonnel, Exams and Records, Legal unit, Administrative, Academic division, and Admissions office constituted a smaller fraction. The above distribution follows the proportion of administrative staff operating in these sub-units-hence Bursary/Internal Audit seems to have the highest number of staff in their unit. Further analysis of the results show that administrative staff working with units such as Registry, Bursary/Internal Audit and Exams and Records posted higher average BMIs- at 29.7, 28.9, and 28.5 respectively- while their colleagues in units such as Personnel, Legal unit, and Academic division had relatively lower average BMIs (at 26.1, 26.3, and 26.5 respectively). It can be seen that the administrative staff working with Registry have the highest average BMI, while those working with Personnel have the lowest average BMI (which is more acceptable). The reason for this disparity cannot be immediately ascertained; however the nature of their job and work schedule could be contributory factors.

Only a little over one third of the respondents have heard of the term "Body Mass Index (BMI)", while the majority had not heard of BMI. The above observation shows that a large proportion of the administrative staff of University of Port-Harcourt are ignorant of the subject matter-leaving room for more vigorous and aggressive campaign to enlighten the general public on the concept of Body Mass Index. Also, it was observed that those who have heard of BMI had an average BMI of 28.1, while their colleagues who have not heard of same had an average BMI of 28.4. This shows that simple awareness of the term BMI

among populations is effective (slightly) in reducing the burden of overweight/obesity.The result shows that 52.2% of the respondents admitted that abnormal BMI can cause disease, while 38.2% were not sure if same can cause disease. Also, 5.1% of them did not think that abnormal BMI can cause disease. 51.7% of the respondents are aware that the ideal BMI category is normal weight, 25.3% think that the abnormal BMI categories (according to WHO) is the ideal, while 23% out-rightly do not have any idea. Majority of the respondents think excessive food/calorie intake (39.8%) and lack of exercise/sedentary life style (36.9%) are responsible for being overweight/obese. This is in keeping with a study carried out in 2011 titled "the Global Obesity Pandemic: shaped by global drivers and local environments", which suggested that the most powerful driver of recent increases in obesity is a rapid increase in the supply of affordable, processed food, which occurs alongside economic development. [4-6]This study also found sedentary life style as a major contributor.[8] A minor percentage identifies genetic inheritance as a possible factor. Studies concerning this have been inconclusive. About a third of the respondents pointed at ill health/sickness to be responsible for being underweight; while a significant percentage thinks that stress/physical over activity and starvation/poor calorie intake (31.1% and 23.8% respectively) are important but less culpable. From observations and deductions, this is most likely correct.

Again, 80.9% of the respondents make conscious efforts at checking/maintaining their weights while 19.1% do not. The average BMI of respondents who make efforts to check their weight is 28.4±4 and 27.5±4 for those who do not. The higher value for respondents who make efforts to check their weight is against the expectation that the practice of weight control should amount to a tendency towards normal weight. However, it is most likely that the efforts at weight control came after the respondents noticed that they were

overweight/obese. Of those who made attempts to check/maintain their weights, they did so mainly by way of exercise and diet (56.1% and 39.4% respectively). Respondents who controlled their weight by exercise only had an average BMI of 28.6±4, 28.7±4 for diet only respondents and 28.5±4 for respondents who practiced both physical and dietary modifications. It may be deduced from these that a combination of diet and physical activity provides a better weight control, and exercise/physical activity alone provides a better control than diet alone. None of the respondents used the available proven pharmacological agents or surgical means to control weight, not even the morbidly obese respondents. This may be so because of ignorance that these measures exist, are locally available and effective or maybe for financial reasons.Regarding the respondents' practice of routine BMI checks, 53.4% regularly check their weight while 43.3% do not. Of the ones that do check their weight, 37.6% do so monthly. This doesn't seem enough for someone who is actually monitoring his/her weight.

The mean BMI of the respondents is 28.3 ± 4, with majority of them being overweight (45.8%). A study on the prevalence of overweight/obesity in Maiduguri, Northern Nigeria, amongst the general population put the prevalence of overweight and obesity as 27.1% and 17.1% respectively. In another study titled "Overweight and obesity among staff of UsmanuDanfodio University, Sokoto, Nigeria", the average body mass index was 25 ± 4 with majority of the respondents (50%) having a normal body mass index. The prevalence of obesity was found to be 12% while the prevalence of obesity and overweight combined was 47% [10]. It was observed that the average BMI of our respondents was higher than that of the general population, as noted in the study in Maiduguri. This is in keeping with the observation made in previous studies including a study carried out on fulltime academic and non-academic staff in a university in Malaysia

which found a higher prevalence of overweight and obesity among employees of a selected public university in comparison to the general population. The prevalence of obesity amongst the respondents is 29.4%, which is significantly higher than what was obtained in the US, Australia and others. [11] A possible reason for this is, attitude towards obesity differs between the developed and the developing world. Obesity is perceived as a sign of prosperity or good living in most cultures of the developing countries especially Nigeria. This was also the case in the Nepal study where 50% of respondents viewed obesity as a sign of prosperity. But obesity is frowned at in the developed countries and considered disfiguring, stigmatizing and a known cause of low self-esteem and social isolation. This ill cultural attitude towards obesity in the developing world is sure to influence the prevalence of obesity in these countries, especially Nigeria. Other possible reasons for the observed higher prevalence of obesity are increasing urbanization/sedentary life style in developing countries and a poor knowledge of BMI and its implications as only 38.3% of the respondents previously heard of BMI. 1.7% of the respondents are morbidly obese with 24.3% being normal weight. On the other hand, underweight is almost unknown with only 0.6% (1 respondent) being underweight.

CONCLUSION: The prevalence of obesity and overweight amongst the administrative staff in the University of Port Harcourt was very high with the female respondents having a higher average Body Mass Index (29.8) than the male respondents (26.8). Also, knowledge of the subject matter was very poor. Government and Non-Governmental Organizations (NGOs) are encouraged to on massive public health education on Body Mass Index (BMI), its significance and the health implications of abnormal BMI.

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