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Full Length Research

Assessment of the nutritional knowledge, eating habits and nutritional statuses of healthcare workers in Jos, North-central Nigeria

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ABSTRACT: The Heath workforce is a critical source of nutritional knowledge for the population in developing countries. Their ability to fulfil this role is dependent on their nutritional knowledge and practises. This study aimed to ascertain the nutritional knowledge, practises and statuses of healthcare workers in Jos metropolis. A descriptive cross-sectional study of 239 healthcare workers, sampled using multi-stage sampling technique from four health facilities in Jos Metropolis. Response rate was 90.8%. Data was collected using self-administered questionnaires and analysed using Epi info version 3.5.4. A 95% confidence interval with a p-value $\leq$ 0.05 was considered statistically significant. The largest proportion of respondents was aged 20 to 29 years, female (54%) and married (51%). Most of them had fair nutritional knowledge (56.8%), and normal Body Mass Index (BMI) (52.9%). There was a statistically significant relationship between the type of foods eaten at work and their sex (0.0005) as well as the presence of a canteen in the hospital (0.043). The likelihood of having a normal BMI were higher if the health worker had worked for less than 5 years or was a community health worker. The levels of nutritional knowledge and practice were largely fair among the studied health workers while some of them were obese (56.8 and 62.1% respectively). There is need for health workers to attend nutritionally related refresher courses periodically.

Key words: Body Mass Index, health professionals, nutrition.

INTRODUCTION

The International Labour Organization (ILO) defines the health-sector workplace as “any health care facility, whatever the size, location (urban or rural) and the types of service(s) provided; including major referral hospitals of large cities, regional and district hospitals, health care centres, clinics, community health posts, rehabilitation centres, long-term care facilities, general practitioners’ offices and other independent health care professionals’ offices” (ILO, 2002). The health worker is the major source of nutritional information for the teeming population, particularly in developing countries; their well-being, as well as their ability to perform optimally in the work place, is largely dependent on their own nutritional knowledge, practises and nutritional statuses.

The health status of the employee is very important to an organization as it determines the level of functionality of the employee and his ability to optimally carry out his duties and responsibilities (Oke and Asamu, 2013). A vital component of the health status of an individual is the nutritional status of that individual; it has also been demonstrated scientifically that optimized nutrition can sustain work output and concentration over extended periods of high physical and mental stress (as typically found in most health facilities in developing countries) with great success (Lemaire et al., 2010).

With the increasing work load in many hospitals and clinics; partly due to the increasing prevalence of Non-Communicable diseases (NCDs) as well as the re-emergence of many haemorrhagic diseases like Lassa Fever and Ebola viral disease, decrease in number of

specialist manpower and dwindling economy, many healthcare workers find it difficult to eat in the workplace, despite their long working hours (WHO, 2006). This poor nutritional practice can affect their ability to work effectively and also increase their risk of succumbing to workplace hazards and nosocomial illnesses. According to the European working conditions survey of the year 2007, 30 to 40% of workers report mental health problems and stress-related disorders which are the biggest overall cause of early death in Europe (WHO, 2006; Parent-Thirion et al., 2007).

The typical work day of health care workers is not only cognitively demanding, requiring complex decision-making in a fast-paced environment, it is also physically demanding, with extended work hours per unit time (Lemaire et al., 2010). During their work time, health care workers may be far removed from places where they can access nutritious foods and drinks. As a result, health care workers either remain hungry until after work or make-do with the snacks and food readily accessible to them.

According to reports from a national survey, the prevalence of obesity was 9.0 and 5.0% in Nigerian adult females and males respectively; a 20% increase from 2002 documented rates (Okafor et al, 2014). This rising trend of obesity in the general population shows the need for proper nutritional education from health workers, to curb attendant problems related with it like increasing prevalence of obesity related to NCDs like Hypertension, Diabetes Mellitus, certain Cancers and mental disorders.

However, a study done among nurses in Akwa Ibom state of Nigeria, reported that 62.6% were obese (Ogunjimi et al., 2010). This proportion was higher than the 2008 Nigerian Demographic Health Survey (NDHS) Data which assessed overweight and obesity among women in the general population, aged 15 to 49 years and resident in the same state, which was 34.8% (NDHS, 2008). Findings of a high prevalence of obesity among health workers is a cause of concern since they are likely to be less agile, be less efficient at work will lack the moral justification and confidence to caution their patients about the health risks of obesity.

This study therefore set out to assess the level of nutritional knowledge, eating habits and BMI of healthcare workers within different types of health facilities in Jos Metropolis.

METHODOLOGY

Study area

Jos Metropolis is the urban part of the state capital of Plateau state and it was established in 1915 as a Tin mining and transportation camp (NPC, 2006). Its geographical coordinates are, Latitude: 9°56′ N and Longitude 8°53′ E. It has a population of about 900,000 residents and remains one of the cosmopolitan cities in Nigeria (NPC 2006). Its temperature could get as low as 15^0C although it can be as warm as 31^0C. Most of its populace literate and are from all over Nigeria, as well as foreigners. The metropolis comprises of three districts (of the seventeen local government areas (LGAs)) in the state namely Jos North (9.9181^{o}N & 8.8804^{o}E), Jos South (9.4800^{o}N & 8.5200^{o}E) and Jos East (9.8679^o N and 9.1013^o E). The state capital however is made from portions of only Jos North and Jos South LGAs. Jos Metropolis accommodates a large number of government and privately owned academic, financial and health institutions. The health institutions include four (4) tertiary health facilities, two (2) secondary health facilities and over 50 public and private Primary Health care facilities within the metropolis.

Study population

The study population consisted of all cadres of healthcare professionals in selected healthcare facilities within Jos Metropolis. Healthcare workers in selected healthcare facilities who were aged between 18 to 64 years of age and were currently employed in that health facility were included in the study. They must have worked for at least six (6) months in the particular health facility and must be directly involved in patient care. However, workers in health centres who were on leave from work were excluded from the study.

Study design

This study was a descriptive, cross-sectional study.

Sample size determination

Sample size for the study was calculated using the single population formula (Araoye, 2005)

$$N = \frac{Z^2 pq}{d^2}$$

Where: Z = Standard normal deviate at 95% confidence interval = 1.96, p = Prevalence = 83.0% = 0.83 (Prevalence of optimal nutrition and healthy eating habits among doctors in a study done in United Kingdom (Winston, 2016), q = Complementary probability = 1 – p = 1 – 0.83 = 0.17 and d = 5% = 0.05

Substituting:

$$N = \frac{(1.96)^2 \text{ x } 0.83 \text{ x } 0.17^2}{(0.05)^2}$$

N = 216.819904 = 217

Therefore, the minimum sample size of 217 healthcare workers as calculated.

Sampling technique

Multistage sampling technique was used to select respondents.

Stage 1: Selection of Local Governments

Jos North, Jos South and Jos East LGAs were purposively selected from the 17 LGAs in Plateau state since they comprise Jos Metropolis.

Stage 2: Selection of health facilities

Stratified sampling technique was used to select the facilities to use:

1. Tertiary health care facilities formed one stratum so one (1) out of the four (4) facilities (Jos University Teaching Hospital (JUTH)) was selected using Simple Random Sampling by balloting.
2. Secondary health care facilities formed another stratum so one (1) out of the two (2) facilities (Comprehensive Health Centre (CHC) Dadin Kowa) was selected using Simple Random Sampling by balloting.
3. Primary Health Care (PHC) facilities formed another stratum. From a list of all the Government owned PHCs in the three districts, one (1) (Township PHC) was selected using Simple Random Sampling by balloting. A similar list of privately owned PHCs was made and one (1) (Kauna Hospital) was selected also using Simple Random Sampling by balloting.

Stage 3: Selection of health workers

First, proportionate sampling was applied to determine number of respondents for each institution:

$$Z = \frac{X \text{ x } n}{Y}$$

Where: Z = Number of respondents to be selected in that facility, X = Total number of healthcare workers in that facility, Y = Total number of healthcare workers in all the selected facilities (1606) and n = Calculated Minimum sample size = 217.

Institution 1 (Tertiary hospital)

$Z = \frac{1450 \text{ x } 217}{1606}$ = 196; a minimum of 196 workers should be selected

Institution 2 (Secondary health facility)

$Z = \frac{96 \text{ x } 217}{1606}$ = 13

Institution 3 (Public PHC)

$Z = \frac{25 \text{ x } 217}{1606}$ = 4

Institution 4 (Private PHC)

$Z = \frac{35 \text{ x } 217}{1606}$ = 5

In each of the smaller health facilities visited, the staff were selected from a list of the staff on duty at the time of the visit using Simple Random Sampling by balloting. However, in the Tertiary hospital, Departmental heads helped select the staff on duty using convenience sampling.

Data collection tools and methods

Data was collected using self-administered questionnaires. This was designed by the researchers, based on the objectives of the study. The questionnaire was pretested on twenty-five clinical medical students to ensure clarity of the questions and appropriate corrections were made before use on the study subjects.

The questionnaire was made of four sections which gathered information on socio-demographics of respondents, their nutritional knowledge and eating habits. Other data collection tools included:

Weighing scale: This was used to measure the weight of study subjects to the nearest kilogram. The subjects emptied their pockets and removed “extra clothing”, then stood erect on the weighing scale. Two readings of each subject’s weight were recorded and the average was calculated.

Stadiometer: This was used to measure the height of the study subjects to the nearest 0.1 meters. Each subject stood erect with the back of their head, shoulder, gluteus and heel touching the vertical tape measure on the stadiometer. The horizontal mobile part of the instrument was then placed flat on the crown of the subject’s head to assess their height.

The weights and heights of the respondents was used to calculate their Body Mass Index using the formula:

$$BMI = \frac{W}{H^2}$$

Where: BMI = Body Mass Index, W = Weight of the study subjects and H = Height of the study subjects.

Data analysis and presentation

Grading of knowledge

Respondents’ nutritional knowledge was graded as good,

fair or poor based on their answers to a set of questions which assessed their knowledge. Correct answers were allocated a score of +1, while incorrect answers were allocated a score of zero. Respondents' scores were added up and graded into percentages:

Good knowledge = $\geq$ 75%
Fair knowledge = 50 – 74.9%
Poor knowledge = <50%

Grading of practises

Respondents' nutritional practise was graded as inappropriate or appropriate based on their answers to a set of questions which assessed their nutritional practises at work. Correct answers were allocated a score of +1, while incorrect answers were allocated a score of zero. Respondents' scores were added up and graded into percentages:

Appropriate practise = $\geq$ 50%
Inappropriate practise = <50%

Grading of eating habits

Each subject was made to describe what he/she usually eats during working hours and the researchers classified it as "highly processed" or not based on if was "fast food" or not. The source of the food was also assessed.

Grading of nutritional statuses

Heights (in meters) and weights (in kilogram) of respondents were used to calculate their BMI using the formula = Weight/(Height)^2 in kg/m^2. This was graded as underweight (BMI of $\leq$ 18.5 kg/m^2), Normal (18.5 to 25.9 kg/m^2), Over-weight (25 to 29.9 kg/m^2) and obese ($\geq$ 30 kg/m^2) according to WHO standards.

All data generated was collated, processed and analysed using EPI info statistical software version 3.5.4. Significant relationships were evaluated using Chi square (X^2) test for qualitative variables, while a *P*-value of $\leq$ 0.05 was considered statistically significant. A multiple regression analysis was used to assess predictors for normal BMI among the respondents. Data is presented in the form of Tables.

Limitations of the study

All respondents' nutritional status was only based on their Body Mass Index (BMI); this has not been associated with much NCD correlates as much as waist-hip ratio.

However, being in the work place and on duty, most of the health workers did not agree to do further anthropometric assessments.

Ethical consideration

Ethical approval for this research was collected from the JUTH Ethical Committee for the study. Each respondent also gave informed verbal consent before they were enrolled into the study, after they were adequately assured of confidentiality and given the option of opting out of the study at any time if they chose to do so.

RESULTS

A total of 250 health workers were approached to participate in this study; only 227 consented and returned appropriately filled in questionnaires. This gave a response rate of 90.8%. The largest proportion of respondents were aged 20 to 29, most were female (54%) and married (51%). Majority spent an average of 6 to 8 hours at work (60.4%) and had worked for less than 5 years (60.8%) in that facility (Table 1).

There was no statistically significant relationship between occupation of respondents and graded knowledge. However, the Community Health workers had the highest proportion of workers with fair knowledge while the laboratory workers had the highest proportion of workers with poor level of knowledge (Table 2).

There was a statistically significant relationship between the presence of a food canteen in the health facility and the type of foods eaten by the health workers (p= 0.043). There was also an association between their sex and the type of food eaten at work (p = 0.000) (Table 3).

The odds of having a normal BMI are 3.3 times if the health worker has worked for less than 5 years. The Community Health Officers/Community Health Extension Worker is also more likely to have a normal BMI when compared to other health professionals. The Doctor has 54% of not being obese while the laboratory has the highest odds of having an abnormal BMI (72%) (Table 4).

DISCUSSION

Majority of respondents in the study were female and single, with less than 5 years working experience in their respective healthcare facilities. This suggests that they were young in their medical practises, they had not left school a long time ago so should have a better recall of the health related nutritional education they had been taught in school. Their nutritional knowledge was therefore expected to be graded more of "good" than "fair", as found in this study. However, other researchers have asserted that nutritional education in many health (undergraduate)

Table 1. Socio-demographic characteristics of respondents.

Variable	Frequency (n = 227)	Percentage (100.0%)
Age group (years)		
20 – 29	93	41.0
30 – 39	63	27.7
40 – 49	46	20.3
50 – 59	24	10.6
60 – 69	1	0.4
Sex		
Female	123	54.2
Male	104	45.8
Marital Status		
Single	116	51.1
Married	104	45.8
Widowed	7	3.1
Occupation		
Doctor	42	18.5
Pharmacist	32	14.1
Nurse	62	27.3
Medical Laboratory Scientist	46	20.3
Physiotherapist	13	5.7
CHO/CHEW*	11	4.8
Others**	21	9.3
Hours spent at work daily		
<6 hours	13	5.7
6 – 8 hours	138	60.8
9 – 11 hours	54	23.8
12 – 14 hours	22	9.7
Duration of employment in facility		
< 5 years	137	60.4
6 – 10 years	44	19.4
> 10 years	46	20.2

*CHO/CHEW = Community Health Officers/ Community Health Extension Workers. **Others include medical laboratory technicians, dental technologists, pharmacist assistants, radiologists, radiographers among others.

institutions are insufficient for the level of healthcare services they offer (Ilmonen et al., 2012; Özçelik et al., 2007; Sodjinou et al., 2014).

There was no statistically significant relationship between respective occupation of respondents and graded knowledge on healthy nutrition. This was not expected as generally speaking, the nurses are mostly female and have the responsibility of the nutritional care for the patients; they are therefore expected to have more nutritional knowledge than the male dominated professions like the medical doctors and physiotherapists.

A facility canteen is expected to provide a varied selection of fresh and healthy food in ideal settings. An ILO study demonstrated that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature death, and reductions in health care costs (ILO, 2005). According to the ILO (2005), a canteen offers both physical and psychological benefits, enabling employees to rest, nourish themselves, relieve stress and escape the monotony or industrial hazards of their work stations (Wanjek, 2005). The presence of a canteen at the workplace, can also influenced choice of food of respondents while at work. In this study, of the respondents whose health facility housed a canteen,

Table 2. Relationship between occupation of respondents and knowledge.

Occupation	Graded Knowledge			Total
	Good	Fair	Poor	
Doctor	18 (42.9%)	22 (52.4%)	2 (4.8%)	42
Nurse	19 (30.6%)	37 (59.7%)	6 (9.7%)	62
Pharmacist	13 (40.6%)	16 (50.0%)	3 (9.4%)	32
Medical Laboratory Scientist	9 (19.6%)	25 (54.3%)	12 (26.1%)	46
Physiotherapist	4 (30.8%)	7 (53.8%)	2 (15.4%)	13
CHO/CHEW	4 (36.4%)	6 (54.5%)	1 (9.1%)	11
Others	4 (19.0%)	16 (76.20%)	1 (4.8%)	21
Total	71	129	27	227

$X^2 = 18.8965$; df = 12; p = 0.0911.

Table 3a. Relationship between Presence of Facility Canteen and type of food eaten at work.

Canteen	Type of food eaten at work			Total
	Highly processed	Unprocessed/mildly processed	Don't eat at work	
Yes	55 (30.4%)	94 (51.9%)	32 (17.7%)	181
No	23 (50.0%)	17 (37.0%)	6 (13.0%)	46

$X^2 = 6.259$; df = 2; p = 0.043.

Table 3b. Relationship between type of food eaten at work and sex of health workers.

Sex	Type of food eaten at work			Total
	Highly processed	Mostly unprocessed/ mildly processed	Don't eat at work	
Male	28 (26.9%)	48 (46.2%)	28 (26.9%)	104
Female	50 (40.7%)	63 (51.2%)	10 (8.1%)	123

$X^2 = 15.2752$; df = 2; p = 0.0005.

majority ate mostly unprocessed or mildly processed foods at work. This finding is corroborated by a study done in Hawaii, which identified the availability of a canteen as having an influence on the healthcare worker's disposition to making healthier food choices (Leslie et al., 2013). Structured catering initiatives have also been found to influence food choices among health workers in two public sector hospitals in Cork, Ireland (Geaney et al., 2011). This same study reported meal intakes of total sugar, total fat, saturated fat and salt to be significantly lower where there was a catering initiative to provide nutritious food.

Majority of respondents had an adequate BMI, with a smaller percentage of respondents being obese or morbidly obese. This is however in contrast to a high prevalence of obesity among healthcare workers as reported by a South African study, irrespective of their job categories (Skaal and Pengpid, 2011). A possible reason for this difference could be because majority of the South African participants were aged 40 years and above, unlike this study where majority of respondents were aged within the younger age group of 20 to 29 years. Several studies have attributed increased BMI to aging. Activity levels progressively decrease with age; metabolic rate also decreases with aging and translates to weight gain (Schutzer and Graves, 2004; Baum and Ruhm, 2009). Adequate BMI positively influences work productivity; workers are more agile, up and doing and have less predisposition to developing obesity-related illness such as hypertension, diabetes, and osteoarthritis. This in turn reduces illness-related work absence and improves workers' output per time. They can also give advice and act as role models to their patients on healthy lifestyle, health promotion and disease prevention, as studies have shown that health workers become reluctant to discuss such issues with their patients, once obese or overweight (Skaal and Pengpid, 2011)

There was found to be a statistically significant relationship between occupation of respondents and BMI with the majority of nurses studied being obese or morbidly obese (45.2%). This finding was similar to that of a 2009 study done in Akwa Ibom that reported a higher prevalence of obesity among nurses (Ogunjimi et al., 2010). Nurses,

Table 4. Multiple Regression table showing Odds of having a normal BMI.

Variable	Odds Ratio	95% CI	P value
Knowledge score			
Good	1	1	1
Fair /Poor	1.372	0.711 - 2.650	0.0991
Practise score			
Inappropriate	1	1	1
Appropriate	1.060	0.562 - 2.000	0.856
Exercise			
Yes	1	1	1
No	1.175	0.628 – 2.198	0.614
Duration of Employment			
5 – 10 years	1	1	1
< 5 years	3.362	1.523 - 7.422	0.003
> 10 years	0.538	0.257 - 2.032	0.723
Occupation			
Physiotherapist	1	1	1
CHO/CHEW	0.035	0.003 - 0.416	0.008
Doctor	0.543	0.136 – 2.853	0.624
Med Lab Scientist	0.723	0.159 – 3.291	0.675
Nurse	0.243	0.053 – 1.124	0.070
Pharmacist	0.406	0.087 - 1.892	0.251

in the Akwa Ibom study, never perceived themselves as being obese, but rather saw their weight as a sign of “good living”. This may explain the high prevalence of obesity amongst nurses as identified by this study. Furthermore, among health care professionals, the female population is highest among nurses; if they are within the reproductive ages, they are highly likely to be lactating or pregnant and have the attendant weight gain of such physiological/hormonal changes. However, excessive weight gain may negatively affect their agility and patient care can therefore become suboptimal, especially with the concept of bedside nursing which demands increased nurse-patient interaction.

Many of the married respondents were either obese or morbidly obese (35.6%), and there was a statistically significant relationship between marital status and BMI. This finding is corroborated by other studies carried out among healthcare workers in developing countries (Ogunjimi et al 2010; Skaal and Pegpid, 2011). This might be accounted for by the African cultural expectation placed on married individuals to put on weight once married else his/her spouse is regarded as poor, irresponsible or unloving. Other possible factors might be the age of respondents (since ages 35 to 45 years is associated with weight gain in both sexes) as well as the weight gained during pregnancy not being lost by female respondents.

Conclusion

The levels of Nutritional knowledge and practice were largely fair among the studied health workers and there was no statistically significant relationship between their occupations and graded knowledge. Although most of the health workers had normal BMI, the odds of having a normal BMI are 3.3 times higher if the health worker has worked for less than 5 years. There is a need for health facilities to organize nutritional refresher courses for their staff as well as encourage them to check their BMI periodically to ensure they are healthy and agile.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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