

Prevalence, Associated Socio-demographic Variables, and Health Conditions of Overweight and Obesity among Nurses in a Tertiary Health Institution in North-West Nigeria

Anyebe, E.E¹, Igbinlade, A.S², Nmerengwa, S³, Aliyu, D⁴, Ortserga, S.T⁵

¹Department of Nursing Sciences, College of Health Sciences, University of Ilorin, Nigeria

²Department of Nursing Science, National Open University of Nigeria, Abuja, Nigeria

³Department of Nursing Services, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

⁴School of Postbasic Perioperative Nursing, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

⁵Department of Nursing Sciences, College of Health Sciences, Benue State University, Makurdi, Nigeria

Abstract

Obesity and overweight have become a global public health and social issues, with concerns for demographic determinants and health sequelae. The situation among nurses in Nigeria lacks empirical evidence. This study determined the prevalence, socio-demographic, and health correlates of overweight and obesity among nurses in a tertiary health institution in North-west Nigeria using a descriptive cross-sectional survey. A convenient sample of 225 nurses, selected from different units, was recruited for the study. A questionnaire and anthropometric measurements were used to obtain data. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 24.0. Body mass index (BMI) was used to categorise weight: <18.5 kg/m², 18.5 – 24.9 kg/m², 25 – 29.9kg/m² and 30kg/m² and above to define underweight, normal, overweight, and obese respectively. Results showed over a third (38.0%) of nurses in this setting are obese; 28.0% are overweight, 32% have normal weight, while a few (2.0%) are underweight. Married females are more obese or overweight; obesity and overweight seem to increase with age and ranks. Obesity and overweight are associated with hypertension, diabetes mellitus, and arthritis in about 25% of nurses. A high prevalence rate of obesity and overweight is thus found, with about two-thirds (66%) of nurses in the study area being either overweight or obese. This is associated with nurses' age, gender, marital status, and ranks, and some non-communicable diseases. It is recommended that regular health checks, stress management, and other health promotion activities should form the institutional policy for health schemes and self-care for nurses.

Keywords: *Body mass index, Nurses, Non-communicable diseases, Nigeria, Obesity, Overweight.*

Introduction

Obesity is widely regarded as a major public health challenge and a global pandemic [1-3]. The burden of overweight and obesity has continued to increase globally. The World Health Organization (WHO) reported that overweight and obese persons nearly tripled

between 1975 and 2016 [4]. The CDC in 2004 reported that the US obesity prevalence rate was 42.4% in 2017–2018. Overweight and obesity are the fifth leading risk of global death with at least 2.8 million adults' deaths each year from complications of overweight and obesity [4] and over 3 million deaths, and an estimated 36 million DALYs were attributed to

overweight and obesity annually [4, 5]. The global prevalence of overweight and obesity and the number of affected people has increased in all age groups and will continue rising during the next decade [6, 7].

Findings from multi-country large-scale longitudinal studies in four sub-Saharan countries in different sites of Nigeria, South Africa, Tanzania, and Uganda among nurses, teachers, and village residents, put the prevalence of overweight and obesity at 31% and 34%, respectively [8].

Similarly, WHO reported that more than 1.9 billion (39%) adults aged 18 years and above were overweight, while more than 650 million (13%) were obese worldwide in 2016 [4]. The prevalence of overweight and obesity among adults in Africa is 27% and 8%, respectively [8, 9].

Other studies have projected that fifty percent of the population will be affected by obesity and overweight by 2030 [7, 10]. The projected overweight persons among persons aged 15 years or more in Nigeria was 20.9 million in 2020, with an age-adjusted prevalence of 20.3%, and obese persons were estimated at 12 million, accounting for 11.6% among person's age 15 years or more with prevalence considerably higher among women [11].

Although the highest prevalence of obesity is documented in developed countries, evidence shows an increasing prevalence of obesity in developing countries also, including Nigeria [12-14]. Nigeria is perhaps depicted to be the most affected country in Sub Sahara Africa [15]. The WHO 2010 survey on Nigeria shows that the prevalence of overweight in the country was 37% and 26% [16], while obesity was lower at 8% and 3%, among women and men and a recent study by [11] reported that the prevalence rates of overweight and obesity in Nigeria were 25.0% and 14.3% from 35 studies. The prevalence in women was higher compared to men at 25.5% versus 25.2% for overweight and 19.8% versus 12.9% for obesity.

The prevalence of overweight and obesity across the geographical regions in Nigeria was marked by wide uncertainties, especially in the northern parts of the country, with our estimates subject to further validation. The 2008 Nigerian demographic and health survey reported striking variations in the prevalence of overweight and obesity across Nigeria, ranging from 10.5% in Yobe (North-east Nigeria) to 50.2% in Lagos (South-west Nigeria) [17]. However, the South-east had the highest prevalence of overweight persons (33%) and one of the leading prevalence of obesity (14%) in this study.

Obesity is a complex multifactorial non-communicable disease defined by excessive adiposity that can impair health [1]. Obesity is also one of the key risk factors for many non-communicable diseases (NCD) such as coronary heart disease, hypertension and stroke, certain types of cancer, type 2 diabetes, gallbladder disease, dyslipidemia, osteoarthritis and gout, and pulmonary diseases, including sleep apnoea. Obesity is the most important modifiable risk factor for type 2 diabetes. In addition, people living with obesity often experience mental health issues alongside different degrees of functional limitations, i.e., obesity-related disability [18], and suffer from social bias, prejudice, and discrimination [19]. Obesity has many root drivers and determinants.

There is a continuous increase in obesity prevalence both in developed and developing countries with its associated chronic health conditions, thus increasing the overall burden of disease and disability at the population level. Several factors have been identified as contributors, including the work environment and lifestyle behaviours [20-22], the female gender, marriage, low physical activity level, positive family history, the urban area of residence, and age ≥ 40 years [15] as well as the urban, professional, high socioeconomic variables of Nigerian adults [13].

Obesity and overweight epidemic high burden in Nigeria have also been associated with rising income, urbanization, unhealthy lifestyles, and consumption of highly processed diets [11], lack of or low levels of physical activity, unhealthy diets, socioeconomic changes, and psychosocial factors [15]. By considering the profession, a higher prevalence of overweight or obesity was found among bankers (77.7%) compared with health care workers 68.9% and teachers 62.6% [11].

Several health risks associated with obesity include coronary heart disease and other atherosclerotic cardiovascular diseases, stroke, type 2 diabetes mellitus, high blood pressure, kidney disease, sleep apnea, osteoarthritis, gallstones, fatty liver disease, stress incontinence, and other gynecological abnormalities (amenorrhea and menorrhagia) and various cancers [23]. [24] reported obesity increasing age are the major risk factors fueling increased prevalence of type 2 diabetes mellitus among Nigerians. [25] reported a high prevalence of overweight and obesity among tertiary hospital workers in Northern Nigeria. A high prevalence of hypertension was reported among healthcare workers in Nigeria [26].

The overall prevalence of overweight and obesity among working adults was 68.9% (31.1% overweight and 37.8% obesity). Risk factors of obesity are increasing in several populations and are becoming an enormous problem among occupational/professional groups [27]. Health-care workers, teachers, and bankers have been identified as high-risk occupation groups more exposed to the predictors of overweight and obesity than the general population [28-31].

In Nigeria, studies have shown a high prevalence of obesity among health workers in Jos, north-central Nigeria [32], in Ido Ekiti, southwest Nigeria [33], Enugu, eastern Nigeria [34], Benin, Edo state, south-south Nigeria [35, 36], Ogbomosho, Oyo State Southwest, Nigeria [37], Ibadan, Oyo State Southwest [37], Bayelsa State, [39] and Akwa Ibom [40], both

in south-south Nigeria and Lagos, Southwest Nigeria [41, 42].

No evidence on overweight and obesity, its correlates, and associated health conditions could be accessed for northwest Nigeria. This study determined the prevalence, socio-demographic correlates, and possible health conditions associated with overweight and obesity among nurses in a tertiary health institution in North-west Nigeria.

Methods and Materials

Research Design

The study adopted a cross-sectional, observational descriptive survey design to study and overweight and obesity among nurses at Ahmadu Bello University Teaching Hospital, Shika-Zaria, northwest Nigeria.

Setting

The study was carried out at Ahmadu Bello University Teaching Hospital [ABUTH] Shika, Giwa Local Government Area, Kaduna State, Nigeria. This facility is a mentor hospital institution to virtually and teaching in northern Nigeria, which continues to serve as a regional and national referral centre of excellence. ABUTH started as the Institute of Health in 1967 to serve entire Northern Nigeria, and on November 11, 2005, it relocated from Tudun Wada area Zaria to its larger permanent site in Shika Zaria [40]. The hospital offers general outpatient services, 24-hour accident and emergency services, and inpatient tertiary health care services to medical and surgical patients within and outside the country. ABUTH has different types of medico-surgical and other specialties and departments. The department of nursing services is one of the departments with a well-organized hierarchical structure that rendered nursing services to patients with a population of 704 nurses, providing nursing services to all categories of patients and clients [41] (Records at Department of Nursing Services, ABUTH, 2021). The hospital is divided into bedded and

non-bedded areas. Nurses were selected from both strata.

Target and sample populations

A total of 704 nurses in the hospital formed the study population.

Sample Size Determination

The sample size for the study was determined using Yamane's formula [42].

$$n = \frac{N}{1 + N(e)^2}$$

Where:

- n = sample size
- N = population size
- e = sample error (e.g., .05, .01 acceptable error)

Therefore

$$\begin{aligned} &= \frac{704}{1 + 704 \times (0.05)^2} \\ &= \frac{704}{1 + 704 \times (0.0025)} \\ &= \frac{704}{1 + 1.76} \\ &= \frac{704}{1 + 2.76} \\ & n = 255 \end{aligned}$$

The total sample size for this study is 255.

Inclusion Criteria

All willing and accessible nurses available at the time of the study were included.

Exclusion Criteria

All nurses indisposed at the time of the study were excluded.

Any nurse unwilling to participate was also excluded.

Sampling Technique

A stratified random sampling method was used. The nurses were stratified into five strata based on areas of clinical placement as follows:

1. The non-bedded area made up of the administration section, clinics, outpatients

departments (OPDs), Modular Operating Theatres, and Central Sterile Supply Department (CSSD).

2. The bedded areas made up of:

- a) Level zero (0) comprising Delivery Suite (DS), Obstetric theatre, Accident and Emergency (A&E), intensive care unit (ICU), Transit ward, and (Renal) Dialysis unit.
- b) Level one (1): Paediatric Medical and Surgical wards and Psychiatric wards.
- c) Level two (2) is made up of Obstetrics, Gynecological, Male, and Female Surgical wards.
- d) Level three (3) comprises Male, Female Medical, Orthopedic, Ophthalmic, and Maxillofacial wards.

A convenient sampling method was then used to select 48 nurses from each unit: arriving at a total of 240 nurses.

Data Collection Tools

1. The instrument used for this study was the questionnaire titled: "Tool on Assessment of Body Mass Index (BMI) of Nurses," designed by the researchers. The instrument is made up of three (3) sections. *Section A:* Information on the socio-demographic characteristics of the participants (age, gender, marital status, and ranks). *Section B:* Any present health conditions being managed (select as many as applicable):
 - a) High Blood Pressure []
 - b) Diabetes mellitus []
 - c) Arthritis []
 - d) Any other (specify) _____*Section C:* measurement of weight and height, and calculated BMI.
2. A weighing scale with height scale, composed of:
 - a) Weight: the same weighing scale calibrated in kilograms was used to measure all participants' weight adjusted to one decimal point (for example, 56.7 kg).

b) Height: the weighing scale had an attached height measurement calibrated in meters (m) and centimeters (cm).

Data Collection Procedure

The data were collected between June and July 2021. All the participating nurses completed the short questionnaire, *Sections A & B*. Then Section C was completed by one of the researchers, taking heights and weight of each respondent. The participants were made to stand on the weighing scale without their sandals, bags, or anything of appreciable weights. The weight was read to the nearest 0.1 kilograms and recorded in the space provided in the questionnaire for weight for each participant.

The value for the height was taken and recorded to the nearest 0.1 centimeters and then converted to meters.

The body mass index (BMI) was calculated using the formula (weight/height squared) and expressed in kg/m² [27], where kg is a person's weight in kilograms and m² is their height in meters squared.

$$Formula = \frac{\text{weight in kilogram}}{\text{weight in meter } m^2}$$

The calculated BMI for each participant was recorded for the respective questionnaire for analysis.

Two hundred and forty (240) were duly completed the questionnaire, and measurements for weight and height were taken and recorded.

Data Analysis

Data collected were screened, then coded and computed into SPSS version 24.0 for analysis. Statistical analysis was performed using descriptive (frequency, percentages, and mean) statistics. The *mean* BMI was used to compare the prevalence with socio-demographic characteristics of the participants.

BMI (kg/m²) was categorized, using the World Health Organization definitions [19]. BMI of <18.5 kg/m², 18.5-24.9 kg/m², 25-

29.9kg/m² and 30kg/m² were used to define underweight, normal weight, overweight and obese respectively.

Ethical Consideration

Ethical clearance for the study was obtained from the Health Research Ethics Committee of Ahmadu Bello University Teaching Hospital in Zaria (NHREC/10/12/2015-ABUTH/HREC/UG/6, dated 26th January 2021) before the commencement of the study.

All the nurses who participated were also adequately educated on the objectives of the study, with emphasis on freedom from any adverse effects. Afterwards, departmental, and individual express consents were obtained. No form of identity was implicated in data collected while utmost of confidentiality was adhered.

Results

Socio-demographic Characteristics

Study participants were predominantly females (74.1%), aged between 40 and 59 years (73.4%), with a mean age of 42.7 ± 9.1 (±SD) years. Half of them (50%) had dual nursing professional qualifications, in addition to the 40.0% (n=96) with Bachelor of nursing science degrees. Only 7 (3.0%) of them had Postgraduate certificates. A quarter of the participants (n=60; 25.0%) were senior cadre nurses from the rank of Chief Nursing Officers and above.

Participants' Measured Weights and Heights

Table 1 above shows that the majority, 167 (70.0%) of the respondents weighed between 60- 89kg, followed by 38 (16%) of those who weighed between 90-119kg, with a mean weight of 75.58 ± 16.22kg. Ninety-six (40%) of the participant's heights range from 1.50 to 1.59 and from 1.60 to 1.69 with a mean height of 1.63 ± 0.08m², respectively.

Table 1. Participants' Measured Weights and Heights

Weight in kilogram	Frequency	Percentage
40-49.9	9	3
50-59.9	26	11
60-69.9	57	24
70-79.9	62	26
80-89.9	48	20
90-119.9	38	16
Total	240	100
Height in meters	Frequency	Percentage
1.5-1.59	96	40
1.6-1.69	96	40
1.7-1.79	48	20
Total	240	100

The BMI of the Study Participants

In Figure 1, it is shown that more than a third (n=93; 38.0%) of the participants were obese with a BMI of 30 and above, while another 67 (28.0%) were overweight (BMI of 25.0-29.9).

About a third (32%) had a normal weight range; the remaining 4 (2.0%) were underweight. This indicates that 66% of the study participants are either overweight or obese.

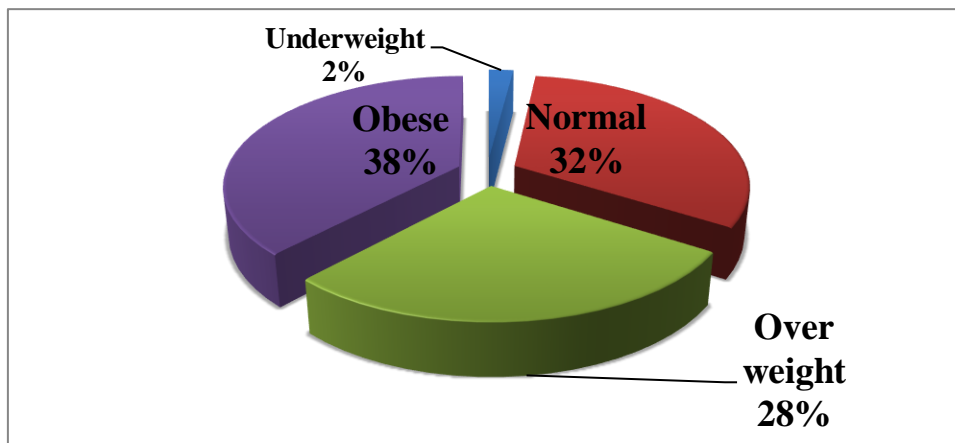


Figure 1. Distribution of Participants by BMI Status

Table 2 reveals that participants within the age of 40-49 years and 50-59 years have the highest BMI means a score of 35.9 and 31.65 had obesity while those in the age range of 30-

39 years were overweight. This indicates that nurses aged 30 years and above are more overweight and obese.

Table 2. Distribution of Participants BMI Status by Age

Age	Frequency	Percentage	BMI Mean
20-29	28	12	22.45
30-39	36	15	26.95
40-49	122	51	35.9
50-59	54	22	31.65
Total	240	100	-

Table 3 shows that female participants were observed to have a higher BMI mean of 31.16 than their male counterparts, with a mean BMI

score of 25.92, indicating more prevalence in the female gender.

Table 3. Distribution of Participant's BMI Status by Gender

Gender	BMI	Underweight		Normal		Overweight		Obese		BMI Mean
	F	F	%	F	%	F	%	F	%	
Male	63	0	-	37	58	14	23	12	19	25.92
Female	177	5	3	41	23	53	30	78	44	31.16
Total	240	5	3	78	81	67	53	90	63	

Table 4 shows that married participants were noticed to have the highest BMI mean score of

30.18 compared to 22.76 BMI mean score for the unmarried participants.

Table 4. Distribution of Participants BMI Status by Marital Status

Marital Status	Frequency	Underweight		Normal		Overweight		Obese		BMI Mean
		F	%	F	%	F	%	F	%	
Married	192	2	1	50	26	53	28	87	45	30.18
Single	48	3	6	32	67	13	27	-	-	22.76
Total	240	5	7	82	93	66	55	87	45	-

Table 5. Distribution of Participants BMI Status by Ranks

Rank	Underweight		Normal		Overweight		Obese		Overall frequency		BMI Mean
	F	%	F	%	F	%	F	%	F	%	
*SN	-	-	12	46	6	27	6	27	24	10	22.66
*SNM	-	-	6	25	11	45	7	30	24	10	27.76
*NO	5	8	31	52	12	20	12	20	60	25	24.98
*SNO	-	-	22	60	7	20	7	20	36	15	26.3
*PNO	-	-	6	27	5	23	13	50	24	10	29.37
*ACNO	-	-	1	11	3	39	5	50	9	3.8	30.7
*CNO	-	-	4	9	28	45.5	28	45.5	60	25	30.78
*ADN	-	-	-	-	2	66.6	1	33.3	3	1.2	30.88
Total	5	2.1	82	34.2	74	30.8	79	32.9	24	100	-

Key

- *SN = staff nurse
- *SNM = staff nurse midwife
- *NO = nursing officer
- *SNO = senior nursing officer
- *PNO = principal nursing officer
- *ACNO = assistant chief nursing officer
- *CNO = chief nursing officer
- *ADN = assistant director of nursing

The ranks of SN to PNO constitute the junior cadre of nursing staff, while ACNO to ADN forms the senior category. In Table 5, all the

senior categories are obese (with increasing BMI from 30.7 for ACNOs through 30.78 for CNOs and ADNs, 30.88). This seems to show a steady increase in BMI as nurses get to the peak of the ladder. Even for the junior category, such an increase from the first level (i.e., SN) with a BMI of 22.66 to PNO (BMI: 29.37) is also apparent. However, the Nursing officers (NO) category shows a casual break in this chain. Nursing officers are the middle cadre supervisors in this setting.

Participant's Present Health Conditions and BMI

Figure. 2 shows that the majority, 159 (66.2%) of the participants, reported no health problem. This shows that many nurses who are overweight or obese did not report any

associated non-communicable disease. However, 81 (33.8%) of the study participants common reported some health conditions, namely: high blood pressure (n=48; 59.3%), diabetic Mellitus (n=8; 10.0%) and arthritis (n=25; 30.7%).

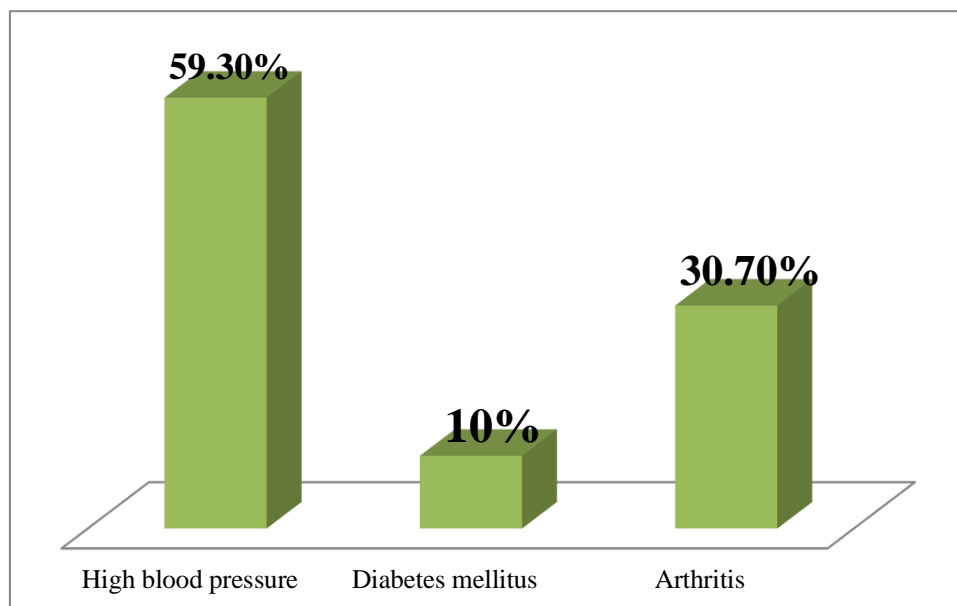


Figure 2. Distribution of Participant's Present Health Conditions

Table 6 shows the distribution of BMI according to health conditions based on the BMI. While it appears that arthritis seems more common with a mean BMI of 35.1, high blood

pressure shows more in those with a mean BMI of 32.3, and diabetes mellitus is associated with a mean BMI of 28.4. The rest of the respondents (159) have no health problem.

Table 6. Health Conditions of Study Participants and BMI

Health condition	Total	Under weight		Normal		Over-weight		Obese		Mean BMI
		F	%	F	%	F	%	F	%	
High blood pressure	48 (59.3)	0	0	12	25	16	35	20	40	32.3
Diabetes mellitus	8 (10.0)	0	0	2	19	4	49	2	32	28.4
Arthritis	25 (30.7)	0	0	2	20	8	35	15	45	35.1
Total	81 (100.0)			14	17.3	28	34.6	37	45.6	31.9

With a general *mean* of 31.9, it is clear that BMI above 30 is commonly associated with high blood pressure, arthritis, and diabetes mellitus. Obesity is clearly more associated with these conditions (45.6%) of all conditions.

A few (17.3%) with normal weight also reported some health problems: hypertension (25%), arthritis (20%), and diabetes mellitus

(19%), although no underweight participants reported any health problems (see Table 6).

Discussion Of Findings

This study revealed that most of the nurses are either obese (38.0%) or overweight (28%). The increasing prevalence of overweight and obesity in this northwest State in Nigeria has

also been reported elsewhere and in some parts of Nigeria.

A study [40] found that obesity and overweight were on the increase among nurses in Nigeria and the United States of America. Although the prevalence of obesity and overweight found in this study was lower than the reported finding of obesity (23.2%) and higher in overweight (31.4%) among healthcare workers at a tertiary hospital [25], the prevalence of obesity found among nurses in Akwa Ibom State of Nigeria and the United States are reportedly much higher, 63% and 54% respectively [40; 46].

In this study, nurses within the age of 40-59 years (51%) were more obese while those within the age of 30-39 years (15%) were more overweight, similar to the finding of an earlier by [25]. So many explanations trail the increasing prevalence of this phenomenon among nurses. It has been stressed, for example, that most nurses work on shifts that are usually busy, thus forcing them to consume less nutritious by resorting to fast food, which has 2.6 times the risk of obesity [47].

The factors associated with overweight and obesity among nurses were age, gender, marital status, and rank. In this study, most of the nurses with obesity were within the age of 40–59 years (BMI means a score of 35.9m² and 31.65m²) and the majority of the married nurses had obesity with a BMI of 30.18m². The study findings also revealed that the senior ranked nurses from assistant chief nursing officer to assistant director of nursing had obesity and those on the senior nursing officer and principal nursing officer rank were overweight. These findings were similar to that of Isaac [20], who reported that the prevalence of overweight and obesity were strongly associated with aging (≥ 41 years), female gender and being married. Similarly, [24] reported obesity and increasing age are the major risk factors fueling increased prevalence of type 2 diabetes mellitus among the participants. The association between gender, (female) and increased in the order

ranked nurse with a high prevalence of obesity are well documented [48, 36, 27]. The prevalence of overweight and obesity was associated with married [25]. Speculations also have it that more senior nurses become more overweight or even obese because they do more of sedentary, mental work than the lower cadre nurses. This is in addition to the slowing basal metabolic rate due to aging, as such senior nurses advance in age as they also become higher on the cadre. This complex explanation could be a possible reason for the scenario among more senior nurses. The reported health problems seem to further support this argument.

Health problems were reported by the nurse participant in this study. The prevalence of possible associated health sequelae of overweight and obesity found in this study (hypertension, diabetic mellitus, and arthritis) is commonplace as they are significant risk factors in obesity and overweight [19, 49, 50, 36, 51, 52, 42, 53]. [29] had faulted healthcare workers in their inability to take care of themselves, resulting in precipitating non-communicable diseases such as those identified in this study.

Although few participants with normal weight ranges also reported some health conditions like hypertension, arthritis, and diabetes mellitus, this could be associated more with the inherently stressful nature of nursing service delivery. Therefore, the health conditions seem among study participants could be as a result of the interplay between stress and weight issues. In fact, some evidence exists that the increasing weight gains are often times stress-induced [2]; and nurses in this same study area have been previously reported to be under intense stress [54].

Study Limitations

The study was carried out in one of the tertiary health institutions in Nigeria, thus, limiting the generalizability of the study findings. A wider and longitudinal coverage study may improve the external validity of the

findings and identify other workplace factors associated with obesity and overweight among nurses, such as the units in which these nurses work.

Conclusion

More than a third of the nurses in this study have obesity; another slightly less than a third is overweight. The prevalence is comparatively higher among married, older, and high-ranking female nurses. These socio-demographic variables need to be explored further to better explain this scenario. Similarly, the health problems found associated with this high level of overweight/obesity (high blood pressure, arthritis, and diabetes mellitus) are familiar consequences. Obesity and overweight in this setting are becoming a health, social and professional concern.

Recommendations

Based on the findings of this study, it is recommended that:

1. Professional in-house education is paramount for nurses to manage their weight more professionally.
2. Regular health checks and health promotion activities should form the institutional policy for health scheme.

References

- [1] Chooi, Y. C., Ding, C., & Magkos, F. The epidemiology of obesity. *Metabolism*, 2019; 92: 6-10. <https://doi.org/10.1016/j.metabol.2018.09.00>.
- [2] Tomiyama, A. J. Stress and obesity. *Annual Review of Psychology*, 2019; 70: 703-718.
- [3] Centre for Disease Control and Prevention (2014). Leading Causes of Morbidity and Mortality and Associated Behavioural Risk and Protective Factors — the United States, 2005—2013. Clifton Road Atlanta (GA): *CDC National Health Report*; 2014.
- [4] World Health Organization. *Overweight and obesity*. Geneva: World Health Organization, 2018. Available from: [https://www.who.int/news-](https://www.who.int/news-room/factsheets/detail/obesity-and-overweight)

3. Studies to reevaluate the stress level of nurses in this setting is necessary and long overdue.
4. Intervention into the identified health conditions should be undertaken; study participants and departments need to be sensitized on this.
5. Expanding the scope of this scope to other tertiary health institutions in northwest Nigeria should produce a better picture of obesity and overweight among nurses in this region in Nigeria.

Acknowledgments

The authors wish to thank and acknowledge the administrative supports received from the Department of Nursing Services and the Management of Ahmadu Bello University Teaching Hospital, Zaria. The cooperation of nurses in ABUTH Zaria is genuinely acknowledged.

Conflict of Interest

The author declares that there is no Conflict of Interest.

room/factsheets/detail/obesity-and-overweight accessed on Oct 2, 2021.

- [5] Ng, M., Fleming, T., Robinson, M., *et al.*, Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*, 2014; 384(9945):766–781.
- [6] WHO. Draft recommendations for the prevention and management of obesity over the life course, including potential targets; WHO discussion paper, 2021.
- [7] Salarzadeh J. H., Bt Wan Mohamed Radzi, C. W. J., & Samsudin, N. Associations of body mass index with demographics, lifestyle, food intake, and mental health among postpartum women: A

- structural equation approach. *International Journal of Environmental Research and Public Health*, 2020; 17(14): 5201. <https://doi.org/10.3390/ijerph17145201>.
- [8] Ajayi I.O., Adebamowo C, Adami H-O, *et al.*, Urban rural and geographic differences overweight and obesity in four sub-Saharan African adult populations: a multi-country cross-sectional study. *BMC Public Health*, 2016; 16(1):1126. doi:10.1186/s12889-016-3789-z.
- [9] Alwan, A. *Global Status Report on Noncommunicable Diseases 2010*. Geneva: World Health Organization; 2011.
- [10] Yang, L., Bovet, P., Ma, C., Zhao, M., Liang, Y., & Xi, B. Prevalence of underweight and overweight among young adolescents aged 12–15 years in 58 low-income and middle-income countries. *Pediatric Obesity*, 2019; 14(3): e12468.
- [11] Zubery, D., Kimiywe, J., and Martin, H.D. Prevalence of Overweight and Obesity, and Its Associated Factors among Health-care Workers, Teachers, and Bankers in Arusha City, Tanzania. Diabetes, Metabolic Syndrome and Obesity: *Targets and Therapy*, 2021: 455–465.
- [12] Adeloye, D., Ige-Elegbede, J.O., Ezejimofor, M., Owolabi, E.O., Ezeigwe, N., Iyamaka Omoyele, C., Mpazanje, R.G., Dewan, M.T., Agogo, E. Gadanya, M.A., Alemu, W., Harhay, M.O., Auta, A. and Adebisi, A.O. Estimating the prevalence of overweight and obesity in Nigeria in 2020: a systematic review and meta-analysis. *Annals of Medicine*, 2021; 53(1): 495–507. <https://doi.org/10.1080/07853890.2021.1897665>.
- [13] Akarolo-Anthony S.N., Willett, W.C., Spiegelman D., Adebamowo, C.A. Obesity epidemic has emerged among Nigerians. *BMC Public Health*, 2014; 14:455.
- [14] Imes, C.C. and Burke, L.E. The obesity epidemic. The USA as a cautionary tale for the rest of the world. *Curr Epidemiol*, 2014: 1:82–8. <https://doi.org/10.1007/s40471-014-0012-6>.
- [15] Akpan, E. and Ekpenyong, C. Urbanization drift and obesity epidemic in Sub-Saharan Africa: a review of the situation in Nigeria. *EJSD*, 2013; 2(2):141–164.
- [16] Ono, T., Guthold R., and Strong K. WHO Global comparable estimates: Global Infobase data for saving lives, 2010: 2005-2012.
- [17] Kandala, N.B. and Stranges, S. Geographic variation of overweight and obesity among women in Nigeria: a case for nutritional transition in sub-Saharan Africa. *PloS One*. 2014; 9(6): e101103.
- [18] ICF-OB. A multidisciplinary questionnaire based on the International Classification of Functioning, Disability, and Health to address disability in obesity. *Eur J Physical Rehab Med*. 2018; 54(1):119-21.
- [19] WHO. Obesity: preventing and managing the global epidemic: World Health Organization, 2000.
- [20] Ladeniyi, I., Adeniyi, V.O., Fawole, O., Adeolu, M., Goon, D.T., Ajayi, A.I. & Owolabi, E.O. Pattern and correlates of obesity among public service workers in Ondo State, Nigeria: a cross-sectional study, *South African Family Practice*, 2017; 59:6, 195-200, DOI: 10.1080/20786190.2017.1333784.
- [21] WHO. Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: report of the ad hoc working group on science and evidence for ending childhood obesity, Geneva, Switzerland. *World Health Organization*, 2016; Geneva: <https://apps.who.int/iris/handle/10665/206549>.
- [22] Wilkinson, T.M. Obesity, equity, and choice. *J Med Ethics*, 2019; 45(5):323-328
- [23] National Institute of Health. Practical guide Identification, Evaluation, and Treatment of Overweight and Obese Adults; 2000. Available from: https://www.nhlbi.nih.gov/files/docs/guidelines/prctgd_c.pdf. Accessed in 2021, Jun 30.
- [24] Sabir, A.A., Balarabe, S., Sanni, A.A., Isezuo, I.A., Bello, K.S., Jimoh, A.O., *et al.*, Prevalence of diabetes mellitus and its risk factors among the suburban population of northwestern Nigeria. *Sahel Med J*, 2017; 20:168-72.
- [25] Dankyau, M., Shu'aibu, J.A., Oyebanji, A.E., Mamven, O.V. Prevalence and correlates of obesity and overweight in healthcare workers at a tertiary hospital. *J Med Trop*. 2016; 18:55-59.

- [26] Gborgbortsiand Dora Mbany, D. Prevalence and factors associated with overweight and obesity in selected health areas in a rural health district in Cameroon: a cross-sectional analysis. *BMC Public Health*, 2021;21:475 <https://doi.org/10.1186/s12889-021-10403-w>.
- [27] Obirikorang, Y., Obirikorang C., Enoch O.A., Acheampong, E., Tuboseiyefah, P. *et al.*, Prevalence and risk factors of obesity among practicing nurses at three selected hospitals in Kumasi Metropolis, Ghana. *Journal of Medical and Biomedical Sciences*, 2016; 5(3): 45-55.
- [28] Chou C.F. and Johnson P.J. Health disparities among America's health care providers: evidence from the integrated health interview series, 1982 to 2004. *J Occupational Environmental Med.*, 2008; 50(6):696. doi:10.1097/JOM.0b013e31816515b517.
- [29] Skaal, L. and Pengpid, S. Obesity and health problems among South African healthcare workers: do healthcare workers take care of themselves? *South African Family Practice*, 2011; 53(6):563–567. doi:10.1080/20786204.2011.1087415318.
- [30] Pobee R.A., Owusu W., and Plahar W. The prevalence of obesity among female teachers of child-bearing age in Ghana. *African j Food, Agriculture, Nutrition Development*, 2013; 13:3.
- [31] Addo, P.N., Nyarko K, M., Sackey, S.O., Akweongo, P., Sarfo, B. Prevalence of obesity and overweight and associated factors among financial institution workers in Accra Metropolis, Ghana: a cross-sectional study. *BMC Res Notes*. 2015; 8(1):599. doi:10.1186/s13104-015-1590-120.
- [32] Ojomu, F. and Kuranga, I.S. Blood pressure and body mass index among Jos University Teaching Hospital staff. *Trans J Sci-Tech*, 2013; 3:73-83.
- [33] Busari, O.A., Opadijo, O.G., Adeyemi, A.O. Risk of developing diabetes among healthcare workers in a Nigerian Tertiary Hospital. *Mera Diabetes Int*, 2008; 16:21-2.
- [34] Aghaji, M.N. Doctors' lifestyle in Enugu, Nigeria. *East Afr Med J*, 2000; 77:480-4.
- [35] Edo, A.E. and Enofe, C.O. Prevalence of dyslipidemia amongst apparently healthy staff of a tertiary hospital in Benin City. *J Med Biomed Res*, 2013; 12:24-9.
- [36] Adaja T.M. and Idemudia O.J. Prevalence of overweight and obesity among health-care workers in University of Benin Teaching Hospital, Benin City, Nigeria. *Ann Trop Pathol*, 2018; 9:150-4.
- [37] Owolabi, A.O., Owolabi, M.O., OlaOlorun, A.D., Amole, I.O. Hypertension prevalence and awareness among health workforce in Nigeria. *Internet J Med Update*, 2015; 10:10-19.
- [38] Adeloye, D., Ige, J.O., Aderemi, A.V., et al., Estimating the prevalence, hospitalisation, and mortality from type 2 diabetes mellitus in Nigeria: a systematic review and meta-analysis. *BMJ Open*, 2017; 7(5): e015424.
- [39] Egbi, O.G., Rotifa, S. and Jumbo, J. Obesity among workers of a tertiary hospital in Nigeria: Prevalence and associated factors. *Highland Med Res J*, 2015; 15:8-13.
- [40] Ogunjimi L. O., Ikorok, M.M. and Olayinka, Y.O. Prevalence of obesity among Nigeria nurses: The Akwa Ibom State experience. *International NGO Journal*, 2010; 5(2):045-049. Available online at <https://academicjournals.org/ingoj>.
- [41] Iwuala S.O., Ayankogbe O.O., Olatona F.A., Olamoyegun M.A., OkparaIgwe U., Sabir A.A., *et al* (2015). Obesity among health service providers in Nigeria: Danger to long term health worker retention *Pan Afr Med J*, 2015; 22:1.
- [42] Ojikutu, R.K. The prevalence of cardiovascular disease in the Lagos State. *Ghana J Dev Stud.*, 2009; 6(2):41.
- [43] Mfuh, A.Y.L., Ekaete, E.P., Aliyu, D., and Omoniyi, S.O. Factors Affecting Communication and Teamwork in the Operating Theatre Towards Improving Quality Care for Patients in Ahmadu Bello University Teaching Hospital, Shika, Zaria. *BJNH*, 2020; 2(1): 348-409.
- [44] Ahmadu Bello University Teaching Hospital, Abuth. Staff Records Department of Nursing Services. 2021.
- [45] Yamane, T. *Statistics: An Introductory Analysis*, 1967. (2nd Ed.), New York: Harper and Row.
- [46] Miller S.K., Alpert P.T. and Cross C.L. Overweight and obesity in nurses, advanced practice nurses, and nurse educators. *Journal of the*

American Academy of Nurse Practitioners, 2008; 20(5): 259-265.

[47]Isah E.C., Iyamu, O.A., Imoudu, G.O. Health effects of night shift duty on nurses in University Teaching Hospital in Benin City, Nigeria. *Niger J Clin Pract*, 2008; 11:144-8.

[48]Ijoma, U.N., Chime, P., Onyekonwu, C., Ezeala-Adikaibe, B.A., Orjioko, C., Anyim, O.B., Onodugo, O.D., Aneke, E., Nwatu, C.B., Young, E., Mbadiwe, N., Ekenze, O.S., Okoye, J.U., Abonyi, M., Ulasi, I.I., Mbah, A. and Onodugo, P.N. Factors Associated with Overweight and Obesity in an Urban Area of Southeast Nigeria. *Food and Nutrition Sciences*, 2019; 10: 735-749. <https://www.scirp.org/journal/paperinformation.aspx?paperid=93652>.

[49]Adeoye A.M., Adewoye IA, Dairo DM, Adebisi A, Lackland DT, Ogedegbe G, *et al*. Excess metabolic syndrome risks among women health workers compared with men. *J Clin Hyperten*, 2015; 17:880-4.

[50]Dada, I.O. The meal pattern and incidence of overweight and obesity among market women in a Southwest community. *Saudi J Obes*. 2017; 5(2):70.

[51]Chinedu SN, Emiloju, O.C. Underweight, overweight and obesity amongst young adults in Ota, Nigeria. *J Public Health Epidemiol*. 2014; 6(7):236–238.

[52]Nwaneli, C. Changing trend in coronary heart disease in Nigeria. *Afrimed J.*, 2010; 1 (1):1–4.

[53]Berrington de Gonzalez, A., Hartge, P., Cerhan, J.R. *et al*. Body-mass index and mortality among 1.46 million white adults. *New England J Med.*, 2010; 363(23):2211–2219. doi:10.1056/NEJMoa1000367.

[54]Anyebe, E.E., Garba, S.N., Ukut, C.I. and Lawal, H. An Assessment of Stress amongst Nurses in Zaria Metropolis, Northwest Nigeria. *West African Journal of Nursing*, 2014; 25 (1); 53-70.