

Health-Related Quality of Life in Primary Care Obese National Health Insurance Scheme (NHIS) Clinic Enrollees in Niger Delta Region of Nigeria

Idung Alphonsus Udo^{1*}, Jombo Henry Effiong² and Umoh Victor Aniedi³

¹Department of Family Medicine, Faculty of Clinical Sciences, College of Health Sciences, University of Uyo, Uyo, Akwa Ibom State, Nigeria

²Department of Mental Health, Faculty of Clinical Sciences, College of Health Sciences, University of Uyo, Uyo, Akwa Ibom State, Nigeria

³Department of Internal Medicine, Faculty of Clinical Sciences, College of Health Sciences, University of Uyo, Uyo, Akwa Ibom State, Nigeria

This article was published in the following Scient Open Access Journal:

Journal of General and Emergency Medicine

Received : June 11, 2018; Accepted June 19, 2018; Published June 27, 2018

Abstract

Introduction: Obesity is a serious health problem that has attracted increasing attention in Nigeria, sub-Saharan Africa and the world at large. It is a risk factor for functional decline in both genders and the risk increases with increasing body weight.

The objective of this study was to describe the effect of obesity on health-related quality of life in primary care obese National Health Insurance Scheme enrollees in the Niger Delta Region of Nigeria.

Methods: This was a prospective cross-sectional study conducted between January and March 2018. Using a systematic sampling technique, 217 eligible respondents aged 18 - 65 years were recruited, data were collected with an interviewer-administered structured questionnaire. Quality of life was assessed using WHOQOL Bréf.

Results: Of the 217 respondents, overweight was present in 25.4% females compared to 22.1% males ($p=0.23$) obesity was present in 56.4% females compared to 51.5% males ($p=0.17$). Obesity was more prevalent in respondents aged between 35 and 54 years of age. The mean Hip circumference for women in this study was 112.2cm (SD=12.9) compared to 93.8cm (SD=5.7) for men ($p=0.000$). Consumption of alcohol was a significant contributor to obesity in this study ($p=0.000$); conversely frequency of exercise per week ($p=0.589$); duration of exercise per session ($p=0.203$); number of hours spent each day to watch television ($p=0.057$) and smoking status of respondents ($p=0.203$) were not significant contributors to obesity among respondents in this study.

Obese respondents reported statistically significant impairment in the various domains of their health-related quality of life (HRQOL). These included impairment in their overall quality of life ($p=0.000$); as well as general health satisfaction ($p=0.000$).

Physical health ($p=0.000$) and psychological health ($p=0.000$) were also statistically impaired among obese respondents.

Conclusion: The increasing prevalence of obesity, associated morbidity and its negative effect on health-related quality of life (HRQOL) will put an enormous strain on obesity management. Primary care workers should seek training in obesity care to be able to provide an informed and effective treatment among obese managed care enrollees in the future.

Keywords: NHIS, Primary Care, Niger Delta Region, Health related quality of life

Introduction

Obesity is a serious health problem that has attracted increasing attention in Nigeria, Sub-Saharan Africa and the world at large [1-3].

Obesity is now prevalent in people of all ages including children and has widespread effects on physical health, reproductive health, employment, mental health, stigma and mortality risk [3].

Overweight and obesity comprise the fifth leading risk factor for mortality resulting in some 2.8 million deaths annually [3].

In addition to an overall increase in mortality, there are reports that link a reduced quality of life (QOL) with obesity [4,5].

*Corresponding Author: Alphonsus Udo Idung, MB, BS, FWACP (FAM.MED.), Department of Family Medicine, College of Health Sciences, Faculty of Clinical Sciences, University of Uyo, Uyo, Akwa Ibom State, Nigeria, Tel: +234 (0) 8069768262, Email: dridung@yahoo.com

Obese individuals reported significantly lower health-related quality of life (HRQOL) than people with normal weight known to be linked to obesity [4,5].

The probable reason is that obese individuals face a great risk of mobility impairments resulting in reduced QoL.

Obesity is a risk factor for functional decline in both genders and the risk increases with increasing body weight [6,7].

Problems with executing such basic tasks such as bending, kneeling, stooping, lifting and carrying create limitations in maintaining strength and mobility, as well as in performing basic activities of daily living [6,7].

Psychological problems are common among obese people. Obesity is strongly associated with depression and other mood disorders, particularly in women [8].

Anxiety and even suicide have been associated with changes in body weight. This will not only have an impact on most areas of an individual's life but will also make treating obesity itself more of a challenge [8]. Obesity is also associated with negative stigma [9].

Weight stigma is prevalent in the media, employment, health-care and education. Obese individuals are considered to be lazy, unmotivated, less competent and sloppy.

Weight stigma increases vulnerability to depression, low self-esteem, poor body image and exercise avoidance [9].

The health consequences of obesity are real and serious, the management of obesity, a chronic medical problem is both complex and time-consuming

There has been increasing interest in research on health-related quality of life (HRQOL) among individuals with chronic medical problems in Nigeria [10,11].

There is however, paucity of published reports on HRQOL among primary care obese NHIS Clinic patients in the Niger Delta Region of Nigeria.

It is hoped that findings from this study will assist primary care workers to provide an informed and effective obesity treatment plan for their patients.

Subjects, Materials and Methods

Location of the study

The study was carried out at the National Health Insurance Scheme (NHIS) clinic of the University of Uyo Teaching Hospital (UUTH).

Family Medicine Department operates four clinic units in UUTH, These comprise the general outpatient clinic (GOPC), the Federal staff clinic, the staff medical services clinic as well as the National Health Insurance Scheme (NHIS) Clinic

The NHIS Clinic caters for the health care needs of individuals employed in Federal government ministries, departments and agencies (MDAs) otherwise referred to as formal sector employees [12].

The clinic holds between 8.00am and 4.00pm every day from Monday to Friday except public holidays. The clinic

attends to adult patients undifferentiated by gender, disease or organ system. About twelve thousand (12,000) enrollees have registered with the NHIS scheme in UUTH [13].

UUTH was established in 1996 as a state specialist hospital but was later taken over in 1997 by the Federal Government of Nigeria and renamed Federal Medical Centre (FMC) Uyo.

It was granted the status of a Teaching Hospital in February 2007 by the Federal Government of Nigeria. The hospital which is located on the outskirts of Uyo, the capital of Akwa Ibom State of Nigeria has 21- department including Family Medicine.

It is a 600-bed hospital occupying 43-hectares of land and currently serves a population of over 3.9 million people of Akwa Ibom State [13].

Nigeria is divided into six geo-political zones as follows: North-East, North-West, North-Central, South-East, South-West and South-South. The South-South geo-political zone is otherwise referred to as the Niger-Delta region. It is one of the major oil producing areas in Nigeria.

A total of 217 respondents who attended the NHIS clinic between January and March 2018 were recruited for the study. Sample size for this study was calculated using the formula $n = z^2 pq/d^2$, where 'n' is the desired sample size, 'z' represents standard normal deviation set at 95% confidence level which corresponds to 1.96, 'p' is the reported prevalence of obesity (17.0%)⁵ 'd' is the precision which at 95% confidence interval is 5%. The calculated sample size was 217.

About one thousand eight hundred and thirty (1830) patients were projected to attend the NHIS clinic during the period of this study. This followed unpublished record obtained from the Health records department of the hospital concerning the number of patients seen in the clinic during the same period in the previous year.

These comprise all newly registered patients as well as those who returned for follow-up care. Their case notes were marked to forestall duplication of entry. They were recruited using a systematic sampling method with a sampling interval of eight [8].

Numbers ranging from one to eight were assigned to the first eight respondents who met the inclusion criteria. The first respondent was chosen by simple balloting which was done by randomly picking one of the numbers from a basket containing the assigned numbers. Thereafter, every eighth (8th) respondent was recruited for the study.

Where, however, such a respondent declines to take part in the study, such respondent was dropped, then the next respondent that met the inclusion criteria was recruited.

Inclusion criteria included willingness to take part in the study as well as individuals whose weight was in the overweight or obese category. Exclusion criteria included critically ill respondents as well as those who refused to take part in the study. Ethical approval for this study was obtained from the UUTH institutional review committee.

A pretest of the research questionnaire was performed in order to determine its applicability, experience and logistic problems.

This was a prospective cross-sectional study conducted between January and March 2018. A structured and pre-tested interviewer-administered questionnaire was used to obtain information about socio-demographic profiles of the respondents such as age, marital status, highest level of education attained, income (in Nigeria Naira denomination) using the approved wage structure in the Nigeria public service [14].

Weight of the respondents was measured in kilograms to the nearest 0.5kg using a Hanna-calibrated bathroom scale, model BR 9011.

Each subject was weighed wearing light clothing without shoes or stocking. The height of the subjects was measured using an improvised wooden stadiometer mounted on a vertical wall with the respondent standing erect against the wall on a horizontal floor without shoes. The head was placed so as to ensure that the external auditory meatus and the angle of the eye were on a horizontal line. The height was measured in metres to the nearest 0.1cm. BMI was calculated as the weight (kg)/(height [m])² (ie kg/m²) [15]. According to World Health Organization (WHO) overweight is defined as BMI of 25.0kg/m² – 29.9kg/m² and obesity as a BMI of > 30.0 kg/m² [16].

A non-stretch tape was used to measure the body circumferences; waist circumference was measured as the smallest circumference between the xiphisternum and the umbilicus on expiration [5,17]. Measurements were taken to the nearest 0.1cm after normal expiration with the subject in an upright position.

Hip circumference was measured to the nearest 0.1cm at the maximum posterior protuberance of the buttocks whilst the subject was standing upright with feet together.

The normal waist circumference for women is 88cm or less, while the normal waist circumference for men is 102cm or less. Average normal waist-hip-ratio (WHR) values for men and women are about <1.0 and <0.85 respectively, while abnormal values are ≥ 1.0 and ≥ 0.85 for men and women respectively [5,17].

Health-related quality of life was measured using the abridged version of the World Health Organization quality of life instrument (WHOQOL-Bréf) [18]. The WHOQOL-Bréf is a generic instrument developed in a wide range of languages for use in different cultural settings. It yields comparable scores across cultures.

The WHOQOL-Bréf consists of domains (or dimensions) and facets (or subdomains). The WHOQOL-Bréf produces quality of life profile with 4-domains namely physical health, psychological health, social relationships and environmental health [19].

Two items are assessed separately and these are individual's overall perception of quality of life (QOL) as well as general health satisfaction.

The four main domain scores are scaled in a positive direction, higher scores denote high Qol. The scores of items within each domain are used to calculate the domain scores. After organizing the responses into the Qol, mean scores were generated from the possible score in each domain.

The raw score was then converted into transformed scores by multiplying the raw scores by 4 in order to make the domain

score comparable with the scores used in the WHOQOL- 100 [19].

The respondents' individual scores for each domain were then compared with the possible mean score. Since the domain scores are normally distributed, a score of mean minus one (-1) standard deviation (SD) is graded poor; while a score of the mean plus one (+1) standard deviation (SD) is graded good [19]. The instrument has been used in previous studies in Nigeria [20-22]. Hypertension, diabetes mellitus and osteoarthritis were diagnosed using standard guidelines [23-25].

Data Analysis

Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 18.0. Summary scores were generated for the WHOQOL -Bréf by organizing the items into facets which represent the domains covered by the questionnaire. Since the scores for each domain were normally distributed, the categorization of the levels of quality of life (QOL) for each domain was done using the value of +1 or -1 standard deviation (SD). The categories of good and poor were cross-tabulated against the presence or absence of obesity. Frequency distribution and cross-tabulation were generated, chi-square was used to compare proportions. The corresponding p-values were used to determine the level of statistical significance. The p-value of 0.05 was used to determine the level of statistical significance.

Results

A total of 217 respondents were recruited into the study; of these, 122(56.2%) were women while 95 (43.8%) were men.

Table 1 shows the socio-demographic and anthropometric characteristics of the respondents.

The mean age of the respondents was 49.4 ± 3.3 years. There was a statistically significant difference between the mean age of women (51.6 [SD = 2.8]) and men (44.7 [SD = 3.4]) ($p \leq 0.001$)

The prevalence of overweight among women in this study was 25.4% versus 22.1% for men ($p = 0.23$); the prevalence of obesity among women in this study was 56.4% compared to 51.5% for men ($p = 0.17$)

Obesity was more prevalent among respondents between 35 and 54 years of age ($p = 0.003$). Married respondents were more overweight and obese in this study ($p = 0.000$).

Overweight and obesity was more prevalent among urban than rural dwellers in this study. ($p \leq 0.001$). Women had a mean waist circumference of 98.6cm (SD = 9.8) compared to 96.6cm (SD = 8.8) for men ($p = 0.002$).

The mean hip circumference for women in this study was 112.2cm (SD 12.9) versus the mean hip circumference of 93.8cm (SD 15.7) for men ($p = 0.000$). Abnormal waist circumference was present in 59.8% of the female respondents compared to 53.7% of the male. Table 2 shows habits related to lifestyle characteristics of the respondents.

Consumption of alcohol was a significant contributor to obesity in this study ($p=0.000$)

Conversely however, frequency of physical exercise per week ($p = 0.589$); duration of exercise per session ($p=0.203$); number of hours spent each day to watch television ($p=0.057$) and smoking

VARIABLES	RESPONDENTS	
	Male (M) (n=95[%])	Female (F) (n=122[%])
Age (in Years)		
18 – 24	7 [7.4]	9 [7.4]
25 – 34	17 [17.9]	11 [9.0]
35 – 44	25 [26.3]	18 [14.8]
45 – 54	21 [22.1]	42 [34.4]
55 – 64	19 [20.0]	26 [21.3]
65+	6 [6.3]	16 [13.1]
Marital Status		
Single	5 [5.3]	12 [9.8]
Married	63 [66.3]	78 [63.9]
Divorced/Separated	12 [12.6]	18 [14.8]
Widowed	15 [15.8]	14 [11.5]
Level Of Education		
No Formal Education	-	-
Primary School	16 [16.8]	23 [18.9]
Secondary School	29 [30.5]	38 [31.1]
Post Secondary School	50 [52.6]	61 [50.0]
Income		
Low	18 [18.9]	57 [46.7]
Middle	21 [22.1]	42 [34.4]
High	56 [59.0]	23 [18.9]
Place of Residence		
Urban	67 [70.5]	89 [73.0]
Rural	28 [29.5]	33 [23.0]
Occupation		
Non-skilled	14 [14.7]	39 [32.0]
Skilled	35 [36.8]	57 [46.7]
Professional	46 [48.4]	26 [21.3]
Body Mass Index (BMI) (kg/m²)		
< 18.5	11 [11.6]	9 [7.4]
18.5 – 24.9	14 [14.7]	24 [19.7]
25.0 – 29.9	21 [22.1]	31 [25.4]
30.0 – 34.9	16 [16.8]	11 [9.0]
35.0 – 39.9	27 [28.4]	38 [40.0]
≥ 40.0	6 [6.3]	9 [7.4]
Waist circumference (WC)		
≤ 88cm (F)		43[70.5]
≤ 102cm (M)	63[66.3]	
≥ 88cm (F)		86[70.5]
≥ 102cm (M)	32[33.7]	
Quartiles of Waist-hip-ratio		
< 0.85 (F)		49[40.2]
< 1.0 (M)	44[46.3]	
≥ 0.85(F)		73[90.8]
≥ 1.0 (M)	51[53.7]	

Table 1: Socio Demographic and Anthropometric Characteristics of Respondents

status of respondents (p=0.124) were not statistically significant contributors to obesity among respondents in this study. Table 3 shows the prevalence of medical conditions among respondents in this study.

There was a statistically significant relationship between obesity and the presence of hypertension (p=0.0000); diabetes mellitus (p=0.000) and osteoarthritis among respondents in this study. Table 4 shows quality of life rating of respondents in this study.

Obese respondent's experienced statistically significant

VARIABLES	RESPONDENTS		x ²	P = VALUE
	Obese (n=107[%])	Non-obese (n=110[%])		
Frequency of physical exercise per week				
< 3	46 [43.0]	53 [48.1]	0.587	0.443
≥ 3	61 [57.0]	57 [51.8]		
Duration of exercises per session (minutes)				
< 20	49[45.8]	41 [37.3]		
≥ 20	58 [54.2]	69 [62.7]	1.623	0.203
Television viewing per day (hours)				
< 4	70 [65.4]	58 [52.7]		
≥ 4	37 [34.6]	52 [47.3]	3.612	0.057
Alcohol consumption				
Yes	62 [57.9]	34 [30.9]		
No	45 [42.1]	76 [69.1]	16.070	0.000
Smoking Status				
Yes	31 [29.0]	22 [20.0]		
No	76 [71.0]	88 [80.0]	2.365	0.124

Table 2: Habits Related to Lifestyle Characteristics of the Respondents

VARIABLES	SUBJECTS		x ²	P = VALUE
	Obese (n=107[%])	Non-obese (n=110[%])		
Medical History				
Hypertension	73 [68.0]	31 [28.2]	28.497	0.000**
Diabetes Mellitus	68 [63.6]	29 [26.4]	30.45	0.000**
Osteoarthritis	54[50.6]	36 [32.7]	7.032	0.008**
Others (malaria, ipv, hernia)	13 [12.1]	17 [15.5]	0.497	0.481

Key

IPV - (Intimate Partner Violence)

* Multiple responses

** statistically significant

Table 3: Prevalence of Medical Conditions of Respondents*

VARIABLES	RESPONDENTS		x ²	P = VALUE
	Obese (n=107[%])	Non-Obese (n=110[%])		
Quality of Life Domains				
Overall quality of life				
Good	34 [31.8]	82 [74.5]	39.878	0.000*
Poor	73 [68.2]	28 [25.5]		
General health Satisfaction				
Good	29 [27.1]	77 [70.0]		
Poor	78 [72.9]	33 [30.0]	39.945	0.000*
Domain 1 (Physical Health)				
Good	26 [24.3]	91 [82.5]		
Poor	81 [75.7]	19 [17.3]	74.524	0.000*
Domain 2 (Psychological Health)				
Good	31 [29.0]	87 [79.1]		
Poor	76 [11.0]	23 [20.9]	54.919	0.000*
Domain 3 (Social relationship)				
Good	46 [43.0]	50 [45.5]		
Poor	61 [57.0]	60 [54.5]	0.133	0.715
Domain 4 (Environmental Health)				
Good	51 [47.7]	46 [41.0]		
Poor	56 [52.3]	64[58.2]	0.750	0.387

* Statistically significant

Table 4: Quality of Life (QoL) Rating among Obese and Non-Obese Respondents

impairment in the various domains of their health-related quality of life (HRQOL) compared to their non-obese colleagues.

Obese respondents experienced significant impairment in their overall quality of life ($p=0.000$) as well as general health satisfaction ($p=0.000$).

There was statistically significant impairment in the physical ($p=0.000$) and the psychological health ($p=0.000$) domains of the health-related quality of life of obese respondents in this study compared to the non-obese.

Discussion

The prevalence of overweight among primary care National Health Insurance Scheme enrollees in this study was 25.4% for females and 22.1% for males.

Obesity was present in 56.4% of females compared to 51.5% of male respondents in this study.

These findings are at variance with a WHO report that showed that 29.0% and 45.1% of adult male and female Nigerians were overweight and obese respectively [26]. The observed disparity is likely due to the subjects studied as well as the methods used. Nevertheless, overweight and obesity is a worrisome health issue among primary care NHIS patients in the Niger Delta Region of Nigeria.

Findings from the study showed that there was no statistically significant difference in the prevalence of obesity among the male and female respondents in this study. This finding is different from report of previous studies which showed the prevalence of obesity to be higher among female subjects [1,27,28].

This is particularly worrisome since obesity in women is thought to reflect affluence on the part of the husband of the obese woman [29]. The presence of obesity also among male respondents in this study cannot continue to justify this argument [2]. Respondents who consumed alcohol were more obese in this study. This finding must be interpreted with caution as there is a need to quantify how much alcohol and what duration of consumption of alcohol would give rise to weight gain. Other factors such as genetics and environment need also be taken into consideration. Obesity was associated with the presence of hypertension, diabetes mellitus and osteoarthritis among respondents in this study. This is consistent with reports from previous studies [6,7,27,30,31]. Obesity is a recognized risk factor for chronic medical problems as observed among respondents in this study.

Respondents in this study reported significant impairment in various domains of their health-related quality of life (HRQOL). This is consistent with report from other studies [4,5].

Quality of life (QOL) was reported to be negatively affected by overweight and obesity among young adult Nigerians in a study among students in a tertiary institution in Umudike, South-East Nigeria [5].

The negative effect of obesity on quality of life (QOL) might be due to the presence of concurrent disease conditions such as hypertension, diabetes mellitus and osteoarthritis as was the case among respondents in this study.

Conclusion

The increasing prevalence of obesity together with the likely increase in the prevalence of comorbidities will put an enormous strain on managed care in future.

The negative effects of obesity on health-related quality of life of the affected will task the skills of primary care physicians in the management of obesity and associated sequelae.

In view of the above, it is therefore essential that primary care health professionals seek training in obesity care to be able to provide an informed and effective obesity treatment plan for their patients.

References

1. Puepet FH, Zoakah AL, Chuwak EK. Prevalence of overweight and obesity among urban Nigerian adults in Jos. *Highland Medical Research Journal*. 2002;1(1): 13-16.
2. Biritwum RB, Gyapong J, Mensah G. The epidemiology of obesity in Ghana. *Ghana Med J*. 2005;39(3):82-85.
3. Obesity: Preventing and managing the global epidemic. Report of a WHO Consultation (WHO Technical Report Series 894). 2000. Geneva, Switzerland.
4. Jia H, Lubetking EI. The impact of obesity on health-related quality of life in the general adult US population. *J Public Health*. 2005;27(2):156-164.
5. Ejike CECC, Ikwegu CE, Abalogu RC. Obesity determined by different measures and its impact on the health-related quality of life of Young-Adult Nigerians. *Asian J Clinical Nutrition*. 2015;7(3):64 -75.
6. Peters A, Bonneux L, Nusselder WJ. Adult obesity and the burden of disability throughout life. *Obes Res*. 2004;12(7):1145-1151.
7. Himes CL. Obesity disease and functional limitation in late life. *Demography*. 2000;37(1):73-82.
8. Mather AA, Cox BJ, Enns MW, Saren J. Association of obesity with psychiatric disorders and suicidal behaviours in a nationally representative sample. *J Psychosom Res*. 2009;66(4):277-285.
9. Brewis AA. Stigma and the perpetuation of obesity. *Soc Sci Med*. 2014;118:152-158.
10. Ogunlana MO, Adedokun B, Dairo MD, Odunaiya NA. A profile and predictors of health-related quality of life among hypertensive patients in South-western Nigeria. *BMC Cardiovascu Disord*. 2009;9:25.
11. Abasiubong F, Ekott JU, Bassey EA, Etukumana EA, Edyang-Ekpa M. Quality of life in people with HIV/AIDS in Niger Delta Region, Nigeria. *J Ment Health*. 2010;19(2):211-218.
12. Obalum DC, Fiberesima F. Nigerian National Health Insurance Scheme (NHIS): an Overview. *Niger Postgrad Med J*. 2012;19(3):167-174.
13. World Health Organization (WHO) newsletter. Quarterly Bulletin of the World health Organization, Abuja, Nigeria. 2007;18(1):7.
14. National Minimum Wage Act Cap No. 61 Laws of the Federation of Nigeria 2004 as amended by Act 2011.
15. Garrew JS, Webster J. Quetelet's Index (wt/ht²) as a measure of fatness. *Int J Obes*. 1985;9(2):147-153.
16. World Health Organization. Preventing chronic diseases: A vital investment. Geneva: World Health Organization; 2005.
17. Njoku CH. Obesity measurement and management: a review. *Nigerian Medical Practitioner*. 2006;49(6):144-147.
18. World Health Organization Quality of life (WHOQOL) group. The WHO quality of life assessment (WHOQOL): Development and general psychometric properties. *Soc Sci Med*. 1998;41(10):1569-1583.
19. World Health Organization programme on mental health. WHOQOL-BREF. Introduction, administration, scoring and generic version of assessment. World Health Organization, Geneva, Switzerland. 1996.

20. Issa BA, Baiyewu O. Quality of life of patients with Diabetes mellitus in a Nigerian Teaching Hospital. *Hong Kong J Psychiatry*. 2006;16:27-33.
21. Fatoye FO, Komolafe MA, Adewuya AO, Fatoye GK. Emotional distress and self-reported quality of life among primary care givers of stroke survivors in Nigeria. *East African Medical Journal*. 2006;83(5):271-279.
22. Makanjuola AB, Adeponle AB, Obembe AO. Quality of life in patients with schizophrenia in Nigeria. *Nigerian Medical Practitioner*. 2005;48(2):36-42.
23. Chobanian AV, Bakris GL, Black HR, et al. The Seventh report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure: the JNC 7 report. *JAMA*. 2003;289(19):2560-2572.
24. International diabetes federation (IDF) 6th Edition of the diabetes atlas, 2011.
25. Manek NJ, Lane NE. Osteoarthritis: Current concepts in diagnosis and management. *Am Fam Physician*. 2000;61(6):1795-1804.
26. Ono T, Guthold R, Strong K. WHO global comparable estimates: Global infobase data for saving lives. 2005.
27. Amodu PH, Mbah IO, Lawson L. Prevalence of obesity and dyslipidaemias in hypertensives in Abuja, Nigeria. *Scand J Clin Lab Invest Suppl*. 2005;240:14-17.
28. Etukumana EA, Puepet FH, Obadofin M. Prevalence of overweight and obesity among rural adults in North-central Nigeria. *Nigerian Journal of Family Practice*. 2013;3(2):41-46.
29. MVO Z, Dick J, Steyn K. Perceptions of overweight African Women About acceptable body size of women and children. *Curationis*. 1999;22(2):27-31.
30. Pi-sunyer FX. Comorbidities of overweight and obesity: Current evidence and research issues. *Med Sci Sports Exerc*. 1999;31(11 Suppl):S602-608.
31. Mannucci E, Petroni ML, Villanova N, et al. Clinical and psychological correlates of health-related quality of life in obese patients. *Health Qual Life Outcomes*. 2010;8:90.