

Prevalence of Obesity and Associated Risk Factors amongst Teaching Staff of Juba University, South Sudan

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Abstract

Obesity is a significant contributing factor in the development of various chronic diseases such as cardiovascular disease, hypertension, type 2 diabetes mellitus, stroke, osteoarthritis and certain cancer accounting for 2.8 million worldwide deaths annually. Recent global figures indicate that the prevalence of obesity is not just a problem of the developed countries but is also on the increase in the developing world, with over 115 million people suffering from obesity-related problems (WHO). In Africa, 8% of adults above 20 years are obese and 27% overweight (Steyn & Mchiza, 2014). Lack of empirical data remains an obstacle in monitoring the magnitude of current and future trends of overweight and obesity in sub Saharan Africa including South Sudan. This study investigated the prevalence of obesity and associated risk factors among teaching staff; a case at University of Juba in South Sudan (Rep). A cross-sectional study design was used. A total of 196 study participants drawn from various Colleges and faculties of Juba University using multi-stage systematic random sampling of 1st selecting the College, department and 2nd stage was the selection of participants using the exiting staff list obtained from the University administration. Key variables collected includes weight/kg, height, age, sex, physical activities, feeding habits and income of the study participants, which was used to determine the prevalence of obesity and associated risk factors. STATA version 12 was used to data analyze. Chi-square statistics were used to compare equality of distribution of obesity. Out of the 196 participants, 18.4% were males (160/196) and 81.6% were females (36/196). The mean age of the participant was estimated at 37 ± 8.5 years. Prevalence of Obesity ($BMI > 30$) and Overweight ($BMI > 25$ to ≤ 30) among teaching staff was 4.1% and 10.2%, respectively. Of those found overweight/or obese, 20% were females (4/20) and 80% were males (16/20). While the age specific prevalence indicates obesity is highest among 35-44yrs (50%), followed by 45-55 yrs+ (37.5%) and 12.5% among 25-34yrs age groups. Age was found to be associated with obesity ($P\text{-value}=0.0337$, $p<0.05$). Meal frequency was noted to be twice a day. Walking is the main physical activities for both males and females (97.5%) and nearly half of the participants (44.9%) had incomes 7500 South Sudan Pounds (SSP) an equivalent of \$1000. Income levels was associated with BMI levels ($P\text{-value}=0.0222$; $p<0.05$). However, low prevalence of obesity among teaching staff at the University of Juba is not yet of an immediate public health concern, however, earlier preventive and control measures is required as most of the staff leads sedentary lifestyle. This study recommends public awareness intervention on dietary intake and physical exercises among others in schools and institutions at all levels to curtail an otherwise gradual rise in obesity and overweight in the near future.

Keywords: overweight, obesity, Risk factors, teaching staff, Juba University, South Sudan

1. Introduction

Obesity is a significant contributing factor in the development of various chronic diseases such as cardiovascular disease, hypertension, type 2 diabetes mellitus, stroke, osteoarthritis and certain cancer accounting for 2.8 million worldwide death annually and estimated 35.8 million (2.3%) of global Disability Adjusted Life Years (DALYs). Obesity and overweight contribute a large proportion of non-communicable diseases (NCDs) and are a major risk factor of other diet related NCDs. (Eliassen A, Colditz G, & Rosner B, 2006). Death rates due to NCDs are closely related to country income with low and middle income facing 29 million deaths annually (Alwan A, Armstrong T, Cowan M, 2011). Recent global figures indicate that the prevalence of obesity is not just a problem of the developed countries but is also on the increase in the developing world, with over 115 million people suffering from obesity-related problems (WHO). In Africa, 8% of adults above 20 years are obese

and 27% overweight (Steyn & Mchiza, 2014). Lack of empirical data remains an obstacle in monitoring the magnitude of current and future trends of overweight and obesity in sub Saharan Africa including South Sudan.

Obesity not only affects the quality of life but also reduces life expectancy. Previously, this was a problem of high - income countries but is now dramatically on the rise in low and middle income countries, especially in urban settings (Scott, Ejikeme, Clottey, & Thomas, 2012). In Sub-Saharan Africa, prevalence of obesity has been found in the ranges of 21.9% to 43.4% (Ettarh R, Van de Vijver S, Oti S, 2013; Mucklesfield LK, Lambert EV, Hume DJ, Chantler S & K., 2013; Msyamboza KP, Kathyola D, Dzowela T., 2013) and highest among women than men. Despite the high prevalence of under nutrition (caloric inadequacy) in Africa, diet related chronic diseases co-exist leading to a double burden of malnutrition (Schmidhuber J & Shetty P, 2005).

Health indicators in South Sudan are some of the worst globally (World Health Organization (WHO), 2014). The development of the health sector has been setback by series of wars (Mayardit, Machar, & Mabior, 2014). In addition, development of infrastructure whose impact is mediated by other psychological and social factors is disrupted. Lack of empirical data remains an obstacle in monitoring the magnitude of current and future trends of overweight and obesity prevalence in South Sudan and Africa as a whole. This study investigated the prevalence of overweight and obesity in Juba University in South Sudan and their associated risk factors. This will provide information for health promotion and development of strategic policies to combat this growing epidemic of public health significance in the near future.

1.1 Objective

To determine the prevalence of obesity and associated risk factors among teaching staff at University of Juba in South Sudan (Rep).

2. Methods

2.1 Study Design

The study used a cross-sectional population study design and a multi-stage sampling technique was used to select the participants.

2.2 Study Site and Population

The study was conducted in 15 functional colleges/schools of the university of Juba in South Sudan (Rep). The participants were both male and female lecturers/instructors/teaching assistants present at the time of the study, who were randomly selected using the staff list obtained from the university administration. All teaching staff adults aged 25 years and above were eligible. Non-consenting and individuals who were sick or bedridden by the time of data collection were excluded.

2.3 Sample Size and Sampling Procedure

The sample size was obtained using the standard formula for cross-sectional epidemiological studies $n = [Z^2 * p * (1 - p)]/d^2$; where n is the number of the sample, d is margin of error at 0.05, and p is the planned proportion estimate population (Kasulevičius V, Šapoka V, & Filipavičiūtė R, 2006). The level of confidence used was 95%. Systematic random sampling technique based on the staffing list obtained of each college from the University Administration was used to obtain participants. Selection was based on the sampling frame (Table 1) generated from the available staff list.

Table 1. Sampling frame for the Obesity study at Juba University

Name of college	Total Staff	Number of Staff Selected for Study	Cum. Sample
Applied & Industrial Sciences	27	9	9
Natural Resources	82	30	39
Medicine	61	21	60
Engineering	38	13	73
Education	73	26	99
Rural Development	35	12	111
Management Sciences	35	12	123
Law	23	8	131
Economics	41	14	145
Arts & Humanities	60	21	166
Arts, Music & Drama	25	8	174
Computer & information Technology	35	12	186
Center for Peace & Development Studies	14	5	191
School of Public Service	7	4	196
Center for Distance Education	15	6	202
Total Staff (N)	554		
Total Sample Size (n)		202	N= 202

Sampling interval (S.I =3)

2.4 Key Indicators of the Study

Overweight was defined as having a body mass index (BMI) $\geq 25.0 \text{ kg/m}^2$, and obesity as BMI of $\geq 30.0 \text{ kg/m}^2$ and pre-obesity as having a BMI of 25.0-29.9 kg/m^2 in adults.(WHO & FAO Expert Consultation, 2003).

2.4.1 Key Variables of the Study

Key variables collected includes weight/kg, height, age, sex, physical activities, feeding habits and income of the study participants, which was used to determine the prevalence of obesity and associated risk factors

2.5 Data Collection

2.5.1 Qualitative Data

Face to face interviews were carried out using a standardized questionnaire. The enumerators were trained prior to the interviewee. Demographic data and information on physical activity, diet frequency and earning/income were obtained. The instrument was pre-tested and revised prior to commencement of the study.

2.5.2 Quantitative Data

Body weight was measured using validated digital scales to the nearest 0.1 kg precision. Participants wore light clothing and removed any footwear. Height was measured using a portable stadiometer to the nearest 0.1 cm precision. Body mass index was calculated as weight (in kilograms) divided by squared height (in meters). The BMI categories of World Health Organization (WHO) (De Onis M, & Habicht J, 1996) were used with normal; less than 25.0 kg/m^2 , overweight; 25.0 to 29.9 kg/m^2 and obese above 30 kg/m^2 .

2.6 Data Entry and Analysis

Data collected entered into an excel worksheet before being exported to STATA version 12 for analysis. The data was analyzed at both univariate and bivariate levels. At the univariate levels, frequencies and percentages were used to summarize the distribution of categorical variables. At the bivariate level, chi-square statistics were used to compare equality of distribution of obesity by selected groupings. Statistical significance was defined as a P-value of less than or equal to 0.05.

2.7 Ethical Considerations

All participants were assured that their anonymity would always be preserved. No association was made between participants' real names and the corresponding codes. All information was kept confidential. All participants were given feedback and advised accordingly on the measurement taken and their BMI.

3. Results

3.1 Characteristics of the Study Participants

Table 2. Socio demographic characteristics of the study participants

Socio demographic characteristics	Total		Male		Female	
	N	%	n	%	n	%
Gender						
Women	36	18.4	-	-	-	-
Men	160	81.6	-	-	-	-
Age (years)						
25-34	97	49.5	70	43.8	27	75
35-44	68	34.7	61	38.1	7	19.4
45-54	19	9.7	17	10.6	2	5.6
>55	12	6.1	12	7.5	0	0
Income Status (SSP)						
500-2500	25	12.8	14	8.8	11	30.6
2501-5000	74	37.8	66	41.2	8	22.2
5001-7500	9	4.6	6	3.8	3	8.3
7501+	88	44.9	74	46.3	14	38.9
Meal frequency per day						
Twice	196	100	160	100	36	100
Physical Activity						
Walking	191	97.4	156	97.5	35	97.2
Running	3	1.5	2	1.3	1	2.8
Jogging	1	0.5	1	0.6	0	0
Others	1	0.5	1	0.6	0	0

Total participants were 196 and composed of 81.6% male (160/196) and 18.4% females (36/196) and this shows majority of the teaching staff at Juba University are males. About 50% of the study participants were in the age bracket of 25-34yrs, followed by those in 35-44yrs contributing 34.7% and the remaining 15.8% were in the age brackets of 45-54yrs and 55yr+. The mean age of the participants was 37 ± 8.5 . Nearly half of the participants (44.9%) earn above 7500 South Sudan Pounds (SSP) per month followed by those earning > 2500 to 5000 SSP income category (37.8%) and then those earning less than 2500 SSP (12.8%). Men had an average income of 8798 ± 7920 and women 5918 ± 3262 and the meal frequency is twice per day for all study participants. While the main physical exercise was walking (97.4%) as shown in Table 2.

3.2 Prevalence of Obesity and Overweight

Figure 1 shows that prevalence of obesity was 4.1%; amongst all the males (8/8) while none of the female had BMI>30. Overweight was found at 10.2% (20/196), with 11.1% being among the females and 10.0% in males studied. Only 2% of the participants were underweight and 83.7% of the participants had normal. The results showed no significant gender influence on the BMI ($p>0.05$, $P\text{-value}=0.567$).

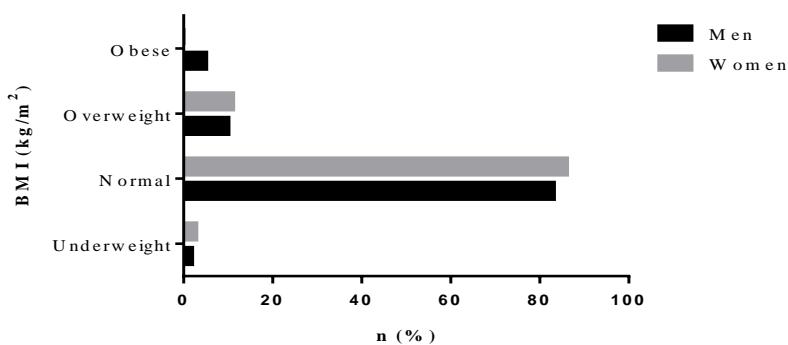


Figure 1. Prevalence of Obesity and Overweight among teaching faculty of Juba University

3.3 Factors Associated With Obesity and Overweight

There was no significant ($P=0.576$) differences in BMI of men and women as shown in Table 3. However, BMI significantly vary by age ($P=0.0337$) and by income levels ($P=0.0222$). Distribution of obesity and overweight was more in the 35-45 age group followed by those above 55 year olds. Obesity also was observed more among those in a higher income group (>7501 SSP) compared to those in a lower income group (500-2500 SSP)

Table 3. Risk factors associated with obesity

Factor	Underweight		Normal weight		Overweight		Obese		P value
	n	%	n	%	n	%	n	%	
Gender									
Female	1	25	31	18.9	4	20	0	0	
Male	3	75	133	81.1	16	80	8	100	0.567
Age (years)									
25-34	4	100	84	51.2	8	40	1	12.5	
35-44	0	0	16	9.8	6	30	4	50	
45-54	0	0	58	35.4	2	10	1	12.5	
>55	0	0	6	3.7	4	20	2	25	0.0337
Income (SSP)									
500-2500	2	50	17	10.4	5	25	1	12.5	
2501-5000	2	50	62	37.8	9	45	1	12.5	
5001-7500	0	0	7	4.3	0	0.0	2	23	
>7501	0	0	78	47.6	6	30	4	50	0.0222

4. Discussions

Prevalence of obesity was found to be 4.1% and overweight 10.2% and this when compared to prevalence of

obesity in other Sub-Saharan African countries was much lower in range of 3.5% in Eritrea to 64% in Seychelles (Agyemang et al., 2016). Of those found overweight/or obese, 20% were females (4/20) and 80% were males (16/20). However, there was no significance gender influence on the BMI levels (P-value= 0.567; p>0.05). This was different from previous studies that reported higher obesity rates among women than men in Ghana 8 times higher (Pereko KK, Setorglo J, Owusu WB, 2013), Tanzania 4.5 times (Njelekela M, Mpembeni R, Muhihi A, Mligiliche NL, Spiegelman D, Hertzmark E, Mtabaji J, 2009) and South Africa (Malhotra R, Hoyo C, Østbye T, 2008). Gender disparities in overweight and obesity amongst teaching staff vary within and across countries (Kanter & Caballero, 2012).

While the age specific prevalence indicates obesity is highest among 35-44yrs (50%), followed by 45-55 yrs+ (37.5%) and 12.5% among 25-34yrs age group. Age was found to be associated with obesity (P-value=0.0337, p<0.05) and the meal frequency was found to be twice per day. Walking is the main physical activities for both males and females (97.5%) and nearly half of the participants (44.9%) had incomes 7500 South Sudan Pounds (SSP), which is equivalent of \$1000 at the ex.rate of (1\$=750SSP) at the time of this study. Income levels was associated with BMI levels (P-value=0.0222; p<0.05).

The findings on income of this study was different from that of previous studies that showed lower income being associated with obesity in developed countries (Conklin et al., 2013; Siahpush, M., Huang,, T. T. K., Sikora, A., Tibbits, M., Shaikh, R. A., & Singh, 2014). However, it is consistent with other studies carried out in sub-Saharan Africa that showed participants of higher household wealth being more likely to be overweight or obese than their poorer counter- parts (Ziraba, Fotsu, & Ochako, 2009). A higher income could be associated to an increased sedentary lifestyle such as low physical activity characterized by less energy spent in movement and change of eating habits to refined and energy-dense foods.

5. Conclusion

The low prevalence of obesity (4.0%) among teaching staff at the University of University does not pose immediate public health risk to the adult population, however, earlier preventive and control measures remain necessary. This study recommends action on public awareness intervention on dietary intake and physical exercises among others in schools and institutions at all levels to curtail an otherwise gradual rise in obesity and overweight in the third world countries of Sub-Saharan African

Conflit of Interest

The authors declare no conflict of interest.

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