Emergence of Overweight and Obesity related Non communicable Diseases in South Africa

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INTRODUCTION: Overweight and obesity are identified as global public health problems because they are associated with increased risk of many diseases including hypertension, diabetes, cardiovascular diseases, stroke, osteoarthritis, and cancers [1,2]. continuing economic growth over the last two decades, many low to- middle income countries are facing increasing prevalence of overweight/obesity [3], and has received considerable attention in developing world where rapid economic growth and development, urbanization, and associated change in dietary and lifestyle patterns are fuelling the rapid rise of overweight/obesity and related diseases.

Obesity is known to affect the overall health of a population. According to the World Health Organization (WHO), overweight and obesity are the fifth leading risk for global deaths. Statistics indicate that 44% of the diabetes burden, 23% of the heart disease burden and between 7% and 41% of certain cancer burdens can be attributed to overweight and obesity [4]. Several environmental, as well as socio-economic and demographic factors are associated with increased risk of overweight and obesity. Age, gender, socio-economic condition, and urban rural residence are associated with overweight and obesity [5-7]. The other factors that are associated with obesity are urbanization, changing lifestyles, low physical activity, and high calorie intake [8-11].

The aim of our study is to examine the extent of overweight and obesity in South Africa. Another aim of the study is to identify the most important factors associated with the increased risk of overweight and obesity in South Africa. In addition, we examine the association between obesity and selected morbidities – hypertension, diabetes, angina, stroke, arthritis, and depression. Our study is likely to provide more robust and comparable evidence on the association between obesity and selected morbidities in South Africa [4]. Understanding the determinants of obesity and its association with non communicable disease is crucial for plan future prevention and programmes. This information is particularly important for developing country like South Africa where rehabilitation services are limited and where obesity and non communicable disease is increasing in parallel with the rapid demographic changes.

DATA SOURCE

We used cross-sectional data from the WHO Study on Global Ageing and Adult Health (SAGE) survey. SAGE covered six countries China, India, Ghana, Mexico, Russia and South Africa – during 2007–2010. A multistage stratified clustered sample design was used in the SAGE. The SAGE- South Africa collected information from 4225 adult respondent's aged 18 years and above. The survey covered domains like health and its determinants, disability, well-being and health care utilization, and health systems responsiveness, sage collected information regarding self–reported morbidities and health conditions based on interview and health measurement, anthropometric measurements and blood tests. Final sample for analysis is 3994 due to excluded missing cases form the analysis.

Variables: in this study body mass index (BMI) is calculated and taken as an indicator of obesity. BMI calculated using weight in kilograms divided by the square of height in meters.BMI was categorised according to WHO standard as Underweight (BMI < 18.5), Normal (18.5≤ BMI <25), Overweight (25≤ BMI <30), and Obese (BMI ≥ 30). [12] Morbidities included in this analysis are based on two criteria first, morbidities influenced by obesity and second, morbidities information was collected by the SAGE survey. In this study, we included hypertension, diabetes, angina, stoke, depression, and arthritis for the analysis.

STATISTICAL ANALYSES

Bivariate and multivariate analysis was used to fulfil the objectives. BMI was categorised into four categories (normal, underweight, overweight, and obese), and multinomial logistic regression was used to estimate and assess the adjusted association with overweight and obesity. Logistic regression was used to estimate and assess the adjusted association of obesity with selected morbidities. Sampling weights are given in the SAGE dataset were used for all the analysis. Analyses were performed using SPSS 20.

RESULTS

Demographic characteristics of the study population are summarised in Table 1. Around two-third of the sample belonged to less than 50 years of age. Majority of respondents were females (53%) and resided in urban areas (69.4%). Majority of people completed primary schooling (51%), followed by higher secondary and above (28%) and secondary schooling (21%). According to wealth status, majority of respondents were richest (28%), poorest (21%), middle (19%), poor (18%) and rich (14%). Only one-fourth of respondents were

current smokers and only 15% were current alcohol users. Slightly more than half of the sample population was engaged in some physical activities.

Table 1. Percentage distribution of sample by selected characteristics in south afric,2007-2010		
Characteristics	**Percentage**	**Number** (3994)
Age group		
<50 years	75.7	385
50+	24.3	3836
Gender		
Male	46.9	1704
Female	53.1	2290
Residence		
Rural	30.6	1335
Urban	69.4	2659
Education level		
Up to primary	51.0	1606
Secondary	21.0	507
Higher secondary and above	28.0	458
Wealth status		
Poorest	20.7	688
Poor	17.7	810
Middle	19.4	797
Rich	14.5	827
Richest	27.7	872
Currently smoking		
No	75.1	2946
Yes	24.9	1048
Currently using alcohol		
No	84.7	3461
Yes	15.3	533
Physical activity		
No	48.2	2209
Yes	51.8	1692

Figure 1. Percentage of population by BMI categories in South Africa

- Normal 35.0
- Underwieght 3.0
- Overweight 27.0
- Obese 35.0
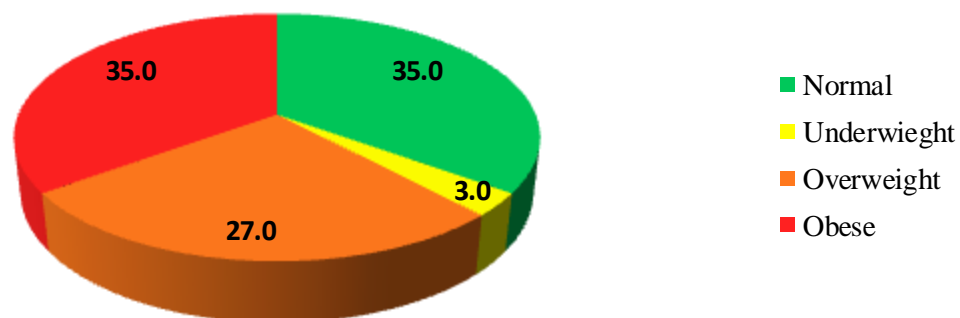
More than one-third of the respondents were obese (35%) in South Africa, which equated the levels of population with normal BMI (35%) as shown in Figure 1. Also the more than one-fourth of the respondents were overweight (27%). The prevalence of underweight was 3.0%.

Table 2. Odds ratios from logistic regression assessing the association between BMI and selected non-communicable diseases in South Africa, 2007-2010.						
BMI Normal[®]	Arthritis	Hypertension	Diabetes	Angina	Stroke	Depression
Underweight	1.68*	0.8*	0.5	0.45	1.48	0.76
Overweight	1.47*	1.53*	1.81*	1.09*	0.97	0.93
Obese	2.47*	1.89*	2.12*	1.67*	1.20*	1.14
*p<0.05. [®] indicates reference category.						

Results from logistic regression suggested that BMI was associated with non-communicable diseases like arthritis, hypertension, diabetes and angina in South Africa (Table 2). Obese respondents were 1.2– 2.5 times more likely to report the NCDs. Overweight respondents were 1.5 times more likely to report arthritis and hypertension than respondents with normal BMI. Similarly, overweight were also 1.8 times more likely to report diabetes and 1 time more likely to report angina than normal ones. Obese were significantly 2.0 times and 2.5 times more likely to report hypertension and arthritis respectively than normal ones. As compared to respondents with normal BMI obese respondents were 1.7 times and 2.0 times more likely to report angina and diabetes. Likewise, obese were 1.2 time more likely to report stroke as compared to respondents with normal BMI.

As compared to people aged less than 50 years, those above 50 years of age were at higher risk of being obese (p< 0.05, Table 3). Females were more likely to be overweight and obese than that of the males (p<0.05). People with secondary education were at more risk of being underweight than those with primary education (p< 0.05). In terms of wealth status, rich and richest were at higher risk of being overweight and obese than the poorest ones (p< 0.05). Current smokers and current alcohol users were at highest risk of being underweight as compared to current non-smokers and current non-alcohol users (p<0.05). Those physically active were at lower risk of being underweight, overweight and obese as compared to physically non-active persons (p<0.05).

Table 3. Relative risk from multinomial logistic regression assessing association between categories of BMI and selected characteristics, South Africa			
Characteristics	Underweight	Overweight	Obese
Age group			
<50 years®			
50+	1.15	1.30	1.48*
	(0.79-1.13)	(0.95-1.76)	(1.11-1.98)
Gender			
Male®			
Female	0.87	1.36*	1.90*
	(0.59-1.27)	(1.12-1.65)	(1.58-2.28)
Residence			
Rural®			
Urban	1.19	0.97	1.17
	(0.79-1.79)	(0.79-1.21)	(0.96-1.43)
Education level			
Up to primary®			
Secondary	0.37*	1.17	1.14
	(0.16-0.86)	(0.88-1.55)	(0.88-1.49)
Higher secondary and above	0.71	1.26	0.98
	(0.33-1.50)	(0.93-1.72)	(0.73-1.31)
Wealth status			
Poorest®			
Poor	1.07	0.88	1.03
	(0.67-1.72)	(0.67-1.17)	(0.79-1.36)
Middle	0.91	1.24	1.29
	(0.52-1.57)	(0.92-1.66)	(0.98-1.71)
Rich	0.70	1.56*	1.90*
	(0.37-1.33)	(1.13-2.14)	(1.41-2.56)
Richest	0.64	1.86*	2.41*
	(0.30-1.35)	(1.32-2.62)	(1.74-3.31)
Currently smoking			
No®			
Yes	1.50*	0.66*	0.40*
	(1.03-2.18)	(0.56-0.81)	(0.32-0.49)
Currently using alcohol			
No®			
Yes	1.60*	0.65*	0.56*
	(1.06-2.42)	(0.52-0.85)	(0.44-0.71)
Physical activity			
No®			
Yes	0.50*	0.98*	0.74*
	(0.34-0.73)	(0.82-1.16)	(0.62-0.88)

*p<0.05 ®:reference category

Discussion

South Africa had highly distorted levels of BMI and the prevalence of obesity and overweight were at alarming levels. More than 60% of the respondents had BMI above the normal range with more than one-third of the respondents being obese and another one-fourth being overweight. Overweight and obesity were found to be significantly associated with arthritis, diabetes and hypertension. These findings are in line with the similar studies done in US, China and Russia [13-15]. Obesity and overweight were also found to be associated with angina but no significant association was found with stroke. It was seen that higher risk of obesity was related to fifty plus age. Also females were at higher risk of overweight and obesity.

Many studies [16-17] have identified urbanisation as the most important factor in determining the risk of obesity but unlike them we did not identify place of residence as a significant risk factor for distorted BMIs. However, on contrary to other studies [16,18] our results show that secondary schooling was related to lower risk of being underweight but no association was found with overweight, obesity and schooling. Our study also confirms the findings from other studies that increased socio economic status led to the greater risk of overweight and obesity in South Africa [19-20]. Increased wealth has led to dietary shift towards junk food [21]. Like other studies [16,22] our study also found that physical activity was associated with lower levels of risk for distorted BMIs – underweight, overweight and obesity.

To conclude, overweight/obesity was found to be an important risk factor for selected NCDs in South Africa. Since obesity it preventable, therefore, it is mandatory to adopt public health programs that accentuate and promote the lifestyle management among the people. As change in lifestyle and regular physical activities are found to be the key to prevent the obesity and NCDs [13, 23-24].

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