



The prevalence of adult obesity in Africa: A meta-analysis[☆]

Orien L. Tulp^a, Olayide F. Obidi^{b,*}, Temitope C. Oyesile^a, George P. Einstein^{a,c}

^a College of Medicine, USAT Montserrat, USA

^b Department of Microbiology, University of Lagos, Nigeria

^c Einstein Medical Institute, USA

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ABSTRACT

Adult obesity, a major risk factor for premature mortality from cardiovascular diseases and diabetes is on the rise in many African countries. This study sets out to investigate the incidence of adult obesity and its associated risk factors in Africa over a twenty-year period. (1992–2012). A literature search was performed using Pubmedcentral, google scholar and other sources. The quality of studies was assessed with the use of meta-analysis. For each study, a Mantel–Haenszel, adjusted relative risks with 95% confidence intervals (CI) were performed for possible confounding factors. Subsequently, a multivariate logistic regression analysis of the adjusted odds ratio was performed to identify the risk factors on the incidence and prevalence of obesity. Separate meta-analyses were performed on results from studies grouped with similar characteristics. Five research studies were selected and utilized for the meta-analysis. Quality of individual studies ranged from 0.51–0.78 (median, 0.62). Meta-analysis based on the prevalence of obesity gave pooled odds ratios 2.97 (95% CI; 2.35–3.68). In the multivariate logistic regression, gender, educational attainment and socio-economic status were found to be independent predictors for obesity. The findings suggests an apparently high obesity in African adults which requires urgent attention.

1. Introduction

Continuous increase in adult obesity as a result of over nutrition is a common trend especially in women from developing countries (Puoane et al., 2002). The trend of obesity has reached particularly alarming levels in the Middle East and North Africa (MENA) region (Musaiger, 2011), especially in Egypt – one of the most populous countries in the world (World Bank data bank, 2012). Over the years, the prevalence of obesity has been observed in more urbanized settings in Africa (Kamadjeu et al., 2006). Sodjinou et al. (2008) also reported that as much as 20–50% of urban populations in Africa are grouped as either overweight or obese. Previous research has reported that in both African and white population, there is a direct link of obesity to increasing risk of diabetes (Asfaw, 2006), hypertension (Steyn et al., 1990; Lackland et al., 1992), coronary heart diseases (Feinleib, 1985; Jooste et al., 1988; Cappuccio et al., 2008) and pre-mature death (Haslam and James, 2005). A relationship between obesity, age group and gender was observed in studies carried out in Gambia. Women who are above 35 years were found to be more obese compared with men in the same age group (Prentice, 2006). Similar results were obtained in

Ghana, South Africa and Morocco. This trend may be attributed to increased urbanization which has contributed to improvement in people's life style and standard of living (Schmidhuber and Shetty, 2005). Unfortunately, most Africans have the traditional and cultural perceptions that obesity is an indication of healthy, comfortable and affluent life-style. Thus, people with low body mass index are perceived as poor, ugly and down trodden. The association of large body size with power, beauty, and affluence (Puoane et al., 2002) has therefore, further contributed to the growing trend. This perception will encourage obesity and influence both young and old. Children obesity has been reported to eventually translate into adulthood especially when such children are from obese parents (Guo et al., 2000).

2. Materials and methods

2.1. Study population

We analyzed data from population-based cross-sectional studies in different regions to estimate the overall prevalence and absolute burden of overweight and obesity in Africa. The study involved a record-review

Abbreviations: CI, confidence interval; SPSS, Statistical Packages for Social Sciences; BMI, body mass index; MENA, Middle East and North Africa

[☆] Address where work was done: Department of Microbiology, University of Lagos, Nigeria.

* Corresponding author.

E-mail addresses: laidob@yahoo.com, oobidi@unilag.edu.ng (O.F. Obidi).

Table 1

Socio-demographic characteristics of the respondents of five peer-reviewed research materials.

Variable	Frequency	Percentage
Population group		
African	37,398	76.6
Coloured	7519	15.4
Asian/Indian	830	1.7
White	3076	6.3
Total	48,823	100.0
Age of respondents (years)		
15–24	14,953	30.6
25–34	9634	19.7
35–44	8121	16.6
45–54	6756	13.8
55–64	5657	11.6
≥ 65	3702	7.6
Total	48,823	100.0
Gender of respondents		
Male	21,189	43.4
Female	27,634	56.6
Total	48,823	100.0
Marital status		
Married	13,866	28.4
Living with partner	4150	8.5
Widow/Widower	4248	8.7
Divorced or separated	1221	2.5
Never married	25,338	51.9
Total	48,823	100.0
Level of education		
No education	6542	13.4
Primary	11,669	23.9
Secondary	29,587	60.6
Tertiary	1025	2.1
Total	48,823	100.0
Area of residence		
Urban	23,435	47.9
Rural	25,388	52.1
Total	48,823	100.0
Employment status		
Employed	6689	13.7
Unemployed	42,134	86.3
Total	48,823	100.0
Annual income		
≤ ₦100,000	19,383	39.7
> ₦100,000	29,440	60.3
Total	48,823	100.0
Body Mass Index (kg/m ²)		
Underweight	1451	3.0
Normal	30,086	61.6
Overweight	6643	13.6
Obese	10,643	21.8
Total	48,823	100.0
BMI (Obesity) Classification		
< 30 kg/m ²	38,180	78.2
≥ 30 kg/m ²	10,643	21.8
Total	48,823	100.0

of five peer-reviewed researches of forty-eight thousand eight hundred and twenty three (48,823) subjects for a period of twenty one years between 1992 and 2013 in Department of Microbiology, University of Lagos, Nigeria in March 2016. The demographics of the subjects included population groups, age group, gender, marital status, level of education, area of residence, employment status, annual income, body mass index and obesity status. The subjects from this study originated from various social and ethnic groups as well as geographically distinct areas from the territory of sub-Saharan African.

Table 2

Lifestyle and behavioural characteristics of the patients of five peer-reviewed research materials.

Variable	Frequency	Percentage
Smoking status		
Yes	12,645	25.9
No	36,178	74.1
Total	48,823	100.0
Smoking history		
Never smoke	31,198	63.9
Former smoker	4980	10.2
Current smoker	12,645	25.9
Total	48,823	100.0
Alcohol consumption		
Yes	13,866	28.4
No	34,957	71.6
Total	48,823	100.0
Level of alcohol intake		
None	34,957	71.6
Moderate	7665	15.7
Excessive	6201	12.7
Total	48,823	100.0
Soft drink consumption		
Regular	35,690	73.1
Irregular	13,133	26.9
Total	48,823	100.0

Table 3

Logistic regression analysis of risk factors of Obesity.

Variable	β	SE	Wald	OR(95% CI)	P-value
Age (years)					
15–24	1.719	0.668	8.115	5.6 (1.9–17.6)	0.009**
25–34	1.273	0.442	13.563	3.6 (1.5–9.8)	< 0.001**
35–44	0.613	0.567	2.447	1.8 (0.9–3.7)	0.181
45–54	0.412	0.398	2.119	1.5 (0.8–3.2)	0.247
55–64	0.347	0.583	2.558	1.4 (0.9–3.1)	0.176
≥ 65	*				
Gender					
Female	0.897	0.274	11.870	2.5 (1.6–4.9)	< 0.001**
Male	*				
Level of education					
No education	0.663	0.592	7.553	1.9 (0.7–5.3)	0.174
Primary	1.566	0.339	12.778	4.8 (1.9–6.4)	< 0.001**
Secondary	1.948	0.484	11.452	7.0 (1.7–18.8)	0.013**
Tertiary	*				
Smoking history					
Never smoke	0.465	0.228	7.224	1.59 (0.9–13.3)	0.482
Current smoker	0.922	0.447	11.956	2.5 (1.6–4.7)	< 0.001**
Former smoker	*				
Level of alcohol intake					
None	0.336	0.489	0.018	1.4 (0.8–2.3)	0.858
Moderate	1.959	0.317	7.335	7.1 (1.9–22.4)	0.018**
Excessive	*				
Area of residence					
Rural	0.024	0.326	0.194	1.02 (0.4–1.9)	0.977
Urban	*				
Soft drink consumption					
Regular	0.082	0.366	0.181	1.08 (0.3–1.7)	0.375
Irregular	*				
Constant	–2.274	0.582	16.117		< 0.001**

* Reference category.

** Significant P-value ($P < 0.05$).

2.2. Data management and analysis

Data analyses were carried out EPI-INFO version 3.5.1 and Statistical Packages for Social Sciences (SPSS) version 20.0. Descriptive

statistics such as means, medians, ranges and standard deviations were used to summarize quantitative variables while categorical variables were summarized with proportions and percentages. Bivariate analysis such as Chi-square test was used to investigate the association between obesity status and the selected variables. Multivariate logistic regression was further used to determine the factors that may be significantly associated with obesity status. Model fit was assessed using the Hosmer Lemeshow goodness of fit test. All tests were carried out at 5% level of significance.

3. Results

Table 1 summarized the socio-demographic characteristics of the five peer-reviewed researches. The mean age was 23.6 ± 9.5 years. Majority of the respondents were Africans (76.6%) between 15 and 24 years of age (30.6%). A larger proportion of respondents were female subjects (56.6%) and 43.3% were males. About half of them were never married (51.9%) while 28.4% were legally married. Most of the respondents had secondary education (60.6%) and only a few (2.1%) had tertiary education. A larger percentage (52.1%) of them are rural dwellers and 47.9% lived in urban settings. Majority of them were unemployed (86.3%) while the annual income of most of the respondents are ₦100,000. About one-fifth of them were classified as obese (21.8%). Table 2 shows the distribution of lifestyles and behavioural characteristics of the respondents. The distribution of smoking history are as follows; Never smoke (63.9%), Former smoker (10.2%) and Current smoker (25.9%). For the level of alcohol intake, we categorized: None (71.6%), Moderate (15.7%) and Excessive (12.7%).

About three-quarter of the respondents (73.1%) had regular soft drink consumption. The results of our multivariate logistic regression analysis showed that after adjusting for Age, Gender, Level of education, Smoking history, Level of alcohol intake, Area of residence and Soft drink consumption, the most significant determinants of obesity were Age group 15–35 years, Female gender, Primary or Secondary level of education groups, Current smoker and Moderate alcohol intake (Table 3).

4. Discussion

Our findings which suggests a lower level of obesity in the more educated subjects, the under 15 years age group and non or former smoker were consistent with findings from other studies (Popkin, 2004; Popkin and Gordon-Larsen, 2004; Aitsi-Selmi et al., 2012) who also observed that the largest absolute increase in prevalence over time occurred in those who were less educated, female gender and poorer subjects. Therefore, people who do not have the adequate knowledge or education to adopt healthier lifestyles are more prone to obesity.

5. Conclusion

Urbanization, female gender and low level of education socio-demographic statuses are important contributor to obesity. The study demonstrated that overweight and obesity are major public health problems in Africa. However, this can be curbed drastically by proper education to enlighten subjects.

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