

Correlates and prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone. A secondary data analysis of the demographic health survey of 2019

Pamela Okot Atim

St. Joseph's Hospital

Nelson Onira Alema

Gulu University

Francis Pebalo Pebolo

Gulu University

Christopher Okot

Gulu Regional Referral Hospital

Denis Ochula

Uganda Medical Association (UMA), UMA-Acholi branch

Smart Geoffrey Okot

Dr. Ambrosoli memorial Hospital

Eric Nzirakaindi Ikoona

ICAP at Columbia University

Mame Awa Toure

ICAP at Columbia University

Lucy Namulemo

Foothills Community Based interventions

Kassim Kamara

Directorate of Health Security and emergencies, Ministry of Health and Sanitation

Freddy Wathum Drinkwater Oyat

Uganda Medical Association (UMA), UMA-Acholi branch

Judith Aloyo

Rhites-N

Amon Njenga

ICAP at Columbia University

Ronald Kaluya

Uganda Counseling and support services

John Bosco Matovu

ICAP at Columbia University

Emmanuel Olal

Yotkom Medical Centre

David Lagoro Kitara (✉ klagoro2@gmail.com)

Takemi fellow of Harvard University and Faculty at Gulu University

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Abstract

Background: Overweight and obesity are emerging public health problems globally and are independent risk factors for heart, blood vessels, reproductive health, and metabolic disorders.

This study aimed to determine the correlates and prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone using secondary data analysis of the Demographic Health Survey of 2019.

Methods: This study was based on the 2019 Sierra Leone Demographic Health Survey (SLDHS) that used a two-stage stratified cluster sampling technique. A total of 7514 non-pregnant women of reproductive age (15-49 years) were used in the analysis. Simple descriptive, bivariable, and multivariable regression analyses were conducted with a significant p-value set at <0.05.

Results: The prevalence of overweight and obesity among women of reproductive age in Sierra Leone was 19.7% and 7.4%, respectively. Overweight was more likely among women of 15-19 age group (adjusted Odds Ratios, aOR=1.933,95%CI:1.532-2.348;p<0.001); women from the north (aOR=1.308,95%CI:1.104-1.581;p<0.006); women without formal education (aOR=1.211,95%CI:1.009-1.454;p<0.040); in poorest (aOR=1.501,95%CI:1.231-1.853;p<0.001) and poorer (aOR=1.419,95%CI:1.154-1.745;p=0.001) wealth indices. However, overweight was 39.9% less likely among 30-39-year (aOR=0.601,95%CI:0.507-0.713;p<0.001) and 49% less likely among 40-49-year (aOR=0.510,95%CI:0.415-0.628;p<0.001) age-groups. It was 27.3% less likely among married women (aOR=0.727,95%CI:0.613-0.863;p<0.001), 24.9% less likely in the south (aOR=0.751,95%CI:0.623-0.911;p=0.002), 38.2% and 48.7% less likely in richer (aOR=0.618,95%CI:0.494-0.773;p<0.001) and richest (aOR=0.513,95%CI:0.389-0.677;p<0.001) wealth indices, respectively.

Also, obesity was more likely among women 15-19-year (aOR=2.051,95%CI:1.316-3.198;p=0.002); from the north (aOR=1.426,95%CI:1.038-1.958;p=0.044); in poorest (aOR=2.390,95%CI:1.618-3.532;p<0.001) and poorer (aOR=1.667,95%CI:1.151-2.415;p=0.007) wealth indices. However, it was 68.3% and 79.6% less likely among women 30-39-year (aOR=0.317,95%CI:0.241-0.419;p<0.001) and 40-49-year (aOR=0.204,95%CI:0.149-0.278;p<0.001) age-groups, respectively. It was 36.8% less likely among female-headed households (aOR=0.732,95%CI:0.590-0.909;p=0.005) and 24% less likely among married women (aOR=0.760,95%CI:0.580-0.995;p=0.046); 26.2% less likely in the south (aOR=0.738,95%CI:0.550-0.992;p=0.044); 62.1% and 75.9% less likely in richer (aOR=0.379,95%CI:0.266-0.540;p<0.001) and richest (aOR=0.241,95%CI:0.159-0.367;p<0.001) wealth indices, respectively; and 39.9% less likely among women who listened to radios (aOR=0.601,95%CI:0.507-0.713;p<0.001).

Conclusion: The prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone was higher compared to world data. Younger age groups, northern region, poorest and poorer wealth indices, and women without formal education were more likely to be overweight and obese. However, overweight and obesity were less likely among older age-groups, married, southern region, richer and richest wealth indices, female-headed households, and listening to radios. There is an urgent need for policymakers in Sierra Leone to tackle overweight and obesity among women of reproductive age (15-49 years) if the current trends are to be reversed.

Introduction

Excess body weight is a significant risk factor for mortality and morbidity from cardiovascular diseases, diabetes, cancers, and musculoskeletal disorders.^{1,2} In 2010, it was estimated that overweight and obese caused 3.4 million global annual deaths, 3.9% of life lost, and 3.8% of global disability-adjusted life years (DALYs).^{3,4,5} Overweight and obesity were previously associated only with high-income countries but are now more prevalent in low and middle-income countries, especially in urban communities.^{6,7,8}

Evidence shows that the burden of overweight and obesity is increasing in developing countries, particularly among urban women.^{6,7,8} Likewise, women in developing countries have higher rates of overweight and obesity than men, and this relationship has persisted over time.^{3,9,10,11}

Global data shows that women's overweight doubled from 9% in 1980 to 18% in 2008, while obesity more than doubled from 2 to 5% over the same period.¹² The prevalence rates of overweight and obesity are increasing at alarming rates in sub-Saharan Africa.¹³

Different factors contribute to overweight and obesity among adult populations. The most frequently reported factors contributing to this have been identified as age^{14,15}, sex^{14,16,18,19}, educational status^{14,19-22}, marital status^{17,20,21,23,24,25}, occupational status^{16,25,26}, income levels^{17,21,27,28}, residences^{15,19,29,30,31}, diet^{20,32}, physical activity^{16,17,25}, alcohol use^{17,23,25}, and smoking^{33,34,35}.

Obesity and overweight status put women at elevated risk for many adverse health outcomes, including cardiovascular diseases, diabetes, kidney diseases, and obesity-related cancers.^{36,37} These women are also more likely to develop pregnancy complications, such as gestational diabetes, hypertensive disorders of pregnancy, and cesarean section delivery.^{38,39}

Transitions from normal weight status to overweight and obesity and from overweight to obesity in midlife have been associated with adverse health outcomes, including increased likelihood of developing primary chronic physical conditions, such as cancers, coronary heart diseases, diabetes, and metabolic syndromes,^{40,41,42} as well as higher risks of mental impairment, including cognitive decline and dementia.^{40,43}

Increased mortality risks overall due to coronary heart diseases, cardiovascular diseases, and cancers have been linked to weight gain among women aged 30–55 years.⁴⁴

Numerous professional groups, including the Institute of Medicine (IOM)⁴⁵ and the United States Centers for Disease Control and Prevention (CDC)⁴⁶, have stressed the importance of entering pregnancy with average weight status and have identified lifestyle counseling and intervention before pregnancy as key strategies for moderating weight and reducing long-term weight gain in women.⁴⁶

This study aimed to determine the correlates and prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone using secondary data analysis of the Demographic Health Surveys 2019 (SLDHS 2019).

Methods

Study design: We conducted a secondary data analysis of the 2019 Sierra Leone Demographic Health Survey (2019-SLDHS) datasets derived from a cross-sectional study.

Study settings: As of July 2019, Sierra Leone had a population of 8,200,00 million people in a total land area of 78,000 km², with 23.8% of the population residing in urban areas.^{47,48} Administratively, Sierra Leone is divided into four provinces; Eastern, Northern, Southern provinces, and Western Areas, which is the peninsular on which the capital, Freetown, is situated.⁴⁷ These provinces are then subdivided into 16 districts (Kailahun, Kenema, Koidu Town, Bombali, Falaba, Koinadugu, Tonkolili, Bo, Bonthe, Moyamba, Pujehun, Kambia, Karine, Port Loko, Western Area Rural and Western Area urban), which are further subdivided into 190 chiefdoms.⁴⁷

Agriculture contributes about 24% of gross domestic product (GDP), providing half of its export earnings, and it the primary source of income for 84% of Sierra Leoneans living in rural areas.⁴⁹ Sierra Leone's health system has six levels ranging from the highest level at the national referral hospital to the lowest at the community level.⁵⁰

Data collection: Data was collected from 14th May 2019 to 31st August 2019.^{47,48,49} It was a nationally representative survey carried out by the Bureau of Statistics of Sierra Leone (stats SL) as part of the international MEASURE Demographic Health Surveys (DHS) with the support of Inner-City Fund (ICF) International and the United States Agency for International Development (USAID).^{47,48,49} SLDHS is a periodical survey conducted every five years in Sierra Leone, and this current (2019 SLDHS) was the third survey, with the second in 2014 and the first in 2010.^{47,48,49}

The five questionnaires in the 2019 SLDHS were Household Questionnaire (HQ), Woman's Questionnaire (WQ), Man's Questionnaire (MQ), Biomarker Questionnaire (BMQ), and the Fieldworker Questionnaire (FWQ) were based on DHS Program's standard Demographic and Health Survey (DHS-7) T4 and was adapted to reflect the population, and health issues relevant to Sierra Leone.^{47,48,49}

Sierra Leone Ethics and Scientific Review Committee (SLESRC) and ICF Institutional Review Board reviewed and approved this survey protocol.^{47,48,49}

All questionnaires in the 2019 SLDHS were in English, and the survey used computer-assisted personal interviewing (CAPI) for data collection.^{47,48,49}

The household questionnaire collected data on household environment, assets, and basic demographic information of household members; the woman's questionnaire collected data on women's background characteristics, reproductive health, the incidence of domestic violence, and nutrition; the man's questionnaire collected data on one-half of the study population on demographic characteristics and incidences of domestic violence; the biomarker questionnaire collected information on the characteristics of women, weights, hemoglobin and blood tests for HIV while fieldworker questionnaire collected data on field workers.^{47,48,49}

Regarding anthropometric measurements, weight was recorded in kilograms (kg) to the nearest decimal point and was measured using an electronic scale (SECA 878).^{47,48,49} Heights of participants were measured in a standing position and bare feet using a stadiometer in centimeters (cm) to one decimal point.^{47,48,49} For each participant, a Body Mass Index (BMI) in kg/m² was calculated to determine the nutritional status of each participant. It was then categorized as normal weight with BMI: 18.5-24.99 kg/m²; overweight with BMI ≥ 25.00 kg/m² and ≤ 29.99 kg/m², and obese with BMI ≥ 30.0 kg/m² and ≤ 50.0 kg/m².

The wealth index was calculated using a computer analysis of composite information on participants' household assets. The study outcome was categorized in quintiles as poorest, poorer, middle, richer, and richest household wealth indices.

Study participants and sampling methods: Sampling of participants for the 2019 SLDHS was based on a sampling frame provided by Statistics Sierra Leone (Stats SL) for the 2015 population and housing census of the Republic of Sierra Leone.⁴⁷⁻⁵³

Sierra Leone is administratively divided into four provinces and sixteen districts. Each district is further subdivided into chiefdoms/census wards and sections.⁴⁷⁻⁵⁴ Too, each locality/section was subdivided into convenient census Enumeration Areas (EAs).⁴⁷⁻⁵³ EAs were used as the primary sampling units (PSUs) or clusters for the 2019 SLDHS.⁴⁷⁻⁵³ A list of EAs from the sampling frame formed the basis for estimating the number of households grouped as urban or rural areas.⁴⁷⁻⁵³

The demographic health survey employed a two-stage stratified sampling design. First, stratification was achieved by dividing each district into urban and rural areas. In total, thirty-one sampling strata were created. In this, samples were selected independently in each stratum via a two-stage selection process.⁴⁷⁻⁵³ Implicit stratification was achieved at each lower administrative level during the first sampling stage by sorting the sampling frame before sample selection according to administrative order and using a probability proportional-to-size selection.⁴⁷⁻⁵³ Thus, in the first stage, five hundred and seventy-eight EAs were selected using probability-proportional-to-EA sizes. The number of households residing there defined the size of the Enumeration Area (EA).⁴⁷⁻⁵³

A household listing operation was then carried out in all selected enumeration areas, which served as a sampling frame for selecting households in the second stage.⁴⁷⁻⁵³ In the second stage's selection, a fixed number of twenty-four households was selected in each cluster using equal probability systematic sampling, resulting in a total sample size of approximately 13,872 households distributed in the five hundred and seventy-eight EAs.⁴⁷⁻⁵³ Household listing was conducted using tablets. Households were selected randomly through computer programming.

The survey interviewers conducted interviews only with participants in pre-selected households in the clusters.⁴⁷⁻⁵³ It ensured that no replacements or changes of the pre-selected households were allowed in the implementation stage to prevent selection bias.⁴⁷⁻⁵³

Due to the non-proportional allocation of samples to different districts and possible differences in response rates, sample weights were calculated, added to the data file, and applied so that results were representative at national and domain levels.⁴⁷⁻⁵³

Since the 2019 SLDHS sampling was a two-stage stratified cluster sampling selected from the sampling frame, sample weights were calculated separately at each sampling stage based on sampling probabilities.

In this survey, all women aged 15-49 years in sampled households were included in the analysis, where permanent residents and visitors who stayed overnight before the study were eligible for interviews.⁴⁷⁻⁵³ The man's survey was conducted in one-half of all sampled households, and all men aged 15-59 years were included. In addition, one eligible woman in each subsampled household was randomly selected to answer questions on incidences of domestic violence. Similarly, biomarker information (weight of women

aged 15-49 years, hemoglobin testing, heights, and HIV status in households selected for the man's survey) were determined from these subsampled households.⁴⁷⁻⁵³

Operational definitions.

Body Mass Index (BMI kg/m²): Weight in kilograms divided by height in meters squared.

Normal weight: BMI: 18.5-24.99kg/m²

Overweight: BMI $\geq$ 25.00 kg/m² and $\leq$ 29.99 kg/m²

Obesity: BMI $\geq$ 30.00 kg/m² and $\leq$ 50.00 kg/m²

Enumeration Areas (Clusters): An EA was defined as a geographic area consisting of a convenient number of dwelling units (households) that serve as a counting unit for the survey.

Data analysis: Data analysis was conducted using SPSS analytic software version 24.0 complex samples package.⁵⁵ Complex samples package was used to account for complex survey sampling, while sample weighted data accounted for unequal probability sampling in different strata. Descriptive statistics and bi- and multivariable logistic regression analyses were conducted on this data. Frequency tables and proportions/percentages were used to describe categorical variables, while means and standard deviations were used for continuous variables.

Initially, each exposure variable was assessed separately for its association with the outcome variables (overweight and obesity) using bivariable logistic regression and presented Crude Odds Ratio (COR) at 95% Confidence Interval (CI) and p-values. Independent variables found insignificant at p-values $\leq$ 0.2 were added to the final multivariable model for further analysis.^{56,57,58} The final multivariable logistic regression model included insignificant variables which were, in previous studies, associated with being overweight or obese.

We constructed two models in the multivariable logistic regression analysis by categorizing independent variables into women's individual, household, and community factors. We first performed a logistic regression model, which included only individual characteristics (age, level of education, work status, parity, smoking, alcohol use, and marital status). After that, we constructed a final model which included individual characteristics adjusted for household and community characteristics (wealth index, household size, sex of household head, residence (urban versus rural), regions (northern, southern, western, and eastern), reading magazines, watching television, and listening to radios. The adjusted Odds Ratios (aOR) at 95% Confidence Intervals (CI) and p-values were calculated, with a statistical significance level set at p-value < 0.05.

Sensitivity analysis was conducted with women who were obese and had normal BMI after excluding those with BMI above 50.0kg/m².

Results

The characteristics of women of reproductive age (15-49 years) (N=7,514) from the Sierra Leone Demographic Health Survey of 2019 (2019 SLDHS) were presented (Table 1, Figure 1).

Sociodemographic characteristics of women (15-49 years) in Sierra Leone: Most women in the study population were in 20-29-year age group, 2528/7514(33.6%) with a parity of one-to-four 3892/7514(51.8%); of rural residence, 4422/7514(58.9%); male headed households, 5356/7514(71.3%); the household size of six and above, 4519/7514(60.1%); working class, 5234/7514(69.7%); married, 4795/7514(63.8%); from the South, 1831/7514(24.4%); had no formal education, 3571/7514(47.5%); richer wealth index, 1634/7514(21.7%); normal BMI, 4974/7514(66.2%); did not watch television, 5625/7514(74.9%); did not listen to radios, 4372/7514(58.2%); did not read magazines, 7025/7514(93.5%), did not smoke cigarettes, 7290/7514(97.0%), and did not use alcohol, 3081/7514(41.0%) (Table 1).

The prevalence of overweight and obesity among the study population: The total number of women aged 15-49 who participated in the 2019 demographic health survey (2019 SLDHS) was 15,574. Women with valid BMI results were 48%(7,514/15,574). Among

women with valid BMI measurements, 66.2%(95%CI:64.9%-67.5%;4,974/7,514) had normal BMI. The prevalence of overweight was 19.7%(95%CI:17.7%-21.7%;1479/7514) and obesity, 7.44%(95%CI:5.2%-9.6%;559/7514) (Table 1).

Overweight, normal weight, and obesity among women of reproductive age in Sierra Leone. In this study population, overweight was commonest among age-group of 20-29 years, 515/1479(34.8%); normal weight among the 20–29-year age-group, 1773/4974(35.6%); and obesity among the 30–39-year age-group, 216/559(38.6%) (Figure 2, Table 2, and Table 3).

Correlates of overweight among women (15-49 years) in Sierra Leone: The correlates of overweight were 1.933 times more likely among 15-19-year age-group (aOR=1.933,95%CI:1.532-2.348;p<0.001) than 20-29-year age-group; 1.308 times more likely among women from the north (aOR=1.308,95%CI:1.104-1.581;p<0.006) than the East; 1.211 times more likely among women without formal education (aOR=1.211,95%CI:1.009-1.454;p<0.040) than secondary education; 1.510 times more likely among women in the poorest wealth index (aOR=1.501,95%CI:1.231-1.853;p<0.001) and 1.419 times more likely among women in poorer wealth index (aOR=1.419,95%CI:1.154-1.745;p=0.001) than the middle wealth index. However, overweight was 39.9% less likely among women of 30-39-year (aOR=0.601,95%CI:0.507-0.713;p<0.001) and 49% less likely among women in the 40-49-year (aOR=0.510,95%CI:0.415-0.628;p<0.001) than 20-29-year age-group, respectively. It was 27.3% less likely among married women (aOR=0.727,95%CI:0.613-0.863;p<0.001) than unmarried women. It was 24.9% less likely among women from the south (aOR=0.751,95%CI:0.623-0.911;p=0.002) than in the East. It was 38.2% less likely among women in richer (aOR=0.618,95%CI:0.494-0.773;p<0.001) and 48.7% less likely among women in the richest (aOR=0.513,95%CI:0.389-0.677;p<0.001) wealth indices than middle wealth index, respectively (Table 2).

Correlates of obesity among the study population: The correlates of obesity among Sierra Leone women (15-49 years) were 2.051 times more likely among 15-19-year age-group (aOR=2.051,95%CI:1.316-3.198;p=0.002) than 20-29-year age-group; it was 1.426 times more likely among women from the north (aOR=1.426,95%CI:1.038-1.958;p=0.044) than the East. It was 2.390 times more likely among women in the poorest (aOR=2.390,95%CI:1.618-3.532;p<0.001) and 1.667 times more likely in poorer (aOR=1.667,95%CI:1.151-2.415;p=0.007) wealth indices than middle wealth index, respectively. But, obesity was 68.3% less likely among the 30-39-year age group (aOR=0.317,95%CI:0.241-0.419;p<0.001) and 79.6% less likely among the 40-49-year age group (aOR=0.204,95%CI:0.149-0.278;p<0.001) than 20-29 year age-group. Obesity was 36.8% less likely among female-headed households(aOR=0.732,95%CI:0.590-0.909;p=0.005) than male-headed households; it was 24% less likely among married women (aOR=0.760,95%CI:0.580-0.995;p=0.046) than unmarried women; 26.2% less likely among women from the south (aOR=0.738,95%CI:0.550-0.992;p=0.044) than the East; 62.1% less likely among women in richer (aOR=0.379,95%CI:0.266-0.540;p<0.001) and 75.9% less likely among women in the richest (aOR=0.241,95%CI:0.159-0.367;p<0.001) wealth indices than the middle wealth index, respectively, and 25.0% less likely among women who listened to radios (aOR=0.750,95%CI:0.602-0.933;p=0.010) than those who did not (Table 3).

Discussion

The prevalence estimates of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone were 19.7% and 7.4% (Table 1, Table 2, and Table 3) and higher than world data at 18% and 5%, respectively¹². Inconsistent with our findings, data from Demographic Health Surveys (DHS) of 2006 to 2016 for women aged 18-49 years in sub-Saharan African (SSA) countries found that Chad had the lowest overweight prevalence at 12.6% while the highest overweight prevalence was observed in Swaziland at 56.6%.⁵⁹ This finding shows that the prevalence of overweight and obesity among women in Sierra Leone was within range observed recently in sub-Saharan Africa.⁵⁹

In contrast to our findings, other survey findings among many sub-Saharan African countries showed that, on average, 31.4% of the women were overweight or obese, with prevalence as high as 38% in Kenya, 35% in Niger and Ghana, and 32% in Tanzania.⁶⁰ However, low values were observed in Malawi (23%), Burkina and Senegal (28-29%).⁶⁰ These differential prevalences by countries could be related to economic development and urbanization, although this is unlikely true with Niger.⁶⁰

Also, in contrast with other studies^{61,62,63}, our findings showed that women of lower socioeconomic status (proxied by household wealth indices) were more likely to be overweight or obese than their richer and richest counterparts (Table 2 and Table 3). Similarly, women engaged in income-generating activities (working) in our study were not significantly associated with overweight or obesity compared to other studies^{61,62,63}. This pattern is unique for our study population as others have suggested that being overweight or

obese was related to changing nutritional and lifestyle trends, with urban people consuming more refined and energy-dense foods and having fewer opportunities for physical activities^{61,62,63}.

Inconsistent with our study findings, evidence from multiple country studies indicates that women of higher socioeconomic status (SES), as defined by household wealth, were more likely to be overweight or obese in sub-Saharan African countries.⁶⁴ It is suggested that affluent groups in many African countries have lower physical activity levels and consume more processed foods, which may explain their elevated adiposity risk.⁶⁵ In addition, sociocultural factors such as association of larger bodies with higher social status in African culture, coupled with other global factors such as unregulated marketing of obesogenic foods, greater levels of mechanization and abundance of resources conferred by high-income status, may result in increased consumption of unhealthy foods and sedentarism.^{66,67}

Also, our study found that women without formal education were more likely to be overweight than their secondary education counterparts (Table 2). However, there was no significant association between the level of education with obese women in the Sierra Leone study (Table 3).

For this analysis, we did not collectively consider factors such as educational attainment, work status, and household wealth indices as socioeconomic indicators. In doing so, we acknowledge that there are numerous approaches for studying the effects of socioeconomic status on health behaviors and that these factors can have impacts not only at individual level but also at community and health system levels.⁶⁸ In this analysis, the relationship between women of reproductive age (15-49 years) and overweight or obesity was similar whether we adjusted the model for educational attainment or household wealth indices. In sum, the prevalence of overweight and obesity among women of childbearing age (15-49 years) in Sierra Leone remains a critical public health concern, especially among teenagers. We, the authors suggest further efforts to design and implement health education campaigns to address both complexities of obesity epidemic and how factors such as socioeconomic status and cultural norms affect health behaviors. This approach may provide the best opportunity to inform and promote healthy eating and a healthy lifestyle across the lifespan in Sierra Leone.

A striking finding from this study was the high prevalence of obesity among women of lower socio-economic status (Table 2 and Table 3). However, household wealth measures used in this paper may not accurately detect individual woman's wealth but rather household assets and characteristics. We, the authors propose that further research using other wealth measures (for example, incomes or/and expenditures) might improve our understanding of the prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone. For example, educational attainment was not used as a proxy for socioeconomic status measure of individual women in the analysis.

Still, our descriptive and multivariable analyses revealed that overweight and obesity of individuals were highest among the uneducated, poorer, and poorest segments of the population studied (Table 2 and Table 3).

Descriptive results showed that the prevalence of overweight and obesity were 699/1479(47.3%) and 262/559(46.9%) among uneducated women, respectively. Still, it increased to 879/1479(59.4%) and 117/559(56.7%), respectively when women educated to primary level were combined with the uneducated (Table 2 and Table 3). This pattern was confirmed in the multivariable results, with an estimated odds ratio of (aOR=1.211;p<0.001) among overweight uneducated women compared to women of secondary education (Table 2). As for obesity among uneducated women, the estimated Odds ratio was (aOR=1.234;p=0.147) compared to the secondary level of education (Table 3). Although this did not reach statistical significance, the numbers of women at lower educational levels were higher than women with higher levels of education (Table 3). This finding suggests that poorer and uneducated residents were more likely to be overweight or obese than their wealthier counterparts or even worse off, as is now the case in the developed world.

In the context of rapid urbanization in Africa, primarily driven by rural-urban migration⁶⁹, the new migrants have been shown to adapt to unique urban lifestyles, ultimately predisposing them to overweight or obese even though their socioeconomic status might be lower than the long-term residents.^{70,71} Further, health consequences of big body size may not be known to people with low incomes; and indeed, some studies have shown that in some sections of African populations, obesity may be positively regarded as a symbol of high social status.^{72,73}

Our study finding in Sierra Leone observed that older and married women were less likely to be overweight or obese compared to younger and unmarried women (Table 2 and Table 3) in contrast to another study in Southern Morocco.⁷⁴ Our result might be explained by the fact that married women, unlike their single counterparts, are less likely to be overweight or obese due to better wealth indices associated with better lifestyles than the poorer and poorest wealth indices in this study population (Table 2 and Table 3). Our finding is also inconsistent with another study which showed that married women were more likely to be obese or at higher risk of obesity because of multiparity.⁷⁵ However, multiparity is not exception to married women in Africa because many reports show that there are many unmarried women who are multiparous due to social factors.

Similar patterns to our study are present in the income-adiposity relationship among high SES women in SSA because existing evidence suggests that highly educated individuals have better diets and are more likely to exercise than the less educated.⁷⁶ Therefore, examining the effect modification of educational attainment on the association between household wealth status, overweight and obesity in the SSA context informs the identification of at-risk subpopulations. We, the authors, suggest additional mechanistic research and increased specificity in targeting obesity prevention interventions at both individual and ecological levels.⁵⁹

Strengths and limitations of this study. This study had many strengths. First, it used nationwide data on women of reproductive age (15-49 years) using DHS survey tools that were validated and carried out by expert researchers. The results from this study are likely robust and reliable. Second, the study used a two-stage stratified probability sampling method, producing accurate, generalizable, and reliable data. Third, the sample population was large, and results can be used to generalize information in this context. Fourth, using a complex sample package, the study accounted for complex survey sampling. At the same time, sample-weighted data was also used to account for unequal probability sampling in the different strata.

This study had four main limitations. First, the data used was cross-sectional, whereas the ideal situation would have been to track individuals over time and ascertain changes in body mass index and the associated risk factors. Second, the female population in this study may only partially represent the entire adult female population of reproductive age in Sierra Leone, given that the anthropometric measurements in the DHS were restricted to women in the age group of 15-49 years. It is important to note that women <15 years and those >49 years are, too, of reproductive age but were excluded from this analysis. This was likely to affect the results of our study and may not be representative of some women in the reproductive age in Sierra Leone. Third, there was a limitation in our data and analysis as the measurement of household wealth was a composite computer analysis based on reported household assets, not including incomes and expenditures of individual participants in this study population. In many ways, this may have under- or overestimated the wealth status of women in the reproductive age (15-49 years) in Sierra Leone. This could influence the categorization of participants in the different wealth quintiles, thus influencing the outcome of our findings.

Last, the need for a uniform definition of what constitutes an urban or rural area poses a challenge in making comparisons and generalizations about observations across districts in Sierra Leone. DHS uses official country-specific designations. More often than not, classifications of urban and rural areas vary across communities in Sierra Leone, considering the varying degrees of attributes such as population density, administrative function, availability of social amenities, and physical infrastructure such as hospitals, post offices, schools, and markets. These differences pose a challenge in the interpretation of results from districts in Sierra Leone that attempted to make rural-urban distinctions and comparisons, as their classifications may not be accurate enough to allow for this proclamation.^{77,78,79}

Generalizability of results: These findings can be generalized among women of reproductive age (15-49 years) in sub-Saharan Africa within similar contexts.

Conclusion

The prevalence of overweight and obesity among women of reproductive age (15-49 years) in Sierra Leone was higher than world data. Women of younger age groups, from northern region, poorest and poorer wealth indices, and without formal education were more likely to be overweight or obese. However, overweight and obesity were less likely among older age groups, the married, from southern region, richer and richest wealth indices, female-headed households, and listening to radios. There is an urgent need for policymakers in Sierra Leone to tackle overweight and obesity among women of reproductive age (15-49 years) if the current trends are to be reversed.

Declarations

Ethics approval and consent to participate: Sierra Leone Ethics and Scientific Review Committee (SLESRC) and ICF Institutional Review Board approved all experimental protocols in this study. We obtained informed consent from all participants and their legal representatives. In addition, the study was conducted following all relevant institutional guidelines and regulations.

Consent to publish: Not applicable.

Availability of data and material: All datasets supporting this article's conclusion are within this paper and are accessible by a reasonable request to the corresponding author.

Competing interests: All authors declare no conflict of interest.

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Authors' contributions: DLK, JA, and FWDO designed this study—JA, ENI, and DLK supervised data management. ENI, JA, FWDO, EO, and DLK analyzed and interpreted the data. FPP, NOA, POA, CO, DO, SGO, JBO, EO, ENI, FWDO, JA, JBM, MAT, LN, KK, AN, RK, and DLK wrote and revised the manuscript. All Authors approved the manuscript.

Authors' Information: Dr. Pamela Okot Atim (POA) is a senior Obstetrician and Gynecologist and a Medical Superintendent at St. Joseph's Hospital, Kitgum, Uganda; Dr. Nelson Onira Alema (NOA) is a lecturer at Gulu University, Faculty of Medicine, Department of Anatomy, Gulu City, Uganda; Dr. Francis Pebalo Pebolo (FPP) is a lecturer at Gulu University, Faculty of Medicine, Department of Reproductive Health, Gulu City, Uganda; Dr. Christopher Okot (CO) is a medical officer Special Grade at Gulu Regional Referral Hospital, Gulu City, Uganda; Dr. Denis Ochula (DO) is a District Health officer at Lamwo district local government, Lamwo, Uganda; Dr. Smart Geoffrey Okot (SGO) is a senior Surgeon and a Medical Superintendent at Dr. Ambrosoli Memorial Hospital, Kalongo, Agago, Uganda; Dr. Eric Nzirakaindi Ikoona (ENI) is a Technical Director at ICAP at the University of Columbia, Sierra Leone; Dr. Amon Njenga (AN) is at ICAP at the University of Columbia, Freetown, Sierra Leone; Dr. Mame Awa Touré (MAT) is at ICAP at the University of Columbia, Freetown, Sierra Leone; Dr. Lucy Namulemo (LN) is at Foothills Community Based interventions, Monticello, Kentucky, USA; Dr. Ronald Kaluya (RK) is at Uganda Counseling and Support Services, Kampala, Uganda; Dr. Kassim Kamara (KK) is at the Directorate of Health Security and Emergencies, Ministry of Health and Sanitation, Freetown, Sierra Leone; Dr. Freddy Wathum Drinkwater Oyat (FWDO) is a senior physician, a public health specialist, and a member of Uganda Medical Association, UMA-Acholi branch, Gulu City, Uganda; Dr. Judith Aloyo (JA) is a Deputy Chief of Party at Rhites-N, Acholi, Gulu City, Uganda; Dr. John Bosco Matovu (JBM) is at ICAP in Nairobi, Kenya; Dr. Emmanuel Olal (EO) is a Public Health Specialist and a Physician at Yotkom Medical Centre in Kitgum district, Kitgum, Uganda. Prof. David Lagoro Kitara (DLK) is a Takemi fellow of Harvard University and a Professor at Gulu University, Faculty of Medicine, Department of Surgery, Gulu City, Uganda.

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Tables

Tables 1 to 3 are available in the Supplementary Files section

Figures



Figure 1

A map of Sierra Leone showing the 14 districts plus two western areas (urban and rural).

FREQUENCY OF OVERWEIGHT AND OBESITY AMONG WOMEN OF REPRODUCTIVE AGE IN SIERRA LEONE

■ Obese ■ Overweight ■ Normal weight

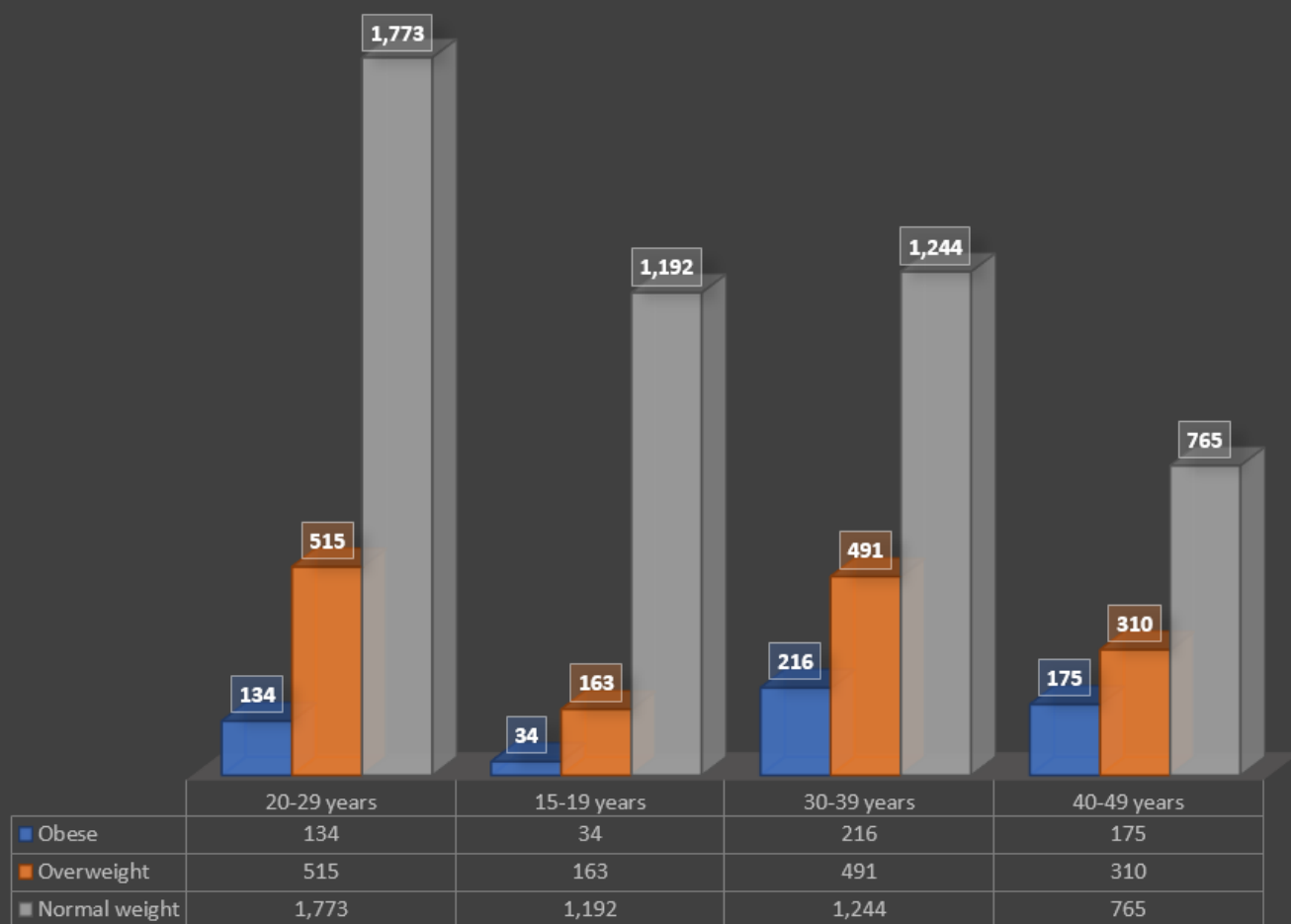


Figure 2

Frequency of overweight and obesity among women of reproductive age (15-49 years) from 2019 SLDHS.

Supplementary Files

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