Household Wealth Inequalities in High Body Mass Index among Women of Childbearing Age: Evidence from the Ghana Demographic and Health Survey

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Research

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Abstract

Background

Ghana is currently experiencing higher body mass index (BMI), that is overweight and obesity, among reproductive-aged women. However, understanding the role of socioeconomic status in the high BMI among this cohort has not been studied extensively in Ghana and the few existing studies in the country have generated mixed results. This study aims to examine household wealth inequalities in high BMI among Ghanaian women of childbearing age.

Methods

The 2014 Ghana Demography and Health Survey (GDHS) dataset was analyzed. A univariable and multivariable regression model with a logit link function was specified to ascertain the effect of household wealth inequalities in high BMI among Ghanaian women. Furthermore, concentration index and curve were used to measure the degree of household wealth inequalities in high BMI among reproductive aged women.

Results

This study found high BMI prevalence of 35.9 percent with significant household wealth-related inequalities (Concentration index = 0.24, 95%CI (confidence interval): 0.22–0.26). The analysis revealed that high BMI is concentrated among wealthier women. Compared to poorest women, poorer (AOR (Adjusted odds ratio) = 2.18, 95%CI: 1.66–2.85), middle-class (AOR = 4.44, 95%CI: 3.24–6.09), richer (AOR = 7.75, 95%CI: 5.53–10.86) and richest (AOR = 11.03, 95%CI: 8.07–15.06) women were more likely to have high BMI. On top of that, socioeconomic characteristics including age, marital status, and education of reproductive-aged women were significantly associated with high BMI.

Conclusions

The research revealed that a woman from a wealthier household had higher likelihood of having high BMI relative to those from a less wealthy household. Also, women who were educated and cohabiting, formerly or currently married had an increased risk of having high BMI. This observation suggests targeted policy interventions and programs that promote healthy body weight to reduce the high BMI prevalence among women of childbearing age in Ghana.

Introduction

High body mass index (BMI) which manifests as overweight and obesity is a global health issue [1, 2]. Regrettably, the high BMI has emerged in sub-Saharan Africa, a region which has been plagued with

underweight over the years [3, 4]. In fact, a study estimated high BMI prevalence between 6.7–44.5% across sub-Saharan Africa [5]. Additionally, the rising level of high BMI has been reported by a study that posited that 1 in 10 west African adults are obese [6]. Furthermore, variation in high BMI between men and women has been observed [7, 8]. An earlier study reported that west African women have about three-folds propensity to have high BMI compared to men [6],

However, the surging levels of high BMI have both health and economic consequences [9–12]. For instance, several studies have attributed high BMI as a risk factor for chronic diseases such as diabetes, musculoskeletal disorders, cardiovascular diseases, hypertension among others [13–16]. Indeed, a study has projected a 27% rise in chronic diseases related mortality in Africa [17]. Besides, the high economic cost associated with high BMI has been evidenced in earlier studies [10, 11].

Ghana has observed an elevated prevalence of high BMI [7, 8, 18]. A previous study in Ghana revealed that high BMI prevalence among adults ranged from 20 to 62 percent [18]. Another study stated that approximately 43% of Ghanaian adults had high BMI [7]. In addition, gender disparities in high BMI have been discerned. A study found that adult Ghanaian women have elevated risk of having high BMI relative to men (21.9% vs 6.0%) [7]. Particularly between 1993 and 2015, overweight (17.9–30.4%) and obesity (7.7%–22.0%) representing high BMI among urban Ghanaian women increased significantly [19]. Moreover, higher BMI-related economic burden and increasing prevalence of non-communicable diseases such as diabetes, hypertension among others have been documented in Ghana [20, 21].

Though some studies have been conducted [22, 23], the research is not exhaustive. Undoubtedly, it is necessary to unravel the underlying factors fueling the rising high BMI in Ghanaian adults. Though socioeconomic factors have been reported to play an important role in the episode of high BMI elsewhere [19, 24] but investigations into these factors in Ghana are not exhaustive and the results of the limited studies are inconsistent. The findings from a systematic review in Ghana show that the majority of the studies did not consider some sociodemographic factors including marital status, religion and many others [7] in spite of their relevance in BMI status [25]. Also, most of the studies that attempted to investigate the socioeconomic factors associated with high BMI in Ghana were confined in a small geographical area [7], which has the potential to affect extrapolation of the findings to the entire Ghanaian population. More importantly, despite the discriminatory higher prevalence of high BMI among women yet just few studies in Ghana focused on only women [26–29].

These highlighted research gaps and thorough literature review points to an urgent need for a comprehensive study examining the association between socioeconomic status and high BMI among reproductive aged Ghanaian women. Therefore, this study aims to assess household wealth inequalities in high BMI among Ghanaian women of childbearing age. Our thorough literature search revealed that, this study will be the first to employ concentration curve and concentration index to ascertain the degree of household wealth inequalities in high BMI among women of reproductive age in Ghana. The findings from this study are expected to support policy interventions and guide the allocation of resources to help reduce the upsurge of high BMI in Ghana and other countries with similar context.

Materials And Methods

Study population and data source

The research was carried out in Ghana, a lower-middle-income sub-Saharan African country. This current study used the 2014 Ghana Demographic and Health Survey (GDHS) dataset was conducted by the Ghana Statistical Service, Ghana Health Service and Inner-City Fund (ICF) International [8]. The survey participants were recruited based on two steps stratified sampling technique with details published elsewhere [8]. In total 9,396 women between the ages of 15-49 years were interviewed representing a response rate of about 97 %. General sociodemographic and health-related information about the women were collected using a pretested structured questionnaire after consenting to participate in the GDHS. Among the anthropometric measurements that were taken, Body Mass Index (BMI) was computed for 4,750 women in the GDHS [8].

Outcome variable

Overweight and obesity, an abnormal or unhealthy fat buildup [16, 30], have been studied using BMI [3, 13, 19]. Conventionally, BMI is estimated as the ratio of a person's weight (Kg) against the square of the individual's height (metres) and have mainly been grouped into four: less than 18.5 kg/m² (underweight), 18.5-24.9 kg/m² (normal weight), 25.0-29.9kg/m² (overweight) and at least 30 kg/m² (obesity) [19, 31, 32]. As shown in Table 1, the BMI status of women which is the dependent variable was classified into two groups. Overweight and obese women were coded '1' representing high BMI whereas women who were not overweight or obese were coded '0' indicating not high BMI.

Primary independent variable

Household wealth index was classified into the poorest, poorer, middle, richer and richest in the 2014 Ghana Demographic and Health Survey data [8] and was coded in this current study as (1) poorest (2) poorer (3) middle (4) rich (5) richest (Table 1). According to the Ghana Statistical Service, Ghana Health Service and Inner City Fund (ICF) International; this variable was derived from the output of the principal component analysis (PCA) of household factors and assets [33].

Control variables

The independent variables examined in this research were age, religion, marital status, ethnicity, parity, employment status, place of residence, educational level. In this study, maternal age was categorized into three groups: 15-24 years, 25-34 years and 35-49 years. The religious affiliation of women was grouped by traditional /other believers, Muslims, and Christians. Women's marital status was classified as never

married, cohabiting, formerly married and currently married. With respect to ethnic background, women were identified as Akan, Northern tribe, Ewe, Ga, and other groups. The employment status of women was categorized as either employed or unemployed. The area women reside were grouped as rural and urban. The educational attainment of women was categorized as uneducated, primary and at least secondary education (Table 1).

INSERT TABLE 1 HERE

Study data analysis and modeling

This study employed a logistic regression model and concentration index after considering sampling weight and clustering in the 2014 GDHS dataset to estimate household wealth inequalities in high BMI among Ghanaian women

A univariable association between high BMI and a study predictor that recorded a p-value of less than 0.25 were selected for inclusion in the multivariable model. This lenient p-value threshold was adopted to retain statistically relevant study variables whose effect could be influenced by confounders and effect modifiers [34, 35]. Further, the multivariable logistic regression was specified using a manual backward selection approach [34]. Initially, all the selected study variables were included in the adjusted model. The study predictors were excluded from the adjusted model based on importance one at a time until all the variables in the final model have p-value ≤ 0.05 . Multicollinearity check was done, study predictors with variance inflation factor (VIF) of >2.5 as well as tolerance of < 0.4 were regarded as collinear. All possible two-way interactions among significant study variables in the multivariable model were tested. Also, more than 20% percentage change in the regression coefficient of study variables between unadjusted and adjusted models was deemed confounders. On model diagnostics, smaller Akaike's Information Criterion (AIC) was adjudged a parsimonious model[36]. Also, the area under the receiver-operating characteristic (ROC) curve and Hosmer-Lemeshow goodness of fit tests were checked [37]. Odds ratios and 95% confidence interval were generated from the crude and the adjusted models, and the statistical package used for the analyses was R version 3.6.3.

Further, this study used concentration index to quantify the changes in the wealth inequalities in prevalence of high BMI among reproductive aged women [38]. Concentration index ranges from -1 to +1, a positive concentration index show that high BMI is concentrated among wealthier women while negative concentration signifies aggregation of high BMI among poorer women. The concentration index of zero infers that there is no household wealth related inequality in high BMI among women of childbearing age [38]. The concentration curve was graphed by the cumulative proportion of high BMI among Ghanaian women against the rank of household wealth status. A curve below the diagonal line shows greater concentration of high BMI among affluent women whereas a curve above the diagonal line

highlights concentration of high BMI among poorer women. In this study, concentration index and concentration curve of household wealth inequality in high BMI were done using STATA 14 (StataCorp LP, College Station, TX, USA) command 'conindex' [38]. Finally, concentration index of household wealth inequality in high BMI were computed across study variables that were significant in the final model.

Results

Descriptive and univariable model findings

As shown in table 2, this study found high BMI prevalence of 35.9 percent. This study found that 25.3% and 18.4% of women were poorest and poorer respectively. For the middle-class, richer and richest women accounted for 20.7%, 18.4% and 17.2% respectively. Out of the poorest and poorer women, 12.8% and 25.8% had high BMI respectively. The middle-class (39.6%), richer (52.1%), and richest (58.6%) women were having high BMI greater than the national high BMI prevalence (Figure 1).

INSERT FIGURE 1 HERE

Besides, women were between the ages of 15 and 49 years. Women aged 15-24 years were 35.5% whereas women who were within the ages of 25 to 34 years and 35-49 years constituted 30.6% and 33.9% respectively. Concerning high BMI, nearly half (49.6%) of women aged 35-49 years had high BMI. Roughly two-fifths (43.8%) and 15.9% of women aged 25-34 years and 15-24 years respectively were having high BMI.

Moreover, most women were Christians (75.2%) while about 1 in 5 women (19.7%) were Muslim and just 5.1% were traditional or other believers. Regarding high BMI, about one-third of Muslims (34.0%), nearly two-fifth of Christians (37.1%) and one-quarter (25.4%) of traditional or other believers were having high BMI.

Also, the majority (45.2%) of women were currently married while formerly married women were the least (9.8%). Further, more than half (52.1%) of formerly married women had high BMI whereas close to one-fifth (19.4%) of never-married women were having high BMI. The high BMI prevalence among currently married women and those cohabiting were 43.5% and 37.4% respectively.

In this study, most women were Akans (41.3%). More than two-fifth of Akan (45.0%), Ga (45.9%) and other ethnic groups (46.4%) were having high BMI but only about 1 in 5 (22.4%) of women who belong to the northern tribe had high BMI. About 37% of Ewe women were having high BMI.

For place of residence, rural dwellers constituted a little over half of the women (51.0%). One-quarter (25.4%) of women who reside in rural areas had high BMI while 46.7% of urban residents were having high BMI.

Close to three-fourth (72.6%) of women were employed while about one-quarter (27.4%) of women were unemployed. Approximately 2 in 5 (40.4%) employed women had high BMI. Of the unemployed women, 23.6% were having high BMI.

A majority (56.7%) of the women had secondary or higher education while primary educated women were the least (18.8%). Nearly, one-quarter (24.5%) of the women did not have formal education. Secondary/higher educated women had the greatest prevalence of high BMI (41.0%) followed by primary ((33.4%) and uneducated women (25.7%).

From the univariable model, all the study variables were candidates of the multivariable logistic regression model because they all had a p-value less than 0.25 (Table 2).

INSERT TABLE 2 HERE

Multivariable model findings

The model diagnostics used in this study assures accurate model estimates. The final model was selected because of lower AIC when compared to the empty model (4999.3 vs 6201.4). Also, area under the ROC curve (Figure 2) and Hosmer-Lemeshow goodness of fit test (p-value=0.1067) indicate a good fit.

INSERT FIGURE 2 HERE

From table 3, the results based on wealth status revealed that poorer (AOR=2.18, 95%CI: 1.66-2.85) and middle-class women (AOR=4.44, 95%CI: 3.24-6.09) had a higher propensity of having high BMI than poorest women. Also, the odds of having high BMI was 7.75 (95%CI: 5.53-10.86) and 11.03 (95%CI: 8.07-15.06) times greater among richer and richest women respectively than the poorest.

Besides, the analyses from this research revealed that women aged 25-34 years were 3.18 (95%CI: 2.56-3.96) times more likely to have high BMI than women between the ages of 15-24 years. Likewise, the odds of having high BMI was 4.56 (95%CI: 3.44-6.03) times more probable among women aged 35-49 years when compared to those aged 15-24 years.

Concerning marital status, women who were cohabiting and formerly married were 1.69 (95%CI: 1.25-2.27) and 2.31 (95%CI: 1.66-3.23) times respectively more likely to have high BMI relative to women who

never married. Among married women, the likelihood of having high BMI was 2.11 (95%CI: 1.63-2.72) times greater than never-married women.

The likelihood of having high BMI among women with primary education was 47% (95%CI: 1.15-1.86) higher than uneducated women. Likewise, women who have attained at least secondary education were 1.59 (95%CI: 1.27-2.01) times more likely to have high BMI when compared to women without formal education.

INSERT TABLE 3 HERE

Household wealth-associated inequality in high BMI

As depicted in Figure 3, the concentration curve falls below the diagonal line indicating a concentration of high BMI among wealthier women.

INSERT FIGURE 3 HERE

From Table 4, the overall concentration index (concentration index = **0.24, 95%CI: 0.22- 0.26**) shows a **significant** household wealth inequality in high BMI among Ghanaian women exist. The positive value of the concentration index indicates household wealth inequality in high BMI was concentrated among wealthier women. Women aged 15-24 years (concentration index = 0.24, 95%CI:0.18-0.30), 25-34 years (concentration index= 0.21, 95%CI: 0.18-0.24) and 35-49 years (concentration index = 0.24, 95% CI: 0.22-0.26) had significant aggregation of household wealth inequalities in high BMI but the inequality difference between the groups was not significant (p-value= 0.6). Concerning marital status, the degree of household wealth inequality in high BMI among never married (concentration index = 0.27, 95%CI: 0.21-0.33), cohabitating (concentration index = 0.21, 95%CI: 0.15-0.27), formerly married (concentration index = 0.16, 95CI: 0.11-0.21) and married (concentration index = 0.27, 95%CI: 0.24-0.30) was significant with a strong inequality difference between the groups (p-value=0.004). Furthermore, the decomposition of the concentration index revealed a significant concentration of high BMI among the wealthier women who were uneducated (Concentration index = 0.32, 95%CI: 0.26-0.38), primary educated (Concentration index = 0.25, 95%CI: 0.20-0.30) and at least secondary educated (Concentration index = 0.19, 95%CI: 0.17-0.21). Also, a significant difference in household wealth inequality was detected among the women’s education groups (p-value=0.003).

Discussion

This study found prevalence of high BMI of 35.9% which was greater than the national prevalence of 30.5% reported in 2008 [39]. However, earlier studies that focused on just one region in Ghana documented elevated prevalence of high BMI of 68.4% [26] and 64.9% [27] compared to the findings from this study.

This study found wealth-related inequalities in high BMI as demonstrated in the concentration curve. The concentration index computed in this research was almost the same as what was estimated in a study conducted among 23 sub-Saharan countries (Concentration index = 0.2285) [5]. This finding supports the literature that high BMI is a pro-rich condition [5]. Furthermore, the findings from this study support the general body of knowledge that wealthier women have a greater risk of having high BMI than poor women [27, 28, 39, 40]. Probably, this may be due to the societal acceptance of larger body size as an expression of affluence and perceived better living [27, 41, 42]. On top of that, the increased access and consumption of food and alcohol as well as the sedentary lifestyle of richer women could be driving the high BMI prevalence as stated in similar studies [28, 43, 44].

Besides, this research finding was consistent with previous studies [27, 28, 39, 40] that stated that older women were more prone to have high BMI. Perhaps this could be explained by the physiological changes associated with advancement in age.

Also, the marital status of women and high BMI were found to have a significant association in this study. Women who were cohabiting, formerly and currently married had increased risk of having BMI than women who never married. This finding agrees with other studies conducted in Ghana [20, 27, 39, 45]. This worrying trend could be due to the perception that having high BMI body figure is a sign of having a responsible partner and good living [42]. Further, the social roles linked to being in a union can alter dietary consumption patterns and at the same time, these engagements tend to reduce physical activity schedules as posited in a similar study [46].

Concerning education, most studies have reported a significant positive association between high BMI and education [20, 28, 39, 40, 47] consistent with the findings from this research. In contrast with this study, a similar study conducted on only urban women in the Greater Accra region found no significant effect of education on high BMI [27]. The probable explanation to the higher odds of high BMI among educated women identified in this research could be that educated women can easily adopt western and sedentary lifestyles due to the ability to access available information through social media among others [48].

Of the study predictors that were investigated, women's religion, ethnicity, place of residence and employment status did not have a significant association with high BMI. A similar study in Nigeria found no significant effect of religion on high BMI [49] as reported in this research. Although some studies have associated ethnicity with high BMI [7, 28, 45] contrary to the findings of this study, the magnitude and direction of the effect need clarity. Therefore, future studies should concentrate on investigating the cultural practices of the ethnic groups that facilitate or discourage high BMI in women. Besides, though previous studies have shown significant association between place of residence and high BMI [40, 47],

the insignificant effect identified in this study may be attributed to general penetration of western lifestyle in both urban and rural areas [43] and the perceived ideal body size of women in Ghanaian communities [26]. The influence of women's employment status on high BMI has generated mix results, some authors agree with this study [49] while other similar studies found a significant association between employment status and high BMI [45, 47]. Further research that would investigate the employment type of women is needed to assess the effect of sedentary work-related lifestyle on high BMI.

Notwithstanding, this study was had both strengths and limitations. Firstly, this research used a population-based dataset that was large and nationally representative to explore the association between socioeconomic factors and high BMI. On top of that, several potential socio-economic and demographic confounding variables were considered in this present to ensure accurate parameter estimates. Finally, this study is the first to quantify household wealth related inequalities in high BMI among reproductive aged Ghanaian women using concentration index. However, the study findings may be limited because the self-reported variables used in this study could be affected by recall bias. Also, causality cannot be assumed because a cross-sectional study design was used.

Conclusion

The study analyses found household wealth inequalities in high BMI among Ghanaian women. Furthermore, the findings from the study demonstrated that socioeconomic factors are associated with high BMI among Ghanaian women. The research revealed that women who were older, wealthier, educated and were cohabiting, formerly or currently married have an increased risk of having high BMI. This observation suggests targeted policy interventions and programs that promote healthy body weight to reduce the prevalence of high BMI in Ghana.

List Of Abbreviations

AIC: Akaike's Information Criterion; AOR: Adjusted Odds Ratio; BMI: Body Mass Index; CI: Confidence Interval; GDHS: Ghana Demographic and Health Survey; UOR: Unadjusted Odds Ratio; PCA: Principal Component Analysis; ROC: Receiver operating characteristics; VIF: Variance Inflation Factor.

Declarations

Acknowledgments

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Author Declarations

Ethics approval and consent to participate

The study used de-identified secondary data from the 2014 GDHS after approval of our data request by MEASURE DHS. Ethical review was not required for this study because ethical approval was sought before the 2014 GDHS was conducted and the dataset is publicly available.

Consent for publication

Not applicable

Availability of data and materials

The datasets analyzed during the current study are available in the [MEASURE DHS] repository, [https://www.dhsprogram.com/data/dataset_admin/login_main.cfm]. [GHIR72DT]

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

The conceptualization, data analyses and results interpretation were done by ED. Both ED and PKB contributed to the writing and approval of the final manuscript.

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Tables

Table 1: Description of study variables

Variable name	Variable description	Coding structure
Outcome variable		
Body mass index (BMI)	Women's BMI	Categorized, 0= Not high BMI, 1 = High BMI
Primary explanatory variable		
Wealth status	Household wealth index	Categorized, 1 = Poorest, 2 = Poorer, 3 = Middle, 4 = Richer, 5 = Richest
Controlling variables		
Age	Maternal age	Categorized, 1=15-24 years, 2=25-34 years, 3=35-49 years
Religion	Religious affiliation of women	Categorized, 1 = Traditional/other, 2= Muslim, 3 = Christians
Marital status	Women's marital status	Categorized, 1 = Never married, 2= Co-habiting, 3 = Formerly married, 4 = Currently married
Ethnicity	Ethnic background	Categorized, 1 = Akan, 2= Northern tribes, 3= Ewe, 4 = Ga, 5 = other
Employment status	Women's employment status	Categorized, 1= Not employed, 2 = Employed
Place of residence	Dwelling place of women	Categorized, 0 = Rural 1 = Urban
Education	Maternal education	Categorized, 0 = No Education, 1= Primary, 2 = Secondary/Higher

Table 2. Distribution of study characteristics, and Unadjusted Odds ratios (UORs) and 95% Confidence Interval (CI) of study factors of having high body mass index (BMI) in the univariable logistic regression model

	All women 4,750 (100%)	High BMI 1,557 (35.9%)	Univariable model	
Study factors	N (%)	N (%)	UOR (95% CI)	P-value
Wealth status				
Poorest	1,200 (25.3)	154 (12.8)	Reference	< 0.0001
Poorer	873 (18.4)	225 (25.8)	2.34 (1.81, 3.02)	
Middle	985 (20.7)	390 (39.6)	4.52 (3.41, 5.98)	
Rich	876 (18.4)	456 (52.1)	7.92 (5.89, 10.65)	
Richest	816 (17.2)	478 (58.6)	11.17 (8.49, 14.69)	
Age (years)				
15-24	1,689 (35.5)	268 (15.9)	Reference	< 0.0001
25-34	1,453 (30.6)	637 (43.8)	4.65 (3.88, 5.57)	
35-49	1,608 (33.9)	798 (49.6)	5.79 (4.74, 7.09)	
Religion				
Traditional/other	240 (5.1)	61 (25.4)	Reference	0.0014
Muslim	938 (19.7)	319 (34.0)	1.57 (0.97, 2.52)	
Christian	3,572 (75.2)	1,323 (37.1)	1.91 (1.31, 2.79)	
Marital status				
Never married	1,513 (31.9)	293 (19.4)	Reference	< 0.0001
Cohabiting	625 (13.2)	234 (37.4)	2.35 (1.81, 3.06)	
Formerly married	463 (9.8)	241 (52.1)	4.53 (3.51, 5.86)	
Currently married	2,149 (45.2)	935 (43.5)	3.52 (2.88, 4.29)	
Ethnicity				
Akan	1,962 (41.3)	883 (45.0)	Reference	< 0.0001
Northern tribes	1,749 (36.8)	391 (22.4)	0.34 (0.26, 0.45)	
Ewe	564 (11.9)	211 (37.4)	0.72 (0.55, 0.96)	
Ga	255 (5.4)	117 (45.9)	1.14 (0.85, 1.53)	
Other	220 (4.6)	102 (46.4)	1.07 (0.76, 1.49)	
Place of residence				
Rural	2,422 (51.0)	616 (25.4)	Reference	< 0.0001
Urban	2,328 (49.0)	1,087 (46.7)	2.39 (1.95, 2.94)	
Employment status*				
Not employed	1,299 (27.4)	307 (23.6)	Reference	< 0.0001
Employed	3,447 (72.6)	1,394 (40.4)	2.14 (1.79, 2.55)	
Education				
No education	1,162 (24.5)	299 (25.7)	Reference	< 0.0001
Primary	895 (18.8)	299 (33.4)	1.55 (1.21, 1.98)	
Secondary/Higher	2,693 (56.7)	1,105 (41.0)	2.19 (1.75, 2.73)	

N, frequency; BMI, body mass index; %, percent; UOR, unadjusted odds ratio; CI, confidence interval; *N=4746, due to missing variables

Table 3. Adjusted Odds ratios (AORs), and 95% Confidence Interval (CI) of study factors of having high body mass index (BMI) in the final logistic regression model

Study factors	Final model
	AOR (95% CI)
Wealth status (Ref: Poorest)	
Poorer	2.18 (1.66, 2.85)
Middle	4.44 (3.24, 6.09)
Richer	7.75 (5.53, 10.86)
Richest	11.03 (8.07, 15.06)
Maternal age (Ref: 15-24 years)	
25-34 years	3.18 (2.56, 3.96)
35 -49 years	4.56 (3.44, 6.03)
Marital status (Ref: Never married)	
Cohabiting	1.69 (1.25, 2.27)
Formerly married	2.31 (1.66, 3.23)
Married	2.11 (1.63, 2.72)
Education (Ref: No education)	
Primary	1.47 (1.15, 1.86)
Secondary and higher	1.59 (1.27, 2.01)

BMI, body mass index; Ref, Reference; CI, confidence interval; AOR, adjusted odds ratio; %. Percent.

Table 4. Concentration index and 95% Confidence Interval (CI) of household wealth related inequality in high body mass index (BMI) across significant factors from the final logistic regression model

Study factors	Concentration index (95% CI)	Testing for differences in inequality	
		F-stat	P-value
Overall	0.24 (0.22- 0.26)	-	-
Maternal age			
15-24 years	0.24 (0.18-0.30)	0.48	0.6
25-34 years	0.21 (0.18-0.24)		
35 -49 years	0.24 (0.22-0.26)		
Marital status			
Never married	0.27 (0.21-0.33)	4.47	0.004
Cohabiting	0.21 (0.15-0.27)		
Formerly married	0.16 (0.11-0.21)		
Married	0.27 (0.24-0.30)		
Education			
No education	0.32 (0.26-0.38)	6.01	0.003
Primary	0.25 (0.20-0.30)		
Secondary and higher	0.19 (0.17-0.21)		

BMI, body mass index; Ref, Reference; CI, confidence interval; %. Percent; *Significant at p-value ≤ 0.05 .

Figures

Figure 1

Prevalence of high body mass index (BMI) among Ghanaian women across household wealth index

Figure 2

Area under ROC curve for the final model

Figure 3

Concentration curve of household wealth inequalities in high body mass index (BMI) among Ghanaian women