Effect of overweight/obesity on caesarean section occurrence among reproductive-aged women in Ethiopia: a secondary data analysis

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ABSTRACT

Background The burden of overweight/obesity increased worldwide and it has unpredictable effect on maternal morbidity and mortality. Different adverse perinatal outcomes observed in overweight/obese women, of those caesarean section occurred frequently. In Ethiopia, the national caesarean section and overweight/obesity rate among reproductive-aged women increased tremendously. Therefore, we intend to assess the association between overweight/obesity with caesarean section in Ethiopia.

Method The data were extracted from the 2016 Ethiopia Demographic and Health Survey in nine regions and two city administrations. A stratified two-stage random sampling design was used to collect data. The exposure variable was overweight/obesity, and the outcome variable was a caesarean section. The final analytical sample consisted of 6928 participants. SPSS V.23 was used to analyse the data. Descriptive statistics and cross-tabulation were performed to describe the study variables. Univariable and multivariable logistic regression models were regressed.

Results The prevalence of caesarean section among women aged between 15–49 years old who gave birth in the last 5 years was 245 (3.54%). The occurrence of caesarean section among overweight/obese women was 2.05 higher as compared with normal-weight women (AOR: 2.05, 95% CI: 1.09–3.83). The occurrence of caesarean section among overweight/obese women was 2.05 higher as compared with normal-weight women (AOR: 2.05: 95% CI: 1.09–3.83). The occurrence of caesarean section among overweight/obese women was 2.05 higher as compared with normal-weight women (AOR: 2.05, 95% CI: 1.09–3.83). The occurrence of caesarean section among overweight/obese women was 2.05 higher as compared with normal-weight women (AOR: 2.05, 95% CI: 1.09–3.83).

Conclusion and recommendation Promoting weight reduction programmes throughout the country would have a greater contribution to reduce caesarean section rate and health cost, and to improve the health of the mother.

BACKGROUND

Obesity is now considered as non-communicable pandemic disease in the entire world. It is a significant health issue for women during pregnancy and the puerperium period. Maternal obesity is associated with an increased risk of antenatal, perinatal, puerperium and neonatal complications.1

Globally, cesarean section (CS) rate has increased by 3.7% each year between 2000 and 2015. Delivery through CS accounted high percentage.7

In Ethiopian context, studies conducted previously on OWO and CS were descriptive and founded on pocket area which make it difficult to generalise. Therefore, the purpose
of this study was to analyse the Ethiopia Demographic and Health Survey (EDHS) data to assess the association between OWO and CS. The findings of the current study will generate evidence for policymakers, programme designer and health professionals to take appropriate actions among reproductive-aged women in Ethiopia.

METHODS
Study setting and design
The 2016 EDHS was designed to provide up-to-date estimates of key demographic and health indicators in Ethiopia. The data are collected from nine regions and two city administrations every 5 years. A detailed description of the study design and methodology of 2016 is found elsewhere. In brief, a stratified two-stage random sampling design was used to collect data from a nationally representative sample. In the first stage, a total of 645 enumeration areas (EAs) (202 in urban areas and 443 in rural areas) were selected with probability proportional to EA size and with independent selection in each sampling stratum. In the second stage, a fixed number of 28 households per cluster were selected with an equal probability systematic selection from the newly created household listing. A total of 15,683 women aged 15–49 years were interviewed in the 2016 EDHS, of which 6928 women had at least one live birth in the last 5 years before the survey. We excluded women with missing data on the question related to the outcomes of interest, like women’s twin pregnancy.

Outcome of interest
The outcome of interest was a CS which was assessed by asking the mother to recall ‘Whether the last child born in the last 3/5 years was born by CS or not’, which has binary outcome. Women who responded ‘Don’t know’ were excluded.

Exposure variable
OWO was categorised based on BMI result; thus, BMI was calculated by dividing weight in kilograms by height in metres squared (Kg/M²). The classification of BMI is taken from the WHO standard, that is, BMI=<18.5 Kg/m², ‘underweight’; BMI=18.5–24.9 Kg/m², ‘normal weight’; BMI=25–29.9 Kg/m² considered as overweight and BMI=≥30 Kg/m² categorised as obese. The BMI level was recorded at the time of data collection.

Covariates
Based on previous researches, the following covariates were selected: age of mother, household wealth index, educational level, occupational status, marital status, anaemia level, antenatal care visit, administrative region and smoking habit.

Statistical analysis
SPSS V.23 was used to analyse the data. Descriptive statistics and cross-tabulation were performed to describe the study variables. Univariable and multivariable logistic regression models were regressed to determine the association between OWO and CS. Crude Odd Ratio and Adjusted Odds Ratio (AOR) were presented with 95% CIs. Each covariate was included in the multivariable model regardless of their statistical significance in the univariable analysis. Finally, the association between OWO and CS was declared statistically significant at p value of <0.05.

RESULT
Table 1 displays the characteristics of the study sample. The prevalence of CS among women aged between 15 and 49 years old who gave birth in the last 3/5 years was 245 (3.54%). Regarding residence, 5504 (79.4%) were rural dwellers and 4202 (60.6%) had no formal education. More than half, 4051 (58.5%), of women did not have any work, and 1391 (20%) were engaged in agricultural work. Anaemia status was assessed through haemoglobin (HGB) level; 4565 (65.9%) had normal HGB levels.

According to EDHS 2016, 4242 (61.2%) women delivered in their home, 2686 (38.7%) women delivered in a health institution and 98 (1.4%) women delivered in other places. Among 6928 women, 4847 (70%) did not use any family planning method currently, 2037 (29.4%) used modern contraceptive currently and 44 (0.6%) used traditional family planning methods. Regarding alcohol consumption, 4894 (70.6) women did not take any alcohol in lifetime ever and 2034 (29.4%) women drank alcohol before the survey.

Being OWO was significantly associated with CS. The odds of CS among OWO women were 2.05 higher as compared with normal-weight women (AOR: 2.05, 95% CI: 1.09 to 3.83) (table 2 and online supplemental file 1).

DISCUSSION
This study assessed the association between OWO and CS delivery. The result showed that OWO was significantly associated with CS. The current study is the first to examine the association between OWO and CS in Ethiopia at the national level.

Being OWO increased the odds of CS rate 2.05 times as compared with those women with normal weight (table 2). This finding is consistent with a study conducted in Greece, Iraq, Nigeria, India and an experimental study in the UK. This might be because of OWO women have an abnormal or excessive fat accumulation that narrows the pelvic cavity. Additionally, the excess accumulation of fat among women also increases the weight of the fetus which results in macrocosmic baby. CS is highly prevalent among OWO women and a major obstetric complication. Obese women are at higher risk of complications at the time of labour and delivery. The rate of successful vaginal delivery decreases progressively as maternal BMI increases. A meta-analysis of 33 studies showed that the occurrence of CS delivery was 1.46, 2.05 and 2.89 times more over overweight,
Table 1  Characteristics of the study sample cross-tabulated with caesarean section among reproductive-aged women in Ethiopia (n=6928)

| Variables                  | Category          | Caesarean section |
|----------------------------|-------------------|-------------------|
|                            |                   | No    | Yes   |
| Age in years               | 15–24             | 1735  | 43    |
|                            | 25–34             | 3286  | 141   |
|                            | 35–49             | 1662  | 61    |
| Residence                  | Urban             | 1243  | 181   |
|                            | Rural             | 5440  | 64    |
| Educational status         | No education      | 4163  | 39    |
|                            | Primary           | 1804  | 82    |
|                            | Secondary         | 493   | 54    |
|                            | Higher            | 223   | 70    |
| Marital status             | Single            | 46    | 9     |
|                            | Married           | 6119  | 217   |
|                            | Living with a partner | 81  | 1     |
|                            | Widowed           | 100   | 1     |
|                            | Divorced          | 260   | 10    |
|                            | Separated         | 77    | 7     |
| Occupation                 | Agriculture       | 1391  | 20    |
|                            | Sales and services| 812   | 11.7  |
|                            | Skilled manual    | 244   | 3.5   |
|                            | Professional      | 140   | 2     |
|                            | Unskilled manual  | 97    | 1.4   |
|                            | Clerical          | 41    | 0.6   |
|                            | Not working       | 4051  | 58.5  |
| Wealth index               | Poor              | 3459  | 29    |
|                            | Middle            | 988   | 13    |
|                            | Rich              | 2236  | 203   |
| Anaemia level              | Non-anaemic       | 4380  | 185   |
|                            | Mild              | 1470  | 39    |
|                            | Moderate          | 618   | 9     |
|                            | Severe            | 103   | 2     |
| Smokes cigarettes          | No                | 66    | 2     |
|                            | Yes               | 68    | 2     |

Table 2  The univariable and multivariable logistic regression analyses of body mass index with caesarean section among reproductive-aged women in Ethiopia

| Variables         | Caesarean section | Crude OR | 95% CI        | Adjusted OR | 95% CI        | P value |
|-------------------|-------------------|----------|---------------|-------------|---------------|---------|
|                   |                   | No       | Yes           |             |               |         |
| Body mass index   | Underweight       | 1609     | 20            | 0.55        | 0.25 to 1.19  | 0.78    | 0.30 to 1.67 | 0.14    |
|                   | Normal            | 4477     | 130           | Reference   | Reference     | Reference|
|                   | OWO               | 597      | 95            | 4.95        | 3 to 8.19     | 2.05    | 1.09 to 3.83 | 0.033   |

Statistically significant at p<0.05.
Adjusted for age, marital status, wealth index, anaemia, occupation, administrative region, smoking habit and educational status of women. OWO, overweight/obese.
obese and severely obese women, respectively, as compared with normal-weight pregnant women. This is also supported by another study which stated that obese women had higher odds of complications at delivery such as prolonged pregnancy (post-term), induced deliveries and CS. The study conducted in England proves that obstetric complications were higher among women in high BMI category as compared with women whose BMI is in the normal range. As women develop obesity, they have high probability of developing birth complication and birth injury. Even if CS is one mode of delivery but the complication is high, managing the root cause like OWO is essential.

The current national survey has some limitations. First, the cross-sectional nature of the study precludes concluding the influence of OWO with CS. Additionally, this study is prone to residual confounding and misclassification bias. The relatively large sample size, availability of detailed data on confounders, standardised instruments and high-quality data collection techniques were the strengths of the current study.

CONCLUSION

OWO was significantly associated with CS. Promoting weight reduction programmes throughout the country would have a greater contribution to lower CS rate and health cost, and improve the health of the mother.

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