

# Determinants of Obesity Among Women of Childbearing Age in Urban Areas of Ethiopia

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**Abstract:** *Background:* Obesity is a major public health problem in both developed and developing countries. Its prevalence is increasing rapidly and reached epidemic proportions globally. Evidence suggests that the situation is likely to get worse especially among women because women tend to gain greatest amount of weight during their child-bearing age, putting them at risk for cardiovascular disease, type II diabetes, hypertension, and many other chronic disorders. Only few studies assessed the situation of obesity in women of childbearing age living in urban areas of Ethiopia. *Objectives:* The aim of this study is to identify the determinant factors of obesity among women of childbearing age in urban areas of Ethiopia. *Methods:* The study used women's of childbearing age dataset from the 2011 Ethiopian Demographic and Health Survey. The survey sample was designed to provide national, urban/rural, and regional representative estimates of key health and demographic indicators. This study used 3,535 urban women's, from the total 14,505 eligible women of childbearing age in the country. The sample was selected using a two-stage stratified cluster sampling procedure. Odds ratio along with 95% confidence interval in binary logistic regression was used to assess determinant factors associated with obesity among urban women of childbearing age. *Results:* The prevalence of obesity was (2.84%) among women of childbearing age living in urban areas of Ethiopia. Obesity was significantly associated with occupation, age, marital status, children ever born, wealth terciles, religion, parent's educational status and residing region in the binary logistic regression analysis. Parents education (AOR= 0.50: 95% CI (0.26 - 0.94), wealth terciles (AOR=2.01: 95% CI (1.10 - 3.67) and (AOR= 6.37: 95% CI (3.38 - 12.00) in medium and high, respectively and residing regions (AOR= 4.91: 95% CI; 1.24 - 19.47), (AOR=5.68: 95% CI; 1.52 - 21.16), (AOR=17.81: 95% CI; 4.97 - 63.78), (AOR=4.62: 95% CI; 1.36 - 15.64), (AOR=4.21: 95% CI; 1.28 - 13.75) and (AOR=6.06: 95% CI; 1.81 - 20.23) in Afar, Oromiya, Somali, Harari, Addis Ababa and Dire Dawa regions, respectively were found to be determinants of obesity. *Conclusion:* The prevalence of obesity among women of childbearing age in urban areas was high. Parents' education, wealth terciles and residing region were associated with obesity. Targeted interventions should be put in place to reverse increasing levels of obesity in order to prevent the risk of obesity and its related life threatening effects.

**Keywords:** Obesity, Body Mass Index, Women of Childbearing Age, Urban, Ethiopia

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## 1. Introduction

Obesity is the accumulation of total body fat. It is clinically defined as having a body mass index (BMI) of over 30 kg/m<sup>2</sup> [1]. More than 1.4 billion adults, 20 and older, were overweight. Of these overweight adults, over 200 million men and nearly 300 million women were obese [2, 3]. The prevalence of obesity is increasing rapidly in both developed

and developing countries. It is reached epidemic proportions globally, and evidence suggests that the situation is likely to get worse especially among women. One of the reasons for this is because women tend to gain greatest amount of weight during their child-bearing age, putting them at risk for cardiovascular disease, type II diabetes, hypertension, and many other chronic disorders [4-8]. Obesity and its associated health effects are more prevalent in women than in men: with the female to male difference in obesity was +4.6% [9].

More than 2.8 million people die each year as a result of being overweight or obese, and an estimated 35.8 million (2.3%) of global DALYs are caused by overweight or obesity. Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Risks of coronary heart disease, ischemic stroke and type 2 diabetes mellitus increase steadily with increasing body mass index (BMI), a measure of weight relative to height. The worldwide prevalence of obesity has nearly doubled between 1980 and 2008. In 2008, 10% of men and 14% of women in the world were obese (BMI  $\geq$ 30 kg/m<sup>2</sup>), compared with 5% for men and 8% for women in 1980. An estimated 205 million men and 297 million women over the age of 20 were obese – a total of more than half a billion adults worldwide [10].

The data analysis on BMI was based on 14,505 women age 15-49 years. Of these BMI weighted women's, 3,535 were residing in urban areas. The mean BMI for Ethiopian women age 15-49 is 20 kg/m<sup>2</sup>. While Five percent were overweight, and just 1 percent were obese nationally. Obesity was varying with residence from 2.84% in urban areas and only 0.4% in rural areas. The prevalence of obesity was as high as 10.6% in Somali region and 0.7% in Tigray region [11]. Therefore, this study was conducted to identify the determinant factors of obesity among women of childbearing age in urban areas of Ethiopia.

## 2. Methods

This study used the 2011 Ethiopian National Demographic and Health Survey (EDHS) (11). The 2011 EDHS weighted the BMI of 14,505 women age 15-49 years nationally and 3,535 from urban residence of the country. Two-stage stratified sampling procedure was used to select 624 clusters in the first stage from the list of enumeration areas delineated during the 2007 population and housing census (12). EDHS aimed at providing national, urban/rural, estimates of health and demographic parameters. The ICF International DHS questionnaire was adopted by Central Statistical Agency. Data were downloaded from measure DHS website with the consent of ICF international.

The dependent variable for this study was obesity while the main independent variables are region, BMI of mothers, mother's education and household wealth quintile. Data were analyzed using STATA version 11. Obesity prevalence rate was computed. Odds ratio along with 95% confidence interval in binary logistic regression was used to assess the association between independent variables and obesity prevalence. Ethical clearance was sought from appropriate bodies.

## 3. Results

A total of 3, 535 women of childbearing age living in urban areas of Ethiopia were included in the survey. The majority of the study participants 1,993 (56.4%) were not in union in their marital status. Nearly two third of women 2,322 (65.7%) were Orthodox while 595 (16.8%), and 618

(17.5%) were Muslim and other Christians, respectively. More than one fifth 758(21.5%) of the study subjects could not read and write during the time of the survey. More than one third 1,492 (42.2%) of the study subjects were no occupation. Nearly one third of the respondents 1,185 (33.5%) belonged to households in the lowest wealth terciles. With regard to age of the study subjects more than one third 1,393 (39.4%) were in the age range of 20 to 29. The majority 3,156 (89.3%) of the study subjects had less than five children ever born (Table 1).

**Table 1.** Socio-demographic characteristics of study participants among urban areas of Ethiopia, 2011.

Variables		Frequency (n= 3,535)	Percent
Marital status	Married	1,542	43.6
	Not in union	1,993	56.4
Religion	Orthodox	2,322	65.7
	Muslim	595	16.8
	Other Christians	618	17.5
Educational status	No education	758	21.5
	Primary	1,521	43
	Secondary	719	20.3
Occupation	Higher	537	15.2
	No occupation	1,492	42.2
	Employee	343	9.7
	Merchant	1,076	30.4
Wealth terciles	Farmer	212	6
	Daily laborer	412	11.7
	Low	1,185	33.5
Age	Medium	1,172	33.2
	High	1,178	33.3
	15 – 19	993	28.1
	20 – 29	1,393	39.4
Children ever born	30 – 39	764	21.6
	40 - 49	385	10.9
	< 5	3,156	89.3
	$\geq$ 5	379	10.7

From the total 3,535 study subjects, 100 (2.84%) of women of childbearing age living in urban areas of Ethiopia were obese during the interview. The prevalence of obesity significantly varied with occupation. Obesity was 27 (7.7%), 36 (2.4%), 28 (2.6%), and 10 (2.5%) in employee, no occupation, merchant, and daily laborer, respectively. The obesity prevalence rate was significantly higher among women's whose age was older than 40 years as compared to younger once less than 20 years (8.9% and 0.3%). Obesity was significantly higher among married women as compared to those not in unions (5% and 1.2%). Meanwhile, obesity was as high as 5.8% in women's who ever born greater or equal to five children as compared to women's who ever born less than five children (2.5%). Obesity was 5.4%, 2% and 1.2% among women whose wealth terciles was high, medium and low, respectively. Obesity was 5.1% among Muslim women as compared to 2.6% in women's confessed in Orthodox religion. In the same fashion, obesity was 7.8% in women's having secondary education where as 2% in women's who were no formal education. On the other hand, obesity significantly varied with residing region. It was as high as 10.6% in women's residing in Somali region while it was very low 0.7% in Tigray region (Table 2).

**Table 2.** Patterns of Obesity by Basic Background Characteristics of Women's of child bearing age in urban areas of Ethiopia, 2011.

Characteristics	Obesity		P-value
	Yes (%)	Number (n=3,535)	
Occupation			
No occupation	2.4	1,492	0.00
Employee	7.7	343	
Merchant	2.6	1,076	
Farmer	0	212	
Daily laborer	2.5	412	
Age			
15-19	0.3	993	0.00
20-29	1.6	1,393	
30-39	5.3	764	
40-49	8.9	385	
Marital status			
Married	5	1,542	0.00
Not in Union	1.2	1,993	
Children ever born			
<5	2.5	3,156	0.00
>=5	5.8	379	
Wealth terciles			
Low	1.2	1,185	0.00
Medium	2	1,172	
High	5.6	1,178	
Religion			
Orthodox	2.6	2,322	0.01
Muslim	5.1	595	
Other Christians	1.6	618	
Parent's educational status			
No education	2	437	0.00
Primary	3.6	809	
Secondary	7.8	380	
Higher	5.7	384	
Region			
Tigray	0.7	275	0.00
Afar	4.2	35	
Amhara	1.2	870	
Oromiya	3.5	841	
Somali	10.6	114	
Benishangul Gumuz	2.6	35	
SNNP	1.5	472	
Gambella	2.2	19	
Harari	4.9	26	
Addis Ababa	4.1	805	
Dire Dawa	6.2	43	

#### Determinants of obesity

Parents' education, wealth terciles and residing region were found to be the determinant factors of obesity among women of childbearing age in urban areas of Ethiopia. Women whose parents have no formal education were 50% times less likely AOR= 0.50: 95% CI (0.26 - 0.94) to be obese compared to those having higher education. Obesity was significantly associated with wealth terciles, women's whose wealth terciles were in medium were more than two times more likely ( AOR=2.01: 95% CI (1.10 – 3.67) to be obese as compared to the low wealth terciles. Meanwhile, women's whose wealth terciles were high were more than six times (AOR= 6.37: 95% CI (3.38 – 12.00) more likely to be obese as compared to the low wealth terciles. On the same way, obesity was significantly associated with residing region. Women's residing in Afar (AOR= 4.91: 95% CI; 1.24

– 19.47), Oromiya (AOR=5.68: 95% CI; 1.52 -21.16), Somali (AOR=17.81: 95% CI; 4.97 – 63.78), Harari (AOR=4.62: 95% CI; 1.36 – 15.64), Addis Ababa (AOR=4.21: 95% CI; 1.28 -13.75) and Dire Dawa (AOR=6.06: 95% CI; 1.81 – 20.23) were found to be obese as compared to women's residing in Tigray (Table 3).

**Table 3.** The Association between background characteristics and obesity among women of child bearing age living in urban areas of Ethiopia, 2011.

Variables	Obesity		OR (95%CI)	
	Yes	No	Crude	Adjusted
Family planning use				
No	63	2,451	1	1
Yes	37		1.72(1.29, 2.31)*	0.93(0.67, 1.30)
Parent education		984		
No education	8		0.42(0.25, 0.69) *	0.50(0.26, 0.94)**
Primary	29	428	0.53(0.35, 0.80)*	0.76(0.46, 1.26)
Secondary	30	780	0.74(0.49, 1.11)	0.72(0.46, 1.14)
Higher	22	350	1	1
Religion		362		
Orthodox	60		1	1
Other Christians	10	2,261	0.94(0.58, 1.51)	0.86(0.48, 1.57)
Muslim	30	608	1.53(1.13, 2.08) *	1.47(0.99, 2.18)
Frequency of watching television		565		
Not at all	32		1	1
Less than once a week	30	809	0.75(0.52, 1.07)	0.71(0.47, 1.08)
At least once a week	39	1,308	0.77(0.54, 1.08)	0.71(0.47, 1.07)
Educational status of women		1,318		
No education	26		1.05(0.69, 1.61)	1.25(0.65, 2.38)
Primary	28	733	0.55(0.36, 0.84)*	0.87(0.50, 1.52)
Secondary	27	1,492	1.00(0.65, 1.53)	1.33(0.79, 2.24)
Higher	19	692	1	1
Wealth terciles		517		
Low	14		1	1
Medium	24	1,171	1.46(0.86, 2.49)	2.01(1.10, 3.67)**
High	63	1,149	3.05(1.90, 4.92)*	6.37(3.38, 12.00)**
Region		1,115		
Tigray	2		1	1
Afar	1	273	5.38(1.46, 19.79)*	4.91(1.24, 19.47)**
Amhara	11	34	2.00(0.44, 9.05)*	1.52(0.24, 9.44)
Oromiya	29	859	4.20(1.16, 15.19)*	5.68(1.52, 21.16)**
Somali	12	811	12.87(3.83, 43.25)*	17.81(4.97, 63.78)**
Benishangul Gumuz	1	102	3.16(0.70, 14.32)	4.41(0.93, 20.78)
SNNPR	7	34	2.26(0.50, 10.23)	2.86(0.60, 13.60)
Gambella	0	465	3.01(0.71, 12.73)*	1.95(0.37, 10.11)
Harari	1	18	5.92(1.78, 19.66)*	4.62(1.36, 15.64)**
Addis Ababa	33	25	5.33(1.66, 17.04)*	4.21(1.28, 13.75)**
Dire Dawa	3	773	8.38(2.57, 27.27)*	6.06(1.81, 20.23)**
		41		

\*\* Statistically significant association at 5% level of significance.

## 4. Discussion

This study was conducted with the aim of identifying the

determinant factors of obesity among women of childbearing age in urban areas of Ethiopia. The study revealed that about 2.8% of the respondents were found to be obese. The obesity prevalence rate estimated in this study was nearly threefold times higher than the national estimate according to the 2011 Ethiopia Demographic and Health Survey report (11) and also higher than the study conducted among Nepal adult women and young adults in Uganda (13, 14). But lower than the studies conducted in Central Pennsylvania, Cameroon and Ghana (15-17). The variation in the level of obesity might be attributed to cultural, residence, food preferences, working habits and living conditions of the respondents.

In the binary logistic regression analysis, obesity was significantly associated with occupation, age, marital status, children ever born, wealth terciles, religion, parent's educational status and residing region.

In this study parents' education, wealth terciles, and residing region were found to be the determinant factors of obesity among women of childbearing age in urban areas of Ethiopia.

Moreover, obesity was significant in women's whose wealth terciles were medium and high. This finding is also consistent with the study conducted in Uganda, Ghana and global studies (14, 18 and 19).

This study revealed that obesity was significantly associated with residing region among women of childbearing age in urban areas of Ethiopia. The finding is consistent with the study conducted in Uganda where obesity was varying in residing cities of the country (14). This could be partly explained by variations in climatic conditions, food preferences, livelihood activities and genetic factors.

## 5. Conclusion

The study revealed that the prevalence of obesity in urban areas of Ethiopia is high as compared to other rural areas of the country. Parents' education, wealth terciles and residing region were found to be significant predictors of obesity among women of child bearing age living in urban areas of Ethiopia. Targeted interventions should be put in place to reverse increasing levels of obesity in order to prevent the risk of obesity and its related life threatening health effects.

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## Competing Interest

We declare that we have no conflict of interest.

## Authors' Contributions

WM and AB carried out the study, participated in the analysis and manuscript drafting. Both authors read and approved the final manuscript.

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