

## Obesity Among Pregnant Women in Heraa General Hospital, Makkah, Saudi Arabia

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### ABSTRACT

**Background:** Women who are overweight or obese before they become pregnant have a higher risk for complications during pregnancy and can expect more problems for their children. This is especially troubling in light of the current obesity epidemic.

**Aim of Study:** To estimate the prevalence of obesity and its associated factors among pregnant women in Heraa General Hospital (HGH), Makkah Al-Mukarramah, 2012.

**Subjects and Methods:** A cross-sectional approach was adopted. It included a representative sample of pregnant women admitted to the ward or visiting the antenatal clinic in HGH during May, 2012, Makkah Al-Mukarramah. A self-administered questionnaire was utilized for data collection. It includes personal data of pregnant women, their practice, opinion and attitude regarding obesity and physical activity during pregnancy. Pre-pregnancy weight and the current weight were calculated to estimate the BMI and then classified according to the Institute of Medicine (IOM) recommendations.

**Results:** The study included 134 pregnant women. Their ages ranged between 16 and 43 years with a mean of  $28.9 \pm 5.5$  years. Majority of them were Saudi (94.8%). All were currently married. More than half of them (50.7%) presented in the 9<sup>th</sup> month of pregnancy. The prevalence of overweight among pregnant women was (38.8%) and that of obesity was (38.1%)

while extreme obesity was observed among (10.4%) of pregnant women. Only (11.2%) were normal and (1.5%) were underweight. History of health education and previous obesity during pregnancy were significantly associated with obesity during current pregnancy.

**Conclusions:** The prevalence of obesity and overweight among pregnant women from Heraa General Hospital (HGH), Makkah Al-Mukarramah is high and more research is needed regarding maternal, perinatal and neonatal outcomes.

**Keywords:** Obesity, Pregnancy, Prevalence, Saudi Arabia.

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### INTRODUCTION

Obesity is an excess amount of body fat, results in significant impairment of health.<sup>1</sup> Health problems of obesity are becoming serious in the present time. Obesity is more common in women than men and reports showed increased risk of complications among pregnant women who were obese.<sup>2</sup>

Obesity is prevalent in both developed and developing countries and is not only a product of urbanized or industrial societies. It is increasing more rapidly in developing nations rather than the developed world.<sup>3</sup>

Consistent with trends highlighted in developing societies globally, modernization is cited as being a key factor in the growing prevalence of obesity. This increase in the obesity epidemic has been caused by a combination of a number of complex factors which include changes in eating habits, lifestyle factors, work environments, socio-economic issues, urbanization, increasingly sedentary lifestyles and cultural issues.<sup>4</sup> notes that the adoption of

an energy dense diet is attributed to the comparative low cost and prevalence of processed foods.

This increase in obesity has caused people significant ill-health by creating new health problems and worsening pre-existing conditions in patients in the strained health systems of the developing countries. Furthermore, this increase in obesity rates has not only put unnecessary risk on the wellbeing of affected individuals but also placed economic burdens on the already stressed health care systems globally.<sup>3,5</sup> The World Health Organization (2003)<sup>3</sup> claims that obesity is accounted by 2% to 6% of total health care expenditures in quite a number of developed countries. However, the exact costs are without a doubt much larger since not all conditions related to obesity are incorporated in the estimations.<sup>6</sup> Furthermore, according to the World Health Organization (2003)<sup>3</sup>, obesity related health risks and complications may include serious diet-related chronic

diseases; such as type II diabetes, hypertension and stroke, cardiovascular disease as well as some forms of cancer.

Western studies have indicated that minority women are particularly vulnerable to obesity.<sup>7,8</sup> However, average estimates of weight retention associated with pregnancy are small, ranging from -0.27 kg to 3 kg.<sup>9</sup> Although some researchers have attributed weight gain to physiological causes, such as delayed lacto genesis ("milk coming in")<sup>10</sup> and lower prolactin response.<sup>11</sup> However, as obese women are more likely to belong to subgroups of women with lower rates of breastfeeding than normal weight women, such as lower socioeconomic status<sup>12</sup> and higher depression<sup>13</sup>, it is necessary to adjust for these potential confounding factors.<sup>14</sup>

A recent document, the WHO consultation report on Obesity, has made special note of the increase in the rates of obesity among women all over the world. It is of concern that this epidemic is affecting women in all fertile ages.<sup>3</sup>

Women who are overweight or obese before they become pregnant have a higher risk for complications during pregnancy and can expect more problems for children.<sup>15</sup> This is especially troubling in light of the current obesity epidemic.<sup>15</sup> The most consistently described maternal complications during pregnancy and delivery in obese women are gestational diabetes, pregnancy-induced hypertension and preeclampsia, venous thromboembolism, the necessity for labor induction, and cesarean delivery.<sup>16-24</sup> Maternal overweight and obesity are associated with a greater risk of stillbirth, perinatal death, preterm delivery, fetal macrosomia, fetal birth defects, and admission to neonatal intensive care.<sup>17,21,24,25</sup> A recent study revealed that 31.5% of

Saudi females of childbearing age were overweight and 21.1% were obese.<sup>26</sup>

Despite these alarming levels of overweight and obesity, to the best of the researcher's knowledge no study on the effects of body mass index on pregnancy outcomes has been carried out in Saudi Arabia.

## SUBJECTS AND METHODS

Cross-sectional analytic approach was adopted to include pregnant women visiting the antenatal clinic or admitted in the obstetrical ward in HGH during the month of May, 2012, Makkah Al-Mukarramah city, which is the holy capital located in the western region of the Kingdom of Saudi Arabia (KSA). Total population in Makkah Al-Mukarramah city in the last statistics in 2010 was around 1,675,368.<sup>27</sup> Heraa general hospital (HGH) is one of seven other hospitals, has been opened since 1404 AH, giving health services to the north of Makkah Al-Mukarramah city. It has the capacity of 277 beds, 65 beds of which are for obstetrical and genealogical cases with average number of 200 admissions per month.

Assuming that, from the literature review of the same subject, the prevalence of overweight and obesity as average as 50%.<sup>28, 29</sup> Setting the confidence interval of 90% and sample error of 6%, using the Raosoft sample size calculator program, the sample size calculation was 159 pregnant women.<sup>30</sup>

The Institute of Medicine (IOM) recommended weight gain ranges for pregnant women depending on whether the pre-pregnancy weight was in the underweight, normal, overweight or obese ranges. (Table 1)

**Table 1: Recommended total weight gain ranges for pregnant women by pre-pregnancy BM**

Pre-pregnancy BMI	Recommended weight gain (kg)	Recommended weight gain (lb)
<b>Underweight, &lt;19.8</b>	12.5 - 18	28 - 40
<b>Normal, 19.8–24.9</b>	11.5 - 16	25 - 35
<b>Overweight, 25–29.9</b>	7 – 11.5	15 - 25
<b>Obese, &gt;29.9</b>	At least 6.8 (higher limit not specified)	At least 15 (higher limit not specified)

Available at: <http://www.iom.edu/~media/Files/Report%20Files/2009/Weight-Gain-During-Pregnancy-Reexamining-the-Guidelines/Resource%20Page%20-%20Weight%20Gain%20During%20Pregnancy.pdf>

The researcher used a self-administered questionnaire adapted by the researcher from other studies with modification. The self-administered questionnaire was validated both during the pilot and by obstetrician and a family physician. It includes personal data (age, marital status, parity, nationality, educational level, job, income and pre-pregnancy weight), their opinion and attitude regarding obesity and physical activity during pregnancy.

The data was collected and verified by hand then coded before entry. Statistical Package for Social Sciences (SPSS) software version 19.0 was used for data entry and analysis. Descriptive statistics (e.g. number, percentage, range, standard deviation, arithmetic mean) and analytic statistics using Chi Square tests ( $\chi^2$ ) to test for the association and/or the difference between two categorical variables and T-test for the mean difference were applied. P-value less than 0.05 was considered statistically significant.

## RESULTS

Out of 159 pregnant women recruited in the study, 134 returned completed questionnaire with a response rate of (84.3%). Table 2 presents the socio-demographic characteristics of the pregnant women. Their age ranged between 16 and 43 years with a mean of  $28.9 \pm 5.5$  years. Majority of them were Saudi (94.8%). All were currently married. More than one-third of them (37.3%) were nulliparous; however, (13.4%) had parity been more than three. Most of them (79.8%) were house wives. More than one-third of them (37.3%) were university graduated. Among slightly less than half of them (47.8%), the income ranged between 3000 and 5000 SR/month and in only (3.3%), it was more than 20000 SR/month. More than half of pregnant women (50.7%) presented in the 9<sup>th</sup> month of pregnancy while the remaining (49.3%) presented in the 6<sup>th</sup>-8<sup>th</sup> months of pregnancy. Almost half of pregnant women (48.4%) had previous history of obesity during pregnancy.

Table 2: Socio-demographic characteristics of the pregnant women (n=134).

Demographic data		Frequency	Percentage
Age in years	Range		16-43
	Arithmetic mean±SD		28.9±5.5
Nationality	Saudi	127	94.8
	Non-Saudi	7	5.2
Marital status	Married	134	100
Parity	None	50	37.3
	One	29	21.6
	Two	19	14.2
	Three	18	13.4
	More than three	18	13.4
Job	House wife	107	79.8
	Governmental employee	15	11.2
	Employee in private sector	4	3.0
	Student	8	6.0
Education	Primary school	18	13.4
	Intermediate	23	17.2
	Secondary school	43	32.1
	University	50	37.3
Income (SR/month)	<3000	15	11.2
	3000-5000	64	47.8
	>5000-10000	45	33.6
	>10000	10	7.5
	>20000	11	3.3

Table 3: Attitude of pregnant women towards obesity during pregnancy.

Statements	Strongly agree N (%)	Agree N (%)	Not sure N (%)	Disagree N (%)	Strongly disagree N (%)
▪ Practicing physical exercise suitable for pregnant women during pregnancy	30 (22.4)	59 (44.0)	36 (26.9)	9 (6.7)	0 (0.0)
▪ Following a healthy suitable diet regimen during pregnancy	31 (23.1)	62 (46.3)	31 (23.1)	10 (7.5)	0 (0.0)
▪ Increasing the weight of pregnant woman is associated with good infant's health and weight	10 (7.5)	26 (19.4)	46 (34.3)	49 (36.6)	3 (2.2)
▪ Obesity is dangerous for pregnant woman	41 (30.6)	49 (36.6)	34 (25.4)	7 (5.2)	3 (2.2)
▪ Obesity is dangerous for newborns	19 (14.2)	44 (32.8)	65 (48.5)	6 (4.5)	0 (0.0)

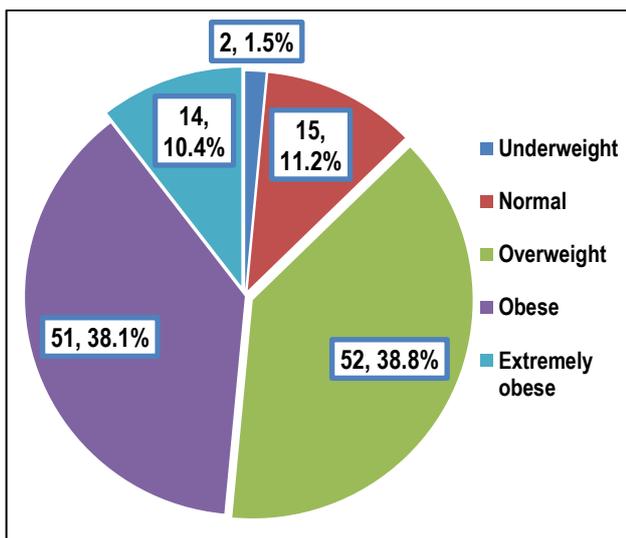


Figure 1: BMI among pregnant women.

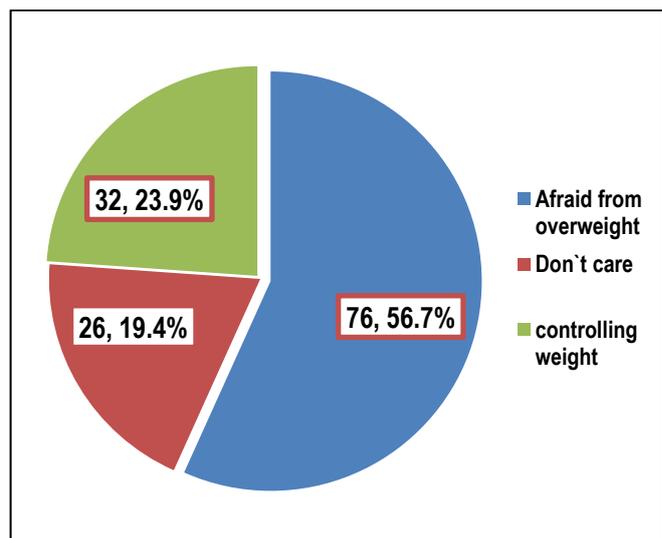


Figure 2: Opinions regarding body weight during pregnancy.

Table 4: Association between history of congenital anomalies among previous children and obesity during pregnancy

		Body mass index				p-value
		Normal	Overweight	Obese	Extremely obese	
		N=15 N (%)	N=52 N (%)	N=51 N (%)	N=14 N (%)	
▪ Age (years)	Mean	29.73	28.33	29.29	30.43	0.532
	SD	6.98	5.30	5.19	4.18	
▪ Nationality	Saudi (n=125)	14 (11.2)	48 (38.4)	49 (39.2)	14 (11.2)	0.654
	Non-Saudi (n=7)	1 (14.3)	4 (57.1)	2 (28.6)	0 (0.0)	
▪ Educational level	Primary (n=18)	3 (16.7)	4 (22.2)	8 (44.4)	3 (16.7)	0.693
	Intermediate (n=21)	1 (4.8)	11 (52.4)	7 (33.3)	2 (9.5)	
	Secondary (n=43)	7 (16.3)	15 (34.9)	17 (39.5)	4 (9.3)	
	University (n=50)	4 (8.0)	22 (44.0)	19 (38.0)	5 (10.0)	
▪ Job	House wife (n=105)	13 (12.4)	40 (38.1)	41 (39.0)	11 (10.5)	0.673
	Governmental employee (n=15)	0 (0.0)	6 (40.0)	8 (53.3)	1 (6.7)	
	Private sector (n=4)	1 (25.0)	2 (50.0)	0 (0.0)	1 (25.0)	
	Student (n=8)	1 (12.5)	4 (50.0)	2 (25.0)	1 (12.5)	
▪ Income (SR/month)	<3000 (n=15)	1 (6.7)	6 (40.0)	5 (33.3)	3 (20.0)	0.801
	3000-5000 (n=63)	9 (14.3)	22 (34.9)	28 (44.4)	4 (6.3)	
	>5000-10000 (n=45)	4 (8.9)	20 (44.4)	15 (33.3)	6 (13.3)	
	>10000 (n=9)	1 (11.1)	4 (44.4)	3 (33.3)	1 (11.1)	
▪ Parity	None (n=48)	6 (12.5)	18 (37.5)	18 (37.5)	6 (12.5)	0.477
	1-3 (n=66)	7 (10.6)	30 (45.5)	22 (33.3)	7 (10.6)	
	>3 (n=18)	2 (11.1)	4 (22.2)	11 (61.1)	1 (5.6)	
▪ Health education during pregnancy	Yes (n=60)	12 (20.0)	21 (35.0)	22 (36.7)	5 (8.3)	0.038
	No (n=72)	3 (4.2)	31 (43.1)	29 (40.3)	9 (12.5)	
▪ Dietician visits during pregnancy	Yes (n=11)	2 (18.2)	5 (45.5)	3 (27.3)	1 (9.1)	0.794
	No (n=121)	13 (10.7)	47 (38.8)	48 (39.7)	13 (10.7)	
▪ Physical activity during pregnancy	None (n=32)	5 (15.6)	13 (40.6)	11 (34.4)	3 (9.4)	0.572
	Light activity (n=85)	8 (9.4)	37 (43.5)	31 (36.5)	9 (10.6)	
	Practicing some days (n=12)	2 (16.7)	1 (8.3)	7 (58.3)	2 (16.7)	
	Regular activity (n=3)	0 (0.0)	1 (33.3)	2 (66.7)	0 (0.0)	
▪ Previous history of obesity during pregnancy	Yes (n=44)	1 (2.3)	15 (34.1)	20 (45.5)	8 (18.2)	0.018
	No (n=47)	9 (19.1)	20 (42.6)	15 (31.9)	3 (6.4)	
▪ History of congenital anomalies among previous children	Yes (n=6)	0 (0.0)	3 (50.0)	2 (33.3)	1 (16.7)	0.760
	No (n=82)	9 (11.0)	32 (39.0)	33 (40.2)	8 (9.8)	

Figure 1 displayed that the prevalence of overweight among pregnant women was (38.8%) and obesity was (38.1%), while extreme obesity was observed among (10.4%) of pregnant women. Only (11.2%) were normal and (1.5%) were underweight. Only 62 pregnant women (46.3%) cited that they had health education regarding body weight during pregnancy while only 11 pregnant women (8.2%) visited dietician during pregnancy. Almost one-quarter of pregnant women (25.4%) did not practice any physical activities during pregnancy while almost two-thirds of them (63.4%) practiced light activities most of the time and only 2, (2.2%) practiced regular activities most of the days. Majority of pregnant women (91.8%) reported that walking was suitable

during pregnancy while (18.7%) reported that swimming is a suitable physical activity during pregnancy.

Figure 2 demonstrated that more than half of pregnant women (56.7%) were afraid from overweight during pregnancy while only (23.9%) of them were controlling their weight and the remaining (19.4%) did not care about their weight during pregnancy.

From table (3), it was evident that almost two-thirds of pregnant women (66.4%) either agreed or strongly agreed that practicing of physical exercises was suitable for pregnant women during pregnancy compared to (6.7%) who disagreed. Similarly, (69.4%) agreed or strongly agreed for following a healthy suitable diet regimen during pregnancy compared to (7.5%) who disagreed.

More than one-third of pregnant women (38.2%) disagreed with the statement that increasing weight of the pregnant women was associated with good infant's health and weight compared to (26.9%) who agreed or strongly agreed with that statement. Almost two-thirds of pregnant women (67.2%) either agreed or strongly agreed with the fact that obesity is dangerous for pregnant women compared to (7.4%) who disagreed. Less than half of the pregnant women (47%) either agreed or strongly agreed with the fact that obesity was dangerous for newborns compared to (4.5%) who disagreed.

Two cases of underweight were excluded from analysis of associated factors with BMI. Only history of health education and previous history of obesity during pregnancy were significantly associated with obesity during pregnancy as seen in table (4). Only 8.3% of pregnant women who had health education during pregnancy compared to (12.5%) of those who had no health education were extremely obese, ( $p < 0.05$ ) and 18.2% of pregnant women who were obese during previous pregnancies were extremely obese compared to only (6.4%) among those who had no such history, ( $p < 0.05$ ).

## DISCUSSION

The impact of increased BMI in the general population has been the focus of many studies, but studies pertaining to pregnant women were few.<sup>31</sup> What studies have been reported were mainly from Western countries; there were very few Saudi studies on pregnant women.<sup>28,32</sup> The findings of Western studies may not be applied to the Saudi population. El-Gilany and El-Wehady collected data from records of 791 pregnant women in Al-Hassa, during the first month of gestation, registered for prenatal care. The prevalence of underweight, normal weight, overweight, obesity, and extreme obesity were 8.5, 39.3, 23.6, 23.9, and 4.7%, respectively. In Sudan, a cross sectional study at Khartoum hospital revealed that out of 1690 term pregnant women, 94 (5.5%) were underweight, 603 (35.6%) were overweight and 328 (19.4%) were obese.<sup>29</sup> In China, 11.5, 63.4, 18.3, and (6.8%) of a cohort of 5,047 singleton nulliparous pregnancies were underweight, normal BMI, overweight and obese, respectively.<sup>33</sup> In a pregnant population of Canary Islands, BMI was measured at the beginning of the pregnancy. One-quarter (25.0%) of the sample of pregnant women were overweight and (17.1%) were obese.<sup>34</sup> In USA, Aviram A, et al<sup>35</sup> reported that the rate of obese pregnant women was estimated at (18-38%). In current study, the prevalence of underweight, normal weight, overweight, obesity and extreme obesity in the last trimester of pregnancy were 1.5, 11.2, 38.3, 38.1 and 10.4%, respectively.

In the current study, almost two-thirds of pregnant women (67.2%) either agreed or strongly agreed with the fact that obesity is dangerous for pregnant women. Many researchers had shown that these women were of major concern to women's health providers because they encountered numerous pregnancy-related complications.

Obesity-related reproductive health complications range from infertility to a wide spectrum of diseases such as hypertensive disorders, coagulopathies, gestational diabetes mellitus, respiratory complications, and fetal complications such as large-for-gestational-age infants, congenital malformations, stillbirth, and shoulder dystocia.<sup>16-24</sup> In the present work, less than half of the pregnant women (47%) either agreed or strongly agreed with the

fact that obesity is dangerous for newborns. recent reports suggest that obesity during pregnancy can be a risk factor for developing obesity, diabetes, and cardiovascular diseases in the newborn later in life.<sup>35</sup> Moreover, maternal overweight and obesity are associated with a greater risk of stillbirth, perinatal death, preterm delivery, fetal macrosomia, fetal birth defects, and admission to neonatal intensive care.<sup>17,21,24,25</sup>

Regarding risk factors for obesity during pregnancy, current results revealed that having health education during pregnancy was associated with lower risk of obesity during that pregnancy. In addition, having previous history of obesity during pregnancy was associated with increasing risk of obesity during present pregnancy.

The study conducted in Canary Islands revealed that overweight and obesity were increasing both with age and not influenced by the educational level.<sup>34</sup> In the current research, although lower educated pregnant women were more obese or extremely obese compared to more educated, however Canary Islands' research showed that, there was no significant association between educational level and obesity during pregnancy. In contrast to Canary Islands' research, age in the current study was not a significant predictor for obesity during pregnancy. This could be attributed to the fact that the majority were below the age of 35 years (86.6%).

In another study conducted in KSA<sup>28</sup>, results revealed that the most important significant independent predictors of obesity were parity of 4 and more and urban residence. Surprisingly, in the current study, parity was not a significant predictor for obesity during pregnancy which could be attributed to the small sample size as only 13.4% of our pregnant women had parity more than three.

In Sudan<sup>29</sup>, Obesity during pregnancy was positively associated with age, with women's education and positively associated with parity. Our results failed to confirm such associations most probably due to relatively small sample size.

Hui et al<sup>36</sup> revealed the feasibility of lifestyle interventions (physical exercise and diet) during pregnancy and its potential to improve pregnancy outcomes. Having health education during pregnancy in the present study was associated with lower risk of obesity. Although visiting dietitian or practicing physical activity in the present study were not associated with significant decrease risk of obesity, yet, they were still important as they lowered the risk but not up to the required significant level.

Among limitations of the present study, it was conducted in one hospital (Heraa General Hospital) in Makkah Al-Mukarramah, which limits the generalization of the findings to Saudi pregnant women population. Secondly, because of the cross-sectional design adopted in this study, more attention should be paid to arriving at definitive conclusions regarding cause-and-effect relationships and finally, the researcher did not study the outcomes of obesity during pregnancy (maternal and perinatal). It was not clear whether obesity is a direct cause of adverse pregnancy outcome or whether the association between obesity and adverse outcome is due to factors or characteristics that were shared by both entities, such as advanced maternal age, high gravidity and associated pregnancy complications.<sup>15</sup> No randomized trials have been performed to investigate this relationship; however, indirect data suggest a possible causal association.

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