

# Impact of Gestational Weight Gain on Maternal and Neonatal Outcomes Among Pregnant Women Attending Latifa Hospital, Dubai, UAE 2013

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## Abstract

**Background:** The amount of weight gained during pregnancy can affect the immediate and future health of a woman and her infant. **Objectives:** To study the impact of abnormal gestational weight gain on maternal and neonatal outcome. **Methodology:** A retrospective records review research strategy was adopted through reviewing Patients records Pregnant women of abnormal gestational weight gain during pregnancy in Latifa hospital, Dubai, UAE, April 2013 to April 2014. **Results:** There was significant association between prenatal BMI and gestational weight gain from one side and nationality from the another side. gestational diabetes was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Cesarean section mode of delivery was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Apgar score of equal or more than 7 was more among those prenatal BMI less than 25 and the difference was statistically significant. Birth weight of less than 2.5 kg was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. gestational diabetes was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant. **Conclusions:** There was important effect of prenatal BMI and gestational weight gain on maternal outcomes such as gestational diabetes and hypertension. There was also effect of prenatal BMI on neonatal outcomes. **Recommendations:** Prenatal and gestational BMI assessments and monitoring program needs to be developed at maternal services as interventional as well as preventive strategies to assure proper neonatal and maternal outcome among Risky BMI pregnant women.

## Keywords

Gestational Weight Gain, Maternal and Neonatal Outcome, Dubai

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## 1. Background

The amount of weight gained during pregnancy can affect the immediate and future health of a woman and her infant. The

population demographics of women who become pregnant have changed dramatically over the past decade; more women are overweight or obese at conception.<sup>(1)</sup> Obesity is an ever increasing problem world wide especially in females

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due to sedentary lifestyle, peculiar eating habits and diet rich in fat & carbohydrates.<sup>(2)</sup>

In 2009, the Institute of Medicine (IOM) published revised pregnancy weight gain guidelines that are based on pregnancy body mass index (BMI) ranges recommended by the World Health Organization. Gaining within the recommended gestational weight gain ranges minimizes maternal, fetal and newborn risks.<sup>(3, 4)</sup> This does not mean, that every woman who exceeds or falls short of the recommended weight gain will have an unhealthy pregnancy. Many other factors besides maternal weight and gestational weight gain (such as smoking and maternal age) may affect pregnancy outcomes.<sup>(3)</sup>

Obesity has increased steadily in many countries since 1900. In the United Kingdom in 2002, it was estimated that 23 percent of men and 25 percent of women were obese. The prevalence of obesity in the United States increased from 22.9 percent between 1988 and 1994, to 34 percent in 2006.<sup>(5)</sup>

In the United States also, more than one third of women are obese, more than one half of pregnant women are overweight or obese, and 8% of reproductive-aged women are extremely obese.<sup>(1)</sup>

Results of studies in obesity prevalence in Gulf Countries have shown that Kuwait has the highest prevalence at 46% of the population, the lowest being 34.9% in Bahrain, in other hand, obesity was found to be prevalent in 35% females in UAE.<sup>(6)</sup>

In developed countries such as the United States, obesity and its complications disproportionately affect minority groups and those of lower socioeconomic status, whereas in countries just emerging from poverty rates of obesity are higher in the wealthier classes.<sup>(2)</sup>

It is well known that obesity increases morbidity for both mother and fetus, and is associated with a variety of adverse reproductive outcomes.<sup>(7)</sup> 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>(8)</sup> In Canada a Cohort study done on 2009 compared maternal and neonatal outcomes based on gestational weight gain in different pre-pregnancy BMI showed that 52.3% of women gained more than recommended. In women with normal pre-pregnancy BMI and overweight women, excess weight gain was associated with increased rates of gestational hypertension, augmentation of labour, and birth weight  $\geq$  4000 g. In morbidly obese women, poor weight gain was associated with less use of epidural analgesia. In women who were of normal weight, overweight, or obese, the rate of adverse

outcome (Caesarean section, gestational hypertension, birth weight  $<$  2500 g or birth weight  $\geq$  4000 g) was lower in women with recommended weight gain than in those with excess weight gain.<sup>(9)</sup> While in gulf area a prospective cohort study done for Eight months (Nov 2008 to June 2009), at Maternity and Children Hospital (MCH) Buraida, Saudi Arabia Sample included a group of 1000 randomly recruited pregnant Saudi females Revealed that PIH and gestational diabetes remained significantly high in overweight and obese groups as compared to normal weight group. The frequency of PIH calculated in different groups is; normal weight (5.6%), overweight (8.4%), obese (11.4%) and in morbidly obese (15.3%) while that of gestational diabetes is; 3.2% in normal weight, 5.1% in overweight, 7.1% in obese and 12.8% in morbidly obese females. higher rates of cesarean section in obese women as compared to those with normal weight (15–25% versus 4.8%) mainly due to macrosomia. macrosomia remained significantly high in obese (07%) and morbidly obese (12%) as compared to normal weight female infants (0.96%). Even after controlling for gestational diabetes, maternal obesity is associated with an 18% incidence of LGA neonates, which is a twofold increase over rates found in non-obese controls. It is a matter of great concern that about 70% of pregnant Saudi females have BMI  $>$ 25 and 80–90% of them are not aware of obesity & its adverse effects.<sup>(2)</sup>

With such high prevalence, predictive studies are important in planning for the needs of pregnant women with regards to obstetric care and its a major challenge to obstetric practice from preconception to postpartum.<sup>(6)</sup>

## 2. Objectives

To study the impact of abnormal gestational weight gain on maternal and neonatal outcome. (Pregnancy induced hypertension, Gestational diabetes, Mode of delivery, Apgar score, Birth weight).

## 3. Methodology

A retrospective records review research strategy was adopted through reviewing Patients records of pregnant women of abnormal gestational weight gain during pregnancy in Latifa hospital, Dubai, UAE, April 2013 to April 2014. All reproductive age female starts from 18 years, primigravida with singleton, full term pregnant who their pre pregnancy BMI more than or equal 25 considered for the study, only are less than 18 years of age, multigravida, preterm, more than singleton pregnancy (twins, triplets. etc), whom previously was diagnosed with hypertension and diabetes mellitus excluded. BMI was obtained from the first visit of their antenatal follow up (prenatal BMI), then their records were

followed to estimate the increase in their weight during whole pregnancy (Gestational weight gain). Their weight gain was classified in the normal range of weight gain during pregnancy as recommended by IOM guidelines.<sup>(1, 4)</sup>

Pre-pregnancy underweight	0.5 kg/week (2nd and 3rd trimester)	12.5-18 kg (total)
Normal weight	0.4	11.5-16
Overweight	0.3	7-11.5
Obese	0.2	5-9

Operational definition was identified for Gestational diabetes mellitus GDM,<sup>(15)</sup> Gestational hypertension,<sup>(16)</sup> Apgar.<sup>(17)</sup> Sample size was calculated using computer program EPI-

Info version”6.04”, by using the frequency rate of pregnancy outcome as cesarean section 55%, 3% of precision, 1.5 design effects and 95% confidence interval, the minimum acceptable sample size will be 384. All delivery records with abnormal gestational weight gain that gave birth at Latifa hospital selected to be considering for the study, when achieving the required sample size. Data collection carried out by using structured questionnaire, The questionnaire cover the following Domains: Socio-demographic data including, data related to gyn-obstetric history, anthropometric Measurements, BMI, weight gain during pregnancy.

**Table 1.** Association between factors (age, nationality, and occupation status) and Prenatal BMI (N=403).

Socio-demographic Characteristics	Groups	Prenatal BMI						P value
		<25		25-29		≥30		
		No.	%	No.	%	No.	%	
Age (in years)	18-23	35	38.9	35	38.9	20	22.2	NS
	24-29	50	32.1	67	42.9	39	25.0	
	≥ 30	17	29.8	18	31.6	22	38.6	
Nationality	Emirati	47	35.1	45	33.6	42	31.3	p≤0.01
	Non Emirati Other Arabs	39	44.3	29	33.0	20	22.7	
	Other non-Arabs	16	19.5	46	56.1	20	24.4	
Occupation status	Employed	30	29.7	44	43.6	27	26.7	NS
	Un Employed	66	36.5	67	37.0	48	26.5	

**Table 2.** Effect of Prenatal BMI on maternal outcomes (GDM and PIH) (N=403).

Prenatal BMI	Maternal Outcomes											
	Gestational Diabetes					p value	Hypertension					p value
	Yes		No		Yes		No					
	No.	%	No.	%	No.		%	No.	%			
<25	17	16.8	84	83.2	p≤0.01	--	--	101	100.0	p≤0.01		
25-29	26	21.7	94	78.3		11	9.1	110	90.9			
≥ 30	30	36.6	52	63.4		9	11.3	71	88.8			

**Table 3.** Effect of Prenatal BMI on neonatal outcomes (Mode of delivery, Apgar score and Birth weight) (N=403).

Prenatal BMI	Neonatal Outcomes																
	Mode of Delivery					p value	Apgar Score					p value	Birth Weight				p value
	Normal		Cesarean		< 7 (1 & 5 Min)		≥ 7 (1 & 5 Min)		<2.5 KG		≥ 2.5 KG						
	No.	%	No.	%	No.		%	No.	%	No.	%		No.	%			
<25	80	80.8	19	19.2	Less than 0.05	2	2.0	99	98.0	Less than 0.05	3	2.9	99	97.1	Less than 0.05		
25-29	98	81.0	23	19.0		5	4.1	116	95.9		4	3.3	117	96.7			
≥ 30	63	76.8	19	23.2		2	2.4	80	97.6		5	6.1	77	93.9			

**Table 4.** Association between factors (nationality, age and occupation status) and gestational weight gain by BMI (N=403).

Socio-demographic Characteristics	Groups	Gestational weight gain by BMI						P value
		<25		25-29		≥30		
		No.	%	No.	%	No.	%	
Age (in years)	18-23	49	39.2	44	35.2	32	25.6	NS
	24-29	58	31.4	74	40.0	53	28.6	
	≥ 30	21	29.6	22	31.0	28	39.4	
Nationality	Emirati	65	34.6	61	32.4	62	33.0	p≤0.01
	Non Emirati Other Arabs	45	42.5	34	32.1	27	25.5	
	Other non-Arabs	18	20.5	45	51.1	25	28.4	
Occupation status	Employed	37	30.3	43	35.2	42	34.4	NS
	Un Employed	82	35.3	88	37.9	62	26.7	

**Table 5.** Effect of Gestational weight gain by BMI on maternal outcomes (GDM and PIH) (N=403).

Gestational weight gain by BMI	Maternal Outcomes								p value	p value
	Gestational Diabetes				Hypertension					
	Yes		No		Yes		No			
No.	%	No.	%	No.	%	No.	%			
<25	17	13.4	110	86.6		1	0.8	125	99.2	
25-29	32	22.9	108	77.1	p≤0.001	10	7.1	130	92.9	p≤0.001
≥ 30	43	37.7	71	62.3		17	15.2	95	84.8	

**Table 6.** Effect of Gestational weight gain by BMI on neonatal outcomes (Mode of delivery, Apgar score and Birth weight) (N=403).

Gestational weight gain by BMI	Neonatal Outcomes										p value	p value			
	Mode of Delivery				Apgar Score				Birth Weight						
	Normal		Cesarean		< 7 (1 & 5 Min)		≥ 7 (1 & 5 Min)		<2.5 KG				≥ 2.5 KG		
	No.	%	No.	%	No.	%	No.	%	No.	%			No.	%	
<25	103	82.4	22	17.6	4	3.1	123	96.9	5	3.9	123	96.1			
25-29	114	81.4	26	18.6	NS	5	3.5	136	96.5	--	4	2.8	137	97.2	--
≥ 30	87	76.3	27	23.7		3	2.6	111	97.4		6	5.3	108	94.7	

## 4. Results

Table 1 shows significant association between prenatal BMI and nationality, while the difference in prenatal BMI among age groups and between employed and unemployed women was not statistically significant.

Table 2 shows that gestational diabetes was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant

Table 3 explains the relationship between prenatal BMI and neonatal outcomes (Mode of delivery, Apgar score and Birth weight). Cesarean section mode of delivery was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Apgar score of equal or more than 7 was more among those prenatal BMI less than 25 and the difference was statistically significant. Birth weight of less than 2.5 kg was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant.

Table 4 shows significant association between gestational weight gain and nationality, while the difference in gestational weight gain among age groups and between employed and unemployed women was not statistically significant.

Table 5 shows that gestational diabetes was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant.

Table 6 explains the relationship between gestational weight gain and neonatal outcomes (Mode of delivery, Apgar score

and Birth weight). Differences were statistically not significant.

## 5. Discussions

There was significant association between prenatal BMI and gestational weight gain from one side and nationality from the another side. It's clear that if there is prenatal BMI equal to or more than 30 then the gestational weight gain will be more than the normal limits. The significant relationship with the nationality variable was because of the cultural differences.

Gestational diabetes was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Maternal outcomes are the first which be affected by prenatal BMI. There will be increased risk of gestational diabetes and hypertension.

Gestational weight gain will be more and the risk subsequently will be more. Gestational diabetes was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant. Hypertension also was more among those who have gestational weight gain by BMI equal or more than 30 and the difference was statistically significant.

Cesarean section mode of delivery was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Apgar score of equal or more than 7 was more among those prenatal BMI less than 25 and the difference was statistically significant. Birth weight of less than 2.5 kg was more among those who have prenatal BMI equal or more than 30 and the difference was statistically significant. Neonatal outcomes are also significantly affected. This will result in more exposure of the fetus to risk.

## 6. Conclusions

There was important effect of prenatal BMI and gestational weight gain on maternal outcomes such as gestational diabetes and hypertension. There was also effect of prenatal BMI on neonatal outcomes.

## Recommendations

Prenatal and gestational BMI assessments and monitoring program needs to be developed at maternal services as interventional as well as preventive strategies to assure proper neonatal and maternal outcome among Risky BMI pregnant women.

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