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SHORT COMMUNICATION

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Abstract

The retrospective study to explore the adverse effect of obesity on pregnancy and labour was conducted at Aga Khan University Hospital, Karachi, Pakistan, and comprised data of all patients booked between 12-14 weeks and required induction of labour from January 1 to December 31, 2012. Women were grouped into two body mass index categories: normal weight (<22.9 kg/ m^2) as controls and exposed group (≥23 kg/m^2). Obesity increased the risk of development of gestational hypertension and diabetes. Therefore obese women were more likely to be induced due to medical indication whether primiparous or multiparous adjusted odds ratio =2.89(95% confidence interval 1.29-6.48) and 2.77 (95% confidence interval 1.07-7.19) respectively. There was increased chance of having caesarean section in primigravida adjusted odds ratio = 1.45 (95% confidence interval 0.72-2.92), duration of caesarean section and blood loss during the procedure were not significantly associated with high body mass index (p>0.05). Obesity may lead to a lot of problems in primigravida, but it did not have major impact.

Keywords: Obesity, Induction of labour, BMI.

Introduction

Obesity represents rapid emerging epidemics among women of reproductive age. In United States 61.9% young women are overweight and obese. In Pakistan 38.4% women of reproductive age are overweight, which is almost double compared to India.[1]

Obesity itself is associated with increased chance of pre-existing and fresh-onset medical problems like preeclampsia, gestational hypertension and gestational diabetes.[2] Therefore, these women are more likely to be induced. A few studies shows that myometrium of obese women was less responsive to oxytocin that leads to prolonged and non-progression of labour and end up in caesarean section (CS).[3]

A meta-analysis has estimated the risk of CS to be double for obese women and triple for women with severe obesity with body mass index (BMI) >35. There is increased risk of CS by 13% for each 5kg of weight-gain.[4]

Babies of obese women are more likely to be large for gestational age and macrosomic, hence these women were more prone to sustaining second-degree perineal tears.[3] It was also observed that foetal monitoring is difficult and delay in action leads to more neonatal intensive care unit (NICU) admission.[5]

Obesity per se causes difficult intubation, and difficulty in modus operandi of CS. Thus they experience more blood loss during surgery with increased risk of infections and thromboembolism. Overall, it is associated with labour complications and related maternal death.[5]

In Pakistan, literature supports the association of diabetes, preeclampsia and CS ubiquitously with obesity.[6] However, no study has included induction of labour (IOL) information.

The current study was planned to compare maternal and neonatal complications associated with IOL among pregnant women with normal BMI and high BMI.

Material and Methods

The retrospective study was conducted at Aga Khan University Hospital (AKUH), Karachi, and comprised data of all patients with 12-14 weeks of gestation from January 1 to December 31, 2012. Those who booked after 14 weeks were excluded. According to BMI (based on the World Health Organization categories for Asian population) at the time of booking, they were divided into normal BMI group (<22.9 kg/m^2) and high BMI (>23 kg/m^2).[7]

A sample size of 302 women divided equally into the two groups was calculated to achieve 80% power with 95% confidence level by taking an anticipated risk of CS 23.8% in normal weight and 38.7% in obese.[8]

Data was analysed using SPSS 19. Mean and standard deviation (SD) were calculated for continuous variables and frequency and percentages were calculated for categorical variables. Differences between means were checked through t-test and association between categorical variable was analysed through chi square/Fisher's exact test as

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appropriate. Crude and adjusted odd ratios (AOR) were calculated through logistic and linear regression as required. To control the effect of parity, sub-set analysis was conducted taking primipara and multipara as separate groups. For final model, $p<0.05$ and clinical relevance was considered significant.

Results

Of the 335 women whose data was analysed, 152(45.3%) were in the normal BMI group and 183(54.6%) in the high

Table-1: Baseline characteristics of pregnant women and newborns induced for labour.

Variables	Frequency (%) Mean±SD N=335	High BMI Frequency (%) Mean±SD N=183	Normal BMI Frequency (%) Mean±SD N=152
Age in years	27.61±4.31	28.58±4.50	26.43±3.77
Parity			
Primipara	183 (54.62)	81(44.26)	102(67.10)
Multipara	152 (45.37)	102(55.73)	50(32.89)
Gestational age at delivery	38.87±1.33	38.90±1.29	38.84±1.39
Inter-pregnancy weight gain	11.46±4.33	10.88±4.31	12.15±4.26
Reasons for IOL			
Non-medical	235 (70)	112(61.2)	123(80.9)
Medical	100 (30)	71(38.8)	29(19.1)
Hypertension			
Yes	23 (7)	15(8.1)	8(5.2)
No	312 (93)	168(91.80)	144(94.73)
Diabetes Mellitus			
Yes	38 (11)	26(14.20)	12(7.89)
No	297(89)	157(85.79)	140(92.10)

SD: Standard deviation
IOL: Induction of labour.

Table-2: Association of body mass index (BMI) with maternal and neonatal complications.

	Total n (%) Mean±SD	High BMI n (%) Mean±SD	Normal BMI n (%) Mean±SD	Crude OR Mean difference (95% CI)	Adjusted OR Adjusted Mean difference (95% CI)
Primiparous women					
High BMI; N=81					
Normal BMI; N=102					
Mode of delivery					
Normal	94(51.36)	34(41.97)	60(58.82)	1.95(1.09-3.57)	1.45(.72, 2.92)
C-section	89(48.63)	47(58.02)	42(41.17)		
Duration of C-section (min)	52.07±25.00	57.11 ±29.99	46.41±16.43	-10.69(-21.18-0.20)	2.14 (-.16,4.45)
Estimated blood loss during C-section(ml)	519±161.44ml	515.31±176.247	525.64 ±142.751	10.33(-58.90-79.57)	7.55(-60.33,75.44)
Estimated blood loss during vaginal delivery(ml)	333.53±196.65	383.61±222.059	291.11±162.026	-92.49(-158.54-26.44)	29.31 (-46.41,105.04)
Baby's birth weight (Kg)	3.07±460	3.51± 492	3.02± 437	-0.13(-0.26—0.08)	
IOL					
Non-medical	139(76)	52(64.19)	87(85.29)	3.23(1.59-6.59)	2.89(1.29,6.48)*
Medical	44(24)	29(35.80)	15(14.70)		
Multiparous women					
High BMI; N=102					
Normal BMI; N=50					
Mode of delivery					**.81(.29,2.24)**
Normal	130(85.52)	88(86.3)	42(84)	95(.35, 2.54)	
C-section	22(14.47)	14(13.7)	8(16)		
Duration of C-section (min)*	53.24±17.22	52.59±16.93	55.20±19.98	-2.61 –(-21.76,16.54)	5.95 (-8.06,19.97)
Estimated blood loss during C-section(ml)*	514.29±300.06	542.31±372.96	468.75±122.29	73.55 (-213.82,360.93)	80.18(-304.90, 465.27)
Estimated blood loss during vaginal delivery(ml)	181.80±95.67	172.16±91.24	200.67±102.21	-28.50 (-62.97, 5.95)	-28.83(-63.359,5.68)
Baby's birth weight (Kg)	3.16 ±.45	3.18±.40	3.11±.54	-.07 (-.22,-.08)	
IOL					
Non-medical	96(63.15)	60(58.82)	36(72.00)	1.80(.86,3.74)	2.77(1.07,7.19)*
Medical	56 (36.84)	42(41.18)	14(28.00)		

C-Section: Caesarean section
IOL: Induction of labour.

BMI group. Overall mean age was 27.61±4.31 years and 183(55%) were primiparous. Among primipara, 102(67%) had normal BMI, while only 50(32%) of multiparous had normal BMI. Inter-pregnancy weight-gain was 1.25kg less in obese woman with a mean of 12.15±4.26 versus 10.88±4.31. Reason for induction was non-medical in 235(70%) patients (Table-1). Overall, BMI did not have statistically significant effect on maternal and neonatal outcome (p>0.05). Parity was the only variable strongly associated with BMI (AOR 0.15; 95% confidence interval: 0.08, 0.29).

About 29(35.8%) of obese primipara and 42(41%) of obese multiparous women were induced for medical reasons. Therefore obese women were more likely to be induced due to medical indication whether primiparous or multiparous adjusted odds ratio =2.89(95% confidence interval 1.29-6.48) and 2.77 (95% confidence interval 1.07-7.19) respectively. Induction failed and resulted in Caesarean section (CS) in 47 out of 81 (58%) obese primiparous women. Association of CS with BMI was reversed in women with multiparity (AOR 0.81; 95% CI: 0.29, 2.24). Obese women had more blood loss during vaginal delivery (primipara 383.6ml vs. 291ml; multipara 542ml vs. 469ml) compared to women with normal BMI. However, association of BMI with blood loss during vaginal delivery or CS was not significant (Table-2).

Discussion

High BMI is an increasing problem globally. Pakistan, being an under-developed country already combating with infectious diseases and malnutrition, failed to provide health facilities to pregnant women and those in labour. The current pandemic of obesity has further burdened the limited resources of Pakistan.[9]

This study shows 20% of women needed IOL, which is comparable with an earlier study in Pakistan.[6] Obesity showed a linear correlation with medical disorders, like pregnancy-induced hypertension and diabetes. These findings are consistent with previous finding.[2] We found high level of diabetes in our data set. This could be due to high prevalence of diabetes mellitus in indo-Asian population.

Our study found that overweight and obese women were more likely to be induced due to medical problems than those of normal weight. Therefore it is possible that women with high BMI are more likely to be induced at poor bishop. This is consistent with other studies.[3]

This study confirmed the association between increased BMI, high chance of failed induction and sections in line with an earlier study.[3]

Primiparous obese women had more chance of CS than women of normal weight. Despite increase in rate of CS in obese primiparous, we found slightly decreased rate of CS in multiparous women. This is in keeping with findings from a large study on healthy obese that showed spontaneous vaginal deliveries more common in women with BMI>30, (p=0.03).[5] However, the number of healthy obese women was small in that study and it did not differentiate between primiparous and multiparous women. Some other studies also did not separate or exclude previous normal vaginal deliveries and CS which can act as confounders.[3]

The duration and amount of blood loss increased in primiparous women with high BMI than in normal BMI women, but it was not much different in multiparous women. Babies born to obese primiparous women were slightly heavier than those to normal-weight women. This is consistent with previous findings. However, contrary to previous literature, there was no NICU admission in our data.[5]

The strength of the current study is that the data was collected from a large tertiary care hospital of Karachi that dealt with more than 4000 deliveries per year. We found obesity in 44% of primigravida and 58% of multigravida. This is in line with findings by national Finnish FINRISK population study, which demonstrated that women who had more than three children were more instinctively bulky than those having one to two children. There is an increment of 7% in weight after each pregnancy.[10]

The National Health Survey of Pakistan declared the prevalence of obese female in general population to be 26%,[9] but our data set showed higher prevalence of obesity which is mainly due to catchment of population from the highly privileged segment of society.

The study had its limitations. It was a retrospective record review, so some details were found missing in the files. The sample was taken from a single centre so the results can't be generalised. We were not able to achieve the required sample size for sub-group analysis and results should be interpreted with caution. Further prospective multi-centre studies are required with larger sample size.

Conclusion

Obesity led to a lot of problems in primigravida but it did not have a major impact except in terms of

increasing the risk of induction due to medical reasons.

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