FREQUENCY OF OBESITY IN PREGNANCY AND OUTCOMES IN NORMAL WEIGHT, OVER WEIGHT AND OBESE PREGNANT FEMALES

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Abstract

Background and Objectives: Obesity is now becoming a significant health problem especially among women of child bearing age. Obesity has a major bearing on pregnancy outcomes, according to latest reports. Especially, during ante and intra partum period, obese women are more prone to develop adverse complication in comparison to women with a normal body mass index (BMI).This study aimed to determine the frequency of normal weight, over weight and obese women presenting for antenatal care and to compare the outcomes in these females.

Methods: A followup study was conducted from 29th October 2022 to 29 April 2023 .200 subjects were recruited to the study after informed consent. BMI was recorded and weight category assigned. All these women were followed-up till 37 weeks of gestation and till delivery. The indications for Caesarean section included those followed in routine as per labour room protocol. Main outcome variable: Fetal outcome was assessed using C-section, macrosomia and admission of neonate to NICU.

Results: Weight of 34% women (n=68) were classified as normal, 40.5% (n=81) were overweight and 25.5% (n=51) as obese. Comparison of outcome in normal weight, over weight and obese pregnant females shows that of 8 cases of macrosomia, 1 in normal and overweight while 6 cases in obese, of 61 cases of C-section 13 in normal, 15 in overweight and 33 were obese, NICU admission cases were 27, out of which 7 in normal, 6 in overweight and 14 were in obese group (p value 0.80).

Conclusion: We concluded that on comparison for the outcome in normal weight, over weight and obese pregnant females, obese and overweight females are higher at the risk of macrosomi;, cesarean birth and NICU admission of the neonate.

Keywords: Pregnancy, weight, antenatal care, outcome

The women can be categorized into four groups according to body mass index (BMI): underweight (<18.5 kg/m²), normal (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²) and obese (≥ 30.0 kg/m²) as per criteria set by WHO.[1] It has been reported that 15% to 30% women are overweight at the onset of pregnancy.[2] In United Kingdom about 50% of the women in reproductive age have an increased BMI , and more than one tenth are obese at the onset of their pregnancy.[3]

Obese pregnant females at the onset of pregnancy are at increased risk for fetomaternal complications during ante and intra partum period.[4] obese pregnant females tend to have a compromised outcome.

There have been some recent studies that maternal obesity is associated with high chance of operative vaginal delivery, cesarean section and related sequel.[5] Studies have shown that rates of induction of labour are increasing around the globe. Evidence indicates that obese women are more likely to have induction of labour.[6]

Angeliki A, et al. reported that obesity had an independent association with operative delivery, in

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overweight and obese women. The Apgar scores were markedly lower in these women in comparison to women with a normal BMI.[7]

There were more cases of poor APGAR scores, nerve damage due to shoulder dystocia, stillbirth, respiratory distress syndrome, bacterial sepsis, convulsions, and hypoglycemia of new born related to obese mothers.[8] Cesarean deliveries, are indicated in best interest of mother and child. One of the findings seen consistently is that birth by cesarean section is associated with a more risk of childhood obesity. Research has indicated an increased risk of obesity for those born by cesarean delivery.[9] There are no studies to support an association between mode of delivery and risk of obesity in the child.[10-11]

Kamel HA, et al concluded that rate of cesarean delivery was proportional to increase in BMI. This increase was proportional to the BMI of pregnant females.[12]

Obese women increased chance to have macrosomic babies, which makes these women to suffer more perineal trauma.[13] in a study it was reported that 4.8% neonates of women with normal BMI, and 18.3% of mildly obese and obese mothers were having microsomal. The admissions in NICU were seen in 4.6% versus 16.7%;[14]

The rationale of this study is that obesity is now on the rise in our country in women of reproductive age. As limited local data is available regarding the impact of obesity on pregnancy on fetal outcome in the local set up, I have designed this study to compare the pregnancy and fetal outcomes in overweight and obese pregnant females with that of normal weight pregnant females in our tertiary care settings. Knowing the exact prevalence of obesity, risk factors and complications during pregnancy would help to prevent adverse fetal outcome. With control of weight before and during pregnancy, a better outcome of pregnancy can be achieved with less complications.

OBJECTIVE

To determine the frequency of normal weight, over weight and obese women presenting for antenatal care and to compare the outcome in normal weight, over weight and obese pregnant females

OPERATIONAL DEFINITIONS

BMI: was calculated by dividing weight in kg by (height in meter 2). According to BMI (patients with $18.5 < 24.9$ kg/m^2 were labeled as of normal BMI and those with >25 kg/m^2 as It overweight more than 30 as obese. It was calculated at the start of pregnancy or at the first visit in first trimester.

Outcome of fetal pregnancy / fetal outcome

Macrosomia: Weight of the baby was noted at birth. Birth weight more than 4 kg was labeled as macrosomia.

Admission to NICU:

Number of neonates admitted in the NICU within 24 hours of delivery were noted. Decision of admission of the neonate in the NICU was made by a consultant pediatrician.

Cesarean section:

It was done if fetal distress on CTG, obstructed labour (partogram), postdate pregnancy, growth restriction were there.

METHODS

This follow-up study was carried out at Department of Gynecology, Lady Willingdon Hospital, from 29 October 2022 to April 29, 2023. Non-probability consecutive sampling was done. WHO sample size calculator was used to calculate the BMI. Expected frequency of macrosomia in obese primigravidae women P= 19%[12]Absolute precision=5.5%, level of confidence = 95%, sample size was 200.

All primigravidae women of age 20 to 35 years presenting at the start of pregnancy (on first antenatal visit) were recruited to the study. Those with history of smoking or any drug abuse, previous history of one or more abortions or miscarriages, pregnancy induced hypertension (PIH) or gestational diabetes and patients with any fetal congenital abnormalities, multiple pregnancies, patients who had epidural analgesia during labour, women who are induced for stillbirths, smokers, women with monthly family income above 300,000 were excluded .

After getting approval from the Ethical Review Committee, 200 subjects who fulfilled the inclusion criteria were enrolled after informed consent. BMI was calculated and weight category assigned. All these women were followed-up till 37 weeks of gestation and till delivery. Detailed history and examination was done in order to meet the exclusion criteria. All the data regarding the outcome variable was noted according to the operational definitions. Patient's height, weight, age and gestational age at inclusion and at delivery was noted. BMI was calculated using the formula and patient was categorized according to the BMI.

The indications for Caesarean section in any pregnancy included prolonged pregnancy, decreased fetal movements, IUGR, and prolonged term pre-labour rupture of membranes. Main outcome variable: Fetal outcome was accessed using C- section, macrosomia and admission of neonate to NICU (as per operational definition).

The data was analyzed using SPSS version 20. Frequency and percentages were calculated for qualitative variables including Educational level, socioeconomic status, BMI class, Macrosomia, Low birth weight, Admission to NICU and C-section. For the quantitative variables like age, weight, height, BMI, Gestational age at delivery, birth weight, mean ±SD was calculated.

The frequency of macrosomia, C-section and admission to NICU in the groups normal, overweight, & obese were compared using chi square test and p value of <0.05 was taken significant. Effect modifiers like age, BMI, Gestational age at delivery, Educational level, and socioeconomic status was controlled by stratification to find out the effect of these on the outcome, through chi square test. (p<0.05 was taken as significant.

RESULTS

200 cases were enrolled in this study for determination of the frequency of normal weight, over weight and obese women presenting for antenatal care and to compare the outcome in normal weight, over weight and obese pregnant females.

Age distribution shows that 60.5 %(n=121) were 20-30 years of age, whereas 39.5 %(n=79) were 31-35 years of age, Mean age was calculated as 29.9+3.53 years. (Table No. 1). Mean body index was calculated as 27.00+3.99. (Table No. 2)

Educational status was recorded as 52.5 % (n=105) were primary or below, 17.5 %(n=35) were Matric-inter and 30 %(n=60) were bachelor or above.

Socioeconomic status was recorded as 48 %(n=96) were poor and 52 %(n=104) were middle class.

Table 1: *Age Distribution   (n=200)*

Age(in years)	No. of patients	%
20-30	121	60.5
31-35	79	39.5
Total	**200**	**100**
Mean+SD	**29.9+3.53**	

Table 2: *Body Mass Index (n=200)*

	Mean	SD
BMI	27.00	3.99

Gestational age at delivery was recorded as 37.45+1.76 weeks. (Table No. 3)

Mean birth weight was calculated as 3317.125+389.6047 grams. (Table No.4)

Frequency of weight of the patients was classified as 34% (n=68) were normal, 40.5 % (n=81) were overweight and 25.5 %(n=51) were obese. (Table No. 5)

Table 3: *Gestational Age At Delivery (n=200)*

	Mean	SD
G.AGE(weeks)	37.45	1.76

Comparison of outcome in normal weight, over weight and obese pregnant females shows that of 8

Table 4: *Mean Birth Weight (n=200)*

	Mean	SD
Birth weight (grams)	3317.125	389.6047

Table 5: *Frequency of Weight of the Patients (n=200)*

Weight	No. of patients	%
Normal	68	34
Over weight	81	40.5
Obese	51	25.5
Total	**200**	**100**

cases of macrosomia, 1 in normal and overweight while 6 cases in obese, of 61 cases of C-section 13 in normal,

Table 6: *Comparison of Outcome in Normal Weight, Over Weight And Obese Pregnant Females (n=200)*

Outcome	Weight Group			P value
	Normal	Over-weight	Obese	
Macrosomia(n=8)	1	1	6	
C-sections(n=61)	13	15	33	0.80
Admission to NICU(n=27)	7	6	14	

Table 7: *Stratification For Age*

Outcome	Age	Weight			P value
		Normal	Over-weight	Obese	
Macroso-mia (n=8)	20-30	0	0	5(62.5%)	--
	31-35	1(12.5%)	1(12.5%)	1(12.5%)	
C-sections (n=61)	20-30	6(9.84%)	10(16.39%)	18(29.51%)	0.54
	31-35	7(11.47%)	5(8.20%)	15(24.59%)	
Admission to NICU (n=27)	20-30	1(3.70%)	5(18.53%)	8(29.63%)	0.38
	31-35	6(22.22%)	17(3.70%)	6(22.22%)	

Table 8: *Stratification For Gestational Age*

Outcome	G.Age at delivery	Weight			P value
		Normal	Over-weight	Obese	
Macroso-mia (n=8)	<37	0	0	0	--
	≥37	1(12.5%)	1(12.5%)	6(75%)	
C-sections (n=61)	<37	4(6.56%)	4(6.56%)	13(21.31%)	0.66
	≥37	9(14.75%)	11(18.03%)	20(32.79%)	
Admission to NICU (n=27)	<37	3(11.11%)	3(11.11%)	8(29.63%)	0.82
	≥37	4(14.81%)	3(11.11%)	6(22.22%)	

Table 9 : *Stratification For Educational Level*

Outcome	Educational level	Weight			P value
		Normal	Over-weight	Obese	
Microsomal (n=8)	Primary	1(12.5%)	0	4(50%)	--
	Matric	0	0	2(25%)	
	Bachelor	0	1(12.5%)	0	
C-sections (n=61)	Primary	8(13.11%)	4(6.56%)	15(24.59%)	0.32
	Matric	1(1.64%)	5(8.20%)	6(9.84%)	
	Bachelor	4(6.56%)	7(11.48%)	11(18.02%)	
Admission to NICU	Primary	4(14.81%)	1(3.70%)	6(22.22%)	0.56
	Matric	0	11(3.70%)	21(7.41%)	
	Bachelor	31(11.11%)	41(14.81%)	61(22.22%)	

15 in overweight and 33 were obese, NICU admission cases were 27, out of which 7 in normal, 6 in overweight

and 14 were in obese group, p value 0.80. (Table No. 6)

Stratification for age, gestational age, educational level and socioeconomic level are elaborated in 7-10

Table 10: *Stratification For Socioeconomic Level*

Outcome	Educatio-nal level	Weight			P value
		Normal	Over-weight	Obese	
Macrosomia (n=8)	Middle	0	1(12.5%)	4(50%)	--
	Poor	1(12.5%)	0	2(25%)	
C-sections (n=61)	Middle	7(11.48%)	9(14.75%)	19(31.15%)	0.94
	Poor	6(9.84%)	7(11.48%)	13(21.31%)	
Admission to NICU (n=27)	Middle	5(18.52%)	3(11.11%)	8(29.63%)	0.72
	Poor	2(7.41%)	3(11.11%)	6(22.22%)	

DISCUSSION

The increase in prevalence of obesity is becoming a public health concern especially among women of child bearing age. It has a major effect on pregnancy outcomes. During pregnancy and childbirth, obese women are more likely to end up in fetomaternal complications than women with a normal body mass index (BMI). Obese women are known to be at risk of antenatal, intrapartum, postpartum and neonatal complications. Knowing the exact prevalence of obesity, and its complications during pregnancy would help to ensure a better fetal outcome. With control of weight before and during pregnancy, many fetomaternal complications could be avoided.

In our study, 34% were of normal weight, 40.5% were over-weight and 25.5% were obese. Comparison of outcome in normal weight, over weight and obese pregnant females shows that of 8 cases of macrosomia, 1 in normal and overweight while 6 cases in obese. Of 61 cases of C-section 13 in normal, 15 in overweight and 33 were obese, NICU admission cases were 27, out of which 7 in normal, 6 in overweight and 14 were in obese group, p value 0.80.

Kamel HA, et al reported that rate of cesarean

deliveries was significantly increased with the increase in BMI.[12] It confirmed the findings of our study, cesarean section was increased with the increase in maternal BMI.

Babies of obese pregnant women are more likely to be macrosomic and females are more prone to sustaining perineal trauma.[13] in a study it was reported that increased maternal BMI was associated with adverse fetal outcome 14 these findings correspond to our results.

Another study 15 determined the frequency of obesity and its adverse effects on reproductive outcome in Saudi females. They found that increasing BMI is of concern and is associated with increasing risks of fetomaternal complications. In a study conducted in India, our neighboring country, it was concluded that maternal obesity had adverse fetal outcome.[16]

Sebire et al[17] found that maternal obesity was associated with a higher still birth rate. While Studies by Kumari[18] and Bianca et al[19] didn't show significant increase in still birth rates in obese women.

L E Edwards and colleagues, drew a comparison between the pregnancy outcomes in obese and normal-weight women and an association with gestational weight change. They revealed that obese women gained an average of 5 kg less during pregnancy and were more likely to maintain their weight. Obese pregnant females were more prone to develop pregnancy complications, but not related to weight change.

In a study done in Muzzafarabad[20], it was seen that to achieve an ideal fetal weight gain of 7-11.5 kg for obese pregnant females and around 16 kg for women with a normal weight appear to be satisfactory. It indicates that maternal weight in the pre pregnancy era has significant effect on pregnancy outcome. Control of weight before and during pregnancy, leads to a better outcome for pregnancy.

CONCLUSION

We concluded that on comparison for the outcome in normal weight, over weight and obese pregnant females, obese and overweight females are at higher risk for macrosomia, cesarean birth and NICU admission.

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