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## Comparative study of foeto maternal outcome in overweight/obese and normal weight pregnancy

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### Abstract

**Introduction:** The latest reports of the World Health Organization (WHO) [1] indicate that in 2005, approximately 1.6 billion people were overweight and at least 400 million adults were obese, a major contributor to global burden of chronic disease and disability.

Increasing rates of overweight/obesity among pregnant women are of significant public health concern with various implications for prenatal care and supervision of delivery. Therefore, the present study is to determine the adverse materno fetal outcome in overweight and obese women delivering singleton babies.

Obesity has become a major health problem all over the world in endemic proportions and it is rising worldwide including in women of reproductive age.

According to WHO World statistics Report 2012, globally one in six adults are obese and nearly 2.8 million individuals die each year due to overweight or obesity. Due to the increased risk of morbidity and mortality, Obesity is now recognized as a disease in its own right.

WHO describes obesity as a 'killer disease' comparing it with HIV. Obesity is expressed as the body mass index or Quetelet's index. The rate of obesity in pregnant women is rising and consequently obesity related problems.

Maternal overweight/obesity has been reported as a risk factor for various antepartum, intrapartum, post partum complications like gestational diabetes mellitus, gestational hypertension, pre eclampsia, antepartum hemorrhage, associated with risk of post-term delivery and greater need for induction of labor (IOL), postpartum hemorrhage, operative vaginal delivery, increased emergency cesarean delivery and total operative time, increased blood loss, multiple epidural placements and complications from difficult or failed intubations, increased infection rates, and prolonged hospitalization and neonatal complications like fetal macrosomia, shoulder dystocia, respiratory distress, NICU admissions and foetal anomalies like neural tube defects and still birth. Obesity is detrimental to the accuracy of obstetrical ultrasound examination. Obesity and hypertension are common co-factors in causing peripartum heart failure.

The increased risks of complications in overweight/obese women during pregnancy and delivery coupled with rising epidemic among women emphasise the need for specialists involved in identifying and treating overweight/obese women and to be aware of the risks, complications and their management.

Second-trimester dilatation and evacuation was reported to take longer and be more difficult in women whose BMI was 30 kg/m<sup>2</sup> or greater.

Obese women are less likely to breast feed than normal-weight women. Postpartum depression was significantly increased in obese women in relation to the degree of obesity.

Overweight and obesity are emerging problems in India. 13% of women and 9% of men are overweight or obese. The NFHS-4 (2015-16) of India [2] reports an increasing prevalence (20.7%) of overweight or obesity among women aged 15 to 49 years (ranging from 31.3% in urban areas to 15% in rural areas) compared to 12.6% in 2005-06 that the percentage of overweight or obese women among NFHS has defined malnutrition as a state of being either underweight or overweight or obese. Taking this definition into regard, 28.9% of malnutrition in urban areas is due to overweight or obesity and only 14.6% of malnutrition is due to overweight or obese in rural areas [2].

**Aims and objective:** Compare the foeto maternal outcome in obese and normal weight pregnancy

**Methodology:** This Prospective comparative study was conducted in the Department of Obstetrics and Gynecology, in Vanivilas Hospital and Bowring and Lady Curzon Hospital associated to Bangalore Medical College and Research Institute, Bangalore during December 2016 to May 2018.

In this study, 75 pregnant women with BMI > 25 kg/m<sup>2</sup> and 75 pregnant women with normal BMI 18.5 - 24.9 kg/m<sup>2</sup> were included. After taking informed consent, detailed history was elicited and detail physical examination, routine investigation were conducted patients are followed till delivery.

**Results:** Incidence of hypertension, gestational diabetes, preeclampsia, induction of labor, PROM, Mode of delivery, caesarian sections, SGA, nicu admissions are higher in obese patients than non-obese patients.

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**Key words:** obesity, pregnancy, fetal maternal outcome.

### Introduction

In numerical terms, we are now in the midst of the greatest epidemic ever experienced by humans. WHO describes obesity as a 'killer disease' comparing it with HIV. Obesity is expressed as the body mass index or Quetelet's index. The nutritional status of a pregnant woman is reflected by her BMI and it is important for her own health and that of the growing fetus. Obesity in female population has major impact on pregnancy. Rates of overweight and obesity, together with a host of their related disorders, are increasing rapidly throughout much of the world. The latest reports of the World Health Organization (WHO) [1] indicate that in 2005, approximately 1.6 billion people were overweight and at least 400 million adults were obese.

An increased association of morbidity and mortality with overweight and obesity is well established in both pregnant and non-pregnant women. Managing these problems and potentially reducing their risk, can pose a challenge to the obstetrical care provider.

Maternal overweight has been reported as a risk factor for various antepartum, intrapartum, postpartum and neonatal complications.

Maternal complications such as gestational diabetes mellitus, gestational hypertension, pre eclampsia, antepartum haemorrhage, induction of labor, operative vaginal delivery, caesarean section rates, total operative time, increased intra operative blood loss, postpartum hemorrhage, multiple epidural placements, complications from failed or difficult intubations and neonatal complications like fetal macrosomia, SGA, shoulder dystocia, respiratory distress, neonatal admissions, fetal anomalies like neural tube defects and still births. The increased risks of complications in overweight and obese women during pregnancy and delivery coupled with rising epidemic among women emphasize the need for specialists involved in identifying and treating these overweight women, and need to be aware of the risks and complications and their management.

The present study is to determine the adverse maternal fetal outcome in overweight and obese women delivering singleton babies. 28.9% of malnutrition in urban areas is due to overweight or obesity and only 14.6% of malnutrition is due to overweight or obese in rural areas [2].

Prospective comparative study was conducted in the Department of Obstetrics and Gynaecology, in Vanivilas Hospital and Bowring & Lady Curzon Hospital associated to Bangalore Medical College & Research Institute, Bangalore (BMCRI) during December 2016 to May 2018.

In this study, 75 pregnant women with BMI > 25 kg/m<sup>2</sup> and 75 pregnant women with normal BMI 18.5 - 24.9 kg/m<sup>2</sup> were included, according to the WHO classification of obesity. Sampling was done by simple random sampling. After taking informed consent, detailed history was elicited and detail

physical examination, routine investigation were conducted. Data analysis was done in SPSS statistical software Chi square test was applied to compare maternal and fetal outcomes.

**Inclusion criteria:** All antenatal mothers with singleton pregnancy admitted at 37 or more weeks of gestation with accurate information regarding height and weight recorded at first booking visit and categorized into two groups:

**Study group:** 75 antenatal mothers with BMI > 25 Kg/m<sup>2</sup>.

**Control group:** 75 antenatal mothers with BMI 18.5 to 24.9 Kg/m<sup>2</sup> with no medical / surgical complications.

### Exclusion criteria

1. All antenatal mothers with multiple pregnancies and malpresentations.
2. All antenatal mothers with previous history of Diabetes, Hypertension, heart disease and other medical complications.
3. All antenatal women with BMI < 18 Kg/m<sup>2</sup> and who do not have accurate weight and height recording during their first booking visit.

Maternal outcome such as pre eclampsia, APH, GDM, vaginal delivery, LSCS, vacuum, forceps delivery, maternal injuries and ICU admission and fetal outcomes such as SGA, LGA, NICU admission etc were recorded and analysed. Data analysis was done in SPSS statistical software.

### Results

This study conducted in the Department of Obstetrics and Gynecology, Bangalore Medical College and Research Institute, Bangalore, spread over one and a half years in which, 75 pregnant women with BMI > 25 kg/m<sup>2</sup> and 75 pregnant women with BMI 18.5 - 24.9 kg/m<sup>2</sup> were studied according to the WHO classification of obesity, data analysis was done in SPSS statistical software and the following observations were made.

- 57.3% (86) patients were in the age group of 21-25 yrs  $p=0.001$ , significant. The mean age of patients in the study was 25 years which reflects the average reproductive age of women.
- Geographical distribution of patients was studied, 72.7% (109) of patients belonged to the Bangalore urban, The incidence of overweight/obesity was 78.7% (59),  $p < 0.001$ , significant, attributable to sedentary life style in urban area.
- BMI distribution, among obese/ overweight group 33% belonged to overweight group, 12.67% belonged to Class 1 obesity, 0.67% of patients belonged to Class 2 obesity and 3.33% of patients belonged to Class 3 obesity.
- Obstetric Score distribution 45.3% of patients were primi gravidae and 54.66% of patients were multi gravidae.

**Table 1:** Past history of Abortion / IUD distribution in relation to patients studied.

Past History	Normal (%)	Overweight/Obese (%)	Total (%)	P-value
Abortion	05(6.7)	13(17.3)	18(12)	0.000
IUD	04(5.3)	04(5.3)	08(5.3)	0.638
No IUD/Abortion	66(88)	58(77.3)	124(82.7)	0.263
Total	75(100)	75(100)	150(100)	

The incidence of past history of abortion in overweight/Obese group is 17.3% (13) ( $p < 0.001$ ), significant.

**Table 2:** Pre eclampsia distribution in relation to patients studied

Preeclampsia	Normal weight (%)	Overweight/Obese (%)	Total (%)	P-value
Yes	6(8)	15(20)	21(28)	0.003
No	69(92)	60(80)	129(72)	0.225
Total	75(100)	75(100)	150(100)	

Overweight/obese group had 20% (15) of patients with pre-eclampsia (PE), the normal weight group had 8% (6) of patients with PE,  $p = 0.003$ , significant.

**Table 3:** Induction of labor (IOL) distribution of patients studied

Induction of labor (IOL)	Normal (%)	Overweight/Obese (%)	P-value
Yes	36(45.56)	43(54.43)	0.000
No	39(54.92)	32(42.66)	0.122
Total	75(100)	75(100)	

54.43% (43) overweight/obese and 45.56% (36) normal weight patients required Induction of labour (IOL),  $p < 0.001$ , significant.

**Table 4:** Premature rupture of membranes (PROM) distribution among patients studied

PROM	Normal (%)	Overweight/Obese (%)	Total (%)	P-value
Yes	7(9.3)	19 (25.3)	26 (17.3)	0.000
No	68(90.7)	56 (74.7)	124 (82.7)	0.163
Total	75(100)	75 (100)	150 (100)	

25.3% (19) of patients in the overweight/obese group and 9.3% (7) patients in the normal weight group had premature rupture of membranes (PROM),  $p < 0.001$ , significant.

**Table 5:** Mode of delivery distribution among patients studied.

Mode of Delivery	Normal (%)	Overweight / Obese (%)	Total (%)	P-value
Vaginal	45(60)	52(69.33)	97(64.66)	0.000
Vacuum	02(2.66)	04(5.33)	06(4.00)	0.152
LSCS	28(37.33)	19(25.33)	47(31.33)	0.001
Total	75(100)	75(100)	150(100)	

Mode of delivery distribution of patients studied, in the normal weight group, 60% of patients had a vaginal delivery, and 2.66% patients had a vacuum delivery. Nearly 31.3% of total patients had LSCS due to various indications. In the overweight/obese group, only 69.33% of patients had vaginal delivery, 5.33% of

patients had a vacuum delivery, and nearly 25.33% of patients had LSCS for various indications,  $p=0.001$ , highly statistically significant and indicated that as the BMI increases the risk for operative interference and LSCS (Obese pregnant mother data was considered for calculation of  $p$ -value).

**Table 6:** Significance level of mode of delivery among obese

Mode of delivery	No of cases	%	P-value
EM LSCS	19	25.33	0.001
Vacuum	04	5.33	0.2634
Vaginal	52	69.33	0.0003
Total	75	100	

As per the table the EM LSCS was found to be statistically significant as compared with obese population it was expressed 25.33%, calculated chi-square to be significantly associated with

all the incumbent parameters BMI, mode of delivery and induction of labour etc. The  $p=0.001$  significant.

**Table 7:** PROM with respect to mode of delivery

Mode of delivery	PROM		p-value
	Yes	No	
EM LSCS	07	12	0.00
Vacuum	01	03	0.28
Vaginal	11	41	0.00
Total	09	56	

The table indicates that the EM LSCS was seen in 07 cases in obese population and it was found to be statistically significant  $p < 0.001$  as compared with vacuum delivery (chi-square 12.11).

the vaginal delivery also found to be positively associated  $p < 0.001$  (chi-square 23.16)

**Table 8:** Birth weight (kg) in relation to BMI of patients studied.

Birth Weight(kg)	BMI (kg/m <sup>2</sup> )					Total
	Normal weight	Overweight	Class I	Class II	Class III	
<2.5	75(100)	5(10)	2(10.53)	0(0)	0(0)	82(54.9)
2.5-3.5	0(0)	39(78)	11(57.89)	1(100)	4(80)	55(36.8)
>3.5	0(0)	6(12)	6(31.59)	0(0)	1(20)	13(8.71)
Total	75(100)	50(100)	19(100)	1(100)	5(100)	150(100)
Mean ±Sd	2.9±0.5	3.06±0.47	3.2±0.55	3.25±0.00	3.05±0.44	

p=0.1064, Not significant,

ANOVA tests as per the above table and figures Normal weight mothers delivered 75 babies of less than 2.5 kg. Overweight mothers delivered 10% babies less than 2.5 kgs, 78% babies between 2.5 to 3.5 kgs & 12% babies more than 3.5kgs. p = 0.1064 Not significant.

**Table 9:** SGA distribution in relation to BMI of patients studied

BMI	SGA	%	P-value
overweight	50	66.67	0.00
Class I	19	25.33	0.03
Class II	1	1.33	0.89
Class III	5	6.67	0.45
Total	75	100.00	

It was observed that 66.67% of overweight women, 25.33% of class I obese, 1.33% of class II obese and 6.67% of class III obese mothers delivered SGA babies. The p value, p = 0.001 in Overweight group, may be attributable to the incidence of Pre eclampsia in Overweight group.

NICU admission in relation to BMI of patients. In overweight group 2.67% and in Class I Obese group 4% of newborn were admitted in. NICU due to respiratory distress. The p value is >0.001 which is statistically insignificant.

**Table 10:** Mean birth weight in relation to BMI of patients studied

Mode of delivery	Mean±SD	P-Value
EM LSCS	2.94±0.40	0.002
Vacuum	3.57±0.22	0.0013
Vaginal	3.11±0.49	0.004
Total	2.98±0.32	

From the table, the results was depicted that, the correlation between mode of delivery and body weight of the baby was done in the paired t test, the mean body weight was 2.94 kgs is recorded in LSCS and vacuum delivery 3.57 kgs and vaginal delivery was 3.11 kgs. The overall mean body weight of the neonates was 2.98 kgs with SD 0.32. The result of body weight of LSCS, vacuum and vaginal delivery is more associated with obese population.

**Table 11:** Mean Hospital stay in relation to mode of delivery.

Mode of delivery	Mean±SD	P-Value
EM LSCS	9.78±2.65	0.00
Vacuum	6.5±2.38	0.132
Vaginal	4.40±1.53	0.263
Total	6.89±2.05	

From the table, the results depicted that, the correlation between mode of delivery and hospital stay was done in the paired t test, the mean hospital stay was 9.78 days is recorded in EMLSCS and vacuum 6.50 days and vaginal was 4.40 days. The overall hospital stay of was 6.89 days with SD 2.05. The result of hospital stay of LSCS is found to be statistically significant  $P < 0.01$  in obese population.

- The incidence of Macrosomia was studied, normal weight women delivered 1 macrosomic baby, Overweight / obese mothers delivered 4 macrosomic babies. Pvalue > 0.01 Not statistically significant.
- Incidence of Shoulder dystocia was studied, in Overweight / obese mothers 2 babies suffered shoulder dystocia, p value >0.01, not statistically significant.
- The incidence of congenital anomalies was nil in both study groups, probably because of prophylactic folic acid tablet to all pregnant mothers during pregnancy.
- Incidence of Wound sepsis was studied, in Overweight / obese group 3 mothers had wound sepsis where as normal weight group mothers did not report any wound sepsis, p value >0.01, not statistically significant.
- Incidence of Breast feeding problems was studied, 3 normal weight mothers had difficulty in breast feeding, compared to 5 Overweight / obese mothers had breast feeding problems, p value >0.01. Not statistically significant.
- Both study groups did not report any cases of DVT / VTE as the mothers at risk were given Thromboprophylaxis treatment and motivated and advised for early mobilisation.
- There were no ICU admission of mothers in both the groups.
- There were no cases of Maternal and Neonatal deaths reported in both groups.

## Discussion

- The latest reports of the World Health Organization (WHO) indicate that in 2005, approximately 1.6 billion adults were overweight and at least 400 million adults were obese - a major contributor to global burden of chronic disease and disability [1]. With obesity reaching epidemic proportions worldwide, WHO has designated this disorder as a major threat to public health which affects young women resulting in rising prevalence among pregnant women. Obesity is a major risk factor to several maternal, obstetric, fetal and neonatal complications.
- The present study correlate that maternal pre pregnancy weight in comparison with normal weight ANC population, and also address the neonatal outcomes with respect to describe the associated parameters of the study, as per the study the greater risks of obese pregnancy-induced hypertension ( $p < 0.01$ ), caesarean delivery ( $p < 0.01$ ), birth weight  $p < 0.01$  at birth etc and significantly associated with morbidity ( $p < 0.01$ ) of the ANC's. It also reveals that, there is a correlation between BMI and pregnancy outcome.
- As per the results out of 150 patients, total 19.3% of patients were in the age group of 18-20 years, 57.3% of patients were in the age group 21-25 years, 18% of patients were in the age group 26-30 years and 5.3% of patients were in the age group of 31-35 years. The mean age of patients in the study was 25 years which reflects the average reproductive age of women.
- It was observed that 50% of patients belonged to normal



weight group. Among overweight/obese group 33% belonged to overweight group, 12.67% belonged to Class I obesity, 0.67% of patients belonged to Class II obesity and 3.33% of patients belonged to Class III obesity.

- In this study Gestational hypertension association with overweight/ obesity was studied, 5.3% of overweight/ obese group pregnant mothers had gestational hypertension which later progressed to pre eclampsia and 2.7% of patients with normal weight group had gestational hypertension. However the p value as calculated by Chi-square test was not statistically significant  $p > 0.001$ .
- In this study, pre eclampsia in association with overweight/obese group was examined. The overweight obese group had 20% with pre eclampsia, normal weight group had 8% had pre eclampsia.  $P < 0.003$  which was statistically significant. This was similar to that reflected by Awan *et al.* [36] study in which 27% of overweight/obese pregnant mothers developed pre eclampsia,  $p < 0.009$ .
- The incidence of GDM in overweight/obese group 2.7% of mothers, & in normal weight group, 1.3%,  $p > 0.011$  statistically insignificant. Awan *et al.* [36] in his study in which 24% of overweight/obese pregnant mothers developed GDM. The  $p < 0.009$  which was statistically significant. However in this present study the association of overweight and obesity and GDM was not found to be significant.
- 25.3% of mothers in overweight/obese group had PROM, 9.3% of patients in the normal weight group had PROM,  $p < 0.001$  statistically significant. In a similar study Awan *et al.* [36] in which 26.7% of overweight/obese pregnant mothers developed PROM  $p < 0.009$ . This is supported by study by Bianco *et al.* he found increased incidence of PROM of normal weight group was (10.56%) in comparison of obese group was (18.7%)  $p < 0.001$ . This study was equated with Bianco *et al.*, and also he presented overweight mothers showed different complications in form of fetal distress, failure of induction, birth injury and shoulder dystocia.
- In this study the association between IOL and overweight/obesity was studied 54.43% of mothers in the overweight/obese group required IOL and 45% normal weight group mothers required IOL,  $p < 0.001$  significant, which is supported by Indian study Arrowsmith S *et al.* [41] he studied the normal and obese population a total of 29, 224 women with singleton pregnancies between 2004 and 2008 of whom induction of labour of normal weight mothers was 42.26% and obese group mothers was 52.11% which was significant with  $p < 0.001$ . In a similar study by Awan *et al.* [36] revealed in which 26.7% of overweight/obese pregnant mothers required Induction of labor  $p < 0.001$ . In this present study the association of overweight and obesity and need for Induction of labor was found to be significant.
- The study examined the association between the mode of delivery with the normal weight group and overweight / obese group. mode of delivery in the normal weight group, 60% of patients had a vaginal delivery, 2.66% patients had a vacuum delivery and 37.33% had LSCS. In the overweight/obese group, only 69.33% of patients had vaginal delivery, 5.33% of patients had a vacuum delivery, and nearly 29% of patients had LSCS. The p value for obese group 0.001, highly statistically significant and reflected that as the BMI increases the risk for operative interference and LSCS (Obese pregnant mother data was considered for calculation of p-value). In a similar study by Seehra N. *et al.* [35] revealed in which 35.8% of overweight/obese pregnant mothers required Induction of labor  $p < 0.001$ . In this present study the association of overweight/obesity and need for LSCS was found to be significant. This was supported by similar study by Ramonien G. *et al.* [37] in which 42.8% of obese women delivered by LSCS compared to 29.8% of normal weight women delivered by LSCS,  $p < 0.001$ . In a study conducted by Sebire *et al.* [38] induction of labour was significantly higher in the study group with a p value  $< 0.05$  with an odds ratio 2.14, 95% CI (1.86-2.04) and odds ratio 1.94, 95% CI (1.86-2.04) respectively in each of the studies.
- 5 In a study conducted by Usha Kiran *et al.* [39] mean duration of labour was 8.09 hours in the study group with BMI  $> 30$  and 7.7 hours in the control group with BMI-20-30.10. In this present study revealed that overweight/obesity is significantly associated with Cesarean delivery. It is now universally acknowledged that maternal overweight and obesity are linked with adverse pregnancy outcome.
- The study of association of birth weight of babies to BMI was studied, normal weight mothers delivered 75 babies of less than 2.5 kg. Overweight mothers delivered 10% babies less than 2.5 kgs, 78% babies between 2.5 to 3.5 kgs & 12% babies more than 3.5kgs.  $p = 1064$  not statistically significant.
- The association between PPH and the BMI of the patients was examined and it was found that 4% of mothers in overweight group, 5.26% of mothers in the class I obesity group, no patients in the class II group of obesity and 20% of patients in the class III group of obesity had PPH. P value was  $0.69(p > 0.001)^*$ , was found to be statistically insignificant. In a study by Sebire *et al.* [38] in his study of 2.87.213 obese pregnant women in London in which Odds risk for obese pregnant mothers in relation to development of PPH was 1.16 was  $p < 0.001$ . In this present study the association of overweight and obesity and PPH was found to be insignificant. The Seehra
- N.*et al.* [35] increased risk of PPH in obese mothers may be explained by more bleeding from the relatively larger area of implantation of the placenta associated with a LGA. In view of the increased risk of PPH, the third stage of labor should be actively managed in obese women.
- The association between overweight/obesity and NICU admission was studied. In his study revealed in which 47% of newborns of overweight group were admitted in NICU and 10% of newborns of normal weight group were admitted in NICU,  $p < 0.0001$ . where as in this present study overweight group 2.67% and in Class I Obese group 4% of newborn were admitted in NICU mostly due to respiratory distress. In this study in the p value is  $> 0.001$  which is statistically insignificant. However in this study the association between Obesity and NICU admission was not found to be statistically significant. This may be attributable to the increased incidence of Pre eclampsia in overweight / obese pregnant mothers.
- Athukorala *et al.* [40] in his study reflected that mean birth weight of babies born to overweight and obese group mothers were greater than babies of normal weight mothers. From the results it was depicted that, the correlation between mode of delivery and body weight of the baby was done in the paired t test, The mean body weight was 2.94 kgs is recorded in LSCS and Vacuum 3.57 kgs and vaginal was 3.11 kgs. The overall mean body weight of the neonates was 2.98 kgs with SD 0.32. The result of body weight of LSCS, vacuum and vaginal is more associated with obese

population. In this study, the mean birth weight increased with increasing BMI as well as the risk of having babies more than 3.50 kg and >3.61 kg.

- In this study the correlation between mode of delivery and hospital stay was done, the mean hospital stay was 9.78 days is recorded in EM LSCS and vacuum 6.50 days and vaginal was LSCS is found to be statistically significant  $P < 0.001$  in Obese population. In a similar study Sewell MF *et al.* [42] reported that, an overweight and obese mothers had longer duration of hospital stay with mean differences of 2.8 and 5.5 days respectively. The mean duration of postnatal hospital stay was also significantly longer ( $p=0.000$ ). Similar findings has been reported by other studies as well.
- The incidence of Macrosomia was studied, normal weight women delivered 1 macrosomic baby, Overweight / obese mothers delivered 4 macrosomic babies. Pvalue  $>0.01$  Not statistically significant.
- Incidence of Shoulder dystocia was studied, in Overweight / obese mothers 2 babies suffered shoulder dystocia, p value  $>0.01$ , not statistically significant.
- The incidence of congenital anomalies was nil in both study groups, probably because of prophylactic folic acid tablet to all pregnant mothers during pregnancy.
- Incidence of Wound sepsis was studied, in Overweight / obese group 3 mothers had wound sepsis where as normal weight group mothers did not report any wound sepsis, p value  $>0.01$ , not statistically significant.
- Incidence of Breast feeding problems was studied, 3 normal weight mothers had difficulty in breast feeding, compared to 5 Overweight / obese mothers had breast feeding problems, p value  $>0.01$ , not statistically significant.

## Conclusion

1. The mean age of patients in the study was 25 years which reflects the average reproductive age of women.
2. Geographical distribution was studied, 72.7% (109) of patients belonged to the Bangalore urban, the incidence of overweight/obesity was 78.7% (59),  $p < 0.001$ , significant, attributable to sedentary life style in urban area.
3. The incidence of past history of abortion in overweight/Obese group is 17.3% (13) ( $p < 0.001$ ) significant.
4. Overweight/obese group had 20% (15) of patients with pre-eclampsia (PE), the normal weight group had 8% (6) of patients with PE,  $p = 0.003$ , significant.
5. Induction of labour distribution of patients was studied 54.43% (43) overweight/obese and 45.56% (36) normal weight patients required Induction of labour (IOL),  $p < 0.001$ , significant.
6. Premature rupture of membranes (PROM) distribution was studied, 25.3% (19) of patients in the the overweight/obese group and 9.3% (7) patients in the normal weight group had premature rupture of membranes (PROM),  $p < 0.001$ , significant.
7. Incidence of SGA distribution was studied, 66.67% of overweight women, 25.33% of class I obese, 1.33% of class II obese and 6.67% of class III obese mothers delivered SGA babies. The p value  $p=0.001$ , significant
8. The incidence of Macrosomia was studied, normal weight women delivered 1 macrosomic baby, Overweight / obese mothers delivered 4 macrosomic babies. Pvalue  $>0.01$  Not statistically significant.
9. Incidence of Shoulder dystocia was studied, in Overweight / obese mothers 2 babies suffered shoulder dystocia, p value

$>0.01$ , not statistically significant.

10. The incidence of congenital anomalies was nil in both study groups, probably because of prophylactic folic acid tablet to all pregnant mothers during pregnancy.
11. Incidence of Wound sepsis was studied, in Overweight / obese group 3 mothers had wound sepsis where as normal weight group mothers did not report any wound sepsis, p value  $>0.01$ , not statistically significant.
12. Incidence of breast feeding problems was studied, 3 normal weight mothers had difficulty in breast. Feeding, compared to 5 Overweight / obese mothers had breast feeding problems, p value  $>0.01$ , not statistically significant.
13. Both study groups did not report any cases of DVT / VTE as the mothers at risk were given. Thrombo prophylaxis treatment and motivated and advised for early mobilization.
14. There were no ICU admission of mothers in both the groups.
15. There were no cases of Maternal and Neonatal deaths reported in both groups.

## Overweight/Obesity is associated with adverse feto maternal outcome.

- Obstetric care providers have an important role to play in promoting healthy weight for women in pregnancy and beyond. overweight or obese pregnant women should be regarded as high risk pregnancy.
- Increased maternal and neonatal morbidity results in increased utilisation of resources at a significant cost to the community. There is a need to plan effective preventive strategies prior to pregnancy and during pregnancy to improve maternal and fetal outcome.
- All attempts should be made to prevent obesity in women of child bearing age and to encourage weight loss before pregnancy.
- Overweight/obese pregnant women, with excessive gestational weight gain should be 'flagged' for health care providers who will be assuming or resuming care.
- Prevention is better than cure, this dictum holds good for overweight / obesity also.
- The adolescent girls in the society should be educated about occurrence, adverse effects & prevention of overweight / obesity and also regarding healthy life style and healthy food habits in their future life. This must be advised to be implemented in ARSH Clinic (Adolescent reproductive and sexual health programme), conducted in all PHC'S under National Health Mission.

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