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Association of body mass index with rate of cervical dialatation in spontaneous onset labour

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Abstract---Objective: To determine association of cervical dialatation rate with body mass index (BMI). Introduction: The prevalence of overweight and obesity is increasing among women of childbearing age. Observational studies show that obese women have up to a 2-fold increased risk for a cesarean delivery compared with normal-weight women. The purpose of this study was to examine the effect of maternal overweight and obesity on the pattern of labor progression in pregnant women with a singleton, term pregnancy with spontaneous onset labour. Methods: We analyzed data from 1531 pregnant women with a term pregnancy those were admitted in SSMC ,Rewa from August 2017- July 2018 with spontaneous onset labour pain at term. The median duration of labor by each centimeter of cervical dilation was computed for under weight(Body mass index BMI<18.5 kg/m2), normal-weight (BMI_ 18.5 –24.9 kg/m2), overweight (BMI >24.9-29.9 kg/m2), and obese (BMI>30 kg/m2) women and used as a measurement of labor progression. Results: After considering inclusion and exclusion criteria all laboring females were allowed to progress naturally and four hourly partogram was recorded. All females who required augmentation ,caesarean or instrumental delivery were excluded from the study. On the basis of individual labour progress chart which were obtained ,a final composite labour graph was derived and appropriate statistical tests were applied. We have found that BMI is directly related to rate of cervical dilatation . Mean rate of cervical dilatation was 1.46 cm/hr in group with BMI <18.5 kg/m2 .The rate of cervical dilatation was less in group with BMI >30 i.e 0.9 cm/hr. Conclusion: . Labor progression in overweight and obese women was significantly slower than that of normal-weight and under- weight women. Given that NFHS (National family health survey -5)[1] has shown that obesity is increasing in India in all states

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from 21% to 24% among women, it is critical to consider differences in labor progression by maternal pre pregnancy BMI before additional interventions are performed.

Keyword---body mass, dialatation, spontaneous onset labour.

Introduction

The prevalence of overweight and obesity is increasing among women of childbearing age. An estimated 12% of pregnant women 18–49 years of age in the India are considered overweight (body mass index _BMI_25–29.9 kg/m2). Observational studies show that obese women have up to a 2-fold increased risk for a cesarean delivery compared with normal-weight women[2-9]. However, it is unclear what factors may contribute to this elevated risk, because scientific evidence on the effect of maternal pre pregnancy weight status on labor progression is still limited[8,10] . Does the course of labor tend to differ for overweight and obese women, compared with that of normal-weight women? The purpose of this study was to examine the effect of maternal overweight and obesity on the pattern of labor progression in pregnant women with a singleton, term pregnancy with spontaneous onset labour.

Materials and Method

This was a prospecve observaonal study conducted from August 2017 to July 2018. The study was conducted at Department of Obstetrics and Gynaecology, SS Medical College Rewa. The study was approved by Instuonal Ethics Commiee. All paents admied in the labour room during the course of study and fulfilling the inclusion and exclusion criteria were enrolled in the study. After considering inclusion and exclusion criteria all laboring females were allowed to progress naturally and a four hourly partogram was recorded. All females who required augmentaon, caesarean or instrumental delivery were excluded from the study. On the basis of individual labour progress chart which were obtained, a final composite labour graph was derived and appropriate statistical tests were applied.

Inclusion criteria

- Term pregnant female of Indian origin
- Maternal age: 18-35 years old
- Gestaonal age: 37 weeks to 41 weeks
- Spontaneous onset of labour
- First to fourth gravida with singleton pregnancy with vertex presentaon
- Cervical dilataon less than or equal to 4cm
- Normal neonatal outcome

Exclusion criteria

- Induced labour, Elecve LSCS or emergency LSCS

- With history of any medical illness
- High risk pregnancy
- Oxytocin augmented labour

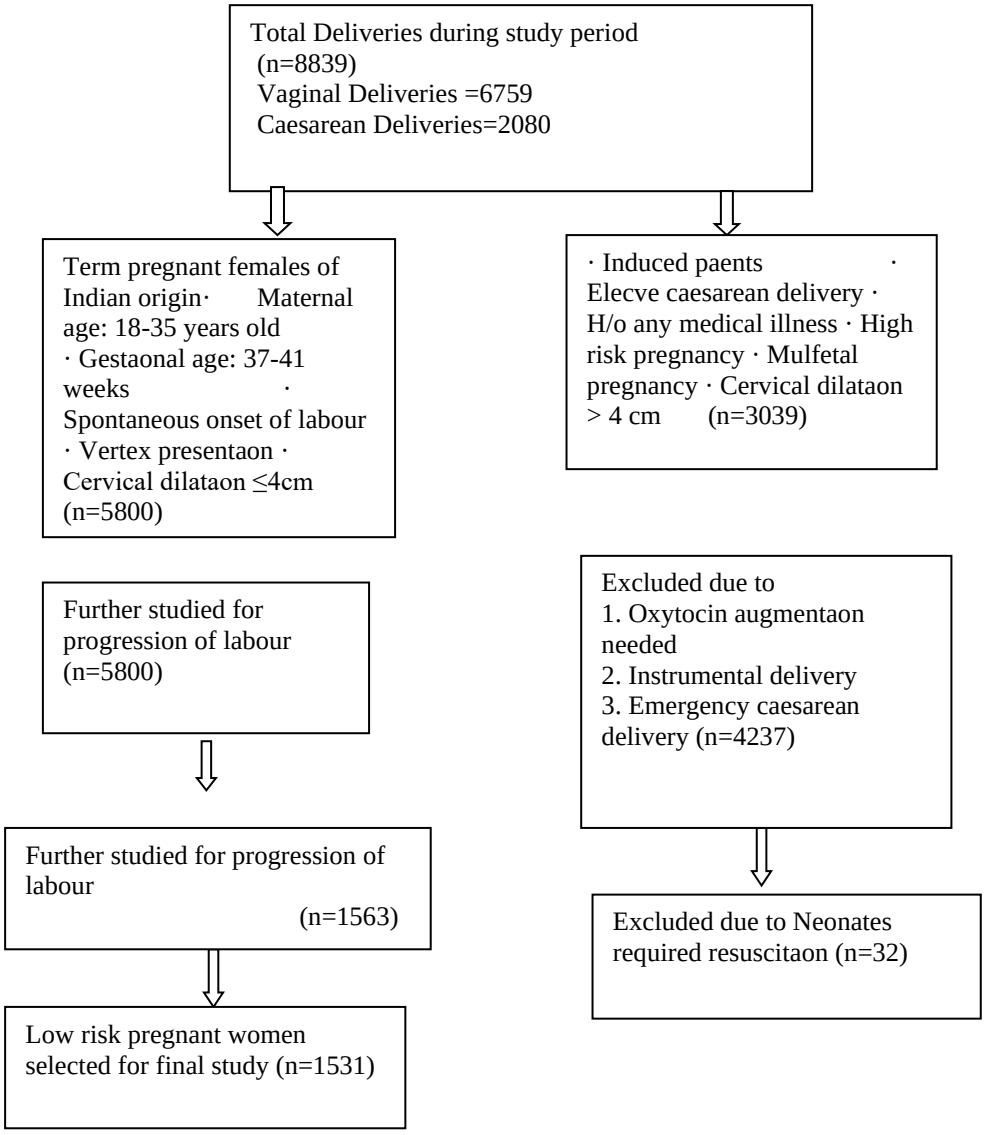


Figure 1. Depicts the process of selecon of final study populaon

Prepregnancy weight was obtained from medical records and based on maternal self-report. Maternal height was measured and recorded at the first prenatal visit or obtained later during medical record abstraction. Maternal age is defined as age in completed years at the time of recruitment

Results

Table 1 presents baseline sociodemographic, anthropometric characteristics of the overall study population,stratified by maternal prepregnancy BMI. Overweight women were similar to normal-weight women on most factors, but obese women had a significantly greater proportion in the younger age categories.

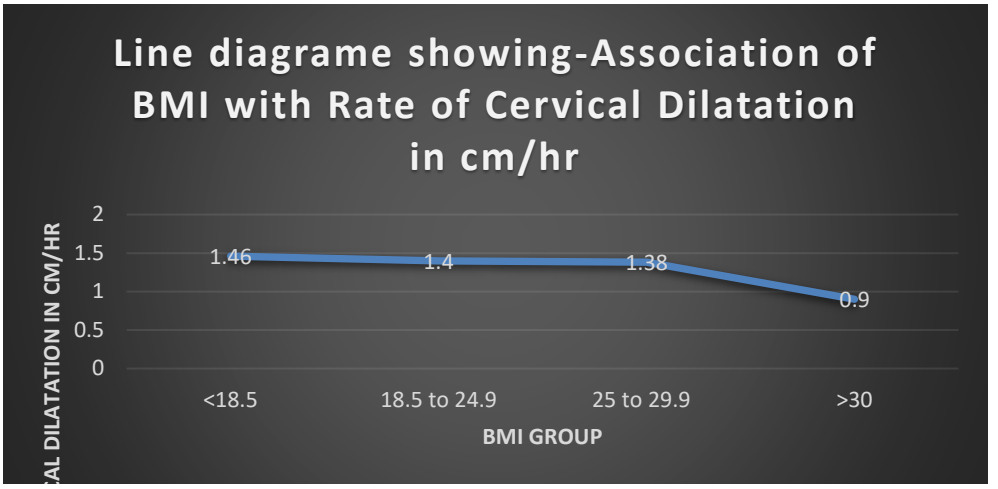
Table 1
BMI and characteristics of study population

S.N.		Under weight	Normal	Over weight	Obese
1	BMI (kg/m2)	< 18.5	18.5-24.9	24.9-29.9	>30
2	HEIGHT(inch)	61±2.5	60±3	61.2±2.6	61.1±2.4
3	AGE(In years)				
	18-25	312	739	43	6
	25-30	112	227	15	2
	30-35	10	61	3	1
4	Socio economic status	22	52	4	4
	Upper				
	Lower	295	698	41	3
	Upper lower	126	300	17	1
	middle	117	277	16	2

Table 2
Association of BMI with rate of cervical dilatation in cm/hr

Table 2 presents association of BMI with rate of cervical dilatation. We have found that BMI is directly related to rate of cervical dilataon. Mean rate of cervical dilataon was 1.46 cm/hr in group with BMI< 18.5 .Mean rate of cervical dilatation was 1.40 cm/hr for pregnant women with normal BMI but it was <0.9 cm/hr for obese women .Ironically mean rate of cervical dilatation was 1.38 cm/hr ,faster than normal BMI women for over weight women .

BMI	N	Mean	Standard deviation	P Value
Under weight(<18.5)	434	1.46	0.34	
Normal (18.5 to 24.9)	1027	1.40	0.44	0.00
Over weight (>24.9 to 29.9)	61	1.38	0.25	
Obese (>30)	9	0.9	0.11	
Total	1531	1.42	0.41	



Association of cervical dilatation with BMI of study population

Obese women had a significantly longer median duration of labor from 4 to 10 cm compared with normal-weight women. Upon further examination, the longer median duration of labor in obese women showed more slower labor progression from 4 to 6 cm. After 6 cm labour progression was slow than in normal BMI pregnant women but was relatively less slower than before 6 cm dilatation. No significant differences were seen between normal and overweight women in the active phase of labor.

Table 3
Association cervical dilatation with BMI of study population

S No.	Cervical dilatation (cm)	Mean duration of progress in normal BMI women(in min)	Mean duration of progress in obese women (in min)
1	4-5	65.34	103.23
2	5-6	45.36	71.66
3	6-7	32.28	50.67
4	7-8	26.22	41.16
5	8-9	25.14	39.12
6	9-10	24.96	38.93

Discussion

Previous studies on pregnancy outcomes in obese women have reported briefly on the prevalence of select characteristics of labor and delivery[8,10,11,12] or offered a crude estimate of the duration of labor[13]. However, few have explored in depth the effect of maternal overweight and obesity on labor progression after adjusting for potential confounders in current obstetric practice. The results from this study are consistent with those from previous studies that showed that obese women are more likely to have an inadequate contraction pattern during the first stage of

labor8 and to have slower labour progression [8,10,12] compared with nonobese women. labor progression before 6 cm of cervical dilation was significantly slower in obese women compared with normal-weight women, Several authors have speculated that this phenomenon may be due to the added soft-tissue deposits in the pelvis of obese women, which coupled with a larger fetus might necessitate more time and slower labour progressionlabor[5,8,13]. Studies that have measured suprailiac skinfold thickness confirm perceptions that more maternal fat is accumulated centrally than peripherally during pregnancy[14,15] especially among obese women[16] .Thus, it is possible that added soft-tissue deposits in the maternal pelvis might narrow the diameter of the birth canal and prolong labor. However, direct evidence of fat deposition in the pelvis of overweight and obese women is needed to support this assertion and is beyond the scope of this analysis.

Majority of our study populaon have BMI< 24.9 . Anjel vahratianh[17] also concluded in his study that labour progression in over weight and obese women was slower than that of normal BMI pregnant women before 6 cm cervical dilatation . Oladepo et al[18] also found that the time difference to reach 10 cm cervical dilatation was 1.2 hr from lowest BMI 9<25) to highest BMI (>40) for nulliparous women. He also concluded that labour proceeds more slowly as BMI increases, suggesting that labour management be altered to allow longer ti me for these differences. The findings of this study must be interpreted with recognition of its limitations. First, the measurement of cervical dilation was subjective. Continuous monitoring of cervical dilation was not performed and the measurements were based on vaginal examinations performed by several obstetricians 4 hourly . Second pre pregnancy weight was taken on the basis of recall by pregnant females or by weight at first antenatal visit from medical records .

Conclusion

Few studies to date have examined the characteristics of labor and delivery for overweight and obese women. In contrast, this study abstracted detailed intrapartum data to examine the relationship between maternal prepregnancy weight status and the pattern of labor progression in term, low risk women with spontaneous onset labour. In our study, obese women had a significantly slower labor from 4 to 10 cm, compared with that of normal-weight women. In particular, the pattern of labor progression for obese women was significantly slower than that of normal-weight women before 7 cm. Given that nearly 25% of women of childbearing age are either overweight or obese as per NFHS -5 survey , it is critical to consider differences in labor progression by maternal prepregnancy BMI before additional interventions are performed.

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