

Original Research Article

Frequency of types of parturition and their relationship with maternal characteristics: a cross-sectional analysis

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ABSTRACT

Background: The pathways that are involved for the duration of pregnancy and type of parturition are extremely complex, involving maternal as well as fetal systems. The objective of this study was to determine the frequency of types of parturition and their relationship with maternal characteristics among pregnant female patients.

Methods: A cross-sectional survey using a non-probability convenient sampling technique was conducted among 195 healthy pregnant females at Obstetrics and Gynaecological Department of Hamdard Hospital, Karachi, from 1st March 2019 to 31st August 2019. After taking written informed consent from the participants, the relevant data were gathered with the help of a structured questionnaire designed specifically for the study. Statistical package for social sciences was used for data entry while the chi-square test was applied for inferential analysis. The duration of the study was six months. Data were entered and analyzed using Statistical Package for Social Sciences version 20.0. Descriptive analysis was performed by generating means and standard deviations for continuous variables while frequencies and percentages for categorical variables. A Chi-square test was applied to perform the inferential analysis while the significance level was set at 0.05.

Results: A total of 195 pregnant females were included in the study, whose mean age was 29.29±5.22 years. The study results showed that BMI before pregnancy ($p=0.021$), rest is taken during pregnancy ($p=0.034$) and gravida status ($p=0.047$) were all significantly associated with the type of parturition among the study participants, but spacing in pregnancies and parity were not.

Conclusions: Maternal characteristics were found to be significantly associated with the type of parturition among pregnant females. For gynecologists the maternal characteristics identified in this study may serve as a useful indicator of the type of parturition expected in their patients.

Keywords: Association, Cross-Sectional Analysis, Mothers, Parturition

INTRODUCTION

The pathways that are involved for the duration of pregnancy and type of parturition are extremely complex, involving maternal as well as fetal systems. The events

are regulated by the combination of hormonal, neuronal, immune-mediated mechanisms that influence parturition.¹ These factors are all affected by maternal characteristics such as age, degree of obesity, weight, height, the spacing between pregnancies, and the number of childbirths.²

Above 30 % of mothers of child-bearing age are reported to be obese, having a body mass index $>30\text{kg/m}^2$ in which high rates are observed among specific races and ethnicities. Obesity is related to a multitude of complications not only in parturition but also throughout pregnancy.³ Incidences of gestational hypertension or pre-eclampsia, maternal diabetes or depression can lead to hazardous effects on both mothers as well as the fetus. Mother's obesity can increase the chances of fetal congenital anomalies, macrosomia (birth weight $>4.5\text{kg}$) as well as lifetime risk for cardiovascular disorders and diabetes.⁴

The start of parturition among obese women can be often delayed. Without induction, mothers that are obese are at almost double the chances of having a prolonged period of gestation, i.e., >41 weeks. The rates get higher, nearly twice as much as the degree of obesity increases.⁵ On the other hand, underweight mothers having BMI below 17kg/m^2 have double chances to be delivered pre-term. Even though the incidences of cesarean section persist among normal healthy or obese mothers without having hypertension, diabetes, or cardiovascular diseases), however a multitude of factors affect the type of parturition.⁶ Despite advancements in clinical intervention, mothers that are obese are 2 to 3 times more at risk as compared with normal-weighting mothers for undergoing an unplanned cesarean section, a risk that can exist even after controlling the co-morbid associated with maternal obesity.⁷ Frequency post-operative complications in pregnancy such as infection, post-partum hemorrhage, and prolong hospitalization can lead to a higher risk for a complicated pregnancy in the subsequent conceptions. It can also create a problem during parturition.⁸ There exists no data on the safety and outcome of intentional loss of weight by obese mothers during pregnancy.⁹ Some had termed this approach to be highly controversial because of concern to the growth of the fetus and maternal ketosis.¹⁰

Maternal obesity, risk of hypertension/pre-eclampsia, and diabetes increase the chances of cesarean section. All these factors are significant in the outcomes of pregnancy. Since the physiology of pregnancy is a complex process, having multi-system involvement, therefore a dysfunctional change in any of the organ systems might affect the outcome/mode of delivery of the fetus.^{11,12}

The mental health of the mother also plays a vital role in the determination of the mode of delivery. For instance, less spacing between pregnancies, peri-natal depression, maternal anxiety, and as the number of pregnancies increases, greater the risk for both mother and fetus are observed.¹³ Even delivery by cesarean section is recognized to be a risk factor for multiple post-operative risks, some of which include short-term impairment in the function of lungs, decreased initiation of the breastfeeding, long-term effect on child's immune system development, other conditions that are immune-mediated

like asthma along with food or respiratory allergy.¹⁴ Although keen interest has been reported in determining maternal characteristics playing a part in its potential impact on the type of parturition, studies done in this regard are only a handful.¹⁵

Modern obstetrics are challenged by obesity because of the high rates of morbidity in pregnancy and during parturition associated with it. The relation in-between maternal obesity, excess of weight gain during gestation, and increase in fetal weight at birth has been linked with more fetuses being delivered through cesarean section. Maternal obesity has been identified as a major risk factor for complications during pregnancy, as well as at the time of delivery.¹⁶

The objectives of this study were to determine the frequency of the types of parturition with their relationship to maternal characteristics.

METHODS

After taking ethical approval from the Institutional Review Board of the hospital, a cross-sectional survey using a non-probability convenient sampling technique was conducted at Obstetrics and Gynaecological Department of Hamdard Hospital, Karachi from 1st March 2019 to 31st August 2019. Keeping the percentage frequency of the study outcome at 50% for the most liberal estimate, with a 95% confidence level and 7.5% precision, the minimum required sample size was calculated to be 171 participants.

Healthy pregnant females with either singleton or multiple pregnancies with at least 3 antenatal checkups were included in this study, while females giving birth at gestational age less than 34 weeks or above 41 weeks and 6 days, or with a complicated pregnancy were excluded from the study. Written informed consent was taken from all participants before their inclusion in the study. No monetary incentive was offered to the patients for their participation. All data were collected by trained data collectors using a structured questionnaire designed specifically for the study.

Data were entered and analyzed using Statistical Package for Social Sciences version 20.0. Descriptive analysis was performed by generating means and standard deviations for continuous variables and frequencies and percentages for categorical variables. A Chi-square test was applied to perform the inferential analysis while the significance level was set at 0.05.

RESULTS

A total of 195 pregnant females were included in the study. Their mean age was 29.29 ± 5.22 years, the BMI of 138 (70.8%) of them ranged from 25.0 to 29.9, 157 (80.5%) of them had up to 24 months spacing during pregnancies, 156 (80.0%) of them had taken adequate rest

during pregnancy, 115 (59.0%) of them were para 1 while 110 (56.4%) of them were gravida 3 or more (Table 1).

Table 1: Participants profile.

Variables (n=195)	Mean±SD/ Frequency (%)	
Maternal Age (Years)	29.29±5.22	
BMI before pregnancy	Up to 24.9	53 (27.2)
	25.0 to 29.9	138 (70.8)
	30.0 or More	4 (2.1)
Spacing in pregnancies	Up to 24 Months	157 (80.5)
	More than 24 Months	38 (19.5)
Adequate rest during pregnancy	Yes	156 (80.0)
	No	39 (20.0)
Parity	1	115 (59.0)
	2	80 (41.0)
Gravida	Up to 2	85 (43.6)
	3 or More	110 (56.4)

Table 2: Relationship between maternal characteristics and type of parturition.

Variables	Type of Parturition		p
	Normal (n=58)	Cesarean (n=137)	
	Frequency (%)	Frequency (%)	
BMI before pregnancy			
Up to 24.9	23 (43.4)	30 (56.6)	0.021
25.0 to 29.9	35 (25.4)	103 (74.6)	
30.0 or More	Nil	4 (100)	
Spacing in pregnancies			
Up to 24 Months	49 (31.2)	108 (68.8)	0.363
More than 24 Months	9 (23.7)	29 (76.3)	
Adequate rest during pregnancy			
Yes	41 (26.3)	115 (73.7)	0.034
No	17 (43.6)	22 (56.4)	
Parity			
1	29 (25.2)	86 (74.8)	0.097
2	29 (36.3)	51 (63.7)	
Gravida			
Up to 2	19 (22.4)	66 (77.6)	0.047
3 or More	39 (35.5)	71 (64.5)	

The study results further showed that BMI before pregnancy ($p=0.021$), rest is taken during pregnancy ($p=0.034$) and gravida status ($p=0.047$) were all significantly associated with the type of parturition among the study participants where patients whose BMI was up to 24.9 were more likely to have normal vaginal delivery than those whose BMI ranged from 25.0 to 29.9 or 30.0 or more (43.4% vs. 25.4% and 0%, respectively).

The patients who did not take adequate rest during pregnancy were more likely to have normal vaginal delivery than those who did (43.6% vs. 26.3%), while patients who were gravida 3 or more were more likely to have normal vaginal delivery than those who were gravida up to 2 (35.5% vs. 22.4%) (Table 2).

DISCUSSION

The current study was an attempt at identifying the role of certain maternal characteristics in defining the type of parturition a mother experiences. Interestingly, BMI before pregnancy, rest taken during pregnancy, and gravida status of the study participants were all found to be significantly associated with the type of parturition. From BMI point of view, studies have reported that in patients having a BMI of 30-34.9 kg/m² and above were at a higher risk for gestational hypertension, pre-eclampsia, fetal macrosomia and be delivered by cesarean section in comparison to the patients having a BMI of less than 30 kg/m².^{17,18}

Al-Kubaisy W et al, in their study reported that maternal age played a significant role along with BMI in determining the factors which could lead to cesarean section.¹⁹ Nakimuli A in his study found that ethnicity also played an important role in complications parturition among obese mothers.²⁰ The fact that in our study, BMI, adequacy of rest during the period of gestation, and the number of pregnancies showed significant association with the type of parturition, either normal or cesarean. Mother's health before, and during the period of gestation along with peri-natal factors like rest, physical activity, alcohol consumption or smoking had been implication as in important integral part of health, fetal development, the bodyweight of the fetus and the type of parturition involved.^{21,22} Even younger age, as in adolescence coupled with low educational levels have been indicated by researchers as part of maternal characteristics predicting lack of care during pregnancy, in-adequate follow-ups to hospitals, making the rate of obstetrical complications to go up higher which increases the chances not only for the cesarean section but sometimes also for pre-term deliveries.²³ Therefore not connecting such young mothers to referral maternity care centers for a proper routine check-up and providing quality care in their prenatal period are vital for both maternal and fetal health.²⁴ Improper facilities, lack of resources, inadequate distribution of appointments, provision of counseling to both mothers and fathers in terms of adequate spacing during pregnancy, proper diet and activity, taking supplements regularly and keep regular follow-ups are necessary to ensure the perfect health for the mother and in turn fetus.²⁵

It has also been observed that while obstetrical complications lead to cesarean sections, some clinicians as well as the mother's request for a cesarean section cannot be ruled out. Previous experiences in specific cases tend to make both mother's or clinician's choice of

parturition be through cesarean section rather than spontaneous vaginal delivery.²⁶ Although both options had their advantages and disadvantages, the preference for the type of parturition does not solely depend upon a clinician or a mother, however, if normal delivery tends to be a predictable cause of complication, the cesarean section becomes the choice of parturition.²⁷ Similar to the findings that were significant in our study, a multiple of other studies also reported the same, i.e., maternal characteristics such as increasing age, the number of pregnancies and obesity increased the frequency of cesarean section as compared to normal vaginal deliveries in which the more young age group either primigravida or less number of pregnancies along with adequate spacing and proper peri-natal care were in the normal vaginal delivery group.²⁸ Mothers that are immunologically compromised have been associated with greater frequencies of cesarean delivery. A relation of cesarean delivery to the increase in respiratory morbidity has also been reported. Even though there are possibilities that some of the cesarean deliveries might occur in emergencies or due to failures in trials of induction.²⁹

Traditionally, the natural process of vaginal birth is viewed as the first line of delivery, while the cesarean section that involves operative incision is perceived as a risk full procedure indicated for mothers with specific situations or conditions.³⁰ Following the advancements in medical technology, increased frequency of cesarean deliveries has been reported in recent years. This fact was similarly reported in our study where a higher proportion of mothers had undergone cesarean section, i.e., 137 as compared with only 58 mothers that were delivered through normal vaginal delivery.

Even a shift in attitude towards the type of parturition has been observed, therefore it is regarded no longer as an unusual act by couples requesting cesarean delivery.

It is acknowledged that the use of a non-probability convenience sampling technique and a moderate sample size was the prime limitations of this study.

CONCLUSION

Maternal characteristics were found to be significantly associated with the type of parturition among pregnant females. For gynecologists the maternal characteristics identified in this study may serve as a useful indicator of the type of parturition expected in their patients.

Recommendation

Before relying on these findings however, due verification by more rigorous study designs is strongly recommended.

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