

## A study of the effect of antenatal and intrapartum risk factors for cesarean delivery in a primigravida – a retrospective analysis

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### Abstract

**Introduction:** In recent times, the caesarean section rate has increased globally. Caesarean section in a primigravida most commonly due to fetal distress may be preceded by certain risk factors present in the antenatal period; or may arise denovo at the time of labour. Hence a study of these antenatal and intrapartum factors that influence the mode of delivery in a primigravida is essential.

**Objective:** To evaluate the antenatal and intrapartum risk factors that effect mode of delivery in a primigravida.

**Materials and Method:** A retrospective analysis of 200 case records of primigravida at Department of Obstetrics and Gynecology, Apollo Institute of Medical Sciences, Hyderabad, was done. 100 who underwent primary caesarean section were taken as cases whereas 100 who underwent normal deliveries were taken as controls.

**Results:** The mode of delivery in primigravida with age <25 years is normal delivery (58%). In primigravida of height <150cms, caesarean section rate of 62%. Among the caesarean section group, 55% had some antepartum risk factor. 72% of the normal delivery group, had spontaneous onset of labour. In the cases who underwent caesarean section, 51% had induction of labour as compared to 26% in the normal delivery group. 92% of primigravida who had normal delivery had clear liquor. Meconium stained liquor was found in 36% of primigravida undergoing caesarean section.

**Conclusions:** Mode of delivery in a primigravida is influenced by various antenatal and intrapartum factors. Identification of antenatal risk factors and careful use of induction of labour can significantly reduce the primary caesarean section rate.

**Keywords:** Primigravida, Caesarean section, Antenatal risk factors, Intrapartum, Induction of labour, Meconium stained liquor.

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### Introduction

Primigravid is defined as a woman who has conceived for the first time. Though it is the beginning of a new era of a woman's life, it may be influenced by various risk factors which may have an effect on the mode of delivery.<sup>(1)</sup> The mode of delivery could be a vaginal delivery or a caesarean section. Caesarean section in a primigravida may not only have an effect on the maternal and fetal morbidity in the present pregnancy but also influence the subsequent obstetrical performance and maternal health.<sup>(2)</sup> Hence there is an urgent need to review these antenatal and intrapartum factors that are associated with caesarean section in a primigravida.

### Objective

To evaluate the antenatal and intrapartum risk factors that affect mode of delivery in a primigravida.

### Materials and Method

**Study Design:** A retrospective analysis of 200 case records of primigravida from Jan 2016 to Dec 2016 at a teaching hospital, Department of Obstetrics and Gynecology, Apollo Institute of Medical Sciences (AIMS), Hyderabad, was done, 100 who underwent caesarean section were taken as cases whereas 100 who underwent normal deliveries were taken as controls.

**Inclusion Criteria:** Primigravida with term pregnancies defined as pregnancies from 37 completed

weeks till 40 completed weeks were included in the study who underwent normal delivery or caesarean section during the study period.

**Exclusion Criteria:** Previous abortions, post dated pregnancies (gestational age 40 weeks 1 day and above), primigravida with pre-existing medical problems such as Chronic Hypertension, Type II diabetes complicating pregnancy or known case of thrombophilia were excluded from the study.

**Method:** The case records of all the primigravida who underwent delivery at AIMS from Jan 2016 to December 2016 were included in the study. Their records were analysed for antenatal factors such as their age and height. Any complications in antenatal period such as preeclampsia, intrauterine growth retardation and oligoamnios were also noted. The intrapartum findings such as birthweight, liquor, cord around the neck and APGAR score at birth were also noted. These findings were correlated with the mode of delivery. Primigravida who underwent normal delivery were taken as controls while the primigravida that delivered by caesarean section were taken as cases.

Statistical Analysis was done using SPSS data packages. Chi square test were applied wherever required.

### Results

Among the 200 primigravida who delivered in our hospital, 62% were booked cases, 26% were unbooked

and 12% were late booking. In the cases undergoing caesarean section, 89 were emergency caesarean section as compared to 11 cases which were elective cases.

**Anthropometric factors and effect on mode of delivery**

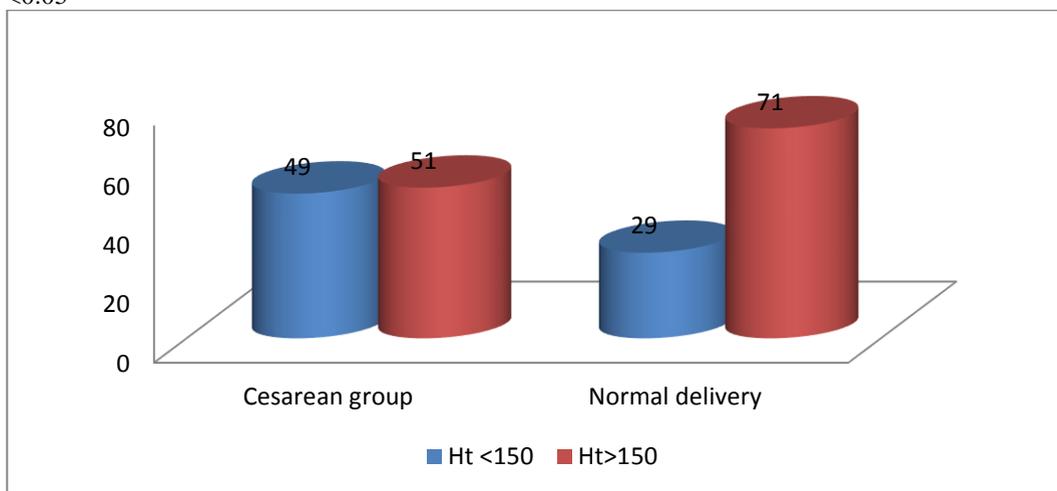
**Table 1: Age and its effect on mode of delivery**

Age (years)	Caesarean section group	Normal delivery group	Total
15-19	12	24	36
20-24	48	59	107
25-29	33	16	49
30 above	7	1	8
	100	100	200

P value- <0.05

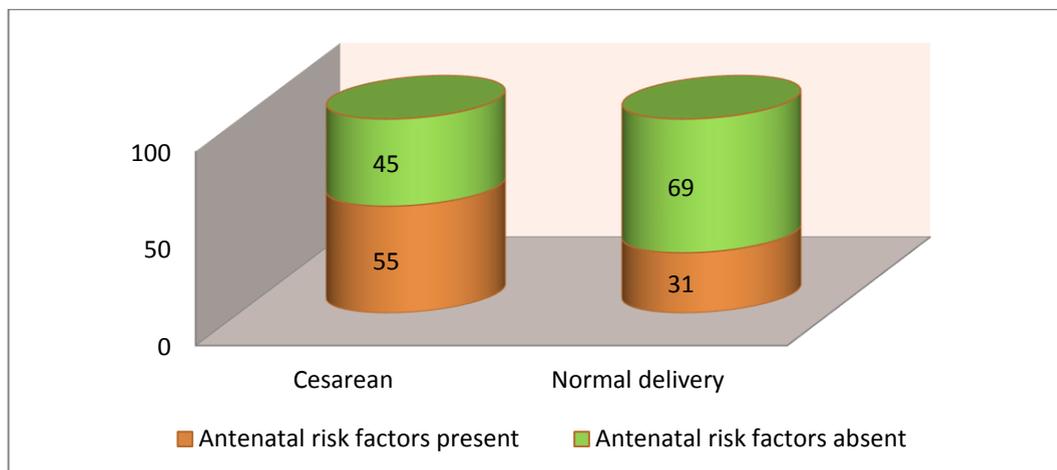
Out of 200 primigravida evaluated 71% belonged to age group of less than 24. Vaginal delivery rates were higher in younger age group less than 24. As age advanced, 25-29 years age group, rate of caesarean section was almost 65% when compared to normal delivery which was only 35%.

Out of the 200 primigravida evaluated 78 had height less than 150cm. Out of them 49 primigravida had caesarean section (62.8%) whereas only 29 (32.8%) had a normal delivery. Normal delivery rate was 58.1% among primigravida with height more than 150 cms. This association was found to be statistically significant. (P value- <0.05)



**Fig. 1: Effect of height on the mode of delivery in a primigravida**

**Antenatal factors:** In 45% of primigravidas who underwent caesarean section did not have any antenatal risk factors as compared to 69% of primigravida who had normal delivery. This association was also statistically significant. (p-value <0.05)



**Fig. 2: Effect of antenatal risk factors on the mode of delivery in a Primigravida**

Antenatal risk factors that were evaluated in both the groups were

**Table 2: Antenatal risk factors and mode of delivery**

Antenatal risk factor	Caesarean section group	Normal delivery group
No risk factors	45	69
Anemia	11	13
Oligoamnios +/- Intrauterine growth retardation	16	10
Malpresentations	5	0
Preeclampsia	6	4
Gestational diabetes	2	1
Cephalopelvic disproportion	11	1
More than two risk factors	4	2

**Intrapartum factors:** Regarding mode of onset of labour, it was found that 74% of the primigravida who had normal delivery, had spontaneous onset of labour. In the cases who underwent caesarean section, 51% had induction of labour as compared to 26% in the normal delivery group.

**Table 3: Onset of labour and mode of delivery**

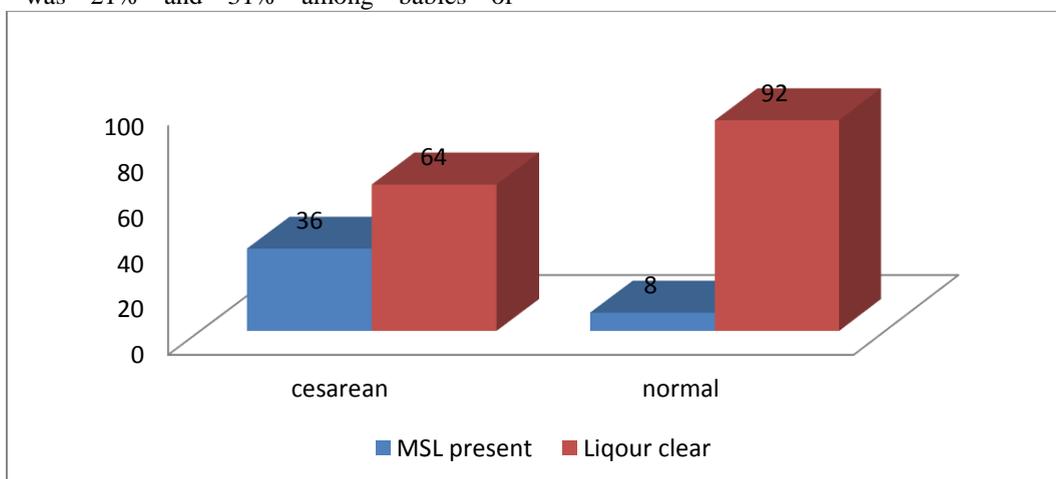
Mode of delivery	Caesarean group	Normal delivery group
Spontaneous labour	38	74
Induction of labour	51	26
Not in labour	11 (elective cases)	0
	100	100

p-value < 0.05

There was no statistically significant association found between birthweight and mode of delivery in primigravida in our study. Among the 100 cases that underwent primary caesarean section, 75% had birthweight more than 2.5 kg in caesarean section and 64% among the normal delivery patients. Almost three fourth of the primigravidas had babies with good APGAR score irrespective of the mode of delivery. APGAR score at birth and mode of delivery in primigravida did not have any statistically significant association in our study. The incidence of cord around the neck in babies of primigravida undergoing normal delivery was 21% and 31% among babies of

primigravida undergoing caesarean section. Presence of cord around the neck also did not have any statistically significant association with mode of delivery in our study.

Presence of meconium stained liquor increased the chances of having a caesarean section. 92% of primigravida who had a normal delivery had clear liquor when compared to 64% of primigravida who underwent caesarean section. Among the primigravida who underwent caesarean section approximately one third had meconium stained liquor and this was found to be statistically significant.



**Fig. 3: Meconium stained liquor and its effect the mode of delivery**

## Discussion

In the present study, among the primigravida who underwent caesarean section, 89% were emergency and 11% were elective. The most common indication for emergency caesarean section in our study was fetal distress diagnosed by meconium stained liquor and/or abnormal fetal heart abnormality, followed by failure to progress while for elective cases it was malpresentation. This was similar to most of the studies.<sup>(4,5,6)</sup>

Most of the primigravida who delivered at our centre belonged to age less than 24 years and they had highest probability of having a normal delivery. Most of the primigravidas who delivered by caesarean section in our study belonged to the age group of 25-29. This could be because most of the patients presenting to our centre belong to lower socioeconomic class and usually complete their family early. This was similar to a study done by Jagannath et al<sup>(7)</sup> in contrast to western studies where the mean age of primigravida was more and where strong association was found between age more than 40 and caesarean section.

In our study, caesarean section was twice more common than normal delivery in a short primigravida (height less than 150 cms), indicating that height is a significant predictor of mode of delivery in a primigravida. This observation was similar to a recent study by Garg et al<sup>(8)</sup> in 2016 who stated that low maternal height was associated with increased risk of caesarean section due to labour arrest. He stated in his study that in height range of <145 cm almost all cases were delivered by caesarean section, in height range of 145- 150 cm also rate of caesarean section was very elevated, thereafter rate of caesarean section decreased and rate of normal delivery increased. A study done in 2010 by Oboro et al,<sup>(9)</sup> the caesarean section rate in primigravidas with height less than 150 was as high as 42%. Hence primigravida with height <150 cm should be monitored carefully during labour. However the combination of other risk factors with maternal height may be of clinical use.

A study by E Ojiji et al<sup>(2)</sup> stated that primigravidae have a higher chance of antenatal and intrapartum complications which if not identified and managed early can lead to increased maternal morbidity due to operative delivery.

In our study out of 200 primigravida 86 of them had identifiable antenatal risk factors. The risk factor that was found to be predominant in the both groups was Anemia. In the caesarean group, the risk factor that predominates was oligoamnios and intrauterine growth retardation followed by cephalopelvic disproportion and preeclampsia. Multiple risk factors increases the chances of having a caesarean section in our study. These observations were similar to a study by Gangwar R et al<sup>(10)</sup> who stated that Intrauterine growth restriction, Oligohydramnios, Hypertensive disorders and meconium stained liquor significantly increased the rate of caesarean section among primigravidas. In

contrast, a study by David et al<sup>(11)</sup> concluded that most caesarean deliveries develop during labour and cannot be anticipated by prelabour factors. In our study too, 45% of primigravida who underwent caesarean section did not have any antenatal risk factor. Induction of labour along with its indication and preceding antenatal risk factor in combination was a significant cause of caesarean section in our study. 2/3<sup>rd</sup> of the patients who had spontaneous onset of labour had a normal delivery in our study while patients who had induction of labour had twice the chance of having a caesarean section. This observation was similar to a study done by Ehrental et al<sup>(12)</sup> in 2010 which stated that labor induction was associated with a twofold increase in the odds of a caesarean delivery after adjustment for confounders and this effect was larger among a low-risk group of women without any antenatal complications. Thereby judicious use of induction of labour is advised.

In our study, no significant relation was found between birthweight and mode of delivery. This could be because the mean birth weight in our study was 2.86 kgs only. The only intrapartum factor that significantly increased the chances of caesarean section were meconium stained liquor which may be secondary to antenatal and intrapartum risk factors. This observation was similar to a study by Ouladsahebmadarek E et al<sup>(13)</sup> who concluded that the rate of caesarean section in the presence of stained amniotic fluid is two times the non-meconium pregnancies (14% vs. 7%). Hence, decision for caesarean section in a primigravida is influenced by a combination of antenatal and intrapartum factors.

## Conclusion

The decision for mode of delivery in a primigravida is an interplay of various anthropometric, antenatal and intrapartum factors. Early identification of antenatal risk factors, judicious use of induction of labour and a careful monitoring of labour play an important role in reducing the caesarean section rate in primigravidas.

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