

## Study of Caesarean Section Rates in Induced Versus Spontaneous Labour at Term

Dr. Arpita Jain<sup>1</sup>, Dr. Samta Bali Rathore<sup>2\*</sup>

<sup>1</sup>2<sup>nd</sup> Year PG Resident Department of Obstetrics & Gynaecology, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, India

<sup>2</sup>MBBS, MS, Professor Department of Obstetrics & Gynaecology, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, India

### Original Research Article

#### \*Corresponding author

Dr. Samta Bali Rathore

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**Abstract:** Over recent decades, more and more pregnant women around the world have undergone induction of labour (artificially initiated labour) to deliver their babies. A major concern of labour induction is that elective labour induction may increase the risk of caesarean section (CS). The purpose of this study was to evaluate the risk of Caesarean section with labour induction versus spontaneous labour in nulliparous and multiparous women at term in Indian population. To compare whether the caesarean section (CS) rate is significantly higher among whose labour was induced compared to those who had spontaneous labour at term pregnancy. A cross sectional descriptive study based on convenience sample in which available data from hospital is used. Data of women whose labour was either induced (induction group, n=713) or spontaneous (spontaneous group, n=1325) at 37<sup>+0</sup> to 41<sup>+6</sup> weeks of gestation from January 2017 to December 2017 at Mahatma Gandhi Medical College and Hospital, Jaipur. Out of 2038 women in the study, 713 were induced and 1325 were those who went into spontaneous labour. The rate of caesarean section among induced group was 37% (vs 18.4% in spontaneous group) and was statistically significant when compared to spontaneous group. The study concludes that labour induction in carefully selected low risk population, excluding the mentioned risk factors causes an increased risk of caesarean section with most common indication being failure to progress.

**Keywords:** Caesarean section, labour induction, spontaneous labour.

## INTRODUCTION

Over recent decades, more and more pregnant women around the world have undergone induction of labour (artificially initiated labour) to deliver their babies. In developed countries, up to 25% of all deliveries at term now involve induction of labour[1]. In developing countries, the rates are generally lower, but in some settings they can be as high as those observed in developed countries [1].

Induction of labour is defined as the process of artificially stimulating the uterus to start labour[2]. It is usually performed by administering oxytocin or prostaglandins to the pregnant woman or by manually rupturing the amniotic membranes.

Induction is indicated when the benefits to either mother or foetus outweigh those of continuing the pregnancy. Common indications include gestational hypertension, premature rupture of membranes, non-reassuring foetal status, post term pregnancy,

intrauterine growth restriction, and various maternal medical conditions such as chronic hypertension and diabetes [3].

But inducing labour may also pose risks such as uterine hyper stimulation, infection, and rupture uterus, iatrogenic prematurity and failed induction resolved by caesarean delivery.

A major concern of labour induction is that labour induction may increase the risk of caesarean section (CS). A caesarean section is usually performed after induction of an unripe cervix for the following indications: prolong first stage of labour, foetal distress, failure to progress.

Reducing the frequency of induction is often cited as an approach to reversing the trend in Caesarean section rates [4]. The association between induction of labour and caesarean delivery is largely based on the findings of observational studies. One clear limitation of

the observational literature is that induction is often indicated by complications of pregnancy, which may independently increase the risk of caesarean section.

A number of studies indicate a higher risk of CS in nulliparous and multiparous women undergoing labour induction, compared with instances of spontaneous labour[5-8], while various others suggest that labour induction is not a factor in determining the risk of CS[9-11].

Although this topic has long been debated world-wide, there are only a few published reports on the risk of CS after labour induction in Indian population

The purpose of this study is to evaluate the risk of CS with labour induction versus spontaneous labour in nulliparous and multiparous women at term in Indian population. It was also important to discern whether induction itself or the circumstances leading to induction were critical as correlates of CS rate

#### AIMS AND OBJECTIVE

To compare whether the caesarean section (CS) rate is significantly higher among whose labour was induced compared to those who had spontaneous labour at term pregnancy.

#### MATERIALS AND METHODS

##### Type of Study

A cross sectional descriptive study based on convenience sample from hospital.

##### Duration of Study

From January 2017 to December 2017

##### Place of Study

OBGY Department of Mahatma Gandhi Medical College and Hospital, Sitapura Jaipur

##### Methods

A cross sectional study was performed in women whose labour was either induced (induction group, n=713) or left spontaneous (spontaneous group, n=1325) at 37<sup>+0</sup> to 41<sup>+6</sup> weeks of gestation from January 2017 to December 2017 at Mahatma Gandhi Medical College and Hospital, Jaipur. Multiple logistic regression analysis was used to examine the association between the caesarean section rate and labour induction. This is a cross sectional study in which odds ratio (OR) with 95 % confidence interval (CI) is used as a measure of relative risk.

#### STUDY DESIGN

A cross sectional descriptive study based on convenience sample in which available data from hospital is used. Data of women whose labour was either induced (induction group, n=713) or spontaneous (spontaneous group, n=1325) at 37<sup>+0</sup> to 41<sup>+6</sup> weeks of gestation from January 2017 to December 2017 at Mahatma Gandhi Medical College and Hospital, Jaipur.

#### Inclusion criteria

- Pregnant women of gestational age from 37<sup>+0</sup> week to 41<sup>+6</sup> week

#### Exclusion criteria

- Multiple pregnancies
- Planned CS
- PROM
- Placental abruption
- In utero foetal death
- Post term
- Malpresentation

#### EVALUATION PARAMETERS

A cross sectional analysis was conducted at our tertiary centre, in which we obtained data of women whose labour was either electively induced or left spontaneous at 37<sup>+0</sup> to 41<sup>+6</sup> weeks of gestation between January 2017 and Dec 2017 after excluding deliveries that falls under our exclusion criteria. Gestational age was estimated by the date recorded as the first day of the last menstrual period or gauged using prenatal ultrasound measurements.

Through medical records, patients were stratified by the nature of labour into induction and spontaneous groups. Labour was induced using a vaginal prostaglandin E2 gel (0.5mg of dinoprostone), oxytocin, artificial rupture of membrane either alone or in sequence.

Induction failure was diagnosed when a woman did not enter active labour pain 24 hours after induction. We compared the percentage of women who underwent caesarean section among women whose labour was electively induced with women whose labour was spontaneous and calculated p value, odds ratios (ORs) and their respective 95% confidence intervals (CIs) using chi square.

#### OBSERVATIONS AND RESULT

During the study period 3027 women had term deliveries at our institute. A total number of 989 were excluded using exclusion criteria and 2038 deliveries were included in our study. Out of which 713 were induced and 1325 were left spontaneous.

**Table-1: Mode of delivery**

Mode of delivery	Spontaneous group		Induced group		Total
	No. Of patients	Percentage	No. Of patients	Percentage	
Vaginal delivery	1081	81.6%	449	63%	1530
Normal	1060	98.0%	430	95.8%	1490
Forceps/ Vacuum assisted	21	2%	19	4.2%	40
Caesarean section	244	18.4%	264	37%	508
Total (n)	1325		713		2038

**Table-2: Indication for caesarean section**

S. No.	Indication for caesarean sections	Spontaneous		Induced		Total	
		No of Patients	Percentage	No. Of Patient	Percentage	No. Of patients	Percentage
1.	Failure of induction	0	0%	75	28.3%	75	14.8%
2.	Foetal distress	33	13.5%	63	23.9%	96	18.9%
3.	Failure to progress	211	86.5%	126	47.8%	337	66.3%
Total		244	100%	264	100%	508	100%

713 patients had induction of labour, giving induction rate of 30.89%. The total percentage of caesarean section in the study period was 24.9%. 37% of induced groups underwent a caesarean section for the most common indication being failure to progress

which is 47.8% 18.4% of spontaneous groups underwent a caesarean section for the most common indication being failure to progress which is 86.5% Caesarean Section rate was nearly two times higher in the induction group compared to the spontaneous group.

**Table-3: Statistical analysis 2x2 Tables**

	Vaginal delivery	Caesarean section	Total
Spontaneous	1081	244	1325
Induced	449	264	713
Total	1530	508	2038

\*Chi Square and Exact Measures of Association

Test	Value	p-value(2-tail)
Uncorrected chi square	85.806	<0.001

All expected values (row total\*column total/grand total) are >=5, OK to use chi square.

Odds-Based Estimates and Confidence Limits

Point Estimates	Value	Confidence Limits Lower, Upper
Odds Ratio(Fisher Exact)	2.6049	2.12, 3.2*

\*P-values <0.05 and confidence limits excluding null values shows value is highly significant

**DISCUSSION AND CONCLUSION**

The goal of induction is to achieve a successful vaginal delivery that is as natural as possible [12]. Evidence-based medically indicated inductions of labour are generally considered within a risk- benefit decision making process, in which the risks of the medical condition worsening or causing harm are balanced against the risks of an induction of labour[13].

Labour induction rate has gradually increased nationwide and caesarean delivery is regarded as its major complication. However, recent literature on the effect of induction of labour on caesarean section (compared with expectant management) has provided conflicting results.

Thus, it is imperative to determine its association with caesarean section in our population. We hence conducted a study to investigate whether the risk of caesarean delivery is higher or lower following labour induction compared with expectant management.

The induced and spontaneous groups were analyzed after excluding the risk factors to determine whether induction of labour (as opposed to spontaneous onset) in singleton term deliveries with cephalic presentation heightens the risk of caesarean section.

The total number of deliveries during the study period of 1 year was 3027 of which 2038 participants who met the inclusion criteria were

included in the study group. 713 patients had induction of labour, giving induction rate of 30.89%. The successful vaginal delivery rate in those induced was 63% compared to 81.6% in those with spontaneous labour. This difference was statistically significant. In the present study, the risk of caesarean section was found to be more in induced group that is 37% while it was less in spontaneous group that is 18.4%.

In group comparisons, the CS rate was two times higher with induced (vs. spontaneous) labour and was statistically significant (p value <0.001, Odds ratio 2.6049, CI 2.12, 3.2). This was regardless of parity, maternal age, BMI, Bishop Score, gestational age, hypertension, and diabetes. This finding is consistent with other studies [14-16].

The most common indication for Caesarean Section in both spontaneous and induced group was failure to progress which was 66.3% of all caesarean sections followed by failure of induction in the induced groups which was 18.6% of all caesarean sections and then foetal distress which was 17.6% of all caesarean sections.

It was noted that, while the goal of labour induction is to achieve successful vaginal delivery, the induction exposes women to a higher risk of caesarean section than spontaneous labour.

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