

## Correlation of Birth Weight and Birth Length with Mode of Delivery in Manipur

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### **ABSTRACT:**

*Background: Caesarean mode of delivery is now a normal trend, which is an important concern for both maternal and child health. Birth weight (BW) and Birth length (BL) are regarded as important determinants of delivery mode. In the present study, an attempt was made to understand the trend of BW and BL with respect to mode of delivery.*

*Aims and Objectives: This paper tries to determine the mode of delivery in the state and further to assess the relationship of mode of delivery with the maternal age, ethnicity and intake of tobacco.*

*Method: A total sample of 120 women was recruited after taking consent from them and the family, the birth weight and birth lengths of the neonate were measured using weighing machine and infantometer from a private and a government hospital.*

*Result: It was found that 82 underwent caesarean section which amounts to 68% of the deliveries showing considerable increase in number of caesarean deliveries as compared to the previous studies. The average birth weight and birth length of the neonate were 3.17 kg and 48.6 cm respectively. The study revealed that the neonate's birth weight is significantly correlated with caesarean delivery ( $r=0.226$ ;  $p=0.012$ ), and also Maternal Age ( $p=0.002$ :  $\chi^2=12.8$ ), Ethnicity ( $p=0.037$ :  $\chi^2=6.59$ ) and Tobacco Intake ( $p=0.025$   $\chi^2=5.02$ ) have significant correlation with the Mode of Delivery.*

*Conclusion: There is significant increase in the caesarean mode of delivery in the state. And it also unveiled the relationship of birth weight, maternal age, ethnicity, and tobacco intake with the mode of delivery.*

**Keywords:** Birth Weight, Birth Length, Caesarean, Neonate, Maternal Age.

## INTRODUCTION

Caesarean delivery also known as caesarean section (CS) delivery is a form of childbirth in which surgical incision is made through a mother's abdomen and uterus to deliver the baby (Joseph et al. 1998). In fact, CS happens when certain complications arise where a normal vaginal delivery is not possible due to varied probable reason. WHO (2015) recommended it as an effective way to save maternal and infant lives in such complications. A large number of studies have stressed that as the maternal age increases the likelihood of a caesarean birth increases (Khawaja et al. 2004; Kassak et al. 2009). Meanwhile, several studies have reported that caesarean deliveries have incurred more after effect complications as compared to normal or vaginal deliveries. These after effect complications are often regarded as an important health issue at the national as well as at the international level (Stanton and Holtz, 2006). The associated after effect complications include uterine-rupture, placental complications such as placenta previa and accreta (Gilliam et al. 2002; Clark and Silver, 2011; Marshall et al. 2011), cystotomy, bowel injury, illues and hysterectomy (Silver et al.2006).

Moreover, caesarean delivery has higher risk of maternal death owing to various after effect complications (Liu et al. 2007). Surgical site infection is also another after effect complications that claimed 2-7% endometriosis post CS delivery (Kawakita and Landy, 2017). Apart from the maternal health problems, Caesarean delivery also cause health consequences to the infant as the infant mortality rate and risk of primary pulmonary hypertension was 4 times higher and five times higher among the infants born through caesarean section respectively than the normally delivered neonate (Richardson et al. 2001). Even CS born infant has the higher disability rates (Gholami et al. 2014).

According to WHO, there is no justification for any region to have a caesarean rate higher than 10-15% (World Health Organisation, 1985). It is considered as a serious cause of concern in most of the countries all over the world to investigate the reasons for the rising rates in caesarean delivery, identifying as emerging "global epidemic" (Savage, 2009). Of lately, the caesarean delivery has been increasing in many developed and developing countries (Gomes et al. 1999; Leone et al. 2008) though such increase has not been clinically justified. Over the last few years, the rates of c-section have risen substantially in many countries ranging from 15% to 40% (Belizin et al. 1999; Murray, 2000; Martin et al. 2002; Ravindran, 2008). Studies have reported that there is gradual increase in the rate of caesarean delivery in India too, ranging from 21% (IIPS, NFSH; 1992-1993); 25.4% (IIPS, NFSH; 1998-1999); Tamil Nadu-34.1%, Kerala- 35.8%, Andhra Pradesh-40.1%, Telagana-58% (IIPS, NFSH; 2015-2016). Keeping in view the emerging trend of caesarean delivery, the present study examines the present trend of caesarean delivery in Manipur and to determine the correlation with anthropometric measurement on infant such as birth weight and length. The study also attempts to explore the relationship with maternal age, ethnicity and tobacco intake with mode of delivery.

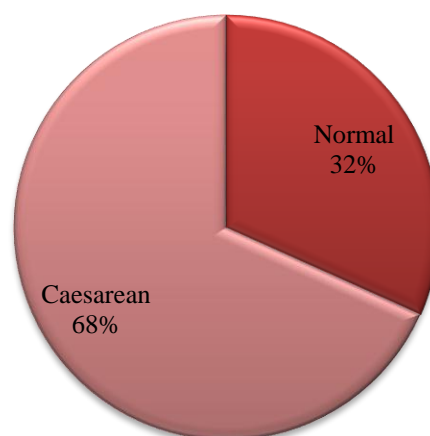
## MATERIALS AND METHODS:

The present study is a cross-sectional study where the data were collected from two hospitals i.e. Maipakpi Maternity and Child Hospital (private hospital), Imphal West and Jawaharlal Nehru Institute of Science (government hospital), Imphal East of Manipur. A total sample of 120 pregnant women and their singleton live-born neonates in the hospital were selected for the study. Prior consent was taken from the respondents after explaining the details of the research. All the necessary information including details of the parents were recorded using a self-administered Performa. Anthropometric measurements of the neonates were taken after delivery, as per standard techniques of Weiner and Lourie (1969), with the help of nurses. Birth weight is taken by using beam balanced scale and Birth Length is measured by using infantometer.

Descriptive statistical analyses were done using XLSTAT. Chi-square and 't' test analysis were done to find out the significant differences of qualitative and quantitative variables with mode of deliveries. Biserial correlations are also calculated to measure the relationship between mode of deliveries with birth length and birth weight. Biserial correlation is a co-relational index that estimates the strength of a relationship between an artificially dichotomous variable (X) and a true continuous variable (Y), under the assumption that both variables are normally distributed in their underlying populations.

## RESULTS

Figure 1 displays the percentage of caesarean mode of delivery (68%) which is exceedingly higher than the percentage of normal mode of delivery (32%).



**Fig 1: Frequency Percentage on Mode of Delivery**

**Table 1: Anthropometric measurement and correlation with Mode of Delivery**

	Birth Weight (kg)			Birth Length (cm)		
	Male	Female	Total	Male	Female	Total
Normal	3.07	3	38 (3.03)	48.69	48.01	38 (48.3)
Caesarean	3.31	3.14	82(3.24)	49.23	48.16	82 (48.7)
't' test	0.05	0.23	2.52*	0.37	0.76	1.23
Mean	3.17			48.6		
Biserial Correlation	0.266*			5.02		

\* p &lt; 0.05

Table 1 shows that the average birth weight and birth length of the neonate were 3.17 kg and 48.6 cm respectively. The average birth weight of normally delivered and caesarean delivered neonate is 3.03 kg and 3.24 kg and the average birth length of normally delivered and caesarean delivered neonate is 48.3 cm and 48.7 cm respectively. The study revealed that the average birth weight and birth length of caesarean delivered male (3.31Kg; 49.23cm) and female (3.14Kg; 48.16cm) neonate is more than the average birth weight and birth length of normally delivered male (3.07Kg; 48.69cm) and female (3Kg; 48.01cm) neonate. The average birth weight of The average birth weight (3.24Kg) of caesarean delivered neonate is more than those of normally delivered neonate (3.03Kg). Similarly, the average birth length (48.7cm) of caesarean delivered neonate is more than the normal born neonate (48.3cm). Average birth weight and length of male neonate is more than the average birth weight and length of female neonate which is similar to several previous studies. It is claimed that birth weight being the important determinants of caesarean delivery, as low and high birth weight newborns have more caesarean deliveries than those of average weight (Poma, 1999). In the present study, birth weight have significant correlation with caesarean delivery (biserial correlation, r: 0.226;  $p \leq 0.05\%$ ), which means that heavier neonates have undergone caesarean delivery significantly.

**Table 2: Biosocial Characteristics associated with Mode of Delivery**

Characteristics	Particulars	Mode of Delivery		$\chi^2$
		Normal	Caesarean	
Maternal Age	$\leq 20$	7(77.8)	2(22.2)	12.8*
	21-34	29(31.5)	63(68.5)	
	$\geq 35$	2(10.5)	17(89.5)	
Ethnicity	Meitei	32(32.9)	65(67.1)	6.59*
	Manipuri Muslim	4(66.7)	2(33.3)	
	Tribe	2(11.8)	15(88.2)	
Tobacco Intake	Yes	7(17.9)	32(82.1)	5.02*
	No	31(38.3)	50(61.7)	

\* p &lt; 0.05

Table 2, exhibits the relationship of biosocial characteristics with mode of delivery. The biosocial characteristics included in the present study are maternal age, ethnicity and tobacco intake. It is observed that there is significant distribution of different mode of delivery i.e. Normal and Caesarean with respect to maternal age ( $\chi^2 = 12.8$ ). Maternal age at 35 years and over, often referred as advanced maternal age has higher rates of Caesarean delivery (89.5%) as compared to young ( $\leq 20$  years) and intermediate maternal age (21-34 years). The significant variation of these two modes of delivery is also observed with Ethnicity ( $\chi^2 = 6.59$ ) and Tobacco Intake ( $\chi^2 = 5.02$ ).

## DISCUSSION

Of the 120 live-births recorded during the study period, 82 live births were caesarean deliveries and 38 normal deliveries, thereby giving the occurrence rate of CS delivery to be 68% (Figure 1). This observation goes well concordant with the national scenario as it was predicted that the average caesarean rate would increase from 21.8% in 1992-1993 (IIPS, NFHS-1) to 25.4% in 1998-1999 (IIPS, NFHS-2). As per the latest IIPS, NFHS-4 (2015-2016) report, the numbers have escalated in many parts of the country-reaching as high as 58% caesarean deliveries in Telangna, 40.1% in Andhra Pradesh, 35.8% in Kerala, and 34.1% in Tamil Nadu (IIPS, NFHS-4 2015-16). The finding in the present is found to be concordant with the study done in Norway where the case of caesarean delivery increases from 7% in women aged 20-24 years to 22% in

those aged  $\geq 40$  years (Herstad et al. 2016). Essex et al. (2013) also concluded that caesarean delivery increases significantly with maternal age. Advanced maternal age is reported to have been associated with pregnancy related risks (Lampinen et al. 2009) and mainly risk for risk of labour and delivery complications (Cavazos-Rehg et al. 2015). Birth weight and birth length are important determinant for CS delivery in the study as reported in other studies. The relationship of gestational age with the birth weight and birth length has also been reported (Magon and Bharatwaj, 2013.), but the present study didn't include gestational age as it was not objective of the study. Moreover, birth weight and length are multifactorial traits (Dubois et al. 2012). The tribes which are mainly inhabited in the buffer hilly regions of Manipur have more significant caesarean delivery. Similarly, those who consumed tobacco during pregnancy have higher rate of caesarean delivery too. The probable reason for such significant cases of caesarean delivery in these biosocial characteristics need to ponder as it may affect the maternal health in overall.

## **CONCLUSION:**

The study reveals there is considerably significant increase in the caesarean mode of delivery in the state. And it further unfolds the relationship of birth weight, maternal age, ethnicity, and tobacco intake with the mode of delivery. The high percentage indicates that there could be overuse of medical technology for childbirth in the state. In India, increasing number of CS is an epidemic so it should be monitored and checked. Therefore, awareness on health and educational programs should be given on enlightening women on appropriate types of delivery in reference to the status of their condition, with direction of effective antenatal care and healthcare management for taking up preventive measures and to decrease CS. The present study brings to the attention of health seekers, providers and even policy makers for Health education to enable the public to opt for appropriate mode of deliveries owing to the pregnant women's health conditions.

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