Prevalence and associated factors for cesarean section among women at a tertiary care hospital in Nepal

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ABSTRACT

Background: There has been a global rise in caesarean section (CS) rates for delivery of baby, which is often associated with short and long-term risks. The main objective of this study was to find out the prevalence of and associated factors for CS delivery against vaginal delivery at a tertiary care hospital of Biratnagar, Nepal.
Methods: A cross-sectional study was carried out in October 2022 using consecutive sampling to include 178 women who gave birth during the study period. Data on socioeconomic and obstetric variables were collected through face-to-face interviews and hospital records. Descriptive and chi-square analysis were performed to identify the factors associated with CS.
Results: The mean age of women was 24.64 (± 4.64) years. The prevalence of CS was 38.2%. Half of the women were primigravida at the time of presentation. Common reasons for CS were previous history of CS (23.45%) and fetal distress (20.98%). Women under 25 years had higher odds of CS compared to those aged 25 years or older (OR = 2.007, 95% CI [1.017-3.961]). Likewise, women who had previous CS (OR = 6.721, 95% CI [2.526 – 17.884]) and fetal distress (OR = 3.157, 95% CI [2.516-3.961]) were more likely to have CS.
Conclusions: Caesarean births accounted for more than one-third of all births. Age, order of gestation (parity), previous CS and fetal distress were significantly associated with higher CS rates.
Keywords: caesarean section, critical threshold, prevalence, primary CS, women

INTRODUCTION

Caesarean section (CS) is a surgical procedure that involves extracting a fetus when complications arise during pregnancy or labour. There is a substantial increase in CS rate, and is projected to reach 29% by 2030, with rates ranging from 7.1% in sub-Saharan Africa to 63.4% in Eastern Asia [1-3]. In Nepal, the CS rate increased from 0.9% in 1996 to 9-10.2% in 2016 [4,5], however it is still below the WHO-recommended critical threshold level of 10-15% [2,6]. However, as high as nearly half cases of CS have also been recorded in some hospitals of Nepal [7]. Despite government efforts to ensure safe vaginal delivery, the CS rate has been increasing [7,8], imposing a burden on the health system and family members [9]. Although CS reduces maternal mortality and morbidity, it is associated with short and long-term risks including breastfeeding challenges [10,11]. Some complications of CS include fever, hemorrhage, infection, anemia, asphyxia, and neonatal sepsis [12]. A study in South West Ethiopia revealed that 28.8% of fetuses and 20.5% of women who gave caesarean birth had unfavorable outcomes [13].

Factors such as age, wealth, overweight, big baby, educational status, occupation, income, previous cesarean, augmentation of labour, and hypertension are associated with CS [4,14,15]. An institution-based study in Southwest Ethiopia concluded that residence, multiple pregnancies, and malpresentation were associated with caesarean birth [16]. Accessibility of institutional birth with incentives might increase cesarean birth rate [17]. Identifying the correlates of CS can help reduce its unnecessary practice and ensure its accessibility to those who need it [14]. However, institution-based studies on CS rate and its associated factors, especially at private sectors in Nepal are limited. This study thus aimed to determine the prevalence of CS and its associated factors among women delivered at Nobel Medical College Teaching Hospital, Biratnagar.

METHODS

Study setting and population

Ethical consent was taken from Institutional Review

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Committee of Nobel Medical College Teaching Hospital, Biratnagar (ref number IRC-NMCTH 632/2022) before conducting the study. A descriptive cross-sectional study was conducted between 1st and 30th October 2022 at the postnatal ward of Nobel Medical College Teaching Hospital in Biratnagar, Nepal. The study population consisted of postpartum women who gave birth either vaginally or via CS from the 28th week of pregnancy and onwards, during the study period. Those women who had home delivery were excluded from the study. A non-probability consecutive sampling technique was adopted to include the first 178 eligible women admitted at the postnatal ward. The sample size was estimated by using cochran formula $n=Z^2pq/e^2$ considering 12% as the magnitude of CS in urban Nepal taken from the national representative sample, 5% allowable error and 10% attrition rate [5].

Data collection tools and techniques

The study gathered socio-demographic information through face-to-face interview technique, while obstetric factors such as gestational age, order of gestation (parity at the time of data collection), birth weight, and indications for CS were collected from the hospital record file of each woman. A structured interview schedule was developed and content validity was ensured through an extensive literature search. Data was entered and analyzed using SPSS version 22.0 with a chi-square test to determine the association between socio-demographic variables, obstetric variables, and the mode of delivery. A p-value less than 0.05 was considered significant, while the odds ratio (OR) was computed to identify the strengths of associations between variables.

Table 1: Socio-demographic characteristics of the participants (n=178)

Variable	Frequency (%)
Age (in years)	
< 20	13 (7.3)
20-24	85 (47.8)
25-29	47 (26.4)
≥ 30	33 (18.5)
Mean age: 24.64±4.64, Range: 16-40 years	
Residence	
Municipality	104 (58.4)
Gaunpalika	74 (41.6)
Education	
Illiterate	31 (17.4)
Primary	25 (14.0)
Secondary	77 (43.3)
Higher Secondary	29 (16.3)
Bachelor and above	16 (9.0)
Husband's education	
Illiterate	20 (11.2)
Primary	24 (13.5)
Secondary	82 (46.1)
Higher Secondary	36 (20.2)
Bachelor and above	16 (9.0)
Occupation	
Homemaker	153 (86.0)
Employee	25 (14.0)
Monthly family income (Nepalese Rupees)	
< 20,000	58 (32.6)
20,000-40,000	91 (51.1)
> 40,000	29 (16.3)

RESULTS

Out of 178 women, the mean age was 24.64 (± 4.64) years. More than half (58.4%) were residing in the municipality. Thirty-one (17.4%) women were illiterate and the majority (43.3%) had acquired secondary-level education. Regarding spouse education, nearly half (46.1%) had acquired secondary-level education. Only 25 (14%) women were employed and one-third (32.6%) of the women's monthly family income was less than twenty thousand Nepalese rupees. **[Table 1]**

More than half (52.2%) of the women were primigravida at presentation. Twenty-five (14%) of all women had a history of prior CS. Seventeen (9.6%) women also had a history of previous stillbirths. Five (2.8%) women didn't have done their ANC examination. Out of 178 women,

Table 2: Obstetrical characteristics of participants (n=178)

Variables	Frequency (%)
Gravida	
Primi	93 (52.2)
Multi	85 (47.8)
Previous CS	
Yes	25 (14.0)
No	153 (86.0)
Previous Still Birth	
Yes	17 (9.6)
No	161 (90.4)
Frequency of ANC visit	
No visit at all	5 (2.8)
≤ 4 times	81 (45.5)
> 4 times	92 (51.7)
Birth weight	
<2500gm	28 (15.7)
2500gm-4000gm	147 (82.6)
> 4000gm	3 (1.7)
Gestational age at the time of CS	
Less than 37 weeks	25 (14.0)
37-42 weeks	147 (82.6)
More than 42 weeks	6 (3.4)
Induction of labour	
Induced	66 (37.1)
Spontaneous	112 (62.9)

Table 3: Mode of delivery (n=178)

Mode of delivery	Frequency (%)
Vaginal birth	110 (61.8)
Cesarean Birth	68 (38.2)

more than one-third (37.1%) have had their labor induced. **[Table 2]** More than one-third (38.2%) of the women delivered via CS. [**Table 3**] The most common indication of CS was previous caesarean birth (23.45%). [**Figure 1**] Regarding the socio-demographic variables, women less than 25 years of age had higher odds of CS compared to those aged 25 years or above (OR =

Table 4: Association of cesarean section with selected socio-demographic variables (n=178)

Variables	Mode of Delivery		χ^2 value	*p*-value	OR (95% CI)
	Vaginal Birth	Cesarean Section			
Age in year					
> 25	42 (72.4%)	16 (27.6%)	4.107	0.043*	2.007 (1.017-3.961)
≤ 25	68 (56.7%)	52 (43.3%)			
Residence					
Municipality	67 (64.4%)	37 (35.6%)	0.730	0.393	1.305 (0.708-2.407)
Gaunpalika	43 (58.1%)	31 (41.9%)			
Education Status					
Illiterate	23 (74.2%)	8 (25.8%)	2.443	0.118	1.983 (0.831-4.729)
Literate	87 (59.2%)	60 (40.8%)			
Husband Education Status					
Literate	107 (61.8%)	66 (38.2%)	0.007	0.933	1.081 (0.176-6.639)
Illiterate	3 (60.0%)	2 (40.0%)			
Occupation					
Homemaker	96 (62.7%)	57 (37.3%)	0.414	0.520	1.323 (0.563-3.112)
Employed	14 (56.0%)	11 (44.0%)			
Annual Income (NPR)					
< 20,000	37 (63.8%)	21 (36.2%)	0.145	0.703	1.134 (0.593-2.171)
≥ 20,000	73 (60.8%)	47 (39.2%)			

χ^2 – Chi-square; OR- Odds Ratio; CI- Confidence Interval; *$p < 0.05$

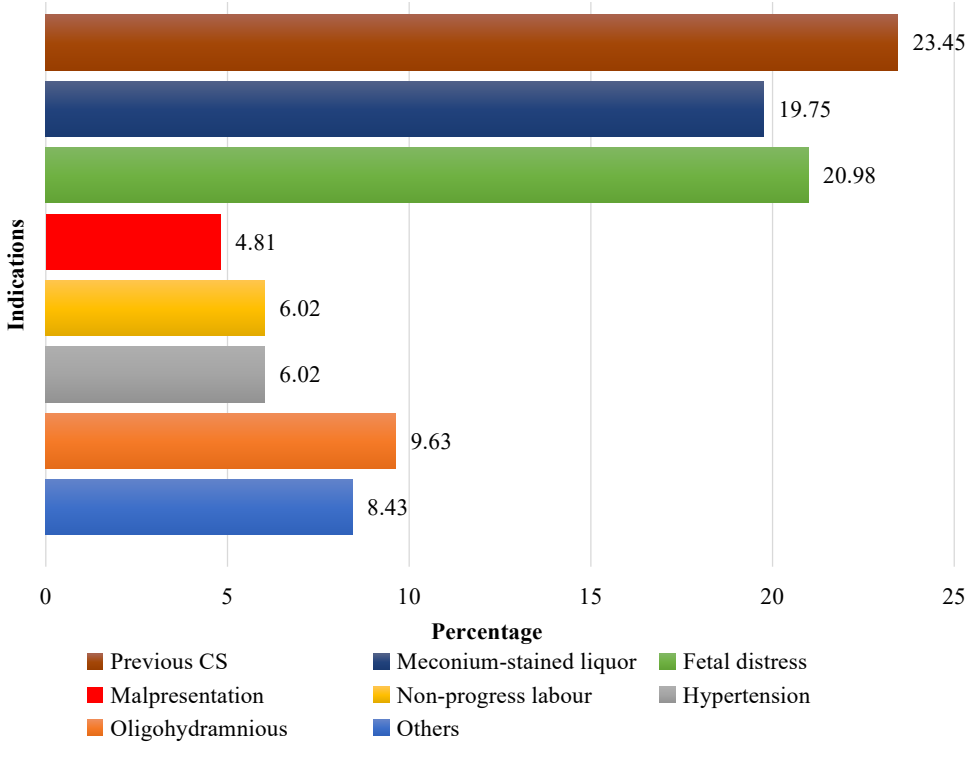

Figure 1: Indications for caesarean section (n=68)

Table 5: Association of cesarean section with obstetric characteristics (n=178)

Variable	Mode of Delivery		χ^2 value	*p*-value	OR (95% CI)
	Vaginal Birth	Cesarean Section			
Order of gestation					
Multi	59 (69.4%)	26 (30.6%)	3.995	0.046*	1.869 (1.009-3.461)
Primi	51 (54.8%)	42 (45.2%)			
Previous CS					
No	104 (68.0%)	49 (32.0%)	17.601	0.000*	6.721 (2.526-17.884)
Yes	6 (24.0%)	19 (76.0%)			
Fetal distress					
Yes	0 (0.0%)	17 (100.0%)	30.404	0.000[a*]	3.157 (2.516-3.961)
No	110 (68.3%)	51 (31.7%)			
Previous still birth					
Yes	12 (70.6%)	5 (29.4%)	0.615	0.433	1.543 (0.519-4.590)
No	98 (60.9%)	63 (39.1%)			
ANC exam					
Yes	106 (61.3%)	67 (38.7%)	0.722	0.651[a]	0.396 (0.043-3.615)
No	4 (80.0%)	1 (20.0%)			
Birth weight					
≤ 2500gm	20 (71.4%)	8 (28.6%)	1.305	0.253	1.667 (0.690-4.029)
> 2500gm	90 (60.0%)	60 (40.0%)			
Gestational age					
≤ 37 weeks	19 (76.0%)	6 (24.0%)	2.485	0.115	2.158 (0.815-5.708)
> 37 weeks	91 (59.5%)	62 (40.5%)			
Induction of labour					
Yes	44 (66.7%)	22 (33.3%)	1.053	0.305	1.394 (0.738-2.631)
No	66 (58.9%)	46 (41.1%)			

χ^2 – Chi-square; OR- Odds Ratio; CI- Confidence Interval; a- Fisher exact test *p <0.05

2.007, 95% CI [1.017-3.961]). **[Table 4]**

Regarding obstetric factors, women who had previous cesarean section (OR = 6.721, 95% CI [2.526 – 17.884]) and fetal distress (OR = 3.157, 95% CI [2.516-3.961]) were more likely to have cesarean section. The odds of having CS were higher in current primiparous women compared to multiparous women (OR = 1.869, 95% CI [1.009 - 3.461]). [**Table 5**]

DISCUSSION

There has been a rising trend in CS rate over the last two decades in Nepal. On top of that, there is a threefold increase in CS rate in the private sector ranging from 8.9% in 1996 to 26.3% in 2016 [4]. Our study shows the overall prevalence of CS to be 38.2% which is higher than a retrospective study conducted in Shree Birendra Hospital, Nepal in the year 2018 which showed that 22.57% of the mothers delivered via CS [18]. However, a similar result was observed in a hospital-based study conducted in Ethiopia in the year 2020 where 39.1% of mothers gave birth via cesarean mode [13]. Although, WHO has recommended the critical threshold of 10-15% at population level, the rates at hospitals can vary according to the need which needs further assessment using Robson classification [2].

This study highlights that the common indications for CS were previous CS, fetal distress, meconium-stained liquor, and oligohydramnious. This finding is supported by the study conducted in the maternity ward of Chitwan Medical College Teaching Hospital where previous CS (22.3%), fetal distress (10.6%), meconium-stained liquor (12.2%), oligohydramnious (7.2%) were the major indications for cesarean section [19].

The statistical analysis of the study showed that age of women had a significant association with CS. Women who were less than 25 years were more likely to have cesarean birth. As primary cesarean section is in increasing trend thus this study also highlights that young women are more likely to have cesarean birth. An institutional-based cross-sectional study in Addis Ababa, Ethiopia also highlights that age was significantly associated with CS in multivariate logistic regression [20].

Likewise, order of gestation and history of previous CS were also significantly associated with CS. Women having two or more children were less likely to have cesarean birth. Likewise, women who previously delivered via cesarean section were more likely to have cesarean birth in this study. The national representative data in Nepal

had mentioned that women having two or more than two children were more likely to have cesarean birth [5]. However, this study showed that primiparous women were having more cesarean birth than multiparous ones. This may be possible because of the discrepancy in the sample. A case-control study conducted in the year 2018/19 in Ethiopia reported that women who had previous CS were 6.93 times more likely to deliver by CS [21]. The study findings highlight that the cases for the primary cesarean should be selected cautiously as it has a high likelihood of having a subsequent cesarean birth. Fetal distress was also a significant factor for cesarean birth in this study of having cesarean birth. This finding is supported by the systematic review study conducted to identify the factors for rising CS rate in South Asian countries where fetal distress was the major indication for cesarean birth [22].

Some of this study's findings were based on hospital records which limits its generalizability. Also, the associations between the variables were tested without adjustments for other variables, hence considered as a limitation of the study.

CONCLUSION

Caesarean deliveries accounted for more than one-third of all births in the hospital during the study period. Age, order of gestation, previous CS and fetal distress were significantly associated with the occurrence of CS. A judicious decision is an utmost priority while selecting a case for primary CS as it is evident that previous CS had a high likelihood of having subsequent CS.

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Consent and/or assent: Informed written consent was obtained from each of the participants prior to study.

Data availability: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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