Prevalence and Associated Factors of Cesarean Section in Dhulikhel Hospital, Kathmandu University Hospital

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ABSTRACT

Background

The Cesarean Section (CS) is a major obstetric life-saving procedure used to avoid pregnancy and childbirth complications. Cesarean sections are becoming more popular across the world, as well as in Nepal.

Objective

To assess the prevalence of cesarean section and its associated factors among women in Dhulikhel, Nepal.

Method

A cross-sectional study was conducted where 1246 pregnant women of age 15-45 years, admitted and delivered in hospital, were selected through purposive sampling technique and interviewed using structured questionnaires in Dhulikhel Hospital, Kathmandu University Hospital, Kavre, Nepal.

Result

The prevalence of cesarean section among women was 39.7% where the most common indication was previous cesarean section with scar tenderness, 27.9%. Half of the participants, i.e. 50.6%, were primigravida. Majority of women, 97.5% had done their antenatal checkup and among them 74.8% had their checkup in Dhulikhel Hospital, Kathmandu University Hospital. Most of them, i.e.76.2% had emergency cesarean section and 69.5% had primary cesarean section. Women of the age group 30-45 years (AOR=2.23) and women with higher secondary education level (AOR=2.03) were two times more likely to perform cesarean section. Women involved in service (AOR=1.37) and business (AOR=1.23) had greater odds of performing cesarean section than homemakers. Women giving birth to infants weighing 3.51-5.00 kg were more likely to perform cesarean section (AOR=1.33).

Conclusion

The prevalence of cesarean section is noticeably high where the educated, employed and higher aged women are more inclined to cesarean section. More obstetric factors could be explored to determine the rise in cesarean section in Nepal which can help in decision making for clinicians.

KEY WORDS

Cesarean section, Dhulikhel hospital, Prevalence

INTRODUCTION

Cesarean section (CS) is one of the lifesaving procedures and safe method of delivery as compared to normal delivery.[1] It is the most preferable method of childbirth in both developed and developing countries.[2] When difficulties emerge during birth, CS one of the most often performed surgical operations, can be life-saving.[3]

The prevalence of CS has progressively increased over the world.[4-6] According to Betran et al. the global CS rate increased by 12.4% from 1990 (6.7%) to 2014 (19.1%), with the Caribbean (40.5%) having the highest CS rate, followed by Northern America (32.3%), Oceania (31.1%), Europe (25.0%), Asia (19.1%), and Africa having the lowest CS rate (7.3%).[7]

In 2015, the global CS rate was 21.1%, almost double that of 2000, according to the Lancet series.[8] There are significant differences in the use of CS between high-income and middle-income countries, as well as between urban and rural settings.[9]

In Nepal, the proportion of births delivered by cesarean section climbed from 5% in 2011 to 9% in 2016, with a significant difference between urban (12%) and rural (6%) areas.[10] Another study done by Pun et al. revealed 37.6% gave birth by CS in two hospitals in Nepal.[11] Of those women who delivered by CS, 84.7% had an emergency CS. Previous CS (27.6%) was the most common indication.[11] The purpose of this study is to determine the prevalence of cesarean section and its associated factors tertiary level care hospital in Nepal.

METHODS

A descriptive cross-sectional study was conducted in Dhulikhel Hospital from July 2018 to June 2019. The study population was 1246 pregnant women, aged 15-45 years who were admitted and delivered in the Dhulikhel Hospital, Kathmandu University Hospital. Dhulikhel Hospital, Kathmandu University Hospital, Kavre, Nepal is a tertiary level community hospital which provides highly specialized care in both obstetrics and gynecology services which reports more than three thousand deliveries i.e. 3071 [2112 normal delivery, 91 complicated, 868 cesarean section] in the year 2017 AD and 2994 deliveries [1997 normal delivery, 72 complicated and 925 cesarean section] occurred in the year 2018 AD.

Purposive sampling technique was used to select a total of 1246 women. Pregnant women who were admitted to the hospital for observation or treatment and women with twin pregnancy were excluded from the study. Data collection was done using pre-tested structured and semi structured questionnaires where respondents were interviewed face-to-face. Other information was obtained from the delivery records book. The questionnaires were divided into sections where the first section was about the selected socio-demographic variables which were women's age, education, ethnicity, occupational status and address of the participants. The second section was about the obstetric health and health care seeking behavior related factors which were gravida status of women, the ANC checkup, place of ANC visits, type of delivery, performance of C-section, indication of C-section, type of C-section, number of C-section and birth weight of infants.

Ethical clearance for the study was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences (approval no: 128/17) and permission to conduct the study was taken from the Obstetrics and Gynecology department as well. An informed verbal and written consent were taken from the respondents after explaining the purpose and procedure of the study. Anonymity and confidentiality was maintained ensuring voluntary participation.

After data collection was completed, the data was entered into IBM SPSS version 16. It was checked for its completeness, cleaned and analyzed accordingly. Frequencies and percentage were used to describe some variables. Bivariate analysis and chi-square test were used to examine association between dependent and independent variables. A 95% CI and p-value of < 0.05 were considered to be statistically significant. In addition, multivariate logistic analysis was carried out and fit to the final model calculating adjusted odd ratios to assess the effects of each independent variable on the outcome variable.

RESULTS

Among 1246 women who participated in the study, more than two third (67.7%) belonged to the age group of 20-29 years with median age of 24. More than half (55.3%) of the participants were from Kavre District and the prominent ethnic group was Newar i.e. 30%. More than one third of women (37.6%) had a secondary education (class 8-10) followed by higher secondary (+2 level) 29.9%. Nearly half of them, 49.2%, were homemakers (table 1).

As demonstrated by table 2, the prevalence of Cesarean Section was 39.7%. Half of the participants (50.6%) were primigravida. Majority of participants, 97.5% had done their antenatal checkup and most of the women among them, 74.8% had their checkup in outpatient department of Dhulikhel Hospital and only 2.2% of them were referred from other hospitals or health posts to Dhulikhel Hospital. More than half of the participants 59.4% had normal vaginal delivery followed by CS 39.7%. Among those who had CS, most of them 76.2% had emergency CS and only 23.8% had elective CS and again more women 69.5% had primary CS whereas only 30.5% had repeat CS. Most of them 73.5% of women gave birth to infants weighing from 2.5 kg to 3.5 kg. The indication of CS for most of the women

Table 1. Socio-demographic characteristics of the respondents (n=1246)

Characteristics	Number	Percentage
Age group(years)		
Less than 20 years	202	16.2
20-29 years	843	67.7
30-45 years	201	16.1
Median age	24	
Ethnicity		
Newar	347	30.0
Tamang	292	23.4
Chhetri	258	20.7
Bhramin	238	19.1
Dalit and others	84	6.7
Address		
Kavre	689	55.3
Bhaktapur	230	18.5
Sindhupalchowk	215	17.2
Others (Dolakha, Sindhuli, Kathmandu)	112	9.0
Educational status		
Illiterate	59	4.7
Primary (1-5)	155	12.4
Secondary (6-10)	469	37.6
Higher secondary (11-12)	373	29.9
Above higher secondary (Bachelor, Masters)	190	15.2
Occupational status		
Homemaker	613	49.2
Service	242	19.4
Agriculture	201	16.1
Business	100	8.0
Daily wage	90	7.2

Table 2. Obstetric characteristics of the respondents and prevalence of cesarean section

Pregnancy and delivery variables	Number	Percentage
Gravidity status of women (n=1246)		
Primigravida	631	50.6
Multigravida	578	46.4
Grand multigravida	37	3.0
ANC Check up (n=1246)		
Yes	1215	97.5
No	31	2.5
Place of ANC Check up (n=1215)		
Dhulikhel Hospital	909	74.8
Outside own case	279	23.0
Referred case	27	2.2
Type of Delivery (n=1246)		
Normal vaginal	740	59.4
Cesarean section (CS)	495	39.7
Instrumental	11	0.9
Type of CS (n=495)		
Emergency	377	76.2
Elective	118	23.8
Number of CS (n=495)		
Primary	344	69.5
Repeat	151	30.5
Birth weight of infant (n=1246)		
Less than 2.50 kg	242	19.4
2.50 - 3.50 kg	916	73.5
3.51 - 5.00 kg	88	7.1
Prevalence of cesarean section (n=1246)		
Non-Cesarean	751	60.3%
Cesarean	495	39.7%

(27.9%) was previous CS with scar tenderness followed by fetal distress (16.8%) and meconium liquor (11.3%).

Bivariate analysis between socio-demographic characteristics and prevalence of cesarean section showed that all socio-demographic characteristics i.e., age of women (p < 0.001), ethnicity (p < 0.001), address (p=0.001), education status of women (p=0.002) and occupation status of women (p < 0.001) were found to be associated with prevalence of cesarean section at 95% CI. But, among obstetric factors, only birth weight of infants was found to be associated with prevalence of cesarean section (p=0.011).

Table 3 shows the multivariate analysis where the women of age group 30-45 years were two times more likely to perform cesarean section than women of age group less than 20 years (AOR=2.23, 95% CI=1.42-3.49, p < 0.001). Women of any other ethnicity were less likely to perform cesarean section than women of Newar ethnicity. Women with educational level of above higher secondary (Bachelors

or Masters) were two times more likely to perform cesarean section than women who were illiterate (AOR=2.03, 95% CI=0.98-4.20, p=0.050). Regarding occupation, though not seen statistically significant, women involved in service had 1.4 times greater odds of performing cesarean section than women who were homemakers (AOR=1.37, 95%CI=0.94-2.01). Similarly, women who were doing business were also 1.2 times more likely to perform cesarean section than homemakers (AOR=1.23, 95%CI=0.77-1.95). Women giving birth to infants weighing 3.51-5.00 kg were 1.3 times more likely to perform cesarean section than women giving birth to infants weighing less than 2.50 kg (AOR=1.33, 95% CI=0.79-2.23).

DISCUSSION

The prevalence of cesarean section rate in Dhulikhel Hospital (39.7%) is approximately similar (36.8%) to the study conducted in tertiary care Hospital of Nepal.[12] Our results are also supported with research done by Pun et

Table 3. Relationship of socio-demographic and obstetric factors with cesarean section   (n=1246)

Study variables	AOR	95% CI		p value
		Lower	Upper	
Age (in years)				
Less than 20	Ref			
20-29	1.492	1.040	2.140	0.030*
30-45	2.233	1.425	3.497	<0.001*
Ethnicity				
Newar	Ref			
Bhramin	0.660	0.453	0.960	0.030*
Chhetri	0.658	0.458	0.944	0.023*
Tamang	0.662	0.456	0.961	0.030*
Dalit and others	0.640	0.371	1.106	0.110
Address				
Kavre	Ref			
Sindhupalchowk	0.963	0.691	1.344	0.827
Bhaktapur	1.280	0.899	1.822	0.171
Others (Dolakha, Sindhuli, Kathmandu)	1.162	0.762	1.772	0.485
Educational status				
Illiterate	Ref			
Primary	1.817	0.929	3.557	0.081
Secondary	1.845	0.983	3.460	0.056
Higher secondary	1.437	0.743	2.781	0.281
Above higher secondary (Bachelor, Masters)	2.038	0.987	4.208	0.050
Occupational status				
Homemaker	Ref			
Service	1.375	0.940	2.012	0.101
Agriculture	1.037	0.735	1.463	0.835
Business	1.235	0.778	1.959	0.371
Daily wage	0.362	0.203	0.648	0.001*
Birth weight of infant				
Less than 2.50 kg	Ref			
2.50 - 3.50 kg	0.699	0.517	0.946	0.020*
3.51 - 5.00 kg	1.333	0.797	2.231	0.274

*Statistically significant (p<0.05) at 95% CI, AOR= Adjusted Odds Ratio, Ref= Reference category

al. in two hospitals (37.6%) in Nepal (Dhulikhel Hospital and Kathmandu Medical College).[11] However, this rate demonstrates a markedly higher rate than the prevalence rate of cesarean section done at Illam District Hospital (14.70%).[13] Rajbhandary et al. at Nepal Medical College and Teaching Hospital in Kathmandu at 21.40% and Dhakal et al. at Mid-Western Regional Hospital in Surkhet at 18.8%.[14,15] The CS rate of this study is approximate to that of the study by Maskey et al. may be because Dhulikhel Hospital is also the tertiary care hospital.[12]

Most women in this study were in the 20-29 years age group (67.7%). In contrast, the study done by Pun et al. and Dhakal et al. shows their participants in the age group of 20-24 years were 42.8% and 42.9% respectively.[11,15] Also, a study done by Sah et al. showed their participants were in the age group 20-24 years (43.8%).[13] This difference with our study might be because the age range is larger than the remaining studies, while the other compared studies have the same age range. Another study done by Karim et al. showed nearly similar results i.e. 60.7% belongs to 20-29 years.[1]

Out of 1246 respondents in this study, 469 respondents (37.6%) had a secondary level of education while cross-sectional study done by Karim et al. in Bangladesh shows 20.2% of the respondents had education higher than primary.[1] This difference might be due to the difference in country setting and educational priorities of two different countries. Most of the women in this study were from Newar ethnicity (30%), from Kavre district (55.3%) and were homemakers. The high prevalence in such a group might be, because Dhulikhel lies in Kavre district, and it is more accessible to the people residing within that district and probably most of the people in Dhulikhel belong to the Newar ethnic group.

More than half of the participants were primigravida (50.6%) in this study. This correlates with the study done by Gurung et al. (52%) in Pokhara.[16] Similarly, in a study done by Pun et al. in Dhulikhel Hospital and Kathmandu Medical College Teaching Hospital, more than half of the participants were (51%) primigravida, which is almost similar to our study.[11] The similar finding may be due to early marriage in the rural areas of the hilly region and also because of the anxiety and fear associated with primigravida.[13] The majority of the respondents (97.5%) had done an ANC checkup and among them most of the ANC checkup was done in Dhulikhel Hospital (74.8%). This finding is likely similar to the study done by Tscga et al.[17]

Another study revealed that 78.4% of participants visited at least 4 and above ANC visits which was quite similar with ours.[11] This similarity may be due to the awareness activities done during pregnancy in both the studies. In Contrast, a study done by Karim et al. in Bangladesh, 52.5% of the respondents have completed at least 4 ANC visits.[1] This difference might be due to the difference in questionnaire as we have not mentioned the specific numbers of completed ANCs. Majority (73.5%) of the infant's birth weight was between 2.5 to 3.5 kg in this study, which correlated with the study done by Sah et al. in-District Hospital of eastern Nepal and Pun et al. in Kathmandu and Dhulikhel Nepal.[10,11]

We found the most common cause of Cesarean section among women in Dhulikhel Hospital was previous CS with scar tenderness (27.9%) followed by fetal distress (16.8%) and meconium liquor (11.3%). Most of these indications have featured in many previous studies such as; Pun et al. showed 27.6% previous cesarean section, fetal cause (18.8%), Sah et al. showed fetal distress (35.1%) and Dhakal et al. showed fetal distress/meconium stained liquor (37.8%).[11,13,15] In studies done previously, meconium liquor

is also considered as fetal distress, in contrast to that, we have separated it therefore, indication of CS was high in previous CS with scar tenderness. However, if we combine both of our options and views together, fetal distress/ meconium liquor will be the main indication (28.1%) of the CS. This demonstrates that regardless of the regional variations or rural and urban divide, the indications of CS remain the same as fetal distress/meconium stained liquor.[13]

This study identifies 5 socio-demographic factors to be associated with prevalence of Cesarean Section. This includes, age, ethnicity, address, educational status and occupational status of the women. In this study, age was significantly associated (p < 0.001) with the prevalence of cesarean section. This correlates with the study conducted by Das et al. in 2021 (p=0.002).[18] Multiple studies worldwide have also reported similarly that the mothers' age remains a significant factor in determining childbirth through CS.[18-23] In contrast, study done in Eastern Ethiopia does not show the association age with Cesarean Section.[17]

The study shows, the birth weight of the infant in between 2.5-3.5 kg has a significant association (p=0.020) with Cesarean Section case. However, the study that analyzed the secondary data from the 2016 Nepal demographic and Health Survey shows only the birth weight of the newborn above 4 kg has association (p = 0.004) with cesarean section. This finding has been supported by the cross-sectional study conducted in Eastern Ethiopia.[10,17]

Regarding other obstetric factors, gravidity of women (0.281) and ANC check-up (0.907), it was found to have no association with the Cesarean Section in this study. But the study conducted by Das et al. shows the association of parity (COR = 1.61) and ANC visit (COR=2.50) with Cesarean Section.[18]

Non-institutional births were not taken into consideration in determining the extent of normal birth, which is one of the study's weaknesses. This study was conducted at a single center therefore it cannot be applied to all hospitals.

CONCLUSION

Cesarean section is an effective intervention to save lives of mothers and newborn at the time of complications during childbirth. More than one third (39.7%) of child births are performed through cesarean section. Previous CS is the most common indication of CS followed by fetal distress and meconium stained liquor. In this study age, education, ethnicity and occupation are the associated factors for cesarean section. More obstetric factors could be explored to determine the rise in C-sections in Nepal which can help in decision making for clinicians.

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