Prithvi Journal of Research and Innovation
[A Peer-Reviewed, Open Access Multidisciplinary Bilingual Journal; Indexed in NepJOL]
ISSN 2705-4888 [Print]; ISSN 2705-4896 [Online]; JPPS Star-Rated Journal
Volume 3; 15 December 2021; pp. 44-51
eJournal Site: http://ejournals.pncampus.edu.np/ejournals/pjri/

---------- *ORIGINAL RESEARCH ARTICLE*

The Role of Birthplace in the Mode of Delivery in Nepal

Sudesh Pandit
Department of HPPE, Prithvi Narayan Campus, Pokhara

Article History:
Submitted 01 October 2021
Reviewed 02 December 2021
Accepted 13 December 2021

Corresponding Author:
Sudesh Pandit
Email: sudesh@pncampus.edu.np

Article DOI:
https://doi.org/10.3126/pjri.v3i1.41631

Publisher:
Centre for Research and Innovation
Prithvi Narayan Campus
Tribhuvan University
Pokhara, Nepal
[Accredited by UGC, Nepal]

Tel.: +977-61-576837
Email: research@pncampus.edu.np
URL: www.pncampus.edu.np

ABSTRACT

The mode of delivery is strong-minded by diverse aspects. The available data and literature argue that the birthplace and birth orders play an imperative role in determining the mode of delivery. This study has been done with the objective to examine the association between the place of delivery and cesarean section in Nepal. A descriptive cross-sectional study was conducted among women who have delivery experience in the last five years of survey, but only the last one has been included. This study is based on the data of Nepal demographic and health survey 2016 [NDHS]. The data were collected from 19 June 2016 to 31 January 2017 through the questionnaires. The sampling frame of Central Bureau of Statistics [CBS] has been updated and used by NDHS where districts and provinces are categorized into urban and rural areas. Frequency tabulation, $\chi 2$ test and multivariate binary logistic regressions are used to analyze the data. There are 10.2 percent of women who had a cesarean section. Out of 3998 total deliveries, cesarean deliveries are 406 (10.2%) at 95 percent confidence interval (9-11). The prevalence of cesarean delivery was seen in women delivered in private hospitals 36.3 percent compared to women delivered in government health facilities 12.8 percent. Among 3998 deliveries, 57.4 percent are institutional deliveries. The place of delivery, anti-natal care visit and cesarean section delivery are related to each other. Women who go to private hospitals for anti-natal care and delivery, such hospitals are found to have performed more caesarean sections than the recommended level of World Health Organization (WHO).

KEYWORDS: Birth order, cesarean section, mode of delivery, place of delivery

INTRODUCTION

The rate of cesarean section delivery has increased more than nine times in the past ten years from five percent in 2011 (Ministry of Health & The DHS Program ICF,

2016) to 45.8 percent in 2018 in Nepal (Prasad et al., 2017). The cesarean section delivery is associated with an increased risk of postpartum maternal death (Deneux, 2006). So it became an issue for the study. The time for child bearing is a crucial time in the life of women (Sharma, 2019). Everyday 810 women die as a result of preventable complications arising during pregnancy and childbirth in the world (WHO, 2013). The international healthcare community has considered cesarean section [CS] as a major component of maternal health since 1985 (Betran et al., 2016). A caesarean section delivery has become a regular practice around the world when an obstetrical complication is envisaged (Sonti, 2012). If the vaginal delivery is not possible, CS delivery is an alternative way to give birth, which may save the lives of mother and child at that situation (Zakerihamidi et al., 2015). CS is a surgical method to decrease complications associated with childbirth (Rahman et al., 2018), which is the surgical delivery of a baby by an incision through the mother's abdomen and uterus. In a CS delivery, an incision is made in the skin and into the uterus at the lower part of the mother's abdomen (Kott, 2012). There are several conditions which may make a cesarean delivery (Abebe et al., 2016). There are two types of cesarean sections: planned cesarean section before onset of labor and emergency cesarean section after onset of labor (Saha & Gautam, 2014). Clinical indication was noted for both elective and emergency cesarean section (Singh et al., 2020).

Access to cesarean sections can reduce maternal and neonatal mortality and complications of labor. Specially, the maternal age, place of delivery, ANC visit and birth order are the strong-minded factors that marks on their mode of delivery. The World Health Organization [WHO] advises that cesarean sections can be done only when medically necessary and does not recommend a target rate for countries to achieve at the population level (Ministry of Health & The DHS Program ICF, 2016). The cesarean section delivery should only be used as a life-saving intervention but no target rate should be set (WHO, 2019). In the context of Nepal, out of the total numbers of births, nine percent were delivered by cesarean section (Ministry of Health & The DHS Program ICF, 2016). Caesarean delivery rates among the women in the richest quintile were much higher than the rates seen in the poorest quintile (Das, 2017).

METHODOLOGY

The NDHS 2016 is the source of data used for this study. This survey is nationally representative cross-sectional survey. This is the ninth in a series of national-level population and health surveys conducted in Nepal. It is the fifth nationally representative comprehensive survey conducted as part of the global Demographic and Health Survey [DHS]. This research is based on secondary data. DHS were collected this data from 19 June 2016 to 31 January 2017 through the questionnaires.

The sampling frame used for the NDHS 2016 is an updated version from the 2011 National Population and Housing Census [NPHC], conducted by the Central Bureau of Statistics [CBS] this frame had updated by the DHS. While preparing the sampling frame districts are divided into urban and rural locations, which are in turn divided into wards. The sampling frame contains information about ward location, type of residence (urban or rural), estimated number of residential households and estimated population.

In this study, the stratified sampling method is used and selected in two stages in rural areas and three stages in urban areas. In urban areas, wards were selected as the primary sampling unit [PSU], one enumeration area [EA] was selected from each PSU, and then households were selected from the sample EAs. The data were taken from the children recode data set (NPKR7HSV) of NDHS-2016 report.

There were 5060 deliveries in the five years before 2016. Only the last deliveries, that is, 3998 have been included in this study, and 1062 births were multiple birth of same mothers. The population of the study was the women of Nepal aged 15-49 years who have at least one live birth in the last five years preceding the survey. The sample for this study was the 3998 women who had undergone cesarean section and normal (vaginal) delivery during their last childbirth. This population is used for analysis.

CS is the focal outcome variable in this study and other explanatory variables are selected on the basis of objectives of this study. Variables are the maternal age (<20, 20 - 34 and ≥35) place of delivery (Government health facilities, NGOs, home and others), ANC visit (No ANC visit, one time, two times, three times and four or more than four times) and the birth order (1, 2, 3, 4 or more).

The data were analyzed through the help of statistical software program (SPSS 24 version). The necessary coding was performed to simplify the data entry and analysis. The data are presented in percentage distribution. Basically, Chi-square ($\chi 2$) test and multivariate binary logistic regressions are used to examine the association between cesarean delivery and maternal parameters. P-values of less than 0.05 are the considered significant level.

RESULTS

Mode of Delivery

Table 1 presents the association between the mode of delivery and place of delivery. Among the 3998 respondents, 45.6 percent delivered at government health facilities whereas only 11.2 percent are at private health facilities and only 0.7 percent at Non-Governmental Organizations [NGOs] (Marie Stopes Family Planning Association). Sadly, 38.1 percent of deliveries are still performed at home. However, the government has implemented various packages or programs in line with the policy of increasing institutional delivery (NPC, 2017). Almost 58 percent mothers are utilized the health facilities and out of them close to 80 percent mothers are delivered in government health facilities and nearly 20 percent mothers are delivered in private health facilities. Similarly, more or less one percent mothers are delivered in NGOs/INGOs health facilities. Similarly, out of the 3,998 people selected in the sample, 10.2 percent had a caesarean section. Out of the total number of deliveries, 406 are through CS, representing a prevalence of CS is 10.2 percent. The highest prevalence of cesarean delivery is seen in women delivered in private hospitals (36.3%) compared to women delivered in government hospitals (12.8%). Among 3998 deliveries, 2297 (57.4%) were institutional deliveries. Among 2297 institutional deliveries, 1823 (80.3%) were delivered at government health facilities and 446 (19.4%) are at private health facilities.

Table 1

Mode of Delivery

	Cesarean		**Vaginal**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
***Age**						
<20	23	6.9	311	93.1	334	100
20-34	346	10.5	2959	89.5	3305	100
≥35	38	10.6	321	89.4	359	100
****Place of Delivery**						
Govt. Facilities	234	12.8	1589	87.2	1823	100
Private Facilities	162	36.3	284	63.7	446	100
NGOs	8	28.6	20	71.4	28	100

Home	0	00.0	1521	100.0	1521	100
Others	1	0.6	177	99.4	178	100
*****ANC Visit**						
No Visit	10	4.2	226	95.8	236	100
One Time	2	1.4	140	98.6	142	100
Two Times	8	2.5	311	97.5	319	100
Three Times	33	6.3	494	93.7	527	100
Four Times or More	354	12.8	2420	87.2	2774	100
******Birth Order**						
One	227	15.2	1271	84.8	1498	100
Two	130	10.8	1077	89.2	1207	100
Three	34	5.4	592	94.6	626	100
Four or more	15	2.3	651	97.7	666	100
Total	407	10.2	3591	89.8	3998	100

$\chi 2$ = *.115, **.000, ***.000, ****.000

(Due to use of weighted data total cases may not match exactly with the sum of each category)

There are four categories of place of delivery and the highest prevalence of cesarean delivery is seen in women delivering in private hospitals (36.3%) compared to women delivering in government hospitals (12.8%). Similarly, 28.6 percent delivered in NGOs facilities. Health institutions also encourage women with good financial status who can afford a private health facility to have a cesarean section (Acharya et al., 2020; Suwanrath et al., 2021). There are significant differences of CS delivery with the place of delivery (p<.001).

Nearly about 70 percent of women have visited for anti-natal care [ANC] at least 4 times, which is positive (WHO, 2016) although about six percent of women have never visited ANC. Similarly, 3.6 percent visited the ANC once, 8 percent twice and 13.2 percent only 3 times. ANC checkups have no significant relationship with CS delivery (p<.001). It shows that ANC checkup does not determine the CS delivery.

A total number of samples were 3998 mothers from the age group 15 to 49 years. The sample characteristics are categorized on the basis of different variables. For the age, categories have been made by three groups of reproductive age: below 20, 20 to 34 and 35 to 49 years. Out of total 82.7 percent of women in the sample were aged 20-34 years, with an average age of around 26.44 (From Respondents current age V12) whereas 9.0 percent were 35 to 49 years of age and 8.4 percent were below 20 years. Out of the total 334 mothers are the age group of below 20 years, out of which 6.9 percent have cesarean section experience. Similarly, 3305 mothers are in the age group 20 to 34 years and out of them 10.5 percent underwent cesarean delivery and 359 mothers are in the age group 35 to 49 years. Within that group, 10.6 percent experienced the cesarean section delivery. It shows that the prevalence of cesarean section delivery is slightly higher in the age group of 35-49 years. Because of this, women over the age of 35 years have special risks for delivery (Bayrampour & Heaman, 2010). But there is no significant association between the age of mothers and CS delivery.

Out of total (3998) deliveries, 37.5 percent occurred at the first birth, 30.2 percent at the second birth, 15.7 percent at the third birth and 16.7 percent at the fourth and more than fourth birth. When women give birth to their first child, the chances of having a cesarean section are more than double than that of the second time (Hure et al.,

2017). The birth orders have a significant relationship with CS delivery (p<.001). It shows that if the birth order is early or first, then the CS delivery is likely to be more.

Logistic Regression Models of Cesarean Delivery

Table 2 presents the results of the adjusted associations between the caesarean delivery and maternal parameters such as age, place of delivery, ANC visit and birth order. Among the set of explanatory variables selected for regression analysis, age, place of delivery and birth order emerge as statistically significant predictors with the cesarean section delivery based on the multivariate analysis and the odds ratios of cesarean section delivery.

Women aged 20-34 and 35-49 years are more likely to have cesarean delivery than their counterparts of below 20 years of age twice and 3.6 times respectively. The findings are also statistically significant at p<.01 and p<.001 levels respectively. Women delivering births in private health facilities and NGOs' clinics are more likely to have cesarean delivery than those giving birth to child in government health facilities as odd ratios for them are found to be 3.8 (p<.001) and 2.8 (p<.05) respectively.

Table 2

Logistic Regression Models of Cesarean Delivery by Maternal Parameters

Variables	OR	95% C.I.		Sig. Level	
		Lower	Upper		S.E.
Maternal Age					
<20 Ref.				.000	
20-34	1.96	1.23	3.129	.004	.23
34-49	3.65	1.94	6.859	.000	.32
Place of Delivery					
Govt. Facilities Ref.			145.42	.00	.00
Private Facilities	3.83	3.01	4.882	.00	.12
NGOs	2.75	1.19	6.33	.01	.42
Home	.00	.00	.	.98	1013.10
Others	.06	.01	.34	.00	.85
ANC Visit					
No Visit Ref.				.14	
1 Time visit	.37	.07	1.98	.24	.85
2 Time Visit	.28	.09	.81	.01	.54
3 Time Visit	.57	.24	1.36	.20	.44
4 or More than 4	-.51	.29	1.40	.26	.40
Birth Order					
First (Ref.)			16.25	.00	.00
Second	.81	.63	1.05	.12	.13
Third	.51	.33	.78	.00	.21
Fourth or more	.26	.14	.47	.00	.30

Women giving births to higher order of births like the third and fourth are less likely to have cesarean delivery compared to their counterparts who have the first order of birth as odd ratios for the former two are found to be only 0.5 and 0.3, which are significant at levels p<.01 and p<.001 respectively. Likewise, women who visited for the ANC checkup were less likely to have cesarean delivery compared to those who did not visit it. However, the value of odd ratio is found significant only for those who visited twice (OR=0.3, p<.05).

DISCUSSION

As institutional delivery increases, so does the rate of cesarean section delivery. Availability and accessibility of health facilities are playing the vital role to promote maternal and neonatal health (Chol et al., 2018), but delivery in health facilities is still challenging in developing countries (Gebregziabher et al., 2019). The cesarean section delivery is in an increasing trend in Nepal (Ministry of Health & The DHS Program ICF, 2016) as well as all over the world (Cai et al., 1998). The national prevalence of cesarean section delivery in Nepal is 10.2 percent, which indicates the best utilization of the health services in the country which is in line with the recommendations level of the WHO (Ana et al., 2015). However, the proportion of caesarean deliveries is more than 44 percent of the number of institutional deliveries (Tamrakar et al., 2021), which is quite higher than the recommendation level 10 percent to 15 percent of WHO (Ana et al., 2015).

In 1985, the WHO stated that the rate of cesarean section delivery should not exceed 15 percent (Ana et al., 2015). It may be relevant to increase the cesarean limit set by WHO due to the widespread expansion and use of health care services and facilities. But there is an unusual difference in the cesarean section delivery when delivering in public and private health facilities. On the other hand, the private health care providers prefer the cesarean section delivery beyond the necessity (Suwanrath et al., 2021). The low prevalence of cesarean section delivery includes associated with incomplete prenatal attendance and birth order ≥ 4. Similarly, delivery in private hospitals is associated with a nearly four times higher (36.3%) prevalence of cesarean section deliveries in Nepal.

Among the 3998 deliveries, 57.5 percent (2298) found to have used health facilities. Out of the 2,298 deliveries at health facilities, altogether 79.3 percent have taken place in government hospitals and 19.4 percent in private hospitals. Of the 1,823 deliveries in government hospitals, 12.8 percent had caesarean section deliveries. Of the 446 deliveries in private hospitals, 36.3 percent had caesarean section deliveries while 28.6 percent of the 28 deliveries in NGOs had caesarean sections. The prevalence of cesarean delivery in private health facility was to be higher than recommended by the WHO. There are more than 45 percent CS in private hospital (Prasad et al., 2017). There is no precise answer from the respondents as to why this happens but the literatures argue that private hospitals motivate women or families to have a caesarean section (Suwanrath et al., 2021).

The birth orders did appear to have effects on the cesarean section. The need for a cesarean section seems to be less in higher order of births than at the first birth. If the first birth is a vaginal birth, the chances of cesarean section are low at the second. A cesarean section at the second birth is the reason for a repeat cesarean section (Sakiyeva, 2018). Literature argues that the ANC visit also determines the cesarean section delivery. The ANC visit has no significant relation with the cesarean section delivery; however, the ANC visitors had lower cesarean section experience than who had not visited ANC once. The ANC visits also appear to be a determining factor for the cesarean section delivery (Barros et al., 2019). The cesarean section rate of ANC visitors is lower than that of the non-ANC visitors according to the odd ratio values from the binary logistic regression. The women who visited ANC four or more times were significantly high prevalence of the cesarean section delivery (Barros et al., 2019). Literatures argue that educated, urban and those with high-income visit ANC four or more than four times and are willing to have a caesarean delivery rather than a medical need (Verma et.al., 2020). Similarly, according to the birth order, most caesarean section deliveries occurred at the first parity and gradually decrease at subsequent parities. The statistics show that women who are too late to give birth to their first child should have a caesarean section later than the age of 35 years.

CONCLUSION

The ANC visit has no effects on the cesarean section delivery. The place of delivery and birth order are the predictive variables for the mode of delivery; however, the respondents did not specify the precise version about the mode of delivery determined by the place of delivery. The pattern of data and literature show that the delivery mode is determined by the place of delivery and the birth order. Since the private hospitals have commercial motives, there are relatively more caesarean section deliveries. The age of women also determines the lead to cesarean section delivery. So far, the rate of cesarean section delivery in Nepal is in line with the limitation set by WHO, but the rate of cesarean section delivery in private hospitals is three times higher than that of government hospitals, which is more than double the limitation set by WHO. Even if the CS is a lifesaving intervention, it should not exceed the recommendation level of WHO. Hospitals should design and advocate an appropriate intervention discouraging unnecessary medical CS delivery. The government should pay attention to regulate the private and government hospitals for making the CS delivery only as medical necessity.

REFERENCES

Abebe, F. E., Gebeyehu, A. W., Kidane, A. N., & Eyassu, G. A. (2016). Factors leading to cesarean section delivery at Felegehiwot referral hospital, Northwest Ethiopia: A retrospective record review. *Reproductive Health*, *13*(1), 1–7. https://doi.org/10.1186/s12978-015-0114-8

Acharya, K., Paudel, Y. R., & Dhungana, C. M. (2020). Rising trends and persisting inequalities in cesarean section rates in Nepal: evidence from demographic and health surveys 2006-2016. 1–24. https://doi.org/10.21203/rs.3.rs-15560/v1

An, B., Journal, I., & Betr, A. P. (2015). *WHO Statement on Caesarean Section Rates*. *July*. https://doi.org/10.1111/1471-0528.13526

Barros, A. J. D., Victora, C. G., Horta, B. L., Wehrmeister, F. C., Bassani, D., Silveira, M. F., Santos, L. P., Blumenberg, C., & Barros, F. C. (2019). Antenatal care and caesarean sections: Trends and inequalities in four population-based birth cohorts in Pelotas, Brazil, 1982-2015. *International Journal of Epidemiology*, *48*, I37–I45. https://doi.org/10.1093/ije/dyy211

Bayrampour, H., & Heaman, M. (2010). Advanced maternal age and the risk of cesarean birth: A systematic review. Birth, 37(3), 219–226. https://doi.org/10.1111/j.1523-536X.2010.00409.x

Betran, A. P., Torloni, M. R., Zhang, J. J., & Gülmezoglu, A. M. (2016). WHO statement on caesarean section rates. *BJOG: An International Journal of Obstetrics and Gynaecology*, *123*(5), 667–670. https://doi.org/10.1111/1471-0528.13526

Cai, W. W., Marks, J. S., Chen, C. H. C., Zhuang, Y. X., Morris, L., & Harris, J. R. (1998). Increased cesarean section rates and emerging patterns of health insurance in Shanghai, China. *American Journal of Public Health*, *88*(5), 777–780. https://doi.org/10.2105/AJPH.88.5.777

Chol, C., Hunter, C., Debru, B., Haile, B., Negin, J., & Cumming, R. G. (2018). Stakeholders' perspectives on facilitators of and barriers to the utilisation of and access to maternal health services in Eritrea: A qualitative study. *BMC Pregnancy and Childbirth*, *18*(1), 1–12. https://doi.org/10.1186/s12884-018-1665-9

Das,S. R. (2017). *Editorial Rising trend to Caesarean Section in Bangladesh : An Upcoming Health Hazards to Women*. *12*(2).

Deneux-Tharaux, C., Carmona, E., Bouvier-Colle, M. H., & Bréart, G. (2006). Postpartum maternal mortality and cesarean delivery. Obstetrics and gynecology, 108 (3 Pt 1), 541–548.

https://doi.org/10.1097/01.AOG.0000233154.62729.24
Gebregziabher, N. K., Zeray, A. Y., Abtew, Y. T., & Kinfe, T. D. (2019). *Factors determining choice of place of delivery : analytical cross-sectional study of mothers in Akordet town , Eritrea*. 1–11.
Hure, A., Powers, J., Chojenta, C., & Loxton, D. (2017). Rates and Predictors of Caesarean Section for First and Second Births: A Prospective Cohort of Australian Women. Maternal and Child Health Journal, 21(5), 1175–1184. https://doi.org/10.1007/s10995-016-2216-5
Kott, A. (2012). Prevalence of Cesarean Delivery Rising Sharply Among Poor, Rural Women. *International Perspectives on Sexual and Reproductive Health*, *38*(2), 111–112. http://www.jstor.com/stable/41585368
Ministry of Health, N. E., & The DHS Program ICF. (2016). *Nepal Demographic Health Survey 2016*.
NPC. (2017). *Nepal's Sustainable Development Goals: Baseline Report.* National Planning Commission, June 2017. https://www.npc.gov.np/images/category/SDGs_Baseline_Report_final_29_June-1(1).pdf
Rahman, M. M., Haider, M. R., Rahman, A. E., Ahmed, S., & Khan, M. M. (2018). *Determinants of caesarean section in Bangladesh : Cross-sectional analysis of Bangladesh Demographic and Health Survey 2014 Data*. 1–14.
Saha, R., & Gautam, P. (2014). Obstetric Emergencies: Feto-maternal Outcome at a Teaching Hospital. *Nepal Journal of Obstetrics and Gynaecology*, *9*(1), 37–40. https://doi.org/10.3126/njog.v9i1.11186
Sharma, S. (2019). *Universal Particulars towards Maternal Health Circumstance*. *7*(June), 27–34.
Singh, N., Pradeep, Y., & Jauhari, S. (2020). *Indications and Determinants of Cesarean Section : A Cross - Sectional Study*. https://doi.org/10.4103/ijabmr.IJABMR
Sonti, B. S. I. (2012). *Caesarean section deliveries : Experiences of mothers of midwifery care at a public hospital in Nelson Mandela Bay Research objectives*. 1–9.
Suwanrath, C., Chunuan, S., Matemanosak, P., & Pinjaroen, S. (2021). Why do pregnant women prefer cesarean birth? A qualitative study in a tertiary care center in Southern Thailand. *BMC Pregnancy and Childbirth*, *21*(1), 1–6. https://doi.org/10.1186/s12884-020-03525-3
Tamrakar, R., Sapkota, S., Sitaula, D., Thapa, R., Pokharel, B., Acharya, S., & Parajuli, A. (2021). Cesarean section among all deliveries in a tertiary care centre of nepal: A descriptive cross-sectional study. *Journal of the Nepal Medical Association*, *59*(241), 839–843. https://doi.org/10.31729/jnma.6667
Verma, V., Vishwakarma, R. K., Nath, D. C., Khan, H., Prakash, R., & Abid, O. (2020). *Prevalence and determinants of caesarean section in South and South-East Asian women. PloS one*, 15(3), e0229906. https://doi.org/10.1371/journal.pone.0229906
WHO. (2013). *Accountability for Maternal, Newborn & Child Survival The 2013 Update*.
WHO. (2016). *WHO recommendations on antenatal care for a positive pregnancy experience*. http://www.who.int
World Health Organization. (2019). Maternal mortality: level and trends 2000 to 2017. *Sexual and Reproductive Health*. https://www.who.int/reproductivehealth/publications/maternal-mortality-2000-2017/en/
Zakerihamidi, M., Roudsari, R. L., & Merghati, E. (2015). Vaginal Delivery vs. Cesarean Section : A Focused Ethnographic Study of Women ' s Perceptions in The North of Iran. *Ijcbnm*, *3*(1), 39–50.