

## Examining Wealth Disparities and Influential Factors on Voluntary C-Section Deliveries in Maharashtra: Insights from the National Family Health Survey, 2019-21

Rushikesh P Khadse and Dhananjay W Bansod\*

*Department of Public Health and Mortality Studies, International Institute for Population Sciences, Mumbai, India*

**\*Corresponding Author:** Dhananjay W Bansod, Professor, Department of Public Health and Mortality Studies, International Institute for Population Sciences, Mumbai, Maharashtra, India.

**Received:** February 28, 2024; **Published:** March 19, 2024

### Abstract

**Introduction:** The C-section rate is on a consistent rise, with evidence indicating that one in every five women globally undergoes a caesarean delivery. This study aims to identify disparities in elective C-section deliveries among women in Maharashtra.

**Materials and Methods:** The fifth round of National Family Health Survey (2019-21) was employed for this study. Univariate analysis, bivariate analysis, binary logistic regression analysis, and concentration index method were utilized to investigate socio-economic disparities in health outcomes.

**Result:** Roughly half of the caesarean deliveries among women in Maharashtra occurred prior to the onset of labour pain. The likelihood of caesarean deliveries was elevated among educated mothers, women over 30 years old, those with a high body mass index, individuals who attended more than four antenatal visits, residents of rural areas, and those from wealthier households. The concentration index suggests that caesarean deliveries were predominantly conducted among women from affluent families in Maharashtra.

**Conclusion:** Several socio-economic factors contribute to the rising rate of C-sections. Almost half of these deliveries occur before the onset of labour pain. One significant contributing factor to the rising prevalence of C-sections could be the preference for scheduling Caesarean deliveries before the onset of labour pain.

**Keyword:** C-Section Delivery; Voluntary C-Section; Disparities; Maharashtra; India

### Abbreviation

C-section: Caesarean Section

### Introduction

Globally, the rate of caesarean section (C-sections) deliveries has been rising consistently, and it is predicted to keep rising over the next ten years as both unmet needs and overuse coexist. Less developed nations had the highest rate of increase around 22% over the past three decades [1]. Recent statistics showed that 1 in 5 women worldwide give birth via C-section [2]. Owing to the economic advantages, private healthcare facilities use C-section deliveries frequently. There is a clear wealth/poverty disparity on the use of C-section delivery.

While around 10% of the women belonging to the poorest wealth quintile go for C-section delivery, 25% of women belonging to the richest wealth quintile delivered their baby through C-section [3]. In India, the prevalence of C-sections is higher in metropolitan regions, among younger, better-educated women, groups with established social structures, and those who regularly receive pay or salary [4]. Due to the increased rate of unintended C-section deliveries among private hospital patients, the cases of C-section delivery patients at public and private hospitals differs significantly. The patients coming to private hospital believe that there is significant difference between necessary c-section and unwanted c-section, private hospital has more unwanted c-section deliveries [5]. Over 30% of C-section deliveries occur in private hospitals, and flagship programme such as the Chiranjeevi Yojana contributes to an increase in this procedure [6]. While women have health insurance and have had previous C-sections, they are more likely to choose one [7]. The age of the mother, mother parity, household socioeconomic status, district of domicile, and level of education of the household head are all relevant C-section delivery factors. Manyeh showed that an increase in maternal age is linked to an increase in the number of C-sections [8]. The study discovered a strong correlation between private sector health and a rise in C-sections in India. According to Bhatia, older women, with a higher body mass index, women with greater levels of education, and women who live in affluent households all had statistically significant increases in the number of C-section deliveries [9]. Bhatia, *et al.* (2020) reported that one of the closest predictors of a C-section delivery is the place of birth. Place of antenatal visit and wealth index, which serve as proxy measures of household income, are major determinants of C-sections performed in private medical facilities [10]. As per a study by Danial, factors that increase the likelihood of a C-section include primipara birth and older women [11]. The results show that women experiencing multiple pregnancies and first-time mothers are more likely to undergo C-sections than mothers under the age of 34. The C-section rates are greater for non-scheduled castes and scheduled tribes and people who have health insurance and live in metropolitan areas. C-section rates are also higher as household wealth and the mother's education increase [12]. According to previous study that affluent families may be choose to C-section in private hospital. Women who are wealthy, belonging to a higher caste, attended a higher level of education, overweight, reside in cities, are exposed to the media, and give birth to more babies via C-section in private medical facilities [13]. Compared to their counterparts, women belonging to higher socio-economic status, and social classes and living in cities, have more C-section deliveries. Compared to Hindu women, Muslim women are less likely to undergo a C-section delivery [14]. In comparison to low income and lower middle income countries, upper middle income and high income countries have higher rates of C-section deliveries [15]. Ethiopia has a high overall pooled prevalence of C-sections. Cephalopelvic disproportion, and febrile illness were the most frequent indicators of C-section [16]. Along with Older women, higher educated mother, residing in urban areas and belonging to high socio-economic status are the ones who opt for voluntary C-section and seek private instructional delivery [17]. Women's education is strongly correlated with C-section birth, and both women's and husband's education influence the procedure [18]. The correlation between maternal age and C-section deliveries may be explained by an increase in the probability of complications during childbirth as maternal age rises [19]. The probability of a C-section increased with maternal age of 35 or higher, infant birth weight of at least 4000g and the absence of a history of vaginal delivery [20]. C-section birth rates were significantly higher in nulliparous mothers, mothers with high body mass index, pregnant women who experienced complications, repeat caesareans, and in private health facilities, indicating that both maternal and institutional factors are contributing to the rising rate of C-sections in India [21]. The possibility of out-of-pocket expenses for institutional deliveries in India increased as a result of lower socioeconomic class individuals using private health facilities for caesarean births [22].

Private medical facilities in Maharashtra do more C-sections than public health facilities do. One cause could be the profit motivation and elective C-section used by private institutions [23]. Maharashtra has a C-section delivery rate of 20.1% (NFHS 4), which is higher than the WHO recommended of 15%. The C-section delivery is risky for the mother and the baby and is quite expensive. In comparison to other states in the country, Maharashtra is a progressive state, with a C-section rate of 25.4% (NFHS 5). The trend of C-section in Maharashtra has increased over time from NFHS 1 to NFHS 5. Therefore, study aim to find factors influencing voluntary C-section depend on labour pain in Maharashtra.

## **Materials and Methods**

The study used data from the fifth round of the National Family Health Survey (NFHS-5) conducted during 2019-21. The NFHS-5 collects information on fertility, infant and child mortality, family planning, maternal and child health, reproductive health, nutrition, anemia etc. obtained from representative household samples at the federal, state and district level across India. The International Institute for Population Sciences (IIPS), Mumbai has been assigned as the nodal agency to conduct different rounds of the national health family survey in India.

### **Outcome variable**

Caesarean section and voluntary C-section among currently married women age 15 - 49 years. There is specific questions are asked about caesarean section, "was delivered by caesarean section?" and voluntary C-section "When was the decision made for you to have a C-section? was it before the onset of labor or after the onset of labor?".

### **Independent variable**

A number of independent variables were used in the analyses. These include: C-section (yes/no), decision for C-section (before labor/after labor), level of education (no education/primary/secondary/higher), age (less than 20/20 to 24/24-29/30 and above), body mass index (less than 19.5/19.5 to 24.9/24.9 to 29.9/29.9 and above), number of ANC visit (no or 0/1 to 3/ 4 and more), birth order (1/2/3), ultrasound (no/yes), place of residence (rural/urban), wealth index (poorest/poorer/middle/richer/richest), religion (Hindu/Muslim/others), caste (scheduled caste/scheduled tribe/other backward class/others) is used to analysis.

### **Method**

Univariate analysis has been done to estimate the prevalence of C-section, timing for C-section delivery in Maharashtra. Chi-square test of association was used to determine the relationship between c-section delivery and the selected explanatory variables.

Binary logistic regression analysis was applied to determine the odds of C-section deliveries for selected explanatory variables. The model is given by the equation below where occurrence of C-section deliveries was considered to be the dependent variable and various demographic and socio-economic characteristics of women were observed to the predictor variables.

### **Concentration index**

The concentration index is a widely used standard tool that examine the magnitude of socio-economic inequality in any health outcome. We used the concentration index to study the extent of inequality in C-section across the district by health facility. The value of the concentration index ranges between -1 to +1, hence, if there is no socio-economic differential the value returns zero. A negative value implies that the relevant health variable is concentrated among the poor or disadvantaged people while the opposite is true for its positive values, when poorest are assigned the lowest value of the wealth index. A zero-concentration index value implies a state of horizontal equity which is defined as equal treatment for equal needs (for further reading on application of the concentration index in malnutrition refer to Wagstaff and Watanabe 2000).

## **Results**

Figure 1 presents the prevalence of C-section delivery by districts of Maharashtra. The Kolhapur district has the highest prevalence of C-section delivery (38.1%) followed by the Satara district (35.6%). On the other range, the Amravati has the C-section delivery rate of 30.2% followed by the Akola (28.7%). The Nandurbar district has the lowest prevalence of C-section delivery (7.9%), followed by Parbhani (12.2%), and Nanded (14%). It is also seeming that the pattern of C-section delivery mostly parallel with socio-economic development of the country.

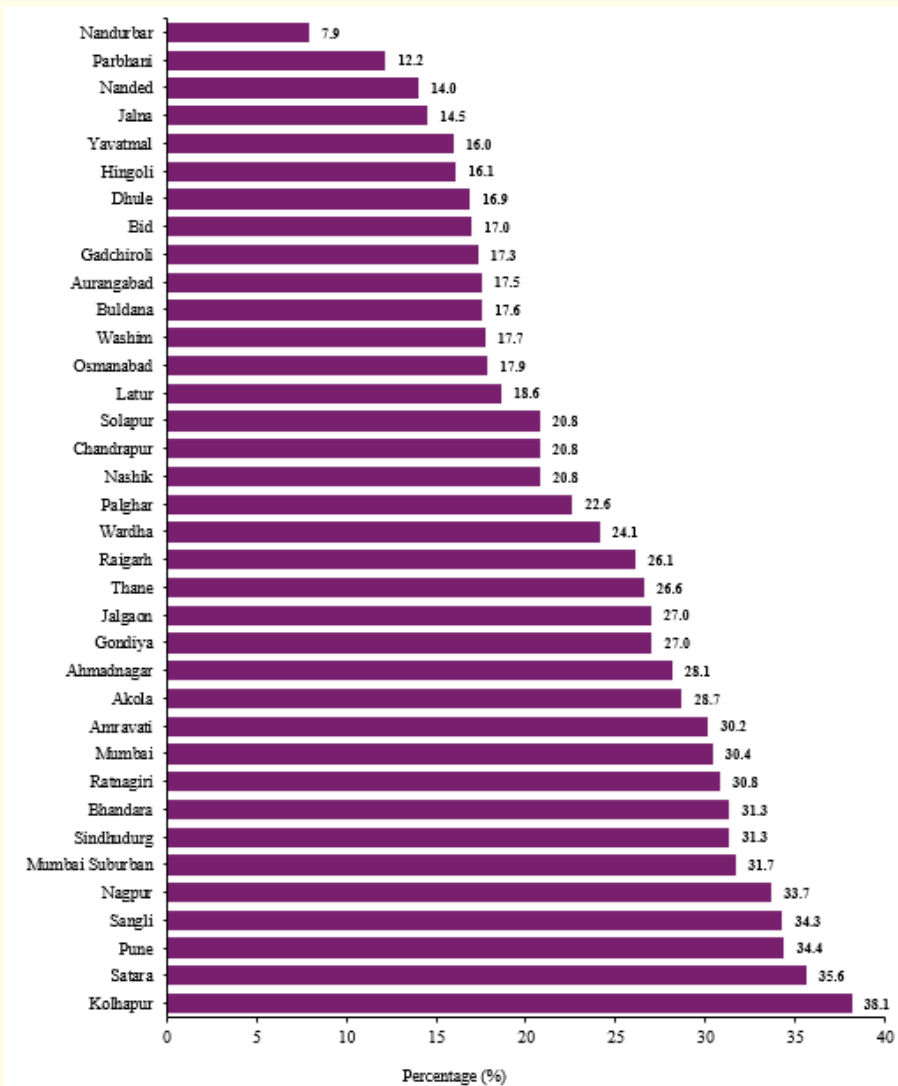


Figure 1: Prevalence of C-section delivery by different districts of Maharashtra, India.

Figure 2 presents the prevalence of timing on decision for C-section delivery by different districts of Maharashtra. Nearly 55% of C-section delivery perform before the start of labor pain. Chandrapur (71.8%) has the highest C-section delivery before the start of labor pain, followed by Gondia (71.7%). Mumbai has the lowest prevalence of C-section delivery before labor pain (30.6%) followed by the Ratnagiri (42.7%).

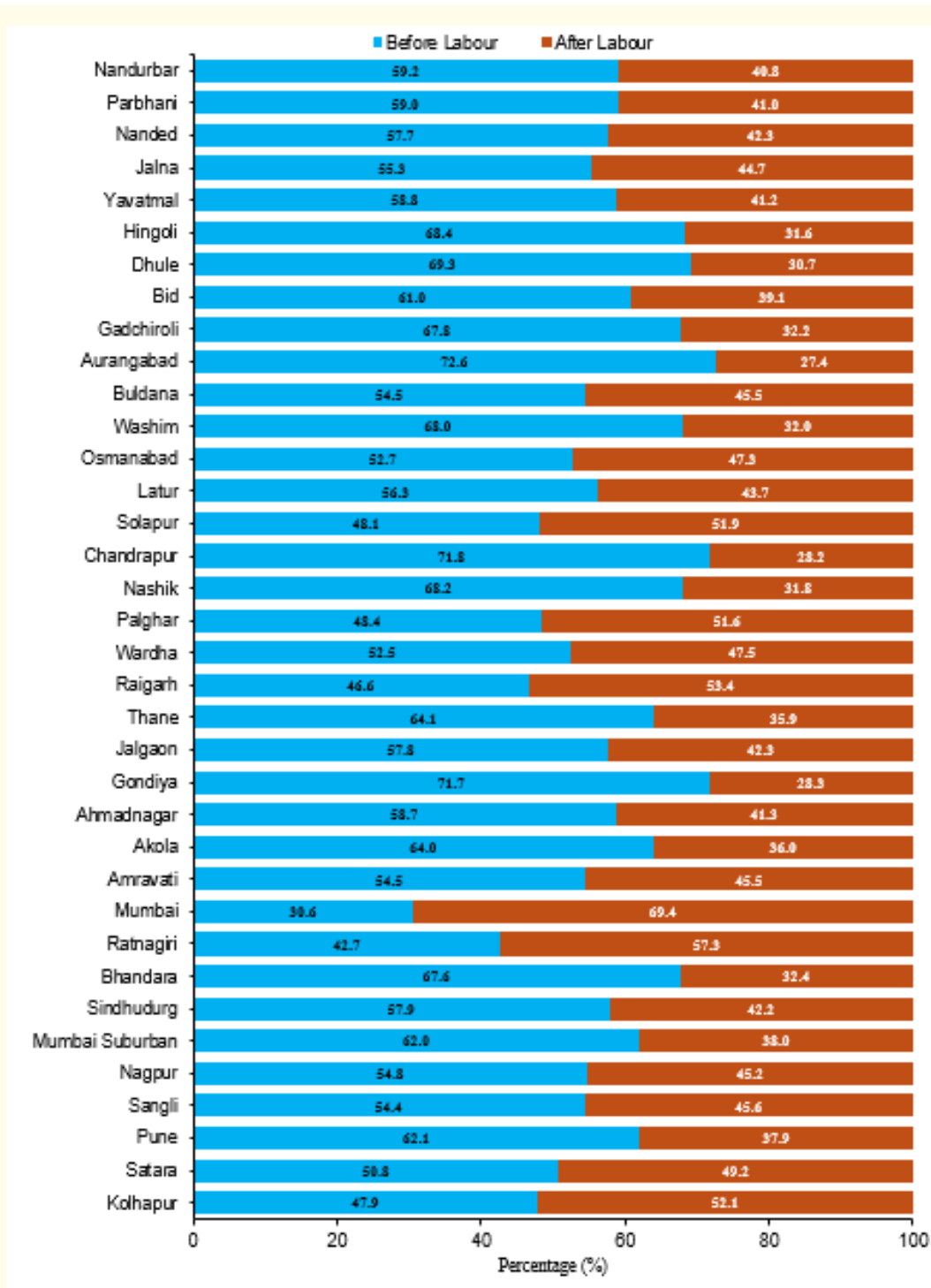


Figure 2: Prevalence of timing on decision for C-section delivery by different district of Maharashtra, India.

Table 1 present the distribution of the study participants. About 68% respondents had secondary level of education. Around 41 percent respondent belong to age group 24 - 19. More than half of the respondents have BMI level between 19.5 - 24.9. Similarly, about 55% of respondents had four or more antenatal care visits. The proportional share of study participant decreased with higher birth order. The firth birth order has highest (42%) C-section delivery followed by second order birth (37%). 93% of respondents had ultrasound test. Majority of respondents live in rural areas (70%). About 27% of the respondent belongs to the household with poorest wealth quintile, followed by the middle is (21%) and the richest is (9.33%). The distribution of respondents differs according to religion. 78% percent of the respondents belong to Hindu and 14% belong to Muslim, followed by respondents belonging to other religion (7%). Nearly 30% respondents belong to other backward caste followed by scheduled tribe's (17%) and scheduled caste (16%).

	N	%
<b>Mother Characteristics</b>		
<b>Level of Schooling</b>		
No Schooling	743	7.82
Primary	844	8.89
Secondary	6,447	67.89
Higher	1,462	15.40
<b>Age (in years)</b>		
Less than 20	341	3.59
20 to 24	3,045	32.07
24 to 29	3,901	41.08
30 and above	2,209	23.26
<b>Body Mass Index</b>		
Less than 19.5	2,244	23.63
19.5 to 24.9	5,511	58.03
24.9 to 29.9	1,120	11.79
29.9 and above	621	6.54
<b>Number of ANC visits</b>		
0	2,678	28.20
1 to 3	1,544	16.26
4 and above	5,274	55.54
<b>Birth Order</b>		
1	4,030	42.44
2	3,530	37.17
3 and above	1,936	20.39
<b>Ultrasound</b>		
No	641	6.75
Yes	8,855	93.25
<b>Household Characteristics</b>		
<b>Place of Residence</b>		
Urban	2,820	29.70

Rural	6,676	70.30
<b>Wealth Index</b>		
Poorest	2,575	27.12
Poorer	2,298	24.20
Middle	2,063	21.72
Richer	1,674	17.63
Richest	886	9.33
<b>Religion</b>		
Hindu	7,498	78.96
Muslim	1,330	14.01
Others	668	7.03
<b>Caste</b>		
Schedule Caste	1,541	16.23
Schedule Tribe	1,646	17.33
OBC	2,785	29.33
Others	3,524	37.11
Total	9,496	100.0

**Table 1:** Percentage distribution of caesarean section deliveries by different socio-economic background characteristics in Maharashtra, India 2019-21.

Table 2 presents the odds of having C-section delivery by selected explanatory variable. C-section delivery is more likely among higher educated mother (OR = 2.21; 95% CI = [1.59, 3.09]) than uneducated mother. Women age 30 and more are more likely to have C-section delivery (OR = 1.88; 95% CI = [1.38, 2.55]). Similarly, women with body mass index of 24.9 to 29.9 are more likely to have C-section. And, compared to women who had no antenatal visit and women with 1 to 3 antenatal visits (OR = 1.29; 95% CI = [1.08, 1.53]) and four or more antenatal visits are more likely to have C-section (OR = 1.57; 95% CI = [1.37, 1.78]). Women who had ultrasound test are more likely to have C-section delivery (OR = 1.84; 95% CI = [1.34, 2.53]). Compared to women belonging to poorest household wealth quintile, women belonging to a higher household wealth quintile are more likely to go for C-section delivery. Women belonging to a Muslim family are less likely to go for C-section delivery compared to women belonging to a Hindu family (OR = 0.71; 95% CI = [0.60, 0.85]). And compared to scheduled caste women, scheduled tribe women are less likely to go for C-section delivery (OR = 0.71; 95% CI = [0.60, 0.85]). C-section delivery before the onset of labour pain is more likely to second birth order than first order birth (OR = 1.37; CI = [1.12, 1.67]) Women belonging to household with middle wealth quintile are more likely to go for C-section delivery before the onset of labour pain compared to women belonging in the household with poorest wealth quintile (OR = 1.47; 95% CI = [1.07, 2.00]).

Table 3 presents the concentration index values for C-section delivery in public and private hospitals across all districts of Maharashtra. The concentration index values across the districts indicates that C-section delivery mostly performed among women who belong to the affluent families in Maharashtra. The value of concentration index (0.226) significantly revealed that C-section is more concentrated among high income household among those delivered in private hospital. The Mumbai Suburban district has concentration index value (-0.140) less than zero, suggesting that C-section deliveries is more concentrated among poor socio-economic families in public health facility. It is also observed that in private hospitals, the concentration index value of Sindhudurg district to be less than zero (-0.078),

	Caesarean Delivery	Time of decision for caesarean delivery										
		Before Labour					After Labour					
		OR	95% CI		OR	95% CI		OR	95% CI			
<b>Mother Characteristics</b>												
<b>Level of Schooling</b>												
No Schooling <sup>®</sup>												
Primary	1.40		0.97	2.01	0.63		0.31	1.28	1.59	0.78	3.23	
Secondary	1.75	**	1.29	2.39	0.70		0.38	1.28	1.43	0.78	2.64	
Higher	2.21	**	1.59	3.09	0.57		0.30	1.08	1.77	0.93	3.36	
<b>Age (in years)</b>												
Less than 20 <sup>®</sup>												
20 to 24	0.95		0.71	1.27	1.03		0.61	1.74	0.97	0.57	1.64	
24 to 29	1.18		0.88	1.58	0.80		0.47	1.35	1.25	0.74	2.11	
30 and above	1.88	**	1.38	2.55	0.78		0.45	1.34	1.29	0.75	2.22	
<b>Body Mass Index</b>												
Less than 19.5 <sup>®</sup>												
19.5 to 24.9	1.17	*	1.03	1.34	0.80		0.62	1.02	1.25	0.98	1.60	
24.9 to 29.9	2.01	**	1.68	2.40	0.90		0.67	1.22	1.11	0.82	1.50	
29.9 and above	1.84	**	1.48	2.28	0.74		0.51	1.07	1.35	0.94	1.95	
<b>Number of ANC visits</b>												
0 <sup>®</sup>												
1 to 3	1.29	**	1.08	1.53	1.13		0.83	1.54	0.88	0.65	1.20	
4 and above	1.57	**	1.37	1.78	1.01		0.80	1.26	0.99	0.79	1.25	
<b>Birth Order</b>												
1 <sup>®</sup>												
2	0.68	**	0.61	0.77	1.37	**	1.12	1.67	0.73	**	0.60	0.89
3 and above	0.32	**	0.26	0.39	1.23		0.88	1.72	0.81		0.58	1.14
<b>Ultrasound</b>												
No <sup>®</sup>												
Yes	1.84	**	1.34	2.53	1.60		0.88	2.89	0.63	0.35	1.13	
<b>Household Characteristics</b>												
<b>Place of Residence</b>												
Urban <sup>®</sup>												
Rural	0.88		0.78	1.00	0.84		0.67	1.04	1.19	0.96	1.48	
<b>Wealth Index</b>												
Poorest <sup>®</sup>												
Poorer	1.52	**	1.28	1.81	1.06		0.78	1.46	0.94	0.69	1.29	
Middle	1.84	**	1.54	2.20	1.47	*	1.07	2.00	0.68	*	0.50	0.93
Richer	1.90	**	1.57	2.29	1.37		0.98	1.91	0.73		0.52	1.02



Richest	2.07	**	1.64	2.62	1.34		0.90	1.97	0.75		0.51	1.11
<b>Religion</b>												
Hindu <sup>®</sup>												
Muslim	0.71	**	0.60	0.85	0.88		0.65	1.20	1.13		0.83	1.54
Others	1.05		0.84	1.32	1.00		0.69	1.45	1.00		0.69	1.46
<b>Caste</b>												
Schedule Caste <sup>®</sup>												
Schedule Tribe	0.72	**	0.58	0.91	0.88		0.59	1.31	1.14		0.76	1.69
OBC	1.19		1.00	1.43	1.01		0.75	1.37	0.99		0.73	1.34
Others	1.18		0.99	1.41	1.07		0.80	1.45	0.93		0.69	1.26
Constant	0.04	**	0.02	0.07	1.40		0.50	3.89	0.72		0.26	2.00
<i>Note: ** p-value &lt; 0.01 and * 0.01 &lt; p-value &lt; 0.05</i>												

**Table 2:** Odds ratio for caesarean section and timing for caesarean section delivery by different background characteristics in Maharashtra, India, 2019-21.

indicating the concentration of C-section deliveries among poorer socio-economic households. In all the district except Sindhudurg, the value of concentration index is more than zero indicating that C-section majorly performs among women belonging to affluent class households in private hospital.

Name of District	Public Hospital		Private Hospital	
	Index	SD	Index	SD
Nandurbar	0.655	0.063	0.222	0.129
Dhule	0.641	0.059	0.259	0.069
Jalgaon	0.185	0.094	0.357	0.051
Buldana	0.353	0.069	0.291	0.102
Akola	0.320	0.058	0.264	0.056
Washim	0.394	0.081	0.361	0.080
Amravati	0.414	0.054	0.092	0.054
Wardha	0.270	0.089	0.125	0.099
Nagpur	0.329	0.070	0.323	0.067
Bhandara	0.338	0.051	0.233	0.097
Gondiya	0.283	0.070	0.015	0.091
Gadchiroli	0.598	0.073	0.058	0.057
Chandrapur	0.226	0.085	0.395	0.085
Yavatmal	0.479	0.100	0.199	0.096
Nanded	0.336	0.104	0.192	0.093
Hingoli	0.505	0.077	0.322	0.095
Parbhani	0.465	0.075	0.292	0.101
Jalna	0.314	0.111	0.151	0.088

Aurangabad	0.196	0.075	0.261	0.115
Nashik	0.389	0.085	0.301	0.060
Mumbai Suburban	-0.140	0.135	0.386	0.088
Mumbai	0.277	0.121	0.384	0.094
Raigarh	0.202	0.096	0.296	0.072
Pune	0.174	0.093	0.274	0.061
Ahmadnagar	0.402	0.071	0.159	0.082
Bid	0.395	0.080	0.408	0.097
Latur	0.306	0.088	0.161	0.079
Osmanabad	0.311	0.095	0.039	0.098
Solapur	0.310	0.105	0.140	0.062
Satara	0.252	0.097	0.100	0.051
Ratnagiri	0.338	0.080	0.120	0.089
Sindhudurg	0.277	0.087	-0.078	0.090
Kolhapur	0.319	0.101	0.040	0.041
Sangli	0.255	0.107	0.180	0.053
Palghar	0.844	0.043	0.255	0.057
Thane	0.470	0.111	0.248	0.075
Maharashtra	0.337	0.014	0.226	0.013

**Table 3:** Concentration index value for caesarean section across district by public and private hospital in Maharashtra India 2019-21.

## Discussion

Results indicate that the elective C-section prevalence is extreme. In lower middle class countries, the risk of maternal death following a C-section operation is disproportionately high [24]. Delivery via C-section has increased during the past three decades. Most wealthy families, better educated women, and those living in urban regions tend to have more C-section deliveries [25]. There are various socio-economic determinates of C-section deliveries. District-wise variance reveals that Kolhapur (38.1%), Satara (35.6%), Amravati (30.2%) and Akola (28.7%) have highest prevalence of C-section delivery. Almost 55 percent C-section perform before starting the labour pain. Chandrapur and Gondia has the almost 70 percent deliveries done before labour pain started, this indicate that 70 percent of women prefer voluntary C-section delivery. The majority of the population resides in rural areas, and the distribution of respondents' wealth index shares drops from the poorest to the richest group. According to odds ratios, higher-educated mothers are more likely to choose a C-section delivery than the less-educated mothers. Study reveals that Maternal age, mothers education, religion, wealth quantile, body mass index, antenatal visit, size of the baby at the time of birth, pregnancy complication, place of delivery were statistically associated with C-section delivery [26].

The qualitative investigation revealed that women and their family members often seek unnecessary C-sections without clear medical justification. The requests for C-sections, coupled with the psychological fears experienced by both women and their families, underscore the primary factors influencing the demand for such procedures, alongside medical practitioners [24,27]. The primary factors of C-section birth include women who are 30 years of age or older, body mass index, and mother prenatal care. Children's birth order on the second number, women who have had an ultrasound, women who live in metropolitan areas, and women who come from wealthy families are the

key factors that influence whether a C-section is performed before labour pains or not. Determinants of C-section include older women in the 35 - 49 years of age group, women with higher levels of education, Muslims, women from wealthy families, women who got antenatal care, women who experienced miscarriage, and women who had problems during birth [28]. Women belong to Muslim household and scheduled tribes are having less C-section delivery. The concentration index reveals that people belong to affluent family are prefer to go for C-section delivery and most of the C-section delivery concentrated at private hospitals only. C-section deliveries are three times higher in the private hospitals than the public hospitals, it is not only increase the cost of C-section but also may pose burden of unnecessary C-section delivery [29]. The research indicates a notable correlation between higher income and education levels and the prevalence of C-section deliveries [30]. Conversely, individuals from economically disadvantaged backgrounds tend to opt for C-sections at public hospitals. Notably, Karnataka exhibits the highest rate of C-section deliveries in private hospitals, with factors such as maternal age at birth, birth weight, birth order, multiple births, and place of residence playing significant roles in this trend [31].

## Conclusion

Over the past three decades, there has been a steady rise in C-section deliveries. This increase can be attributed to various socio-economic factors influencing the decision for C-section births. Additionally, there exists district-wise variation in C-section rates across Maharashtra. One significant contributing factor to the rising prevalence of C-sections could be the preference for scheduling Cesarean deliveries before the onset of labour pain.

## Acknowledgements

The authors express gratitude to the Demographic and Health Survey (DHS) program for granting permission to utilize the dataset in this study. Additionally, appreciation is extended to anonymous reviewers for their valuable and constructive feedback on this paper.

## Conflict of Interest

The authors declare that they have no conflict of interest.

## Bibliography

1. Betran AP, *et al.* "Trends and projections of caesarean section rates: Global and regional estimates". *BMJ Global Health* 6.6 (2021): e005671.
2. Betrán AP, *et al.* "The increasing trend in caesarean section rates: Global, regional and national estimates: 1990-2014". *PLoS One* 11.2 (2016): e0148343.
3. Singh RR, *et al.* "Are cesarean deliveries equitable in India: assessment using benefit incidence analysis". *BMC Health Services Research* 22.1 (2022): 670.
4. Govil D, *et al.* "Catastrophic household expenditure on caesarean deliveries in India". *Journal of Population Research* 37.2 (2020): 139-159.
5. Potter JE, *et al.* "Unwanted caesarean sections among public and private patients in Brazil: Prospective study". *British Medical Journal* 323.7322 (2001): 1155-1158.
6. De Costa A, *et al.* "The state-led large scale public private partnership "chiranjeevi program" to increase access to institutional delivery among poor women in Gujarat, India: How has it done? What can we learn?" *PLoS ONE* 9.5 (2014): e95704.
7. Reiter M, *et al.* "Systematic review and meta-analysis of studies on delivery preferences in Brazil". *International Journal of Gynecology and Obstetrics* 143.1 (2018): 24-31.

8. Manyeh AK, *et al.* "Socioeconomic and demographic factors associated with caesarean section delivery in Southern Ghana: Evidence from INDEPTH Network member site". *BMC Pregnancy Childbirth* 18.1 (2018): 405.
9. Bhatia M, *et al.* "Assessment of variation in cesarean delivery rates between public and private health facilities in India from 2005 to 2016". *JAMA Network Open* 3.8 (2020): e2015022.
10. Sk R. "Does delivery in private hospitals contribute largely to Caesarean Section births? A path analysis using generalised structural equation modelling". *PLoS One* 15.10 (2020): e0239649.
11. Daniel CN and Singh S. "Caesarean delivery: "An experience from a tertiary institution in north western Nigeria"". *Nigerian Journal of Clinical Practice* 19.1 (2016): 18-24.
12. Shabnam S. "Caesarean Section Delivery in India: Causes and Concerns. Sess 221 Assessments Facil Deliv Serv" (2009): 1-20.
13. Das S and Sahoo H. "Caesarean section delivery in India: Public and Private Dichotomy". *Demography India* 48.1 (2019): 36-48.
14. Sahoo H and Jeermison RK. "Repeated caesarean section delivery in India". *Children and Youth Services Review* 116 (2020): 105258.
15. Sarngadharan RC, *et al.* "Rising trend of caesarean section: review on the determinants of caesarean section deliveries". *European Journal of Molecular and Clinical Medicine* 7.7 (2020): 5904-5909.
16. Gedefaw G, *et al.* "Prevalence, indications, and outcomes of caesarean section deliveries in Ethiopia: A systematic review and meta-analysis". *Patient Safety in Surgery* 14.1 (2020): 11.
17. Singh SK, *et al.* "Prevalence and determinants of voluntary caesarean deliveries and socioeconomic inequalities in India: Evidence from National Family Health Survey (2015-16)". *Clinical Epidemiology and Global Health* 8.2 (2020): 335-342.
18. Vora KS, *et al.* "Predictors of maternal health services utilization by poor, rural women: a comparative study in Indian States of Gujarat and Tamil Nadu". *Journal of Health, Population and Nutrition* 33 (2015): 9.
19. Khawaja M, *et al.* "Determinants of caesarean section in Egypt: evidence from the demographic and health survey". *Health Policy (New York)* 69.3 (2004): 273-281.
20. McMahon MJ, *et al.* "Comparison of a trial of labor with an elective second cesarean section". *New England Journal of Medicine* 335.10 (1996): 689-695.
21. Mohanty SK, *et al.* "Out-of-pocket expenditure and correlates of caesarean births in public and private health centres in India". *Social Science and Medicine* 224 (2019): 45-57.
22. Mishra S and Mohanty SK. "Out-of-pocket expenditure and distress financing on institutional delivery in India". *International Journal for Equity in Health* 18.1 (2019): 99.
23. Mishra U. "Delivery-related complications and determinants of caesarean section rates in India". *Health Policy Plan* 17.1 (2002): 90-98.
24. Takegata M, *et al.* "Reasons for increased caesarean section rate in Vietnam: A qualitative study among Vietnamese mothers and health care professionals". *Healthcare* 8.1 (2020): 41.
25. Arendt E, *et al.* "Effect of maternal height on caesarean section and neonatal mortality rates in sub-Saharan Africa: An analysis of 34 national datasets". *PLoS One* 13.2 (2018): e0192167.
26. Bansod D, *et al.* "Increasing trends of caesarean deliveries in India: does private sector contributes it?" *SSRN Electronic Journal* (2018): 3112190.

27. Mogren I, *et al.* "Maternal height and risk of caesarean section in singleton births in Sweden-a population-based study using data from the Swedish pregnancy register 2011 to 2016". *PLoS One* 13.5 (2018): e0198124.
28. Roy A, *et al.* "Geographical variability and factors associated with caesarean section delivery in India: a comparative assessment of Bihar and Tamil Nadu". *BMC Public Health* 21.1 (2021): 1715.
29. Singh P, *et al.* "High prevalence of cesarean section births in private sector health facilities-analysis of district level household survey-4 (DLHS-4) of India". *BMC Public Health* 18.1 (2018): 613.
30. Shams-Ghahfarokhi Z and Khalajabadi-Farahani F. "Intention for cesarean section versus vaginal delivery among pregnant women in Isfahan: Correlates and determinants". *Journal of Reproduction and Infertility* 17.4 (2016): 230-239.
31. Golandaj JA and Hallad JS. "Levels, trends and socio-economic correlates of caesarean section deliveries: District level analysis in Karnataka, India". *Journal of Health Research* 33.4 (2019): 323-335.

**Volume 13 Issue 4 April 2024**

**©All rights reserved by Rushikesh P Khadse and Dhananjay W Bansod.**