



TREND OF DELIVERY BY CAESAREAN SECTION IN LEADING STATES/UTS IN INDIA: EVIDENCE FROM NFHS-5

Dr. Ashish Kumar Sharma*

Assistant Professor, Department of Community Medicine, Varun Arjun Medical College and Rohilkhand Hospital, Banthra. *Corresponding Author

Dr. Rohit Patawa

Tutor cum Statistician, Department of Community Medicine, Autonomous State Medical College, Firozabad

Dr. Devika Saraswat

Junior Resident, Department of Obstetrics and Gynaecology, Varun Arjun Medical College and Rohilkhand Hospital, Banthra

ABSTRACT

INTRODUCTION: The increasing c-section rate is a multifactorial phenomenon. Indeed, technological, professional, legal, ethical and cultural factors have contributed to the rise in c-sections in the past few decades and have been extensively studied, with a growing consensus that clinical factors alone cannot explain the observed increases. **OBJECTIVES:** This study has conducted with the objective to know the change in caesarean section from NFHS-4 to NFHS-5 and also to know the change in caesarean section in different type of factors like Health facility and Place of Residence. **MATERIAL AND METHODS:** Secondary data has been used to conduct the study and the data has obtained from NFHS with the covering 99% of population. **RESULTS:** By this study it has seen that Telangana, Andhra Pradesh, Jammu Kashmir and Kerala are having highest Caesarean Section rate in both NFHS-4 and NFHS-5, Sikkim has highest change in performing Caesarean Section in both Urban and Rural areas but Nagaland, Mizoram and Meghalaya have lowest change in performing Caesarean Section from NFHS-4 to NFHS-5 and Jammu & Kashmir, Telangana has highest performing states in both Private and Public Health facility in NFHS-5 data.

KEYWORDS : Delivery, Caesarean Section, NFHS-5, Trend

INTRODUCTION:

Caesarean section is the most commonly performed surgery in obstetrical care. It can be life-saving and is also a highly effective procedure for preventing complications such as dystocia. The WHO stated, in 2015, that every effort should be made to provide CS to women in need, rather than striving to achieve a specific rate.¹

The increasing c-section rate is a multifactorial phenomenon. Indeed, technological, professional, legal, ethical and cultural factors have contributed to the rise in c-sections in the past few decades and have been extensively studied, with a growing consensus that clinical factors alone cannot explain the observed increases.²

OBJECTIVES:

The present study aimed to perusal the change in caesarean section (CS) in leading states and UT of India on the basis of NHFS data (NFHS-4 and NFHS-5). This study also includes the changes in CS on the basis of different factors like type of residence and the sector of delivery (public/private). Apart from the comparative study, the change in CS in between NFHS-5 has also been reported in overall scenario as well as on the basis of different leading factors which affects the CS.

DATA & METHODOLOGY:

The present study was conducted in January 2021. The data of the study was obtained from National Family Health Survey (NFHS)- 4³ and NFHS- 5⁴. NFHS-4 was conducted in 2015-2016 while NFHS-5 was conducted in 2018-2019. These surveys were conducted in whole nation with covering more than 99% of the Indian population. All the data have been retrieved from the state wise fact sheets of NFHS-4 and NFHS-5 reports.

The first NFHS-1 was conducted in 1992 to 1993. NFHS is a large scale, multi-round survey conducted in a representative sample of households throughout India. The NFHS-5 survey has a questionnaire with 4 section details like Biomarker, Household, Man and Woman details.⁴

The NFHS data of two consecutive term were analysed to explain the trend of Caesarean Section, Trend in different

population residing areas like Urban and Rural Areas, Trend in different sectors like Private Health Sectors and Public Health Sectors and also Change from NFHS-4 to NFHS-5 in the Trend in different sectors and areas.

RESULT AND DISCUSSION

In India, too many deliveries are undergoing by Caesarean Section. Caesarean Section should be performed in given indications like Central placenta previa, Cephalopelvic disproportion, Contracted pelvis, History of Previous caesarean delivery, Pelvic mass causing obstruction, Non-reassuring FHR (foetal distress), Advanced carcinoma cervix, Dystocia, Vaginal obstruction, Antepartum haemorrhage, Malpresentation: Breech, shoulder (transverse lie), Medical-gynaecological disorders: (a) Diabetes (uncontrolled), heart disease (coarctation of aorta, Marfan's syndrome; (b) mechanical obstruction (due to benign or malignant pelvic tumours (carcinoma cervix), or following repair of vesicovaginal fistula and many more.⁵

Table- 1 Trend in Caesarean Section from NFHS-4 and NFHS-5

State/UTs	NFHS-5	NFHS-4	Gap between NFHS-4 and NFHS-5
Andaman & Nicobar Islands	29.9	19.3	10.6
Andhra Pradesh	42.4	40.1	2.3
Assam	18.1	13.4	4.7
Bihar	9.7	6.2	3.5
Dadar & Nagar Haveli	22.9	16.1	6.8
Goa	39.5	31.4	8.1
Gujarat	21.0	18.4	2.6
Himachal Pradesh	21.0	16.7	4.3
Jammu & Kashmir	41.7	33.4	8.3
Karnataka	31.5	23.6	7.9
Kerala	38.9	35.8	3.1
Ladakh	37.6	16.1	21.5
Lakshadweep	31.3	38.4	-7.1
Maharashtra	25.4	20.1	5.3
Manipur	25.6	21.1	4.5
Meghalaya	8.2	7.6	0.6

Mizoram	10.8	12.7	-1.9
Nagaland	5.2	5.8	-0.6
Sikkim	32.8	20.9	11.9
Telangana	60.7	57.7	3
Tripura	25.1	20.5	4.6
West Bengal	32.6	23.8	8.8

Fig-1- State/UT with highest and lowest CS according to NFHS-5 and change from NFHS-4

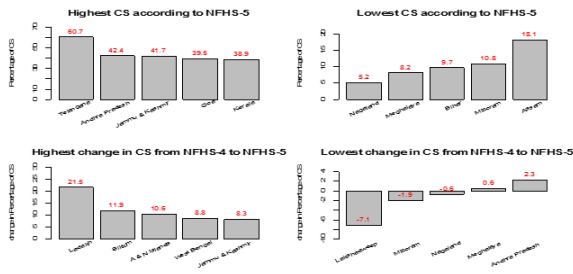


Table 2: Distribution of Deliveries by Caesarean Section by place of residence

State/UT	Urban (NFHS-5)	Urban (NFHS-4)	Change in Urban Area	Rural (NFHS-5)	Rural (NFHS-4)	Change in Rural Area
Andaman & Nicobar Islands	40.8	27.4	13.4	20.2	13.8	6.4
Andhra Pradesh	50.5	48.4	2.1	39.3	37.1	2.2
Assam	39.2	36.8	2.4	15.6	10.8	4.8
Bihar	15.7	13.9	1.8	8.8	5.4	3.4
Dadar & Nagar Haveli	29.9	26.7	3.2	16.1	8.7	7.4
Goa	39.1	33.5	5.6	40.1	27.7	12.4
Gujarat	30.7	27.8	2.9	15.3	12.0	3.3
Himachal Pradesh	26.2	29.6	-3.4	20.3	15.6	4.7
Jammu and Kashmir	54.7	53.1	1.6	37.8	26.9	10.9
Karnataka	35.2	29.1	6.1	29.4	19.8	9.6
Kerala	39.1	37.1	2	38.7	34.6	4.1
Ladakh	47.7	36.4	11.3	35	49.2	-14.2
Lakshadweep	30.7			33.2		
Maharashtra	30.6	26.3	4.3	21.5	15.2	6.3
Manipur	38	33.0	5	19.7	15.2	4.5
Meghalaya	21.6	20.5	1.1	6.1	5.6	0.5
Mizoram	16.8	19.0	-2.2	4.8	6.0	-1.2
Nagaland	9.8	12.4	-2.6	3.6	3.4	0.2
Sikkim	43.1	28.8	14.3	26.9	17.1	9.8
Telangana	64.3	62.8	1.5	58.4	53.1	5.3
Tripura	47.5	45.8	1.7	18.6	12.2	6.4
West Bengal	43.5	36.6	6.9	28.6	18.9	9.7

Fig-2- State/UT with highest and lowest CS in urban and rural areas according to NFHS-5

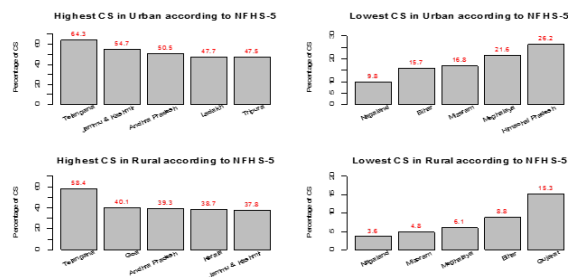


Fig-3- State/UT with highest and lowest change in CS in urban and rural areas from NFHS-4 to NFHS-5.

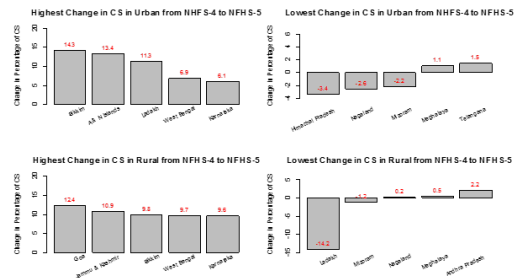


Table- 3 Distribution of deliveries by Caesarean Section in different sectors as per NFHS-5

State/UTs	Delivery in different sectors by Caesarean Section					
	Private Health facility		Public Health facility			
	NFHS-5	NFHS-4	Gap in NFHS-5 and NFHS-4	NFHS-5	NFHS-4	Gap in NFHS-5 and NFHS-4
Andaman & Nicobar Islands	79.2			23.6	16.9	6.7
Andhra Pradesh	63	57.0	6	26.6	25.5	1.1
Assam	70.6	26.7	43.9	15.2	21.0	-5.8
Bihar	39.6	31.0	8.6	3.6	2.6	1.0
Dadar & Nagar Haveli	42.5	38.4	4.1	17.3	12.0	5.3
Goa	50.0	51.3		31.5	19.9	11.6
Gujarat	30.8	26.6	4.2	12.4	10.8	1.6
Himachal Pradesh	51.4	44.4	7	17.4	16.4	1.0
Jammu and Kashmir	82.1	75.5	6.6	42.7	35.1	7.6
Karnataka	52.5	40.3	12.2	22.6	16.9	5.7
Kerala	39.9	38.6	1.3	37.2	31.4	5.8
Ladakh		59.9		39.3	27.1	12.32
Lakshadweep	37.7			28.2		
Maharashtra	39.1	33.1	6	18.3	13.1	5.2
Manipur	53.2	46.2	7	24.7	22.6	2.1
Meghalaya	40.8	31.4	9.4	9.2	9.8	-0.6
Mizoram	30.4	30.1	0.3	9.8	12.3	-2.5
Nagaland	23.6	31.5	-7.9	8.0	13.4	-5.4
Sikkim	55.4	49.3	6.1	30.4	18.1	12.3
Telangana	81.5	74.5	7	44.5	40.3	4.1
Tripura	69.3	73.7	-4.4	22.7	18.1	4.6
West Bengal	82.7	70.9	11.8	22.9	18.8	4.1

Fig 4- State/UT with highest and lowest CS in private and public health facility according to NFHS-5.

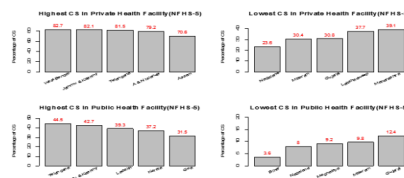


Fig- 5- State/UT with highest and lowest change in CS in private and public health facility from NFHS-4 to NFHS-5.

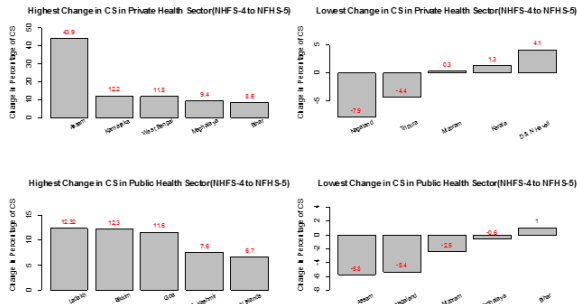


Table 1 contains the Trend in Cesarean Section from NFHS- 4 to NFHS- 5 of States/UTs like From the data of NFHS-4, Telangana (57.7%) has highest Cesarean Section followed by Andhra Pradesh (40.1%), Kerala (35.8%), Jammu and Kashmir (33.4%) whereas Nagaland (5.8%) has lowest Cesarean Section followed by Bihar (6.2%), Meghalaya (7.6%) and Mizoram (12.7%) but From the data of NFHS-5, Telangana (60.7%) is again having highest Cesarean Section followed by Andhra Pradesh (42.4%), Jammu and Kashmir (41.7%), Kerala (38.9%) whereas Nagaland (5.2%) has lowest Cesarean Section followed by Meghalaya (8.2%), Bihar (9.7%), and Mizoram (10.8%). From this table, it was observed that Telangana, Andhra Pradesh, Jammu Kashmir and Kerala are having highest Cesarean Section rate in both NFHS-4 and NFHS-5.

On the basis of Table 1 data, we have calculated top 5 highest and lowest change in Cesarean Section States/UTs from NFHS-4 to NFHS-5 in Fig. 1. It was found that Ladakh (21.5%) has highest change in Cesarean Section followed by Sikkim (11.9%), Andaman and Nicobar Islands (10.8%), West Bengal (8.8%) and Jammu & Kashmir (8.3%) while lowest change has seen in Lakshadweep (-7.1%) followed by Mizoram (-1.9%), Nagaland (-0.6%), Meghalaya (0.6).

Table 2 and Fig. 3 contains change in the distribution of deliveries performed by Cesarean Section by place of residence in terms of Urban area and Rural Area. According to Census 2011, It was defined that Urban area should have following criteria's like Places with a municipality, corporation, cantonment board or notified town area committee, etc. with minimum population of 5,000, 75 percent of the male main working population engaged in non-agricultural pursuits and density of population must be at least 400 persons per sq. km⁶ but Rural Area is defined as population less than 5000, more than 75 percent working population engaged in agriculture. So, It was observed from the data that Sikkim (14.3%) has highest change in urban areas followed by Andaman and Nicobar Islands (13.4%), Ladakh (11.3%), West Bengal (6.9%) whereas lowest change has seen in Himachal Pradesh (-3.4%) followed by Nagaland (-2.6%), Mizoram (-2.2%) and Meghalaya (14.1%) but In rural areas, highest change has seen in Goa (12.4%) followed by Jammu and Kashmir (10.9%), Sikkim (9.8%) and West Bengal (9.7%) whereas lowest change has seen in Ladakh (-14.2%) followed by Mizoram (-1.2%), Nagaland (0.2%) and Meghalaya (0.5%). From this table, It was observed that Sikkim has highest change in performing Cesarean Section in both Urban and Rural areas but Nagaland, Mizoram and Meghalaya has lowest change in performing Cesarean Section from NFHS-4 to NFHS-5.

On the basis of Table 2, we have calculated top 5 highest and lowest Cesarean Section performing States/UTs in both Urban and Rural areas from the data of NFHS-5. So, in Fig. 2. It has found that Telangana (64.3%) has highest Cesarean Section in Urban areas followed by Jammu & Kashmir (54.7%), Andhra Pradesh (50.5%), Ladakh (47.7%) and Tripura (47.5%)

and lowest Cesarean Section has seen in Urban areas of Nagaland (9.8%). Bihar (15.7%), Mizoram (16.8%), Meghalaya (21.6%) and Himachal Pradesh (26.2%) whereas in Rural areas, Highest Cesarean Section has seen in Telangana (58.4%) followed by Goa (40.1%), Andhra Pradesh (39.3%), Kerala (38.7%), Jammu and Kashmir (37.8%) and lowest Cesarean Section has seen in Nagaland (3.6%) followed by Mizoram (4.8%), Meghalaya (6.1%), Bihar (8.8%) and Gujarat (15.3%). So, by this figure, it was observed that Telangana and Andhra Pradesh have highest Cesarean Section in both Urban and Rural areas.

On the basis of table 3, we have calculated top 5 highest and lowest Cesarean Section performing States/UTs in both Public and Private health facility from NFHS-5 in Fig. 4. So, By this fig it has observed that West Bengal (82.7%) and Jammu Kashmir (82.1%) has almost same and highest caesarean Section rate in Private health facility followed by Telangana (81.5%), Andaman and Nicobar Islands (79.2%), Assam (70.6%) whereas lowest Cesarean Section has seen in Nagaland (23.6%) followed by Mizoram (30.4%), Gujarat (30.8%), Lakshadweep (37.7%) and Maharashtra (39.1%) and Highest Cesarean Section rate of Public Health Facility has again seen in Telangana (44.5%) and Jammu and Kashmir (42.7%) followed by Ladakh (39.3%), Kerala (37.2%), Goa (31.5%) whereas Bihar (3.6%) has lowest Cesarean section in Public Health facility followed by Nagaland (8%), Meghalaya (9.2%), Mizoram (9.8%) and Gujarat (12.4%).

On the basis of table 3, we have also calculated Highest and lowest change in Cesarean Section in Public Health facility and Private health facility from NFHS-4 to NFHS-5 in Fig. 5. So, Highest change has seen in Assam (43.9%) followed by Karnataka (12.2%), West Bengal (11.8%), Meghalaya (9.4%), Bihar (8.6%) in Private Health facility while in Public Health Facility, It has seen that Ladakh (12.32%) and Sikkim (12.3%) has highest change followed by Goa (11.6%), Jammu & Kashmir (7.6%) and Andaman & Nicobar Islands (6.7%) while lowest change has seen in Private Health Facility of Nagaland (-7.9%) followed by Tripura (-4.4%), Mizoram (0.3%), Kerala (1.3%), Dadar and Nagar Haveli (4.1%) whereas in Public Health facility lowest change was seen in Assam (-5.8%) and Nagaland (5.4%) followed by Mizoram (-2.5%), Meghalaya (-0.6%) and Bihar (1%).

In India, The Cesarean Section trend have been increasing rapidly with wide variation. The present study was also compared from Paula da Silva et al⁷, the study revealed that The Cesarean Section rate had increased 17% in Sweden. The Mean age had also given in between 28 to 30 years old females. The rate of Cesarean Section in Sweden Tertiary Care hospital has also increased by 22%. The rate of Cesarean Section of Sweden was quite higher from Bihar (9.7%).

The Present study data was also compared from Md. Nuruzamman Khan et al⁸ Cesarean Section rate was 19% in Bangladesh which was quite higher from Bihar (9.7%) but lower from other states. It was also seen in the study that there was a change in Cesarean Section in the age less than 19 years (6.23%) while more than 35 years (7.71%).

The study was also compared from other studies like Myriam de Loenzien et al⁹ the study revealed that The Cesarean Section rate was 29.2% in Vietnam which was higher than Bihar (9.7%), Assam (18.1%), Dadar & Nagar Haveli (22.9%), Gujarat (21.0%), Himachal Pradesh (21.0%), Maharashtra (25.4%), Manipur (25.6%). The study was also revealed that Cesarean Section was highly performed in women living in Urban areas (42.4%) while (22.9%) Rural areas women. When it was compared from the data of present study it was found that the data was higher than some states like Assam (39.2%), Bihar (15.7%), Dadar & Nagar Haveli (29.9%), Goa (39.1%),

Gujarat (30.7%), Himachal Pradesh (26.2%), Karnataka (35.2%), Kerala (39.1%), Lakshadweep (30.7%), Maharashtra (30.6%), Manipur (38%), Meghalaya (21.6%), Mizoram (16.8%), Nagaland (9.8%) while in Rural areas data compared and it was found that it was higher than Andaman & Nicobar (20.2%), Assam (15.6%), Bihar (8.8%), Dadar & Nagar Haveli (16.1%), Gujarat (2.9%), Himachal Pradesh (20.3%), Maharashtra (21.5%), Manipur (19.7%), Meghalaya (6.1%), Nagaland (3.6%), Tripura (18.6%).

Geetesh Solanki et al¹⁰ revealed that there was 73.6% Caesarean delivery performed in South Africa which was so higher than all leading States/UTS of India.

According to WHO, Caesarean section rates have been steadily increasing worldwide over the last few decades above levels that cannot be considered medically necessary. This trend has not been accompanied by significant maternal or perinatal benefits.¹¹ India has witnessed a revolution in access to modern delivery facilities, spearheaded by the Janani Suraksha Yojana program introduced in 2005¹² and supplemented in 2011 with the Janani Shishu Suraksha Karyakram program.¹³ These new policies offer in particular conditional cash transfers to encourage women to use free prenatal and postnatal care in modern health centres, with additional cash benefits for health workers in charge of the coordination in more vulnerable states.^{14,15}

CONCLUSION

By this present the study, it can be said that the trend of Caesarean Section is rising in all States/UTs of India. According to WHO there is evidence that potentially unnecessary caesarean sections may put the lives and well-being of women and their babies at risk – both in the short and long-term. Caesarean section increases the likelihood of requiring a blood transfusion, the risks of anaesthesia complications, organ injury, infection, thromboembolic disease and neonatal respiratory distress, among other short-term complications.¹³ So, here ques has raised that Why do the trend is rising in Caesarean Section in India? For this WHO said that Women has Fear of pain, Fear of Medical Litigation, Financial Incentives that's why women prefer Caesarean Section to deliver the baby. So, there is need to aware the women to the effects of Caesarean Section.

LIMITATIONS

There is a limitation in the study that Data was not completely available of NFHS-4 and NFHS-5 of some States/UTs on a public domain.

REFERENCES

1. World Health Organization. WHO Statement on Caesarean Section Rates, 2015. [Last accessed on 20/01/2021]
2. D'Souza R et al 'To C' or not to 'C'? /Caesarean delivery upon maternal request: a review of facts, figures and guidelines. J Perinat Med. 2012; 41: 5-15. [Google Scholar]
3. NFHS- 4 accessed from http://rchiips.org/nfhs/factsheet_NFHS-4.shtml [Last accessed on 25/01/2021]
4. NFHS- 5 accessed from http://rchiips.org/nfhs/factsheet_NFHS-5.shtml [Last accessed on 25/01/2021]
5. D C Dutta et al, Textbook of Obstetrics, Jaypee Brothers Medical Publications 8th Edition 2015, Page. 670
6. Urban Area Available from <https://censusindia.gov.in/2011provresults/paper2/datafiles/india2/1.%20data%20highlight.pdf> [Last accessed on 06/03/2021]
7. Paula da Silva et al, Indications for increase in Caesarean Delivery. Reproductive Health (2019) 16:72, Page. 1 to 6 [PubMed] [BMC]
8. Md. Nuruzamman Khan et al, Sociodemographic Predictors and average annual rates of caesarean section in Bangladesh between 2004 to 2014, PLoS ONE 12(5): e0177579 [Google Scholar]
9. Loenzien M et al Magnitude and correlates of caesarean section in urban and rural areas: A multivariate study in Vietnam. PLoS ONE 14(7): e0213129. [Google Scholar]
10. Geetesh Solanki et al, A Cross sectional analytic study of modes of delivery and caesarean section rates in a private health insured South African Population, PLoS ONE 14(6): e0219020 [Google Scholar]
11. WHO Recommendations- Accessed from <https://www.who.int/reproductivehealth/infographic/unnecessary-caesarean-section.pdf?ua=1> [Last accessed on 30/01/2021]
12. Lim SS, Dandona L, Hoisington JA, James SL, Hogan MC, Gakidou E. India's Janani Suraksha Yojana, a conditional cash transfer programme to increase

- births in health facilities: an impact evaluation. Lancet. 2010;375(9730):2009-2023. doi:10.1016/S0140-6736(10)60744-1 [PubMed]
13. Salve HR, Charlette L, Kankaria A, Rai SK, Krishnan A, Kant S. Improving access to institutional delivery through Janani Shishu Suraksha Karyakram: evidence from rural Haryana, North India. Indian J Community Med. 2017;42(2):73-76. doi:10.4103/0970-0218.205223 [PubMed]
 14. Gupta SK, Pal DK, Tiwari R, et al. Impact of Janani Suraksha Yojana on institutional delivery rate and maternal morbidity and mortality: an observational study in India. J Health Popul Nutr. 2012;30(4):464-471. doi:10.3329/jhpn.v30i4.13416 [PubMed]
 15. Gopalan SS, Durairaj V. Addressing maternal healthcare through demand side financial incentives: experience of Janani Suraksha Yojana program in India. BMC Health Serv Res. 2012;12(1):319. doi:10.1186/1472-6963-12-319 [PubMed]