TRENDS IN CESAREAN SECTION OVER A DECADE BASED ON MODIFIED ROBSON'S CLASSIFICATION IN A TERTIARY CARE CENTRE OF SOUTH GUJARAT

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ABSTRACT

Background :

Caesarean section (C-section) delivery is a serious maternal health concern in the long run. Notedly, there is a lack of studies dealing with understanding the ways and reasons of C-section deliveries becoming a public health issue in today's time in India and the measures to reduce the unnecessary caesarean sections.

Aims and objectives:

1) To study the trend of Caesarean section (CS) over one decade using modified Robson's classification.
2) To analyse the change in feto-maternal outcome, if any , with respect to change in caesarean trends.

Introduction: The WHO considers the ideal rate of caesarean sections to be between 10% -15%. The idea is to have a classification system to help monitor and compare CS rates across hospitals, countries and continents and help understand where it is necessary to reduce CS rates(1). The classification should help to understand what groups of women undergo CS and give reason for rising trends. It should be applicable internationally, reliable, and verifiable, clinically relevant and consistent. After analyzing and understanding on who, when, how, why and where CS are performed it then becomes possible to implement strategies targeting high risk groups and then possibly reduce or increase CS rates in order to improve maternal and fetal well being .

The Robson classification is such a tool focusing on parity, gestational age, previous CS, onset of labour, fetal lie and presentation and number of fetuses. This forms 10 groups, that are mutually exclusive and totally inclusive. Every women coming to a hospital for delivery can be assigned to one of the groups(2).

The use and benefits of Robson classification has been shown in many studies. They show that a system to classify and observe CS can help identify the group of women who need to be focused on in order to only perform CS on the women who really need it and subsequently lowering the rates(3).

Methodology:

This retrospective cross-sectional trend study was done by Secondary data analysis using the hospital management information system and Delivery register data of Tertiary Health Care Centre of South Gujarat between January 2011 to July 2021(4).

Details of childbirths beyond 28 weeks gestation in the months of January 2011, July 2011, January 2016, July 2016, January 2021 and July 2021(6 months) was noted in the proforma if details of all variables were available. (5)

Inclusion criteria:(6)

Data in hospital management information system and delivery register record of women delivering in January 2011, July 2011, January 2016, July 2016, January 2021, and July 2021

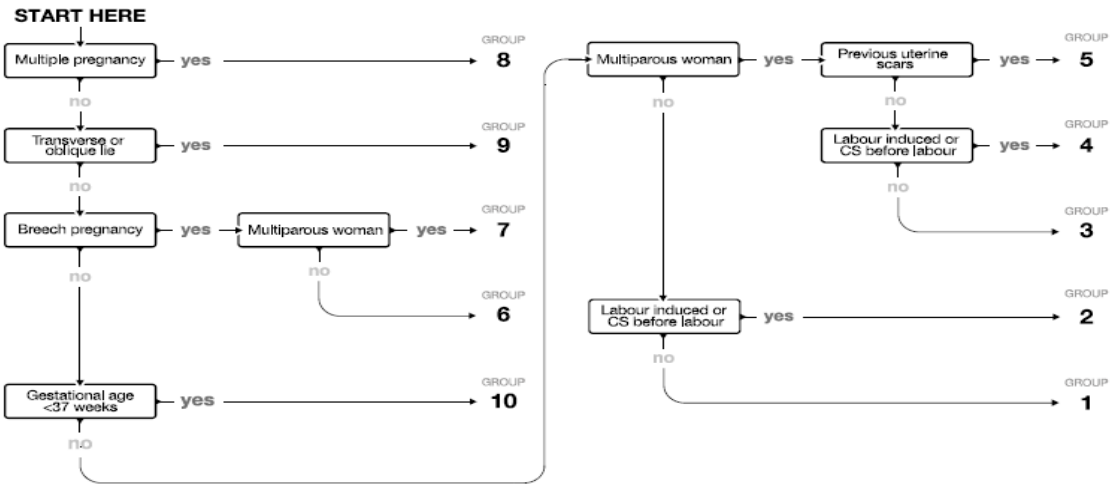
Exclusion criteria:

Incomplete or missing data.

Following variables were considered for the Robson's classification:

- Parity
- Gestational age
- Fetal presentation
- Previous CS
- Number of fetus
- Onset of labour
- Mode of delivery

Following flow chart was used to categorise women,(7)



Following calculations were done from data obtained in table:

$$\text{Group Size (\%)} = \frac{\text{total number of women in group}}{\text{total number of women delivered}}$$

$$\text{Group CS Rate (\%)} = \frac{\text{no. of CS in group}}{\text{no. of women in group}}$$

$$\text{Absolute Group contribution to overall CS rate (\%)} = \frac{\text{No. of CS in group}}{\text{total number of women delivered}}$$

$$\text{Relative group contribution to overall CS rate (\%)} = \frac{\text{No. of CS in group}}{\text{Total number of CS}}$$

Following variables were also be collected:

- Maternal age at time of delivery
- Maternal educational status
- Maternal high risk factors if any – hypertension, anaemia, heart disease, Infective Hepatitis, HIV infection, thyroid disorder, sickle cell disease etc
- Newborn status at birth
- Newborn weight at birth
- NICU admission
- Outcome of admission for both mother and baby- discharge/death

The relationship between above variables and CS rates was also studied.

Results:

The observations of our study are discussed below:

We calculated the overall CS rate during the study period as follows:

Table :1: Overall CS rate

	Jan & July 2011			Jan & July 2016			Jan & July 2021		
	Number of subjects (n=649)	**Number of subjects who have undergone CS(n=153)**	**CS rate (%)**	**Number of subjects (n=1177)**	**Number of subjects who have undergone CS (n=249)**	**CS rate (%)**	**Number of subjects (n=553)**	**Number of subjects who have undergone CS(n=158)**	**CS rate (%)**
Total number of deliveries	**649**	153	23.57%	1177	249	21.15%	553	158	28.57%

Overall CS rate increased over decade from 23.57% in 2011 to 28.57% in 2021.

Table : 2 : Baseline parameter (Age and Parity)

	Jan and July 2011			Jan and July 2016			Jan and July 2021		
	Number of subjects (n=649)	**Number of subjects who have undergone CS(n=153)**	**CS rate (%)**	**Number of subjects (n=1177)**	**Number of subjects who have undergone CS(n=249)**	**CS rate (%)**	**Number of subjects (n=553)**	**Number of subjects who have undergone CS(n=158)**	**CS rate (%)**
<20 year	53	4	7.54%	87	13	14.94%	25	8	32.00%
20-30 year	526	132	25.09%	1005	217	21.59%	480	130	27.08%
>30 year	70	17	24.28%	85	19	22.35%	48	20	41.66%
PARITY									
Primi	244	44	18.03%	430	85	19.76%	251	55	21.91%
Multi	405	109	26.91%	747	164	21.95%	302	103	34.10%

An increase in CS rates across all age groups in the last decade and the difference in rate of CS in under 20 years and more than 30 years across the decade was statistically significant (p-value <0.001). Though we noted a gradual increase in CS rates in both multis and primis over the decade, the difference in rate of CS in the two groups was not statistically significant (p-value >0.05).

Table : 3 : Robson's Group CS rate

Robson's Group	Jan and July 2011			Jan and July 2016			Jan and July 2021		
	No. of subjects in group. (n=649)	**No. of subjects undergoing CS(n=153)**	**Group. CS rate %**	**No. of subjects in group. (n=1177)**	**No. of subjects undergoing CS(n=249)**	**Group. CS rate %**	**No. of subjects in group. (n==553)**	**No. of subjects undergoing CS(n=158)**	**Group. CS rate %**
1	114	21	18.42	209	34	16.26	126	14	11.11
2	91	25	27.47	173	34	19.65	97	25	25.77
3	272	28	11.06	491	25	5.09	154	16	10.38
4	69	18	26.08	105	20	19.04	60	18	30
5	41	39	95.12	114	109	95.61	61	56	91.80
6	8	6	75	10	9	90	10	9	90
7	11	5	45.45	9	6	66.66	7	6	85.71
8	5	3	60	4	3	75	3	2	66.66
9	3	3	100	4	3	100	3	3	100
10	35	5	14.28	58	6	10.34	32	9	28.1

- CS rate in following groups remained constant across the decade :
  - Group 9 (Transverse or oblique lie with singleton pregnancy irrespective of gestational age).
  - Group 3 (Multipara at term with singleton cephalic pregnancy in spontaneous labour, without previous CS) and
  - Group 8 (multiple pregnancy).

- CS rates in following group increased marginally:
  - Group 4 (multipara delivering singleton at term by induced labour or CS before labour)
- CS rates in following groups decreased marginally :
  - Group 1 (Primipara at term with singleton cephalic pregnancy in spontaneous labour)
  - Group 2 (Primipara at term with singleton cephalic pregnancy delivering by induced labour or CS before labour)
  - Group 5 (Multipara at term with cephalic singleton with previous CS)
- CS rates in following groups increased significantly:
  - Group 6 (Primi with singleton with breech) ($p<0.05$)
  - Group 7 (Multi with singleton with breech) ($p<0.001$)
  - Group 10 (Preterm pregnancy with cephalic presentation) ($p<0.05$)

TABLE : 4 : Absolute group contribution to overall CS rate

	Jan and July 2011		Jan and July 2016		Jan and July 2021	
	Total no. of women delivered=649		Total no. of women delivered=1177		Total no. of women delivered=553	
ROBSONS GROUP	No. of CS in group.	Absolute group contribution to over all CS rate%	No. of CS in group.	Absolute group contribution to over all CS rate%	No. of CS in group.	Absolute group contribution to over all CS rate%
1	21	3.23	34	2.88	14	2.53
2	25	3.85	34	2.88	25	4.52
3	28	4.31	25	2.12	16	2.89
4	18	2.77	20	1.69	18	3.25
5	39	6.02	109	9.26	56	10.21
6	6	1.0	9	0.76	9	1.62
7	5	0.77	6	0.51	6	1.09
8	3	0.46	3	0.48	2	0.36
9	3	0.33	3	0.25	3	0.54
10	5	0.50	6	0.51	9	1.62

- Absolute group contribution to overall CS rate by group 5 (Multipara at term, with cephalic, singleton pregnancy, with previous CS) remained highest (6.02% in 2011,9.26% in 2016,10.21% in 2021). This reiterates the need to rationalise indications for primary CS.
- The second group was group-3 (Multipara at term with singleton cephalic pregnancy in spontaneous labour, without previous CS) in 2011 which changed to group -2 (Primipara at term with singleton cephalic pregnancy delivering by induced labour or CS before labour) in 2021. This suggests the need to look into the indications for induction of labour.
- The absolute contribution by group 10 (Preterm pregnancy with cephalic presentation) also increased from 0.5 % in 2011 to 1.62% in 2021.

Table: 5 : Maternal and Neonatal outcome(8)

	Jan and July 2011(n=649)	**Jan and July 2011(n=1177)**	**Jan and July 2011(n=553)**
Livebirths	635(97.84%)	1159(98.47%)	528(95.47%)
Stillbirths	14(2.15%)	18(1.52%)	25(4.52%)
Maturity			
Term birth	616(94.91%)	1113(94.56%)	506(91.50%)
Preterm birth	33(5.08%)	64(5.43%)	47(8.50%)
Birth weight			
<2.5kg	49(7.55%)	106(9.00%)	56(10.12%)
2.5-3.5kg	558(85.97%)	1026(87.17%)	459(83%)
>3.5 kg	42(6.47%)	45(3.82%)	38(6.87%)
Maternal death			
Vaginal delivery (n=7)	2(20%)	3(23.07%)	2(22.22%)
CS(n=25)	8(80%)	10(76.92%)	7(77.77%)
Direct cause	8(80%)	9(69.23%)	4(44.44%)
Indirect cause	2(20%)	4(30.76%)	5(55.55%)

- The proportion of preterm births was also noted to increase with increase in CS rates across the decade from 5.08% in 2011, to 8.49% in 2021 but statistically not significant (p value > 0.05).
- The proportion of newborns with birthweight of less than 2.5kg did not change significantly over the decade (6.47% in 2011 and 6.87% in 2021).
- The proportion of newborns with birthweight of more than 3.5kg increased from 7.55% in 2011 to 10.12% in 2021, but this increase was not statistically significant.(p value > 0.05)
- The distribution of maternal death with respect to mode of delivery has remained similar through out the decade.
- An increase in proportion of indirect cause of maternal of all maternal deaths from 20% in 2011 to 55.55% of all maternal deaths in 2021, probably because of successful interventions in reduction of direct causes of maternal death in our area.

CONCLUSION

The Caesarean section rates have increased over the decade, especially in certain Robson's groups (like previous CS, malpresentations, prematurity), without significantly affecting the feto-maternal outcome. It reiterates the need to exercise caution in planning primary Caesarean section in primigravida, considering promoting external cephalic version in breech pregnancies and strengthening interventions to prevent preterm births.

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