

Rural Community Based Caesarean Section Rates in A Resource Poor Region

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Abstract: *Background:* Tremendous increase in caesarean section rates (CSR) is reported with controversial relationship between CSR and maternal-perinatal outcome.

Objective: was to know rural community based CSR, spill over effects of institutional practices and maternal, perinatal outcome in low resource region.

Material Methods: Nurse Midwives based at institute visit each village, five times a year, provide home based prenatal care, advocacy for intranatal, postnatal care, create awareness in women, communities about emergencies in high, low risk, action needed. Records of pregnancy outcome, collected on regular basis were analysed irrespective of place, delivery mode.

Results: CSR was 4.8% between 1987- 1990, (base information), 11.6% between 2008 - 2011, in villages within 25-35 kms from institute, being served since 26 years (old), 1.2% between 1996 - 1999, 5.4% between 2008 - 2011 in villages 75-85 kms from institute, being served since 1996 (new). Perinatal mortality rates (PMR) have decreased, 62 between 1987 - 1990, 26 between 2008 - 2011 (2.38 times reduction) in old villages, 42 between 1996 - 1999 and 23 between 2008 - 2011 (1.82 times reduction) in new villages, with no maternal death due to pregnancy, labour specific disorders, one death each due to sickle cell disease, murder, suicide in 15 years in this small population. There was disproportionate increase in CSR midway, parallel to institute's CSR.

While nurse midwives can do a lot for maternal care in community, facility's everyday practices affect community's CSR. Periodic audit is essential at health facility, community for possibilities of improving maternal perinatal outcome, curtailing CSR.

Keywords: Community based, Increase Caesarean section rates, Perinatal mortality, Resource poor region.

INTRODUCTION

Globally there is a change in obstetric practice because of advances in knowledge, technology, interventions, women's awareness, managed health care etc. Most visible change is increase in caesarean section rates (CSRs), attributed to many factors like, safety of procedure, better anaesthesia, antibiotics, specialized neonatal care, defensive medical practice and so on [1-2]. The reasons seem to be multifactorial and complex, however the pace at which CSRs are increasing, is a matter of concern, especially because the precise relationship between CSRs and pregnancy outcome continues to be debated [5-8]. Whatever the reasons there is spillover effect on low resource communities also. A better understanding of cause and effect is imperative, especially because CSRs affect future health, fertility and resources. Studies from rural low resource communities are scarce.

From the institute where the study was conducted, maternal services are being provided to rural communities since more than 26 years in 25 villages, called old villages, around 25 to 35 kms away from the

institute, and since around 17 years in 28 villages called new villages, 80 - 85 kms away. Nurse midwives based at the institute visit each village five times a year to provide prenatal care with special guidance to high risk, not forgetting to inform women and families that low risk can also have problems. There is advocacy for intranatal and postnatal care to all. Information and guidance, about possible obstetric emergencies during pregnancy, birth, post birth are provided to all women irrespective of high or low risk. Some pregnant women are available for care/advocacy only 2 - 3 times during index pregnancy because of various reasons, including life style. Each woman is advised health facility delivery in view of various problems specially transport in emergency, however women and their families decide the place of delivery, which is either home or nearby health facility or district hospital or the referral institute where study is being done. CS facilities are available in nearby health facilities. The practice style at these places is different than medical institution. Women of far off villages do use these facilities. NM follows each pregnancy and its outcome, irrespective of place and type of birth and outcome.

MATERIALS METHODS

The records of all the pregnancies and their outcome are made during village visits on regular basis

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by the NM. These records were analysed by the author and co-authors with the help of NM. This was irrespective of place, mode and outcome and is the basis of the article with thrust on CSRs with indications of CS and perinatal outcome.

OBJECTIVE

Was to know rural community based CSR, maternal, perinatal outcome with low resources and spillover effect of institutional practices.

RESULTS

Community based CSR increased from 4.8 % between 1987- 1990 (taken as base data) to 11.6 % between 2008- 2011, (2.41 times increase in 25 years) in old villages. From 1.2 % in 1996 - 1999 (taken as

base data) to 5.4 % between 2008 - 2011 (4.5 times increase in 15 years) in new villages. More of CS were performed in primigravida in old villages, (58.6%) as well as in new villages (52.2%) (Tables 1 and 2).

Out of the overall 9827 births in 53 villages, 621 (6.32%) were by caesarean section, 189 (30.44%) elective CS and 432 (69.56%) emergency CS. Foetal distress remained the leading indication throughout (249(40.09%)), as per the discharge cards and / or information provided by the women. Other indications were, cephalopelvic disproportion (11.11%), previous CS 103 (16.58%), abnormal presentations 71 (11.43%), failure to progress 46 (7.40%) and others 83 (13.36%). Many CS had more than one indication (Tables 3 and 4). Number of CS for foetal distress increased a lot, increase from 1987-1990 to 2008-2011 was 8.53% as against an increase of 2.09% in CPD, 4.99% in PCS, 2.57% in abnormal presentations,

Table 1: Caesarean Section in Women of Old Villages

Period	Births	Total CS		Elective CS			EmCS		
		No	%	P	M	Total	P	M	Total
1987-1990	499	24	4.8	5	1	6	1	6	18
1990-1993	636	28	4.4	4	2	6	12	10	22
1993-1996	761	44	5.7	6	6	12	20	12	32
1996-1999	784	58	7.3	10	6	16	24	18	42
1999-2002	864	62	7.1	12	6	18	26	18	44
2002-2005	820	64	9	10	6	16	24	24	48
2005-2008	928	92	9.8	20	17	37	30	25	55
2008-2011	956	111	11.6	31	16	47	37	27	64
Total	6248	483	7.7	98	60	158	185	140	325

Em-Emergency P-Primigravida
CS-Caesarean Section M-Multigravida

Table 2: Caesarean Section in Women of New Villages

Period	Births	Total CS		Elective CS			EmCS		
		No	%	P	M	Total	P	M	Total
1996-1999	580	7	1.2	1	-	1	4	2	6
1999-2002	684	18	2.6	1	1	2	9	7	16
2002-2005	702	28	3.9	2	4	6	12	10	22
2005-2008	789	40	5	4	6	10	16	14	30
2008-2011	824	45	5.4	5	7	12	18	15	33
Total	3579	138	18.1	13	18	31	59	48	107

Em-Emergency P-Primigravida
CS-Caesarean section M-Multigravida

Table 3: Indications of Cs in Women of Old Villages

Period	Births	Total CS		Gravidity	Indications of EmCS					
		No	%	Primi	FD	CPD	PCS	Abn Present	NPOL	Others
				Multi						
1987-1990	499	24	4.8	P	7	4	-	2	1	-
				M	4	-	1	2	-	1
1990-1993	6.36	28	4.4	P	6	5	-	1	2	1
				M	7	-	3	1	1	1
1993-1996	761	44	5.7	P	12	6	-	3	1	-
				M	7	-	5	1	-	1
1996-1999	784	58	7.3	P	11	6	-	3	4	1
				M	9	-	9	2	1	2
1999-2002	864	62	7.1	P	16	7	-	4	3	1
				M	8	1	9	3	1	1
2002-2005	820	64	9	P	13	7	-	4	4	2
				M	14	-	10	3	-	2
2005-2008	928	92	9.8	P	22	5	-	6	5	3
				M	10	-	15	2	-	1
2008-2011	956	111	11.6	P	31	11	-	10	8	4
				M	16	-	23	3	3	2
Total	6248	483	7.7	P	118	51	-	33	28	12
				M	75	1	75	17	6	11

FD-Fetal distress, CPD-Cephalopelvic disproportion, PCS-Previous Caesarean Section, Abn Prest-Abnormal presentation, NPOL-Non progress of labour, P-Primigravida, M-Multigravida.

*Indications do not add up to the number of CS as some subjects had more than one indication.

Table 4: Indications of Cs in Women of New Villages

Period	Birth	Total CS		Gravidity	Indication of EmCS					
		No	%	Primi	FD	CPD	PCS	Abn Present	NPOL	OTHERS
				Multi						
1996-1999	580	7	1.2	P	3	1	-	1	1	-
				M	1	-	1	1	-	-
1999-2002	684	18	2.6	P	6	3	-	2	1	1
				M	2	-	4	1	2	1
2002-2005	702	28	3.9	P	8	2	-	2	1	2
				M	5	1	6	2	-	-
2005-2008	789	40	5	P	8	4	-	3	2	2
				M	6	-	8	2	2	-
2008-2011	824	45	5.4	P	11	6	-	4	3	2
				M	6	-	9	3	-	1
Total	3579	138	18.1	P	36	16	-	12	8	7
				M	20	1	28	9	4	2

FD-Fetal Distress, CPD-Cephalopelvic disproportion, PCS-Previous Caesarean Section, Abn Prest-Abnormal presentation, NPOL-Non progress of labour, P-Primigravida, M-Multigravida.

*Indications do not add up to the number of CS as some subjects had more than one indication.

2.09% in non-progress of labour and 1.28% for other indications between 1987-1990 to 2008-2011.

There has been fall in perinatal mortality rate (PMR) from 62 between 1987 - 1990 to 26 in 2008-2011 in old

villages and from 42 between 1996-1999 to 23 in 2008-2011 in new villages.

In true sense pregnancy labour, birth related deaths have been eliminated in the last 20 years in old villages, 15 years in new villages and no one had severe illness, which could cause permanent disability amongst these 9827 women. However there have been three unrelated maternal deaths, one due to anaemia with sickle cell disease, a suicide and a murder.

Demographic analysis of these women showed, the mean age 23.2 ± 3.12 years and 23.2 ± 1.14 years in the old and new villages respectively. The mean gravidity of women included in the study was 1.33 ± 0.82 & 1.03 ± 0.32 . The mean gestational age in old and new villages was 37.27 ± 1.53 & 36.27 ± 0.32 weeks respectively. Mean baby weight of babies of old villages was 2348 ± 308 grams and new villages was 2216 ± 218 grams. However this part of data needs to be interpreted cautiously, because of limitations due to non-availability or incomplete records and dependability of the information provided by the women or relatives in some cases.

DISCUSSION

In developing countries including India, information about community based CSR is scarce. Although unevenly distributed, 15% of births worldwide occur by CS [9]. Studies reported are institution based which are affected by practices in western world. But women from rural communities who use institutions specially for emergencies also get affected. Increase in CSR in developed countries is largely due to fear of litigation, for health insurance, increased electronic monitoring, breech presentation, CS by choice and many other such indications [10]. There is ripple effect and the rates have risen in developing countries also, where women do not get the autonomy of decision and the health personnel play the key role [11]. According to a study conducted in three regions of China the upsurge in rates of births by caesarean section could not be fully explained by increase in institutional births alone, but is likely to be driven by medical practice within secondary-level hospitals and women's demand for the procedure [12]. The indications of CS still continue to be more often emergencies. Emergency caesarean births (CB) are associated with increased chances of stillbirths, neonatal deaths, severe neonatal morbidity including, asphyxia and sepsis [7]. CS has short and long term effects on the mother as well as the baby. Emergency CS carries greater risks regarding maternal

complications compared to elective procedures [13]. Decision of primary CS is important as it affects future decisions, and there is less enthusiasm for vaginal birth after caesarean section (VBAC). Recurrent CS, scar rupture, hysterectomy, maternal and foetal neonatal deaths are some of the future risks. CS has risk of placenta previa and accreta in subsequent pregnancies and significant cost implications also [14]. In a prospective study by Chattopadhyay *et al.* [15] placenta praevia complicated 2.54% of cases with a previous caesarean section compared with 0.44% of cases with no scar, a 5-fold increase. In patients with placenta praevia occurring with a previous scar, 18 were complicated by placenta accreta (38.2%) compared with only 8 (4.5%) in unscarred uteri. After one caesarean section, placenta praevia was complicated by accreta in 10% of cases and after two or more this was 59.2%. The risk of hysterectomy with placenta praevia and uterine scar was 10% but with placenta praevia accreta it was 66%. For the last 30 years there has been a public concern about increasing CSR. In general CSR of 29.1% has been reported from USA [16], 21.5% in England [17] and 40% for Latin American countries [18]. Between 1998 to 2008, the CSR in New South Wales, Australia increased from 19.1 to 29.5 per 100 births, giving an overall rate of 25.4% [19], lower than USA [20]. In China, the population based CSR increased from 4.9% in 1993-1994 to 20.4% in 2001-2002 [21]. Klemetti *et al.* [21] reported that the CS rate increased from 1% in 1991 to 17% in 2002 in rural China. However, in Sweden, Denmark and Netherlands, the overall CSRs are still close to 10% with world's lowest maternal mortality and PMR. The reasons for the dramatic increase in CSRs are somewhat complex. Efforts to reduce the CSRs need to be focused on reducing the primary CSR which affect the future. Indian reports of CS are mostly hospital based with scarce population based studies. Institution's practices with all its sequelae affect women with low resources. In an urban population based study from Chennai, India, high CSR of 32.6 % has been reported [22]. National family health survey in India has revealed that, Goa & Kerala are the two states with relatively higher CSR, 15.3% & 13.7% respectively [23]. Both states have high female literacy and better economy. These issues need to be further researched in communities with low resources.

In the present rural community based study 58.6% of all CS in villages being served since around 25 years (old) & 52.2% of all in villages being served since around 15 years (New) were in primigravida, with all

the possibilities for future CS. There was an increase in the CSR for repeat CS from 4.1 % of all CS between 1987 - 90 to 20.7% between 2008 - 2011 in old villages and from 14% to 20% between 1996 - 1999 to 2008 - 2011 respectively in new villages. Obviously advocacy of rational approach is essential while doing primary CS.

Present study is rural community based with mission of service. Basic antenatal services and advocacy for intranatal & post birth care are being provided by nurse midwives based at the institution. Families and communities are being made aware about emergencies with advocacy of preparedness for birth, emergency transfer. Out of total the 9827 births, 621 (6.32%) were CB, 189 (30.44%) elective and 432 (69.56%) emergency. Foetal distress remained the leading indication of CB throughout. It is known foetal distress is too broad a indication and vague to be applied with any precision to clinical situations [24]. There remains a lot of uncertainty about the diagnosis based on interpretation of foetal heart patterns. Assessments are subjective clinical judgments, subject to imperfection [25]. Barber *et al.* [26] reported that primary caesarean births accounted for 50% of the increasing caesarean rate. Among primary caesareans, more subjective indications (non reassuring fetal status and arrest of dilation) contributed larger proportions than more objective indications (mal presentation, maternal-fetal, and obstetric conditions). It has been advocated that the CS for foetal distress should be audited carefully [27]. In the present study foetal distress was an increasingly recorded indication on the discharge paper and / or told to the women. In this part women are told that baby's heart rate is not satisfactory, so CS is needed to which they always agree. This is the usual practice in this part.

Present study revealed that, while there has been change in the place of birth, with increase in hospital deliveries, some women still deliver at home. There has been more increase in CSR in the recent past, parallel to changing trends of the CSR at the institution, but proportionate change in PMR is not there. Also changing trends of indications of CS were observed. Hypertensive disorders of pregnancy accounted for 6.23% of all CS between 1987-1990 to 10.2% of all CS between 2008 - 2011.

Earlier Alten *et al.* [26] reported a CSR of 1.4%, 0.4% among low risk population in the Netherlands. The relatively low obstetric interventions were related to the fact that responsibility of normal pregnant women

was under the personnel who were unable to intervene in the sequence of events. Those women who seek higher facilities are exposed to high technology more often. Technology does affect their management with more of operative deliveries and probably the same thing is happening here also. In the old villages which are being exposed to institution, CSR increased more than double, in new villages with recent exposure to various health facilities it was more than 4 times.

Further 12% CS were for failure of progress, where missed cephalo-pelvic disproportion and malposition were the final causes of nonprogress of labour recorded. Trends of foetal distress, NPOL as indications of CS increased over the years and many CS have been performed in emergency. However there has been a progressive decrease in the emergency CS, from 75% between 1987 - 1990 to 58% between 2008 - 2011 in old villages and from 86% in 1996 - 1999 to 73% in 2008 - 2011 in new villages (insignificant difference, p value: 0.34), with a proportionate increase in the elective CS, main indication in such CS being previous CS which also carries serious risk for mother & child, present & future [14].

The perinatal deaths have decreased significantly, PMR was 62 between 1987 -1990 and 26 in 2008 - 2011 in old villages and 42 between 1996 - 1999 to 23 in 2008 - 2011 in new villages but the rise in the CSR to 11.6% in old & 5.4% in new villages, in recent past was disproportionate. Old villages are near the institute. Women have been using the institute more often, but new villages are little away, having townships around, with CS facilities available. All women's pregnancy outcome, place of birth are recorded during regular field visits. All the records irrespective of place, mode, and outcome of pregnancy were analysed for the present study. There has been no direct pregnancy, birth related maternal death or major residual morbidity in this small rural population with 9827 births, though three maternal deaths did occur, one each due to sickle cell disease, murder and suicide. There was disproportionate increase in CS, parallel to institute's CSR without proportionate change in PMR.

WHO [29] & others [30] report no additional health benefits associated with CSR above 10 - 15%. Our population based figures are lower (6.32%), but increase in trends without proportionate change in pregnancy outcome in these rural women is worrisome. The risk/benefit ratio needs to be assessed.

Increased CSR cannot be explained by maternal or pregnancy characteristics, but seem to be related to clinical practice. Increasing number of institutional deliveries, as well as the defensive practices by obstetricians at institution. Nippita *et al.* [31] report that differences in clinical practice were substantial contributors to variation in intrapartum CS rates. Their findings suggest that CS rates in some hospitals could be lowered without adversely affecting pregnancy outcomes. Many countries have recognized high CSR as a major public health problem and are trying measures to reduce it. Proper evaluation and management play key role in decision making and prevent unnecessary interventions. The problems in rural settings are emergency transfer and timely intervention, which do affect the intervention. Periodic audit is essential with medical audit of labour records at the health facilities as well as amongst community. In a data obtained from 137 countries accounting for 95 % of global births for that year countries with CS rates below 10% were considered to show underuse, while countries with rates above 15 % were considered to show overuse. Worldwide, CS that are possibly medically unnecessary appear to command a disproportionate share of global enomic resources. CS arguably function as a barrier to universal coverage with necessary health services. 'Excess' CS can therefore have important negative implications for health equity both within and across countries [32].

Limitations of Study

Though the records of all the women of the villages were collected during regular visits going on over the years, the nurse midwives recorded what the women said in some cases where documented records were not available either because they were lost or never collected. Sometimes the records were incomplete and information was from women.

DISCLOSURE OF INTEREST

The authors report no conflicts of interest. No funding has been taken for the study.

DETAILS OF ETHICS APPROVAL

Approval from the ethics committee at the institution has been taken.

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