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Caesarean Section rates in South Asian cities: Can midwifery help stem the rise?

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Abstract

Introduction: Caesarean section (CS) is a life-saving surgical intervention for delivering a baby when complications arise in childbirth. World Health Organization recommends a rate of CS from 10% to 15%. However, CS rates increased steadily in recent decades and have almost doubled from 12.1% in 2000 to 21.1% in 2015. Therefore, this has become a global public health problem. The main purpose of the scoping review article is to give an overview and analysis of the rising CS use in four South Asian countries: Bangladesh, India, Nepal and Pakistan.

Methods: A scoping review was carried-out using several bibliographic electronic databases (MEDLINE, EMBASE, SCOPUS, CINAHL and Web of Science), organizational websites and open access journal databases. Literature was searched from December 2011 to December 2018 for articles reporting hospital-based CS rates. Inclusion criteria were primary studies conducted in institutional setting in Bangladesh, India, Nepal and Pakistan and published in the English language.

Results: We have included 43 studies. Together these studies show that the rate of CS is increasing in all four countries: Nepal, Bangladesh, Pakistan and India. However, this is uneven with very low rates in rural and very high rates in urban settings, the co-existence of ‘Too Little Too Late & Too Much Too Soon’. Hospital based studies have shown that the CS rate is higher in urban and private hospitals. Age, education and socio-economic status of women, urban residence and distance from health facility are associated with CSs. CS is higher among highly educated affluent urban women in private hospitals in South Asian Countries.

Conclusion: Rising CS rates in South Asian cities, particularly in specific groups of women, present a challenge to hospital staff and managers and policy-makers. The challenge is to avoid ‘Too Much Too Soon’ in otherwise healthy urban women and avoid ‘Too Little Too Late’ in women living in remote and rural area and in poor urban women.

Keywords: *Caesarean Section, South Asia, Scoping review, midwifery*

Introduction

Caesarean section (CS) is a surgical procedure which is performed to reduce the risk of mortality or morbidity in the mother and foetus. The World Health Organization (WHO) recommends a CS rate of 10 to 15%, irrespective of geographical region, because, from a health point of view, there is no justification to have a rate of CS higher than this.¹ Experts emphasize that, because of the risks associated with it, CS should be performed only based on medical indications^{2–5}. In spite of this, CSs are regularly carried out without clear medical indications.⁵ At a population level, a rate of CS higher than 10-15% is not associated with a reduction in maternal and new-born mortality rate.² Nevertheless, it is advanced obstetric care which has been gaining popularity in the modern world particularly in urban settings.³⁻⁷

On the one hand, a huge rise in CS use, often for non-medical reasons, is harmful for both mother and baby. On the other hand, inadequate access to CS in most low-income countries and several middle-income countries is a major health issue. Underuse of CS (<

10%) leads to perinatal morbidity and mortality.²⁻⁷ Thus, the WHO statement on caesarean section rates emphasises that CS should be undertaken when medically essential, rather than striving to attain a specific rate and every effort should be focused on providing CS to all women in need.²

Health and social problems associated with Caesarean Birth

CS is a lifesaving intervention, when medically indicated for specific complications during childbirth. However, the WHO states that CS can cause significant or permanent complications, death and disability especially in setting where the infra-structure is not well-developed and material resources are short.²

The Lancet series (2018) on optimising caesarean section use has emphasized the significance of increased understanding of short-term and long-term health effects of CS on women and children.⁹ These include severe maternal outcomes of CS such as admission to intensive care units, severe haemorrhage/ blood transfusion, hysterectomy, complications associated with anaesthesia, obstetric shock, thromboembolism, major puerperal infection, cardiac failure, acute renal failure, in-hospital wound disruption, intubation and haematoma.⁹ High rates of CS are positively associated with postpartum antibiotic treatment and severe maternal morbidity and mortality.⁴

There are many adverse outcomes for women after CS in subsequent pregnancies, which is particularly significant in areas with limited access to emergency obstetric care. These include increased risk of abnormal placentation (placenta previa), hysterectomy, uterine rupture, ectopic pregnancy, stillbirth, preterm birth and miscarriage.^{9,10-15} Multiple CS birth increases the risk of severe maternal morbidity in subsequent pregnancies.¹⁰⁻¹¹ Although there are some benefits of CS identified, such as less frequency of urinary incontinence and urogenital prolapse, multiple CSs can cause undesirable long-term health effects such as pelvic adhesions, small bowel obstruction, menorrhagia, dysmenorrhoea, sexual dysfunction, chronic pain and subfertility.^{9,12,14} Furthermore, a study revealed that CS can have negative effects on the quality of life of primiparous women.¹⁵

In addition to negative maternal outcomes, infants born by CS incur adverse health outcomes due to exposure to a different medical, hormonal, bacterial and physical environment as compared to infants born vaginally. The *Lancet* series (2018) has highlighted many short-term health risks for children born by a caesarean birth, such as allergy, atopy, asthma, alteration of immune development and reduced intestinal gut microbiome diversity.⁹

Children born by CS are more prone to several chronic health conditions such as leukaemia, bowel diseases, juvenile arthritis, asthma, systematic connective tissue disorders and inflammatory immune deficiencies.¹⁶ Additionally, CS is negatively associated with successful breast feeding initiation.¹⁷ A study reported that infants born by elective CS had significantly higher rates of mortality, respiratory morbidity and risk of special care admission as compared to planned vaginal delivery.¹⁸ Similarly, other studies showed associations with childhood obesity,^{12,19} asthma¹² and type 1 diabetes²⁰.

Global rising of Caesarean Section Rate

The rate of CS has risen steadily worldwide, and has now reached unprecedented levels.³⁻⁷ Betran et al. (2016) reported the rising global CS rate with 12.4% increase from 1990 (6.7%) to 2014(19.1%) with the highest CS rate being in the Caribbean (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25.0%), Asia (19.1%) and the lowest in Africa (7.3%).⁶ *The Lancet* series (2018) highlighted the global rising trend of CS rate of 21.1% in 2015 (29.7 million births), which was almost double that of 2000 (12.1%, 16.0 million births). According to this report, the CS rate was the highest in Latin America and the Caribbean (44.3%) and lowest in West and Central Africa (4.1%).⁷

CS utilisation was higher among rich and educated women.⁷ Huge inequality in use of CS exists between, within countries and higher and lower resources settings.³⁻⁷ CSs was very low in South Sudan (0.6%) and very high in the Dominican Republic (58.1%).⁷ Out of 169 countries, CS rate was still less than 10% in 47 countries with women are struggling to receive lifesaving emergency obstetric care. The wide variations in use of CS between high-income and middle/low-income countries as well as urban and rural settings exist. The rising rate of CS world-wide has become an alarming issue in public health.³⁻⁷ In the growing economies of South Asia, the number of hospitals and especially private ones is growing rapidly and therefore, the risk of increased CS birth. This scoping review aims to highlight the prevalence of CS in Bangladesh, India, Nepal and Pakistan.

Methods

A scoping review of the published literature of CS rates was carried-out using bibliographic electronic databases such as MEDLINE, EMBASE, SCOPUS, CINAHL and Web of Science. In addition, organizational websites such as WHO, and open access journal databases such as Nepal journals on-line (NepJOL) and Bangladesh journals on-line (BanglaJOL) were also searched. Databases were searched from January 2011 to December

2018 especially for articles reporting hospital-based CS rates. Inclusion criteria were primary studies reporting the CS rates, conducted in institutional setting in Bangladesh, India, Nepal and Pakistan and published in English language. Mesh terms and Key words for ‘caesarean’; ‘cesarean’; C-section’ was combined with the specific country using Boolean operators (and/or). Titles and abstracts of the identified citations were initially scanned for the rates of caesarean sections to assess eligibility. Full text articles of eligible studies were appraised, and relevant data was extracted, and proportions of C- sections were reported. Articles highlighting the issues around the increase in CSs and the potential reasons were also included, and a simple content analysis was conducted.²¹

Results

We initially found 1518 primary studies but most articles were on obstetric issues and only mentioned CS as a cause or consequence. After scanning of titles and abstracts we included 43 papers, five were from Bangladesh, 18 from India, 12 from Nepal, and eight were from Pakistan. Most prevalence studies were retrospective studies of hospital records. The results showed that the CS is steadily rising in all four South Asian countries (especially in urban settings).^{6,13-15} However, as in Africa, there is a huge inequality in access to CS use between rich and poor women.²² CS use is higher among highly educated urban women in private hospitals in South Asian Countries.²³ There are concerns about the rising rate of CS with wide variation between urban and rural, private and public hospital, and with no evidence of associated reductions in morbidities or mortalities.

Rising Caesarean Section Rate in Bangladesh

Caesarian sections have become increasingly common in Bangladesh (Table 1) and have increased alarmingly in recent decades. Despite the rising trend of institutional births from 23% in 2010 to 47% in 2016, maternal deaths are still as high as 194 per 100,000 live births.²⁴ In Bangladesh, CS rate increased from 3.5% in 2004 to 23.0% in 2014 with wide variation in access to CS use between urban (40%) and rural women (18.7%).²⁵ Among women, older age and high educational status;²⁵⁻²⁸ residing in urban area and obesity;^{25,26} high socio-economic status;^{25,27} access to antenatal care^{25,26,28} and birth order^{25,27} were found to be associated with CS delivery.

Table 1: CS rates in hospital-based studies in Bangladesh

Authors & year	Hospitals in Bangladesh	CS rate (%)
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Nazneen et al., 2011 ²⁹	Holy Family Red Crescent Medical Collage Hospital, Dhaka	70.55*
Aminu et al., 2014 ³⁰	Five Rural Public Hospitals, Thakurgoan Districts	21.2 ⁺
Husan et al., 2015 ³¹	Four Hospitals, Rajshahi City	77.3*
Islam et al., 2015 ³²	Six Hospitals, Narsingdi	32.3 [#]
Ara et al. 2018 ³³	Combined Military Hospital (CMH), Savar, Dhaka	70.3*

*Urban hospital; # semi-urban hospital; + rural hospital

Rising Caesarean Section Rate in India

CS rates are steadily increasing in India with 2.9% in 1992/93, 7.1% in 1998/99, 8.5% in 2005/6 and 17.2% in 2015/16.³⁴ Similar to other South Asian countries, there was disparity in CS rate between urban and rural areas as well as different states of India. In 2015/16, CS rate was 12.9% in rural India as compared to 28.3% in urban areas. The lowest CS rate was in Nagaland (5.8%) and the highest rate in Telangana (58.0%). CS rate was high in Andhra Pradesh (40.1%), Kerala (35.8%), Tamil Nadu (34.1%), Jammu & Kashmir (33.1%) and Goa (31.1%). The proportion of institutional birth has increased from 38.7% in 2005/06 to 78.9% in 2015/16.³⁴ It is also worth noting that the CS rate has increased from 26.6% in 2007/08 to 40.7% in 2010/11 in the state of Madhya Pradesh in India, where the National Janani Swastha Yojana (YSY) scheme was implemented. YSY is a conditional cash transfer paid to the mother when they present to deliver their baby in a health facility.³⁵ Interestingly, in 2003, Sreevidya and Sathuyasekaran reported a high CS rate (32.6%) in urban India with higher CS rate in the private sector (47%) as compared to charitable (38%) and public (20%).³⁶ That trend has continued, with increased CS rate in private hospitals from 27.7% in 2005/6 to 40.9% in 2015/16 but it declined in public hospitals from 15.2% in 2005/6 to 11.9% in 2015/16.³⁶ Similarly, Mittal and colleagues also reported a rising trend of CS rate in tertiary care hospital in Western India where CS rate has increased from 69.03% in 2001 to 72.62% in 2011.³⁷ Age and education of mother, parity, previous history of CS and distance from the health facility were found to be important determinants of CS.³⁸ Furthermore, hospital-based studies stress the rise of CS rate in India (Table 2).

Table 2: CS rates in hospital-based studies in India

Authors & year	Hospitals in India	CS rate (%)
Padamleela et	Government Teaching Hospital, Andra Pradesh	31*

al.,2013 ³⁹		
Santhanalakshmi et al., 2014 ⁴⁰	Karpaga Vinayaga Inst Med Sciences, Kancheepura	12.5 [#]
Bade et al.,2014 ⁴¹	Government Medical College, Latpur	23.97 [#]
Yadav RG, 2015 ⁴²	Baroda Medical Collage, Vadadara	25.17 [#]
Nikhil et al., 2015 ⁴³	GMERS Medical College, Ahmedabad	25.18*
Subhashini et al., 2015 ⁴⁴	Adhra Medical Colleage, Andra Pradesh	25.66*
Yadav et al., 2016 ⁴⁵	MMIMSR Mullana, Haryana	21.60 [#]
Sarma et al., 2016 ⁴⁶	Tezpur Medical Colleage & Hospital, Assam	27.60*
Saxena et al., 2016 ⁴⁷	Shri Guru Ram Rai Inst Med & Health Sci, Dehradun	31.18*
Jawa et al., 2016 ⁴⁸	Mahatma Gandhi Medical Sciences & hospital, Jaipur	31.80*
Das et al., 2016 ⁴⁹	NEIGRIHMS, Shillong	33.1*
Preetkamal et al., 2017 ⁵⁰	Sri Guru Das Inst Med Sci Research, Punjab	33.2*
Chavada et al., 2017 ⁵¹	P. D. U Medical Colleage, Gujrat	19.9 [#]
Gupta et al., 2017 ⁵²	RUSH Colleage of Medical Sciences, Jaipur	31.46*
Bala et al., 2017 ⁵³	JK Ion Hospital & Medical Colleage, Kota	39.6*
Kaul et al., 2017 ⁵⁴	Defence Zonal hospital, Varanasi	45.5*
Banergee et al.,2018 ⁵⁵	Silchar Medical Collage, Assam	34.1*
Das et al.,2018 ⁵⁶	IMS& SUM Medical Colleage, Odisha	34.45*

*Urban hospital; # semi-urban hospital; + rural hospital

Rising Caesarean Section Rate in Nepal

The prevalence of CS increased more than four times from 2001 to 2011 in Nepal.⁵⁷ Similarly, the rate of CS was 4.6% in 2011,⁵⁸ 8.6% in 2014⁵⁹ and 9.0% in 2016.⁶⁰ However, there is wide inequality in access to CS between urban and rural women. Studies have reported that CS rate is significantly higher (12-19%) in urban areas than in rural Nepal (3.5-7.1%).⁵⁷⁻⁶⁰ Additionally, the most recent Nepal Demographic and Health Survey (2016) discovered that CS rate is substantially higher in private hospitals (35.5%) than public hospitals (12.5%).⁵⁹ Some studies showed that older women, women with good education, residing in city and rich women are more likely to undergo CS delivery.⁵⁷⁻⁵⁸ The Government of Nepal has been promoting safe motherhood through initiatives such as offering free

delivery care and transportation incentive schemes to women who give birth in hospital. The percentage of institutional birth has increased from 35% in 2011 to 57% in 2016.⁶⁰ The growing trend of birth in hospital is contributing to rising rate of CS in Nepal.⁷ Amatay et al reported an increase in CS rates at Tribhuvan University Teaching hospital from 16.6% in 2005 to 25.4% in 2009.⁶¹ Furthermore, individual hospital-based studies on CS in different hospitals in Nepal show the rising CS rate (Table 3).

Table 3: CS rates in hospital-based studies in Nepal

Authors & year	Hospitals in Nepal	CS rate (%)
Chhetri et al., 2011 ⁶²	B P Koirala Health Science Teaching Hospital, Dharan	33.7*
Subedi, 2012 ⁶³	Nobel Medical College, Biratnagar	19.89*
Suwal et al., 2013 ⁶⁴	Nepal Medical College Hospital, Kathmandu	22.30*
Amatya et al., 2014 ⁶⁵	Khadbari District Hospital, Sankhuwasabha	18.5 [#]
Pradhan et al., 2014 ⁶⁶	Kirtipur Hospital, Kirtipur	50.9*
Pradhan et al., 2015 ⁶⁷	Patan hospital, Lalitpur	41.9*
Samdal et al., 2016 ⁶⁸	Okhaldunga Community Hospital, Okhaldunga	9.5+
Singh et al., 2017 ⁶⁹	Western Regional Hospital, Pokhara	25*
Prasad et al., 2017 ⁷⁰	Kathmandu Medical College Teaching hospital	48.81*
Dhakalet al., 2018 ⁷¹	Mid-Western Regional Hospital, Surkhet	18.9 [#]
Vaidya Malla et al., 2018 ⁷²	Nepalese Army Shree Birendra Hospital, Kathmandu	22.57*
Chaudhary et al., 2018 ⁷³	Paschimanchal Community hospital, Pokhara	63.2*

*Urban hospital; [#] semi-urban hospital; ⁺ rural hospital

Rising Caesarean Section Rate in Pakistan

Similar trends and inequalities of CS rates are observed in Pakistan, where the CS rate increased from 2.7% in 1990–'91 to 15.8% in 2012–'13 with a big difference between urban (25.6%) and rural (11.5%) as well as the poorest (5.5%) and the richest (35.3%).⁷⁴ Similarly, highly educated women (40.3%) are more likely to have access to CS delivery than non-

educated women (7.7%).⁷⁴ Hospitals based studies reflect rising CS rate in Pakistan (Table 4).

Table 4: CS rates in hospital-based studies in Pakistan

Authors & year	Hospitals in Pakistan	CS rate (%)
Karim et al., 2011 ⁷⁵	Civil hospital & Dow university health science, Karachi	27.94*
Jabeen et al., 2013 ⁷⁶	CMH. Rawalpindi	56*
Hafeez et al., 2014 ⁷⁷	Sharif Medical & Dental collage, Lahore	21.4 [#]
Bano et al., 2015 ⁷⁸	Aga Khan Hospital for women, Karachi	31.26*
Baig et al., 2016 ⁷⁹	CMH, Hyderabad	41.96*
Latif et al., 2017 ⁸⁰	Nawas Sharif Social Security hospital, Lahore	81%*
Naeem et al., 2018 ⁸¹	Government Sardar Begam Hospital, Sialkot	40%*
Tahir et al., 2018 ⁸²	Combined Military hospital, Abbottabad	46.7%*

*Urban hospital; [#] semi-urban hospital; ⁺ rural hospital

There are wide variations also in the CS rates across South Asia, comparing urban and rural populations/hospitals. The private health providers/hospitals may be partly influencing the rise of CS rate in South Asian countries.²³ The rising rates in the cities are possibly linked to ‘unnecessary intervention of CS. However, the actual reasons behind this and the wide variations reported across facilities are unclear.

Discussion

The data presented above show a range of CS rates within each country and with a trend of increases over time. There are a range of possible explanations as listed in the next section.

Reasons of Caesarean Section

There are many medical and non-medical reasons for performing CS delivery. In South Asian countries, the most common indications of CS are foetal distress^{33,39,40,42-47,49,50,52-56,62-64,66,67,75,76,78-81}, foetal malpresentation/malposition^{29-32,39,40,42-44,46,47,49-56,62,63,65-}

73,75,76,78-81, previous CS^{29-31,39,40,42-56,62-64,65,73,75-78}, non-progressing labour/prolong/obstructed labour^{29-33,40,42,44-50,51,54,56,62-67,68-73,75-81}, failed induction^{29,30,42,44-46,50,52,64-72,75,79,80}, cephalo-pelvic disproportion (CPD)^{39,30,39,40,42,43,44,47,49,40,52-56,62,63,65,66,68,70,72,73,75,78}, pregnancy induced hypertensive disorder including pre-eclampsia/eclampsia^{29-31,40,42,44,45,47,49,50,56,63,72,78-81}, and oligohydramnios^{30,31,40,42,43,47,49,50,56,65,66,69,70,72,73,75}.

There are several other indicators for CS which are noteworthy such as antepartum haemorrhage^{29,31,33,40,42,45,50,53,63,69,71,75,78}, multiple pregnancy^{39,40,49,52-56,62,63,69,70,72}, intra uterine growth retardation (IUGR)^{39,40,43,44,46,49,51,56,75}, placenta previa/abruptio^{29,31,33,44,49,72,73,81}, postdate pregnancy^{30,31,43,46,47,53}, meconium stained liquor^{32,62,65,67,70,71}, bad obstetric history/complicating pregnancy^{39,47,53,56,69,72,81} and big baby^{33,43,44,52,56}. Similarly, some studies show premature rupture of membrane (PROM)^{30,31,68}, cord prolapse^{33,66}, chorio-amnionitis^{79,80}, cervical dystocia^{32,33}, obesity³³, previous traumatic delivery⁶⁸ and congenital malformation as causes for CS.⁵²

Most importantly, some studies have highlighted that CSs are performed for non-medical indications such as demand of women and family.^{39,43,53,56,63,66,75,79-} Some of the demand for CSs are due to either bad obstetric history or precious pregnancy due to the subfertility.^{39,75,79,80}⁸¹ This trend is increasing in South Asia.

The role of midwifery in keeping childbirth normal

There is international consensus that midwifery care is the most cost effective way of supporting normal childbirth. Midwives are trained to use minimal intervention but to refer timely when complications arise. Midwifery care can decrease maternal and new-born mortality in low and lower-middle income countries.⁸³,⁸⁴ To ensure positive maternal and newborn health outcomes, high quality intrapartum care, especially through the promotion of spontaneous vaginal births with a minimum of medico-technical interventions is central.^{85,86} The outcome of the care for women and newborns around the time of birth in health facilities reflects the evidence-based practices used and the overall quality of services provided. The quality of care during childbirth in health facilities depends on the physical infrastructure, human resources, knowledge, skills and capacity to deal with both normal pregnancies and complications that require prompt, life-saving interventions.⁸⁷ There is evidence to suggest that midwives who work in the communities in which they live and are known are most effective at delivering effective care.⁸⁸

Combating 'Too little, too late' (TLTL) and 'Too much too soon' (TMTS)

TLTL refers to lack of resources, low standard of quality of care/services and unavailability of care until too late. TMTS describes the over use of emergency obstetric care as well as unnecessary use of non-evidence-based intervention and over-medicalisation of normal pregnancy and childbirth.⁸⁹ The rate of CS has been increasing in developing countries with socio-economic disparity.²² Massive inequality exists in access to CS among poor and middle-income developing countries.^{6,7,21} Similarly, there is wide variation in CS rate between rural and urban areas as well as between private and public hospitals.²³ In South Asia, there is a double burden with low numbers of CSs in poor remote rural areas and very high in wealthier urban areas. The former is due to underdeveloped local health systems in remote areas with limited provision of timely and safe CS procedure to save the lives of mother and fetus.²² Provision of adequate access to skilled care is essential in rural areas. In contrast, emergency obstetric care is easily accessible in urban areas. Easily available private facilities (oversupply of hospital beds) and education of women have been suggested as factors for the rising rates of CS in urban settings.²³ Dhakal et al recently highlighted the rising rates of CS in urban Nepal.⁸⁹ Overuse of CS may cause not only severe maternal and foetal outcome but also financial burden to low-income countries and low and middle-income families in those countries.

The rising CS rate in South Asian countries is an alarming public health problem. The issue of growing CS rate in South Asia need to be reduced in effective ways by implementing evidence-based interventions to reduce unnecessary caesarean sections in healthy women. *The Lancet* series (2018) highlights the need for multicomponent and locally tailored interventions which address both women's and professionals' concerns as well as health system and financial factors.⁹⁰ Similarly, same fee for CS and vaginal delivery, comprehensive information on benefits and risk of CS to women, uniform classification system for CS and annual CS rate publication by hospitals are also needed to reduce the high CS rate.⁹¹ Routine information on all aspect of childbirth and adoption of standard classification systems (Robson's 10 groups classification) are needed for comparison and improvement of CS use.⁹²

Conclusion

The CS rates are growing at an alarming rate in urban settings in South Asian countries warranting immediate attention. Further research needs to be conducted to explore the factors/reasons associated with rising CS in urban settings both from the patient's and the health system perspectives. This will help to develop appropriate tailored interventions.

Improving the quality of intrapartum care through midwifery care in health facilities is an important focus in the pursuit to reducing unnecessary CS and end preventable mortality and morbidity among mothers and newborns.

Conflict of Interest

None declared by authors

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