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A Review of Cesarean Section Rates and Associated Factors in Pakistan Using Anderson Health Behavior Model

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Abstract

Background: In Pakistan, proportion of births delivered by Cesarean section has rapidly increased from 3.1% in 1992 to 22.3% in 2017-18. This scoping review was conducted to review available evidence on key underlying determinants of caesarean birth rates in Pakistan using Andersen health behavior model, to control this escalating rate of CS in Pakistan.

Results: We analyzed utilization of CS services as a function of three different types of factors i.e., i) predisposing ii) enabling, iii) need factors. Predisposing factors included older maternal age, higher education of mother, & living in urban areas with few barriers to getting medical care. Among Enabling factors, cost of CS and type of health facility (public or private) are key drivers of a CS delivery. Need factors included user related and provider related factors. User related factors were found to be influenced by previous pregnancy and childbirth experience, fear of birth trauma or complications of vaginal delivery. Provider related factors suggests that private health sector in Pakistan is over medicalizing childbirth through CS for financial gains and indicates mal practicing at the physician's end.

Conclusion: Effective multifaceted targeted response is necessary to reduce unnecessary C-sections in Pakistan. There is need for implementation of universally acceptable standards and audit mechanism without compromising maternal or fetal safety. It is crucial to formulate policies and ensure public health practices to implement proper guidelines, improve training and regulate the conduction of CS in public and private health facilities to reduce burden of CS on healthcare system in Pakistan.

Keywords: C-section; Caesarean section; Anderson model; Surgical delivery

Abbreviations: CI: Confidence Interval; CS: Cesarean Section; EMONC: Emergency Obstetric And. Newborn Care; KP: Khyber Pakhtunkhwa; LHV: Lady Health Visitor; PDHS: Pakistan Demographic and Health Survey; PRISMA: Preferred Reporting Items For Systematic Reviews And Meta-Analyses; RTGCS: Robson's Ten Group Classification System; USD: United States Dollar; WHO: World Health Organization

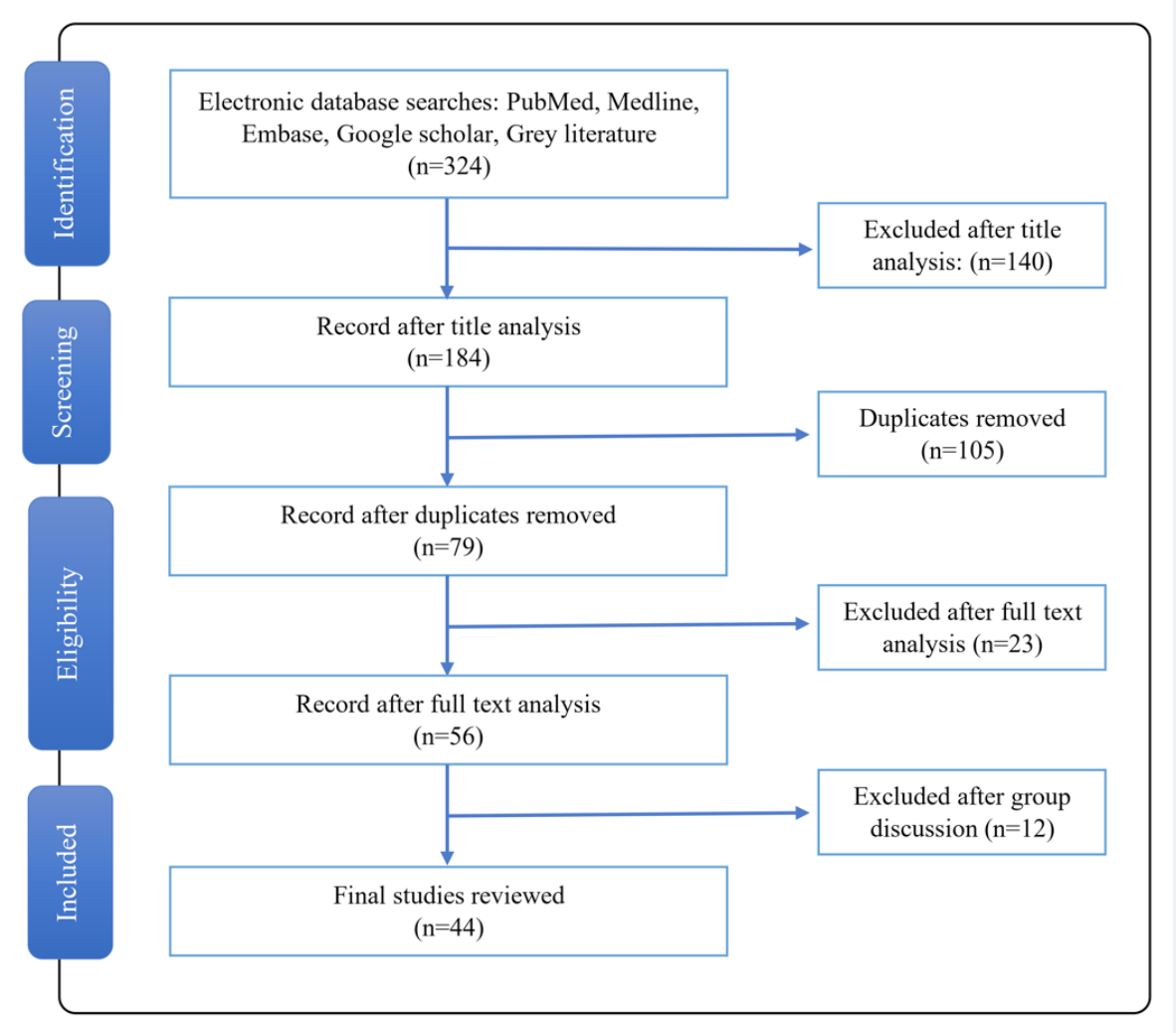
Introduction

Cesarean section (CS) is an important indicator of accessibility to the emergency obstetric care and has contributed significantly in saving maternal and neonatal lives worldwide [1,2]. While availability of cesarean section was intended to ensure safe deliveries, larger concern remains over its overuse and long-term effects on the health of mothers and children [3]. During the last two decades, the increase in caesarean section deliveries has become a matter of serious concern for public health experts globally [4]. The 2018 Lancet series published on the "global cesarean section epidemic" shows that the global rate of caesarean birth has doubled in the past 15 years to 21% and is increasing annually by an astounding 4% [5]. Data from 150 countries shows that the rate of cesarean sections is increasing at an "alarming" rate globally, and 18.6% of all births occur by CS; ranging between 6% in the least to 27.2% in the most developed regions. A high rate of Cesarean section is not always correlated with better maternal-fetal outcomes. Several systematic reviews have shown that although CS can be a truly life-saving procedure, it's also associated with poor outcomes for the mothers as well as the newborn. It is therefore challenging to determine the optimal or adequate rate of caesarean sections in a country [6].

In Pakistan, the proportion of births delivered by Cesarean section is also on a rise. The Pakistan Demographic and Health survey (PDHS) conducted in 2017-18 shows, that nearly 2/3rd of the deliveries are taking place at a health facility [7]. This increase in institutional deliveries is coupled with a substantial rise in caesarean deliveries, which stands at a national prevalence of 22% [8]. To control this escalating rate of CS in Pakistan, there is a need to understand the factors contributing to this increase. Over the years, socioeconomic disparities have influenced the patterns of health services utilization and research has shown that CS rates are being affected by multiple contributing factors prevailing at individual, organizational and cultural levels. While a number of frameworks and health utilization models have been used to describe the patterns of health services utilization, the Andersen health behavior model has been used as a reliable tool to study the utilization of health services as well as understand its associated factors [9]. This model explains how and why people use healthcare services and is used by health policy makers and planners to develop strategies that ensure equitable access to care. This scoping review was conducted to review the available evidence on key underlying determinants of caesarean birth rates in Pakistan using the Andersen health behavior model.

Search Strategy

A scoping review was conducted to explore and map the literature on Caesarean sections in Pakistan. For identification of available peer-reviewed studies, we searched electronic bibliographic databases including PubMed, MEDLINE, Scopus, Web of Science, Google scholar, Directory of Open access journals, Pak Medinet for articles related to caesarian section in Pakistan. We used the terms and keywords including "caesarean section", "c-section", "caesarean delivery" and limited our search to Pakistan. To access unpublished and grey literature, we searched Open Aire as well as individual relevant websites such as Ministry of National Health Services, Regulations and Coordination, Pakistan Bureau of Statistics, WHO, UNFPA, UNICEF and multinational NGOs working on Maternal and Newborn child health in Pakistan.



Flow Chart:

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Results were imported into excel and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used to document study inclusion based on the selection criteria. Title and abstract screening were conducted by two authors following full text analysis by three authors to agree on the final included articles. Following this, all articles had references and citations screened for additional relevant articles. While a total number of 324 articles were found in the initial database search, the final review included 48 research manuscripts. The PRISMA flow chart is given below: (Flow Chart)

Result

Cesarean Section Rates and Trends in Pakistan

The proportion of births delivered by Cesarean section has rapidly increased in the past 5 years, from 3.1% in 1992 to 22.3 % in 2017-18. Figure 1 shows the trends of Cesarean section rates across different region as shown by the PDHS data from 2006-07 to 2017-18. Further analysis of PDHS data shows wide variations across provinces, health facility type and urban rural strata. The highest rates of Cesarean section were reported from Islamabad at 26.6%, while the lowest rates of 2.7% were seen in FATA. Punjab reported a rate of 16.9%, while Sind, KP and Balochistan reported rates of 15.4%, 4.6% and 4.1% respectively. It also shows that the Cesarean section delivery rate is higher for births in private facilities (38%) than in public facilities (25%). Cesarean section deliveries are almost twice as prevalent in urban areas compared with rural areas (32% vs 18%) and almost four times higher in women with higher education (49%) compared to women with no education (11%).

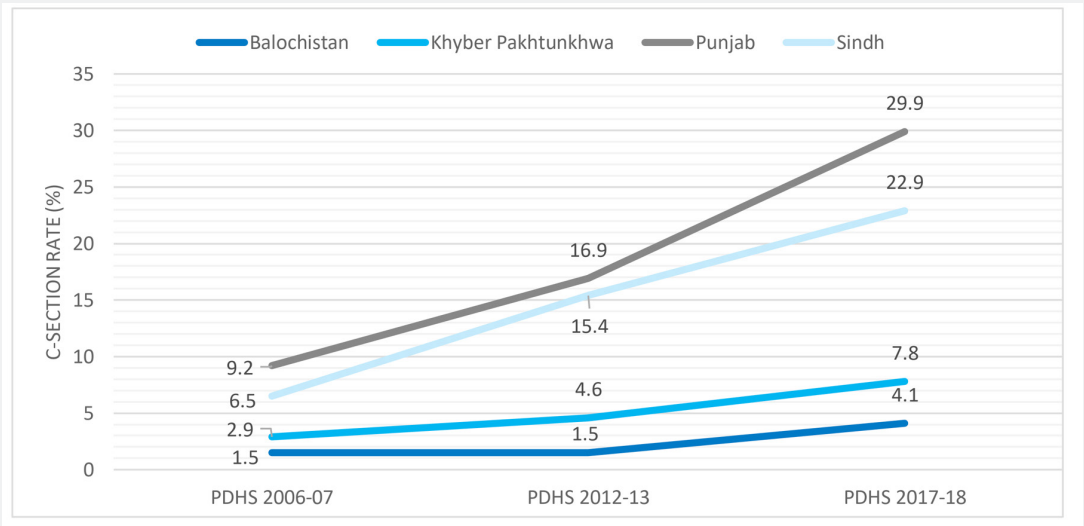

Figure 1: Trends of CS delivery in Pakistan by provinces, 2006-7 to 2017-18.
Source: PDHS 2006 to 2016

Factors Associated with Cesarean Section in Pakistan

As mentioned, we used the Anderson model to understand the factors associated with the growing trends of Cesarean section in Pakistan. The model suggest that health service utilization is influenced by the environment and structural context and is a function of three different types of factors i.e., i) predisposing (demographic and social) factors, ii) enabling (economic) factors, and iii) need (health outcomes) factors [10]. The framework developed using the model is shown in Figure 2.

Pre-Disposing Factors

Predisposing factors include the socio-demographic characteristics of an individual as well as the knowledge and utilization of the health care system based on a person's beliefs.

Socio-Demographic Characteristics

Maternal Age: In Pakistan, the rising trends among women of getting married or conceiving at a later age due to their orientation towards career, educational, financial and other goals tends to increase their chances of undergoing caesarean deliver [11]. When the age at first marriage was 20–25 years, the odds of delivery through Cesarean section were 1.3 times higher compared with those in the 15–19 years, and further increased to 2.6, when age at first marriage was 31–35 years [12,13]. Literature shows, women with older age groups are more likely to have an institutional birth, which increases their chances of having a Cesarean section [14]. Other indicators of need, previous Cesarean section delivery and being told about signs of pregnancy complications during most recent pregnancy, were also associated with higher odds of Cesarean section delivery [12].

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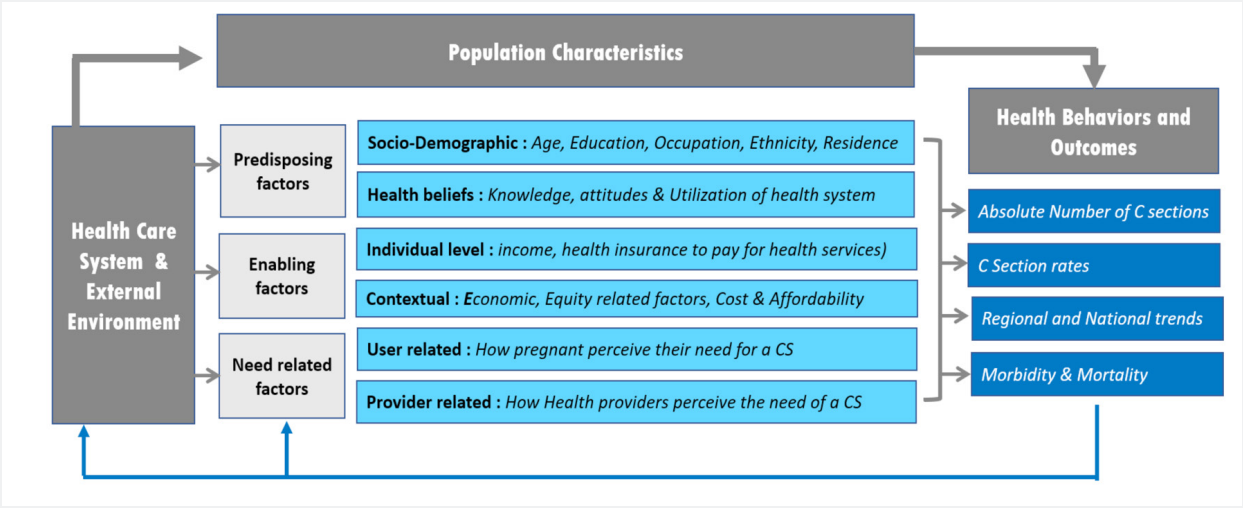

Figure 2: Using the Anderson Health model to understand factors associated with CS.

Maternal Education and Mode of Delivery: Numerous studies point to the positive effect of women's schooling on their maternal health-seeking behavior . Education has been found to have a both direct and indirect effect on women's empowerment, which has a significant relation with maternal health care seeking behavior [15,16]. Serial PDHS data provides evidence that CS rates increase with increasing education of the mother, and the rates have significantly increased over time [17,18].

Geo-Location and the Place of Residence: As mentioned, Punjab shows the highest rates of CS across all other provinces. Further, across all provinces, CS deliveries are almost twice as prevalent in urban areas (32%) compared with rural areas 18%. This review suggests that women in Pakistan who resided in communities where the average woman perceived few barriers to getting medical care were more likely to receive ANC services and deliver at health facilities rather than at home.

Religious and Societal Norms: In most rural areas as well as in parts of urban areas, there is a strong norm of observing 'Pardha' during pregnancy and childbirth. Studies from the neighboring countries also discussed the gender or religious norms related to 'Purdha' that generally restrict women's movement outside the home without veiling herself and should be accompanied by a male family member or an older woman [19-21] "Pardha" may also restrict women from being physically examined by a male doctor, during pregnancy or for childbirth. These factors are important determinants of heath behavior and affect women's ability to utilize a formal health care system and plan their deliveries at facilities eventually raising the odds to a Cesarean section.

Health Beliefs and Cesarean Section: According to the Andersen's Behavioral Model the process of decision making for health utilization is usually influenced by a person's environment, values, personality, knowledge, and insight, which influence each other interactively [22]. Research indicates that cultural beliefs, values and traditions significantly affect individuals' attitudes towards modes of delivery, their definitions of different modes, and the decisions they make in this regard. These "birth stories" are mostly concerned with unpleasant aspects of childbirth, such as physical pain, psychological pressure at the time of delivery, inappropriate midwifery interventions, and emergencies [23]. Cesarean section is still being perceived as an abnormal means of delivery by women in remote areas of Pakistan. In a study which looked at the perceptions of women in the North West of Pakistan showed that only 1.7% of the women interviewed, viewed CS as feasible and elected to undergo CS while 17.6% considered to consent for a CS in a life-threatening situation, whereas nearly half of the women said that they won't accept CS in any circumstances [24]. It is also documented that a significant proportion of antenatal clients are opposed to CS, which is primarily because of the negative cultural perception of people and communities towards CS [25].

Enabling Factors

Enabling factors facilitate the use or non-use and one's perceived or influenced need for care and also facilitate access to services. Enabling factors deserve attention because they explain barriers and facilitators to service use, which in turn can be targets of interventions. Enabling factors include individual/financial and organizational fac¬tors that enable women to access and utilize healthcare services.

Financial Factors and Cesarean Section: The cost factor is shown to be the biggest obstacle for many poor households in accessing maternal health care. A study of costs of vaginal delivery and Caesarean section at a tertiary level public hospital in Islamabad Pakistan reveals that the average cost for a spontaneous vaginal delivery from the patient's perspective was 79 USD in contrast to 204 USD for a CS. The study further reported an average monthly household income of 141 ± 87 USD

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for women undergoing spontaneous vaginal delivery and 168 ± 97 USD for those opting for CS [26]. The financial stability of users and the cost related to cesarean section thus becomes one of the key variables in determining Cesarean section rates [27]. Equity based analysis based on PDHS data from 2013 and 2018 shows that women in the highest wealth quintile are more likely to be delivered by Cesarean section in 2013 as well as in 2018 when compared to women in the lowest quintile. Women of two richest quintiles have 1.65 times more chances of having C section than women from poorest quintile [28].

Organizational Factors and Cesarean Section: Organizational factors include variables such as the human resources, and infrastructure of healthcare organizations. It also includes the health care process, capacity to provide safe caesarean birth and blood transfusion. Various authors have established a strong link between the type of the health care facility (private/ government) and caesarean birth rate [29]. In addition, the governmental commitment, health policies and International stakeholders involvement etc., all have strong influences as enabling factors which drive Cesarean section rates in Pakistan. The capacity of the health system to deliver surgical obstetric care, it's financing structure, and possibly also its human resources profile, have stronger aggregate-level effects on caesarean section rates than does income [30,31]. Despite an elaborate and extensive health infrastructure, the health care delivery in Pakistan suffer from key issues like high population growth, uneven distribution of health professionals, deficient workforce, insufficient funding and limited access to quality health care services. Given the importance of the formal health care system in reducing maternal mortality and morbidity, the state of that system, public and private, is seriously inadequate. A comparison of health man power from 2011-12 to 2016-17 shows that the number of doctors, dentists, nurses and LHVs have all increased as well as per capita availability of human resources has gradually improved [32]. These numbers are outweighed by an uncounted but undoubtedly larger number of private facilities. In Pakistan, the health sector is privatized, including the maternal health care system. PDHS data shows that Cesarean section delivery rate is higher for births in private facilities (38%) than in public facilities (25%) and Cesarean section deliveries are almost twice as prevalent in urban areas [7]. Although it has been shown that access to EmONC services is essential to reducing maternal mortality in Pakistan, but it has been estimated that less than 5% of women with complications recognize the need and are provided with EmONC at the health facility level (unmet need for EmONC) [33]. Uptake of caesarean birth is supply induced and thus strongly dependent on the capacity of healthcare systems to provide safe emergency obstetric services.

Need Factors

The third set of factors associated with CS are the factors which could be related to the need due to medical reasons while at the same time perceived need of the pregnant women. "Perceived or user related need" could also mean how people view their own general health, how they experience symptoms and whether or not they judge their problems to be of sufficient importance to seek professional help. "Evaluated or provider related need" on the other hand represents professional judgment about people's health status and their need for medical intervention.

Perceived or User Related Factors: The cesarean rate has been said to be driven by the interaction between mothers and their providers. A systematic review and meta-analysis of 38 research studies which looked at the women's own preference for caesarean section reported an overall pooled preference for caesarean section of 15.6% (95% CI 12.5–18.9). The decision was found to be strongly influenced by the previous pregnancy and childbirth experience, as a higher preference for caesarean section was reported in women with a previous caesarean section versus women without a previous caesarean section (29.4%; 95% CI 24.4–34.8 versus 10.1%; 95% CI 7.5–13.1) [34]. Similar results have been seen in Pakistan, where women have shown to prefer caesarean section, because of the fear of birth trauma to the newborn, labour pain, or complications of vaginal delivery such as possible fecal or urinary incontinence [35,36]. Another study conducted in Pakistan shows that the intensity of fear of childbirth calculated by W-DEQ amongst pregnant women in the third trimester of pregnancy was relatively high, with a much higher rate of CS in women who have this fear [37]. Dissatisfaction with childbirth is well-documented for cesarean delivery, which can cause postpartum maternal depression and a lesser caretaking approach with their babies within the first five months [38], however such evidence is not readily available in Pakistan. Although there are a few sporadic studies that have tried to examine women's preferences for mode of delivery (36), a systematic and comprehensive exploration of this information is lacking in Pakistan.

Evaluated or Provider Related Factors: The evaluated need represents objective measurement of women's health status, usually determined by the health professional and set a treatment plan. In the private sector of Pakistan, where doctors are responsible for one-to-one care of patients as far as antenatal and delivery care is concerned, doctors mostly have the sole authority to make medical decisions based on patient conditions. There is a whole spectrum of private health facilities which vary in characteristics and quality of care ranging from self-owned one-room maternal clinics to large state-of-the-art private hospitals facilitating child delivery in Pakistan. Utilization of private maternal medical care is very high in Pakistan and women belonging to better socio-economic background are presumed to avail private facilities more due to the affordability factor, which opens up possibility of higher C section rates in these facilities [27,39]. Research shows that about 48 percent of the deliveries are done in health facility, out of which only 14.6 percent are in pubic while the remaining are in private health facilities [40]. Multiple studies shows that C section rates in private hospitals are much higher than in public hospitals, [41] because the nexus of income, education and area of residence that

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somehow explains the decision-making power of women to go for C section without having any medical complication [42,43]. The finding is concerning and suggests that the private health sector in Pakistan is over medicalizing childbirth through CS, which could be attributed to financial gains and indicates mal-practicing at the physicians end [24]. The high rates of Cesarean section in any country could be due to two reasons; either the maternal health care sector is augmenting the Cesarean section rates for financial gains or medically unnecessarily performing it on women's choice. In Pakistan, where a large population is served by private health providers, the former is deemed to be the case. Moreover, the literature suggests that health professional performed Cesarean section due to financial gains or time management indicates mal practicing at the physicians end [44].

Conclusion

Unnecessary Cesarean sections is viewed as a global pandemic, which has significantly grown over the last few years. The share of women undergoing C-section is constantly rising over time globally as well as in Pakistan. Over the past 30 years it has increased in excess of the 10–15% of births considered optimal, without significant maternal or perinatal benefits in Pakistan. Rising CS rates are a major public health concern due to potential maternal and perinatal risks associated with this increase, inequity in access and cost issues.

Our review highlights the existing inequities in the use of caesarean sections. Lack of education, access to facility-based delivery and non-coverage of lowest skilled birth attendants during childbirth were the major underlying factors among the disadvantaged populations for suboptimal caesarean birth. On the other hand, higher rates of CS were seen in urban populations which had higher affordability. Among Public health facilities, CS rates are substantially high in various teaching and tertiary level hospitals owing to the large number of referrals of high risk and complicated cases from primary and secondary level facilities. In public hospitals especially those associated with teaching facilities, there is a noted desire of junior and young doctors to improve their surgical experience of conducting CS deliveries. While private health providers substantially contribute to non-necessary CS rates, similar trends are seen in Public health facilities as well. Preference of women to cesarean section over vaginal birth in order to eliminate the pain of normal labor is an important contributing factor to the high rates of CS [45]. Health care providers in private health facilities are more likely to perform unnecessary cesarean sections in order to fulfill women's preference for Cesarean section as well as due to financial incentives for both themselves as well as for the owner of private hospitals.

Based on the conclusion of the review, an effective targeted response is necessary to reduce unnecessary Cesarean section rates in Pakistan. There is a need for implementation of universally acceptable standards and audit mechanism without compromising maternal or fetal safety. To reduce the escalating caesarean rate, concerted efforts are needed at all levels i.e., at the patient, provider and system levels. At the community level, there is a need to improve services and maternal health awareness in the community with specific focus on the advantages and disadvantages of Cesarean sections. These could take the form of mass education campaigns via electronic media, group meetings and seminars with organized and motivated antenatal care at all levels. While women are to be provided awareness, health service providers should also be provided awareness on the burden imposed by unnecessary CSs on the health system. At a policy level Robson's Ten Group Classification System" (RTGCS) as recommended by the World health organization should be undertaken and policies and strategies need to be devised to achieve the ideal rate recommended by WHO. It is crucial to formulate policies and ensure public health practices to implement proper guidelines, improve training and regulate the conduction of CS in public as well as private health facilities to reduce the burden of CS on the healthcare system in Pakistan.

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