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Examining Clinical Indications for Cesarean Section in a University Hospital in Karachi, Pakistan

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Abstract

Background and objectives: Current research reports that Pakistan exceeds the recommended percent of deliveries via cesarean sections, including both emergent and non-emergent. In order to better understand the high rate of cesarean sections in Pakistan we examined the medical and non-medical indications of these surgeries at a private university hospital in Karachi.

Methods: A retrospective analysis of patient medical record data was conducted from January 1st, 2018 to March 31st, 2018. The data collected was analyzed using SPSS 25.

Results: The total number of deliveries during the period was n= 1,211, out of which n=602 (49.70%) were CS. The top five indications for CS were: repeat CS n=199 (44.20%), failure to progress n=58 (12.90%), abnormal lie n=42 (9.30%), fetal distress n=37 (8.20%), and fetal growth restriction n= 21 (4.70%).

Conclusion: This study contributes to a broader understanding of the indications of cesarean section rates in the developing world. This information can be used to improve infant and maternal health by reducing the complications associated with operative deliveries.

Keywords:, *Cesarean section, indications for cesarean, frequency, Pakistan*

Introduction

Over the years, the World Health Organization (WHO) reports cesarean section rates have been on the rise in both the developed and developing nations [1]. According to the WHO, the ideal rate for CS should be below 10 to 15 percent. When the rate of CS exceeds 10 percent, there is no significant evidence to suggest improvement in maternal mortality [1-2]. A 2015 study states that a substantial increase in cesarean sections rates were not due to medical indications, but rather were performed as unnecessary surgical procedures, including: non-evidence-based indications, professional convenience, and maternal requests [3].

According to the WHO, in 2015 there were 9,700 women who died of maternal complications in Pakistan. Studies indicate a significant increase in cesarean section rates from 2.70% in 1990–1991 to 15.80% in 2012–2013 overall, with rates of CS specifically in the urban regions of Pakistan during the same time period were 35.90% and 36.40% in public and private hospitals respectively [3-6].

There are several known reasons why performing CS are deemed medically necessary. These include, but are not limited to, fetal distress, failure to progress while in labor, arrest of descent of fetus into the maternal pelvis, repeat CS, and breech presentation [7]. However, in Pakistan, there has been an increase in maternal requests as an indication for performing CS [7]. When comparing rates of CS in private and government hospitals, in Pakistan, private sectors are performing cesarean sections at twice the rate. “Unlike government medical institutions, in private hospitals mothers were not given enough trial period or time in labour” [8]. Although performing cesarean sections have become safer, they still account for higher rates of maternal and neonatal morbidity and more costs when compared to vaginal deliveries [9]. Maternal complications can include infection, hemorrhage, anesthesia complications, postoperative

thromboembolism, and adhering of the placenta to the uterine wall (placenta acreta) leading to hysterectomy or uterine rupture with subsequent pregnancy [10-11].

The rates of CS over the past two decades in Pakistani military, teaching, and tertiary care hospitals varied from 41.96-45.50%, 21.40-22.83%, and 12.60-64.70%, respectively [7,10-17]. When analyzing rates and indications at military hospitals in Pakistan at a hospital in Rawalpindi, Pakistan, of 3,555 deliveries over the course of six months, 1,620 (45.50%) women were delivered by cesarean sections [17]. Researchers reported the three most common indications of CS surgeries were: prior CS delivery, failed trial of labor, and fetal distress [17]. In contrast, the CS rates at a teaching hospital in Karachi, Pakistan were found to be significantly and consistently lower. A three-year study (2005-2008) reported the rates of22.92%, 22.78%, and 22.83%, respectively [16], most were emergency cesarean sections. The indications differed slightly in primi gravids and multigravidas. The main indications in primi gravida women included: dystocia, malpresentation, and fetal distress. Whereas the main indications for multiparous women were: repeat CS, malpresentation, and dystocia [16].

Most studies that examined the incidence and indications of cesarean sections in Pakistan were done in tertiary hospitals—versus military or teaching institutions—where the CS prevalence varied drastically from 12.60% to 64.70% [7,12]. At Isra University Hospital in Hyderabad, Pakistan, over a one-year period the CS rate was 64.7%, of which 225 out of 380 (59.3%) were emergency and 155 (40.7%) were elective [7]. This study also examined the socioeconomic characteristics and found that in this region, the highest rates occurred in the lowest socioeconomic group, 57.8%, and least educated populations, 61.8%. The authors attributed this to the hypothesis that women living in this area only go to the hospital when they are seriously ill. In addition, rates of CS at this hospital are high because majority of the women in this area deliver at home attended by traditional birth attendants [7]. On the other hand, a 2017 study noted that there was “an overall increasing trend and unequal coverage of C-sections in Pakistan, with lower rates among the less educated, the poorest socioeconomic stratum and rural areas, and higher rates in women with higher education, women from the richest socioeconomic stratum and from the urban areas” [5].

There are several factors which can influence a healthcare provider's decision to perform a cesarean including: the type of healthcare provider, whether midwife or obstetrician; the healthcare provider's training, appropriate use and interpretation of fetal heart rate monitoring, local culture, availability of hospital support services, healthcare delivery system and in some cases, legal factors [16]. Several recommendations have been suggested to decrease the rate of cesarean sections including: having peer discussions on the necessity of cesareans, accurate documentation of indications for cesareans, repeat CS should be avoided if possible, how to avoid cesareans in primi gravids is an area which needs extensive research, patients should be counseled on VBACs (Vaginal Delivery After C-Section), inductions with a poor bishop score should be highly discouraged, diagnostic testing during labor is highly encouraged, external cephalic version should be offered to uncomplicated breech at 37 weeks of gestation, and decision of CS should be taken by a senior physician [17]. While past studies reveal that Pakistan exceeds the recommended percent of deliveries via cesarean section to date, both emergent and none emergent, there have been no known studies which examine indications for CS in tertiary, teaching hospital settings in Pakistan. Therefore, this study examined the indications for CS, the frequency of indications, and the relationship between indications and maternal risk factors, at a private university hospital in Karachi, Pakistan.

Methods

A retrospective analysis of birth records of women who delivered at a University Hospital in Karachi, Pakistan from January 1st, 2018 to March 31st, 2018 was performed. A chart review was conducted of patient medical records and the electronic record of the Labor and Delivery Management system (LRMS). The LRMS data were obtained from the Health Information Management Systems (HIMS) department at this particular hospital. Statistical Package for the Social Sciences (SPSS) 25 software was utilized for data analysis.

The data for these analysis originate in the medical records for women who gave birth via CS. Following retrieval, these records were and abstracted and included detailed notes from the entire healthcare team that cared for the patient, including doctors, nurses, and anesthesiologist as necessary. Specific data elements included maternal age, parity, gestation, indication for CS (i.e. fetal intolerance to labor, arrest of dilation, arrest of descent, macrosomia,

repeat sections/history of prior abdominal surgery, multiple birth, breech/transverse lie, placenta previa, placental abruption, failed shoulder dystocia, cord prolapses, elective), and maternal risk factors including: obesity, small for gestational age (SGA), large for gestational age (LGA), intrauterine growth restrictions (IUGR), gestational diabetes mellitus (GDM), gestational hypertension (GHTN), preeclampsia. Ultimately, LRMS data reveal the total number of vaginal deliveries and CS preformed each month, the indications for the surgeries, and any maternal risk factors.

Results

Overall, the total number of deliveries during the study period was N= 1,211, of which 602 (49.70%) were CS. Of these, 450 medical records were abstracted into a dataset for analysis. During the period January-March 2018, the monthly portion of births that were cesarean were: 44.40%, (n=203), 46.70% (n=166), and 58.40% (n=233). The top five indications for CS were repeat CS 44.20% (n=199), failure to progress 12.90% (n=58), abnormal lie 9.30% (n= 42), fetal distress 8.20% (n=37), and fetal growth restriction 4.70% (n= 21). Also of note, the study sample included CS due to precious pregnancy 0.2% (n=1). (Table 1).

Of the 450 CS performed, 46.20% (n=208) were primary. The remaining number of patients had 1-5 repeat CS. Patients with history of two repeat CS had the highest incidence of their third pregnancy being a CS (31.10%; n= 140;). This was followed by patients who previously had 3 CS (13.10%; n=59), 4 CS (4.20%; n=19), 1 CS (3.60%; n=16) and 5 repeat CS (1.80 %; n=8), respectively.

Table 1: Indication for Cesarean Sections

Indication for CS	Frequency	Percent
Repeat	199	44.20
Failure to Progress	58	12.90
Abnormal Lie	42	9.30
Fetal Distress	37	8.20
Fetal Growth Restriction	21	4.70
Induction of Labor, Patient Request	19	4.20
Placenta Previa	14	3.10
Twins	10	2.20
Poor Obstetric History	10	2.20
Preeclampsia	10	2.20
Meconium	6	1.30
Bicornate Uterus	4	0.90
Cephalopelvic Disproportion	3	0.70
Placental Abruption	3	0.70
Placenta Percreta	2	0.40
Eclampsia	2	0.40
Chorioamnionitis	2	0.40
Oligohydramnios	2	0.40
Placenta Increta	1	0.20
Placenta Acreta	1	0.20
Precious Pregnancy	1	0.20
Active Herpes	1	0.20
Macrosomia	1	0.20
Maternal Request	1	0.20
Total	450	100

There was a weak, positive correlation (*p = 0.316*) between the patients' age and primary CS. Additionally, maternal risk factors such as gestational diabetes and preeclampsia were significantly related to CS (χ^2 = 4.60, *p= 0.032, n* = 450) and (χ^2 = 6.503, *p= 0.011, n = 450),* respectively. However, obesity (χ^2=1.847, *p= 0.174, n = 450*) and gestational hypertension (χ^2 = 0.181, p = *0.670, n = 450*) were not significantly correlated with primary CS (Table 2).

Table 2: Maternal Risk Factors

Risk Factor	Frequency	Percent
Obesity	417	92.70
Gestational Diabetes	119	26.40
Gestational Hypertension	51	11.30
Preeclampsia	17	3.80
Eclampsia	2	0.40

Discussion

CS rates were high for the three months of data we examined; nearly half of the mothers received cesarean sections in the months of January and February. However, the rates rose to over 58% in March. The rise in CS rates creates an increased risk for maternal and neonatal morbidity and mortality. This study also identified that the nearly half of the CS performed during these three months were primary and the most common five indications for CS included: repeat CS, failure to progress, abnormal lie, fetal distress, and fetal growth restriction.

With nearly half of the surgeries performed during the three months being primary CS, regardless of the number of prior pregnancies, suggests that the threshold of medically indicated CS has become lower over time and/or that the rate of elective CS have increased, thus, increasing the overall rates. In addition, the rise in primary CS puts mothers at a higher risk of requiring CS for subsequent pregnancies consequently increasing likelihood of maternal and neonatal complications. Our study sample also captured one "precious pregnancy," described as a pregnancy conceived using assisted reproductive technology to a mother with a history of losses and/or advanced maternal age, in which elective cesarean sections are inappropriately and liberally applied as the mother has "tried harder to conceive and may have less change to succeed again in the future [17]."Reducing the number of elective CS, elective inductions of labor, decreasing augmentations rates, and increasing trail of labor after cesarean (TOLAC) for those who qualify, can decrease overall rates and decrease maternal complications associated with surgery [18].

In accordance to previous studies, our study shows that the rates of CS are still at rising in Pakistan. The rates of CS performed at this university hospital most closely relates to military and tertiary care hospitals in Pakistan [7, 11-13, 18]. However, the rates of CS at teaching

hospitals were significantly lower in previous studies (21.4-22.92%) [16]. With most teaching hospitals being tertiary care centers as well, it is probable that most of the patients who seek care at these facilities are those with increased risk factors, multiple co-morbidities, and those who have financial means. Due to this facility being one of the highly accredited, teaching, non-for-profit institutions in the country, there is an increased number of patients with multiple risk factors who travel from different parts of the country to obtain quality health care. Therefore, maternal risk factors, such as obesity, diabetes, hypertension, and preeclampsia put these patients at an increased risk for surgery, and helps explain the increased correlation between gestational diabetes and preeclampsia with primary CS.

In addition, similar to previous studies done in Pakistan, our study identified that the most common indications for CS were repeat surgeries, fetal intolerance, failure to progress, and abnormal lie [11,18]. However, the fifth most common indication our study found, fetal growth restriction, was not one that was commonly reported in the literature. This occurs when the fetal weight is below the 10^{th} percentile. Fetal growth restriction can have several causes, including poor nutrition during pregnancy, pregnancy induced hypertension, gestational diabetes, oligohydramnios, birth defects or chromosomal abnormalities, placental abnormalities, and umbilical cord abnormalities. Fetal growth restriction can have serious risks to the fetus including urgent CS, hypoxia, meconium aspiration, and hypoglycemia. Since access to clean water and regular healthy meals can be a challenge for those in developing nations, individuals of a lower economic status would have poor nutrition during pregnancy thus causing fetal growth restrictions [19]. University hospitals, similar to this one, have trained medical staff and proper equipment, like ultrasound machines to diagnose this condition. Hence, the increased rate of CS due to fetal growth restriction could be attributed to advanced screening during prenatal care.

With the help of the globalization of health care policy development through the WHO pertaining to CS of keeping rates between 10-15% could ultimately improve maternal and perinatal care outcomes. For example, though there is not an internationally accepted classification system for CS which would calculate relevant and meaningful comparisons across facilities, cities or regions, the Robson classification is one which is widely used and considered as the global standard by WHO. Implementing the Robson classification at this facility, and other similar facilities in the region, can help to categorize indications and pinpoint high-risk

groups who are at an increased risk of having a CS [4]. The Robson classification system categorizes all deliveries in one of ten groups based on five parameters: obstetric history (parity and previous CS), onset of labor (spontaneous, induced, or CS before onset of labor), fetal presentation or lie (cephalic, breech, or transverse), number of neonates, and gestational age (preterm or term) [2-3].

Furthermore, the WHO's 2018 report on non-clinical interventions to reduce unnecessary CS clearly outlines the benefits of a collaborative midwifery-obstetrician model of care. In this collaborative model, previously demonstrated effective in teaching environments such as university hospitals, both midwives and obstetricians are present in-house cooperatively managing patient care. This collaborative model has been shown to significantly reduce the rate of unnecessary CS [20]. Integrating the Robson classification systems, a collaborative midwifery-obstetrician model of care, and overall adoption of system-wide clinical guidelines and organizational leadership support, including proper provider training and data transparency, could shift the university hospital culture in Pakistan to promote what is in the best interest of the patient and ultimately decrease primary and elective CS rates.

There is paucity of research studies that examined the indications of CS in Pakistan. Though this study gave further insight on indications in a developing county, it is not without limitations. First, the data solely represented one university hospital in Karachi, Pakistan, and therefore cannot be generalized to populations with different demographic and regional characteristics. Secondly, as we were only able to obtain data for a three-month period, January through March of 2018, there may be a seasonal relationship amongst the study variables uncaptured as we were unable represent of a full calendar year. Furthermore, as we were not capable of reporting on maternal sociodemographic characteristics due to data unavailability, our capacity to fully describe the study sample of women who undergo CS at this university hospital was limited, impacting the representativeness of our findings to all women in this region of Pakistan. However, despite these limitations, the study yielded important insights on the indications for CS performed at a university hospital.

Overall, when rates of CS go over 10% there is no significant evidence to suggest improvement in maternal mortality. Therefore, more research at the hospital level in Pakistan is

needed to discover ways to decrease the number of elective and repeat surgeries. Educational training programs led by midwives for the obstetrical staff on successful vaginal births after CS can be useful to decrease or even prevent any fears of healthcare providers [21]. In addition, future evidence-based studies are recommended to analyze maternal educational status and understanding of risk, benefits, and alternatives on CS. Furthermore, it is crucial that future studies aim to reduce primary CS rates in order decrease maternal morbidity and mortality outcomes.

Conclusion

In order to improve maternal health outcomes and decrease elective and primary CS rates, it is crucial that hospitals implement proper guidelines, especially those recommended by WHO, including implementation of collaborative midwifery-obstetrician model of care, to promote optimal care of mothers and neonates. In addition, proper training for healthcare providers and increasing patient education can potentially aid in decreasing rates. In conclusion, with the rise in CS rates in the developing nations, like Pakistan, our study contributes to research on maternal health by offering a deeper understanding of the indications of cesarean section rates in the developing world. However, future studies can aim to focus on implementing the necessary guidelines and their outcomes.

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