

11.6% of total deliveries, shown in **Table 1**. There were 645 babies delivered during the period of the study, among which 95% (613/645) were singletons and 3% (19/645) were multiple gestation deliveries. The sex distribution of the neonates shows a preponderance of male 53% (342/645) over female 47% (303/645). Emergency caesarean section was performed on 84.5% (533/630) and elective caesarean section on 15.4% (117/630) of patients. The rate of primary caesarean section was 79.5% (501/630) and repeat caesarean section was 20.4% (129/630), details of which are shown in **Table 2**. The age range of the patients was between 16 and 45 years. Socioeconomic status showed 68% of the patients being poor and 32% in the lower middle class.

Table No. 2: Mode of caesarean section

Mode	No. of patients	Percentage
Emergency C/S	533	84.60%
Elective C/S	97	15.39%
Primary C/S	501	79.50%
Repeat C/S	129	20.49%

Table No. 3: Gravidity Status in patients.

Gravidity Status	No. of patients	Percentage
Primigravida	246	39%
Primipara	111	17.6%
Multipara	273	43.1%

Table No. 4: Indications for primary caesarean sections

Indication	No. of patients	Percentage
Fetal Distress	97	19.3%
Obstetric Labour	67	13.3%
APH	58	11.5%
Pre-eclampsia/ Eclampsia	31	6.18%
CPD	31	6.18%
Negative(?) Lie	31	6.18%
Postdate	7	1.39%
PROM	31	6.18%
Failed Induction	16	3.1%
Oligohydramnios	15	2.99%
Breech Presentation	49	9.7%
Triplet	3	0.59%
BOH	10	1.99%
Non-progress of labour	17	3.39%

Among 630 patients, 39% (246) were primigravida, 17.6% (111) were primipara, and 43.1% (273) were multigravida, shown in **Table 3**. The most common indication in primary caesarean section was fetal distress at 19.3%, followed by obstructed labour at 13.3% and breech presentation at 9.8% (see **Table 4**).

The most common indication in repeat caesarean section group was previous 1 caesarean section at 60.4% followed by previous 2 caesarean section at 34.1% and then previous 3 caesarean section at 5.42% (see **Table 5**).

The birth weight of the neonates ranged between 500 grams to 4800 grams. 90% (547) had an APGAR score of more than 6/10 at 5 min, while 10% (65) of the neonates had an APGAR score of less than 6/10 at 5 min. There were 5.1% (33) stillbirths. During the study period there were 93 perinatal deaths, thus giving a perinatal mortality rate of 144/1000. A majority (78%) were peripartum and early neonatal deaths. This was a result of obstructed labour and birth asphyxia in the patients referred too late from the periphery.

Table No. 5: Indications for repeat caesarean sections

Indication	No. of patients	Percentage
Previous 1 C/S	78	60.4%
Previous 2 C/S	44	34.1%
Previous 3 C/S	7	5.42%

There were 4.1% (26) cases of postpartum haemorrhage (PPH). There were 4 maternal deaths. One each as a result of eclampsia, APH, PPH, and lastly DIC, giving a case fatality rate of 0.63% or, in other words, approximately one maternal death for every 157 caesarean sections performed at the hospital during the study period.

DISCUSSION

The incidence of caesarean deliveries and surgically completed pregnancies has been on the rise for the past 20 years. In North America and some countries in Western Europe during the last couple of years, the CSR was about 21%.⁷ In our study at the Department of Obstetrics and Gynaecology at Mardan Medical Complex, the caesarean section rate was 11.6% (630/5409). This result was within the 15% limit recommended by the World Health Organisation for developing countries.⁸ When we compare our results with the other studies done in Pakistan, only one study by Sultana A⁽⁹⁾ showed a similar CSR (11.8%), which is in accordance with ours. Other studies from Pakistan showed much higher figures of 21.1% by Khawaja NP¹⁰, 44.8% by Ehtisham S¹¹ and 45.1% by Shamshad¹². This difference may be due to the fact that doctors in our hospitals maybe conscious of the WHO proposal that there is no justification for any region to have a CSR higher than 10-15%.^{13,5,14} Other reasons may be judicious use of instrumental delivery in our hospitals, our trainees are trained to do instrumental deliveries. Looking at results outside Pakistan, ours is comparable with the study conducted by Geidam AD et al⁸ in which the CSR was also 11.6%. Taking into account population dynamics in high-income countries, increasing maternal age, increased maternal demand,

fear of litigation and a shift in maternal health; these factors may result in increased CSR.

The rate of primary caesarean section was 79.5% which is comparable to the studies conducted by Mathew M¹⁵, and Ehtisham S¹¹, and the top three indications were fetal distress (19.3%), obstructed labour (13.3%) and APH (11.5%). The results are comparable with the study conducted by Ehtisham S (11)(R). Previous one Caesarian section, previous two Caesarian sections, followed by previous three Caesarian section, were the most common indications for repeat cesarean section and the results are comparable to studies conducted by Mathew M¹⁵ and Ehtisham S¹¹. In our study, the 79% rate of primary caesarean section was the major contributor to a high rate of emergency Caesarian sections, so the aim should be to reduce the rate of primary cesarean sections. Each case should be thoroughly evaluated to determine the possibility of vaginal delivery.

Fetal distress was the main indication for primary cesarean sections. In the majority of patients with presumed fetal distress, babies delivered with good APGAR scores but with meconium-stained liquor. The understanding of CTG findings are subjective and also one of the reasons for increased Caesarian sections done for fetal distress. There should be facilities for continuous fetal heart rate monitoring and samples from the fetal scalp blood should be taken for acid-base studies to confirm true fetal distress. Involvement of consultant obstetrician in the decision-making is very important.

Previous scars were the main indication for repeat Caesarian section in our study. A trial of vaginal delivery should be considered in the hospital with appropriate facilities, services, and staff for a prompt emergency Caesarian section birth. Reluctance to give a trial of vaginal delivery after cesarean section may be due to the fear of litigation related to the risk of uterine rupture and associated increased maternal and fetal morbidity and mortality. The studies show that the women delivered by cesarean section were less likely to have a subsequent pregnancy (66.9%) compared with those having spontaneous vaginal delivery (73.9%) and instrumental vaginal delivery (71.6%), and they were more likely to have problems like APH, preterm and prolong labour, morbidly adherent placenta and risk of malpresentation.^{16,17}

Average blood loss in our study was from 0.7 to 1.0 litre. 4.7% patients went into postpartum haemorrhage and they were successfully managed with uterotonics and replacement of blood products, except for two, one of whom underwent a caesarean hysterectomy and survived and the other died due to the PPH, because of uncontrollable haemorrhage.

All fetal complications occurred in the emergency Caesarian section group. 10% of the fetuses were born with an APGAR score of less than 6 out of 10 at 5

mins, and there were 5.1% stillbirths. The major cause of low fetal APGAR scores was birth asphyxia. Other studies have reported similar facts.^{18,19} Perinatal mortality of Caesarian sections was 144 per 1000 caesarean births, and was only observed in the emergency Caesarian section group. Our figure is quite higher than the figure given by an earlier study conducted by Daniel CN²⁰. The reason was absence of NICU facility, and last-moment referrals from the periphery with complications. There should be in-time referrals of patients who may need a Caesarian section.

CONCLUSION

On the basis of the analysed data, we conclude that in the Department of Obstetrics and Gynaecology, Mardan Medical Complex, the mainstay is vaginal birth. The CSR is much lower than that of the other centres in Pakistan, but we cannot ignore the fact that the CSR has been following a rising trend over the past few years and it is worrisome. Especially the fact that perinatal outcome is not consistently improving. If unchecked, the rate might reach epidemic proportions.

As previous Caesarian section was a major indication, it is recommended that a trial of vaginal birth after a Caesarian section should be encouraged in the appropriate cases. The use of CTG for continuous fetal heart rate monitoring during labour and confirmation of suspected fetal distress by fetal scalp blood acid-base studies is also recommended. Proper training of skilled birth attendants, and general practitioners is needed to minimise last-moment referrals from the periphery.

It was a retrospective study and there is a need for a prospective study, to know the rising trends and maternal and fetal outcomes in the country.

Author's Contribution:

Concept & Design of Study:	Samia Tabassum
Drafting:	Sadia Ali & Samia Tabassum
Data Analysis:	Rukhsana Karim & Samia Tabassum
Revisiting Critically:	Sadia Ali & Rukhsana Karim
Final Approval of version:	Samia Tabassum

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

- Madsen K, Grønbeck L, Riffbjerg Larsen C, Østergaard J, Bergholt T, Langhoff-Roos J, et al. Educational strategies in performing cesarean section. *Acta Obstet Gynecol Scand* [Internet]. 2013 Mar [cited 2017 Sep 8];92(3):256–63. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23173712>
- Dinas K, Mavromatidis G, Dovas D, Giannoulis C,

- Tantanasis T, Loufopoulos A, et al. Current caesarean delivery rates and indications in a major public hospital in northern Greece. *Aust New Zeal J Obstet Gynaecol* [Internet]. 2008 Apr [cited 2017 Sep 9];48(2):142–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18366486>
3. Betran A, Torloni M, Zhang J, Gülmezoglu A, WHO Working Group on Caesarean Section. WHO Statement on Caesarean Section Rates. *BJOG An Int J Obstet Gynaecol* [Internet]. 2016 Apr [cited 2017 Aug 20];123(5):667–70. from: <http://www.ncbi.nlm.nih.gov/pubmed/26681211>
 4. Gibbons L, Belizán J, A Lauer J, Betrán A, Merialdi M, Althabe F. The Global Numbers and Costs of Additionally Needed and Unnecessary Caesarean Sections Performed per Year: Overuse as a Barrier to Universal Coverage Health Systems Finacingi Vol. 30, World Health Report 2010. 2010.
 5. Althabe F, Sosa C, Belizán JM, Gibbons L, Jacqueroiz F, Bergel E. Caesarean Section Rates and Maternal and Neonatal Mortality in Low-, Medium-, and High-Income Countries: An Ecological Study. *Birth* [Internet]. 2006 Dec [cited 2017 Aug 20];33(4):270–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17150064>
 6. Ye J, Zhang J, Mikolajczyk R, Torloni M, Gülmezoglu A, Betran A. Association between rates of caesarean section and maternal and neonatal mortality in the 21st century: a worldwide population-based ecological study with longitudinal data. *BJOG An Int J Obstet Gynaecol* [Internet]. 2016 Apr [cited 2017 Aug 20];123(5):745–53. Available from: <http://doi.wiley.com/10.1111/1471-0528.13592>
 7. El-Ardat MA, Izetbegovic S, Djulabic A, Hozic A. Incidence of cesarean section at the department of gynecology and obstetrics of hospital in travnik during 2012. *Mater Sociomed* [Internet]. 2014 Feb [cited 2017 Aug 20];26(1):53–4. Available from: <http://www.scopemed.org/fulltextpdf.php?mno=153813>
 8. Geidam AD, Audu BM, Kawuwa BM, Obed JY. Rising trend and indications of caesarean section at the university of Maiduguri teaching hospital, Nigeria. *Ann Afr Med* [Internet]. 2009 [cited 2017 Oct 19];8(2):127–32. Available from: <http://www.annalsafmed.org/text.asp?2009/8/2/127/56242>
 9. Sultana A, un Nisa A. Indications of caesarean section in a district head quarter hospital for women. *J Ayub Med Coll Abbottabad* [Internet]. [cited 2017 Aug 20];15(3):36–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14727338>
 10. Khawaja NP, Yousaf T, Tayyeb R, Audu B, Nelda M. Analysis of caesarean delivery at a tertiary care hospital in Pakistan. *J Obstet Gynaecol* [Internet]. 2004 Feb 2 [cited 2017 Aug 20];24(2):139–41. Available from: <http://www.tandfonline.com/doi/full/10.1080/01443610410001645415>
 11. Ehtisham S, Akhtar Hashmi H. Determinants of caesarean section in a tertiary hospital. *J Pak Med Assoc* 2014;64(10):1175–8.
 12. Samshad. Factors Leading To Increased Cesarean Section Rate. *Gomal J Med Sci* 2008;6(1):1–5.
 13. Appropriate technology for birth. *Lancet* (London, England) [Internet]. 1985 Aug 24 [cited 2017 Oct 19];2(8452):436–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2863457>
 14. Villar J, Valladares E, Wojdyla D, Zavaleta N, Carroli G, Velazco A, et al. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet* [Internet]. 2006 Jun 3 [cited 2017 Aug 20];367(9525):1819–29. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16753484>
 15. Mathew M, Kumari R, Vaclavinkova V, Krolikowski A. Caesarean sections at Sultan Qaboos University Hospital: A three year review 2017;4:29–32.
 16. Mollison J, Porter M, Campbell D, Bhattacharya S. Primary mode of delivery and subsequent pregnancy. *BJOG* [Internet]. 2005 Aug [cited 2017 Aug 20];112(8):1061–5. Available from: <http://doi.wiley.com/10.1111/j.1471-0528.2005.00651.x>
 17. Kennare R, Tucker G, Heard A, Chan A. Risks of adverse outcomes in the next birth after a first cesarean delivery. *Obstet Gynecol* [Internet]. 2007 Feb [cited 2017 Aug 20];109(2 Pt 1):270–6. Available from: <http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006250-200702000-00006>
 18. Benzouina S, Boubkraoui ME-M, Mrabet M, Chahid N, Kharbach A, El-Hassani A, et al. Fetal outcome in emergency versus elective cesarean sections at Souissi Maternity Hospital, Rabat, Morocco. *Pan Afr Med J* [Internet]. 2016 [cited 2017 Aug 20];23:197. Available from: <http://www.panafrican-med-journal.com/content/article/23/197/full/>
 19. Onankpa B, Ekele B. Fetal outcome following cesarean section in a university teaching hospital. *J Natl Med Assoc* [Internet]. 2009 Jun [cited 2017 Aug 20];101(6):578–81. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19585926>
 20. Daniel CN, Singh S. Caesarean delivery: An experience from a tertiary institution in north western Nigeria. *Niger J Clin Pract* [Internet]. 2016 [cited 2017 Aug 20];19(1):18–24. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26755213>