Bangladesh J Obstet Gynaecol, 2023; Vol. 38(1): 27-34

Analysis of Deliveries Using Robson's 10-Group Classification at a Semi-Urban Hospital

AFSANA HAQUE CHOWDHURY[1], ANJUMAN ARA[2], FARHANA DEWAN[3], KHAIRUN NESSA[4]

Abstract:

Introduction: *Cesarean section (CS) is an important indicator of access to, and quality of maternal health services. The World Health Organization recommends the Robson's ten group classification system.*

Method: *This is a prospective study carried out over a period of one year from Jan 2018 to Dec 2018. All caesarian section conducted during the study period were included in the study. Patients' demographic data age, parity, gravidity, pregnancy related information- gestational age, fetal presentation, number of fetuses, onset of labor, delivery details operative or vaginal delivery, indications of Caesarian section, type of C-section, fetal details - APGAR scores, all were recorded.*

Based on patients' data, women were assigned to one of 10 groups as per Robson's 10-group classification system. This classification system categorizes women into ten mutually exclusive groups, considering the following criteria: parity, previous obstetric record of the woman, the course of labor including pre-labor duration and gestational age.

Result: *Overall Caesarean section rate of 42%. Total number of deliveries in this one-year period was 1727 of which 715 women had lower segment caesarean section (41.4%). Group 5 contributed the most (19%) followed by Group 1 (6.5%) then Group 2(5.6%). Women in group 2(b)& 4(b) went into had a CS rate around 6.7%.*

Conclusions: *Robson 10 group classification is an important tool to classify the indication of caesarian section. Implementation of this classification system may help in reducing primary caesarian section as well as caesarian section done for relative indications & encourage VBAC without compromising health of mother & newborn.*

Introduction:

Caesarean section (CS) is a major obstetric intervention for saving lives of women and their newborns from pregnancy- and childbirth-related complications. It is well-established that caesarean section (CS) rates have risen in both developed and developing world over the past three decades.[1-3]

Caesarean section also has its own risks for maternal as well as infant morbidity and for subsequent pregnancies.[4,5]These risks will outweigh the potential benefits associated with lowering the threshold at which the procedure becomes indicated at some point.[6]

Worries over such increases have led the World Health Organization to advise that Cesarean Section (CS) rates should not be more than 15%[7] with some evidence that CS rates above 15% are not associated with additional reduction in maternal and neonatal mortality and morbidity.[8]

However, regional variation is prevalent in CSR. According to the latest data from 150 countries, Latin America and the Caribbean region have the highest CSR (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%) and Africa (7.3%).[9]

1. Asst. Professor, Obs & Gynae, Ibn-Sina Medical College.
2. Professor, Obs & Gynae, Centre for Woman and Child Health.
3. Professor, Obs & Gynae, Ibn-Sina Medical College.
4. Assoc. Professpr, Obs & Gynae, Ibn-Sina Medical College.

Address of Correspondence: Dr. Afsana Haque Chowdhury, Asst. Prof, Obs & Gynae, Ibn-Sina Medical College.

In Bangladesh caesarian section rate has increased from 12%, in 2010 to 31% in 2016. Bangladesh Maternal Mortality & health care Survey (BMMS)

To address concerns over rising rates of CS and to provide a mechanism for audit and feedback, a 10-group classification system to examine CS within mutually exclusive groups of women with particular obstetric characteristics was proposed by Robson in 2001.[10]

Analyzing CS rates in different countries, including primary vs. repeat CS and potential reasons of these, provide important insights into the solution for reducing the overall CS rate. Robson, proposed a new classification system, the Robson Ten-Group Classification System to allow critical analysis according to characteristics of pregnancy.[11]

In an effort to reduce the rising CSR in developed countries, the need of a standardized classification system for C-section that would allow meaningful and relevant comparisons of CSR across different facilities, cities or regions was felt.[12] The Robson's 10 group classification, proposed by Dr Michael Robson in 2001, stratifies women according to their obstetric characteristics, thereby allowing a comparison of CSR with fewer confounding factors.[13]

The Robson classification system groups women in the obstetric population according to plurality, fetal presentation, parity, obstetric history (i.e., previous CS), course of labour and delivery, and gestational age, providing clinically relevant categories for analyzing and reporting rates of CS.[10]

Methods:

This is a prospective study carried out over a period of one year from January 2018 to 31st December 2018, in a semi urban hospital at Ashulia, Savar Dhaka.

All hospital deliveries conducted during the study period were included in the study. Exclusion criteria remained all women having laparotomy for uterine rupture or those with missing records were excluded during the study period. All relevant information which would help to classify the women according to the Robson's 10 classes were recorded.

Patients' demographic data, age, parity, gravidity, pregnancy related information- gestational age, fetal presentation, number of fetuses, onset of labor, delivery details operative or vaginal delivery, indications of CS, type of C-section, fetal details - APGAR scores, NICU admission were all recorded.

Fetal presentation was classified as cephalic, breech or transverse/oblique. Gestational age was categorized as a term e" 37 weeks or preterm < 37 weeks. Gestational age was assessed using early USG or LMP. Based on patients' data, women were assigned to one of 10 groups as per Robson's 10-group classification system (Table 1). This

Table-I

Robson's Ten Group Classification:

Group		Description
1		Nulliparous, single cephalic, ≥37 weeks, in spontaneous labor
2		Nulliparous, single cephalic, ≥37 weeks, induced or CS before labor
	2a	Nulliparous, singleton, cephalic, ≥37 weeks' gestation, induced labor.
	2b	Nulliparous, singleton, cephalic, ≥7 weeks' gestation, cesarean section before labor.
3		Multiparous (excluding previous cesarean section), singleton, cephalic, e" 37 weeks' gestation, in spontaneous labor.
4		Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced or cesarean section before labor.
	4a	Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced labor.
	4b	Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, cesarean section before labor.
5		Previous cesarean section, singleton, cephalic, ≥37 weeks' gestation.
6		All nulliparous with a single breech.
7		All multiparous with a single breech (including previous cesarean section).
8		All multiple pregnancies (including previous cesarean section).
9		All women with a single pregnancy in transverse or oblique lie (including those with previous cesarean section).
10		All singleton, cephalic, < 37 weeks' gestation pregnancies (including previous cesarean section).

classification system categories women into ten mutually exclusive groups.

Percentages were calculated for the overall rate, the representation of the group's contribution of each group to the overall rate and percentage in each group.

The size of each group, frequency of caesarean sections, cesarean section rate and contribution of each group towards overall CS was calculated. The results were calculated in terms of frequencies and percentages.

All data obtained were recorded and analyzed using SPSS version 21. Results were then presented as tables.

Results:

This study was conducted on 1727 pregnant women who delivered during the period of one year. Out of which CS deliveries were 715.

Out of 2717 cases 964 women (56 %) fall in 16- 25 years' age group. 710 cases (41 %) were between 26 - 35 years, 53 cases (3 %) cases were in the age group of 36 - 45 years (Table-II).

Among 715 CS group 38 (5%) women had undergone caesarian section at < 37 weeks, whereas majority were in the 37 – 40 weeks of gestation 531 (74 %). 146 (21%) women presented at >40 weeks (Table-III)

The elective caesarean section and emergency caesarean section contributed 53% and 47% of the total caesarean sections respectively. (Table-IV)

Table-II

Distribution of patient by their age

Maternal age	Number	%
16-25	964	56
26-35	710	41
36-45	53	3

Table-III

Distribution of women according to gestational age

Gestation Age (Weeks)	*Number (N)*	Percentage
<37 weeks	38	5
37-40 weeks	531	74
>40weeks	146	21
Total	715	

Table-IV

Elective vs emergency caesarian section

Maternal Characteristics	Number	%
Type of CS		
Elective	382	53
Emergency	333	47

Analysis based on Robson's Ten Group Classification:

The total number of women delivered for the period of one year was 1727, out of which CS deliveries were 715. Overall, CS rate calculated in this specified period was 41.4%, (Table 5).

On analysis of indications of CS according to Robson's classification, different rate of each group was shown separately. (Table-6)

Group 5 (Previous cesarean section, singleton, cephalic, ≥37 weeks' gestation.) made the greatest contribution to the total CS rate. Group 1 (Nulliparous, single cephalic, ≥37 weeks, in spontaneous labor) had the second highest contribution to the CS rate and then group 2 (Nullipara single cephe"37 wks ind. or CS before labour), placed third. Hence, these three groups (5,1 and 2) contribute to more than 70% of all Caesarean sections carried out during the study period.

Group 5 was further analyzed according to the indications of CS. Out of 327 CS procedures, elective CS were 239 and emergency CS were 88.

Contribution from group 2(b) to overall caesarean section rate was 4.0% whereas it was 1.6 % for group 2(a).

Robson Group 4(b), (Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, e" 37 weeks' gestation, cesarean section before labor) had a CS rate of 2.4%.

On the other-hand Robson Group 4(a), (Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, e" 37 weeks' gestation, induced labor.) had its contribution of 0.5% to overall caesarean section rate.

The cesarean section rate for nulliparous breech (group 6) was 75 % while it was 80.6% for multiparous breech (group 7). Group 9 was the smallest group with maximum CS rate of 63%. CS rate for group 10 was 38.5%.

Table-V

Contribution of caesarian section according to Robson classification:

Robson Groups	No. of CS	Percentage %
Group 1	104	14.5
Group 2 (a)	33	4.6
(b)	74	10.34
Group 3	60	8.3
Group 4 (a)	08	1.1
(b)	42	5.8
Group 5	327	45.7
Group 6	06	0.8
Group 7	25	3.5
Group 8	9	1.2
Group 9	7	0.97
Group 10	20	2.8
Total	715	41.4

Table-VI

Indication of caesarean section by Robson classification system

Group	Number of CS Group	Number of women in group	Group Size[1] %	Group CS rate[2] %	Absolute group contribution to overall CS rate[3] (%)
Gr.1. Nullipara single ceph ≥37wks spon labour	113	298	18.6	37.9	6.5%
Gr.2a. Nulliparous, singleton, cephalic, ≥37 weeks' gestation, induced labor.	28	102	7.3	27.4	1.6
Gr.2b. Nulliparous, singleton, cephalic, ≥37 weeks' gestation, cesarean section before labor.	70	227	14.9	30.8	4.0
Gr. 3. Multipara (exclude previous caesarean sections) single cephe"37 wks spon labour	60	384	22.5	15.6	3.5
Gr. 4a. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, induced labor.	08	51	2.9	15.7	0.5
Gr.4b. Multiparous without a previous uterine scar, with singleton, cephalic pregnancy, ≥37 weeks' gestation, cesarean section before labor.	42	219	12.7	19.1	2.4
Gr.5. Previous caesarean section single ceph ≥37 wks	327	331	14.3	98.8	19
Gr.6. All nulliparous breeches	06	8	0.5	75	0.35
Gr.7. All multiparous breeches (including previous caesarean sections)	25	31		80.6	1.5
Gr.8. All multiple pregnancies (including previous caesarean sections	09	13	1.8	69.2	0.5
Gr. 9. All abnormal lies (including previous caesarean sections)	07	11	0.6	63.6	0.4
Gr.10. All single ceph<37 wks (including previous caesarean sections)	20	52	3	38.5	1.2
Total	715	1727			

Group size (%) = n of women in the group/total N women delivered in the hospital x 100
Group CS rate (%) = n of CS in the group/total N of women in the group x 100
Absolute contribution (%) = no of CS in the group/total N of women delivered in the hospital X100

Clinical indications of caesarian section: In our study period clinical indications for CS were grouped into nine different categories: hypertensive disorder (include gestational hypertension, eclampsia, preclampsia,); malpresentation (includes breech and transverse lie); disorder of amniotic fluid (covers both oligo and poly hydramnios); antepartum haemorrhage; prolonged and obstructed labour; fetal distress; previous CS; multiple pregnancies & others including maternal requests.

Previous CS—327 (46%), Foetal distress-179 (25%); Hypertensive disorder—57 (8%); APH-29 (4%) Malpresentation—38 (5%), Severe oligo & polyhydramnios-27(4%), Obstructed labour—21 (3%), Multiple pregnancy—9 (1%), Others including maternal request —28 (4%) (fig-1)

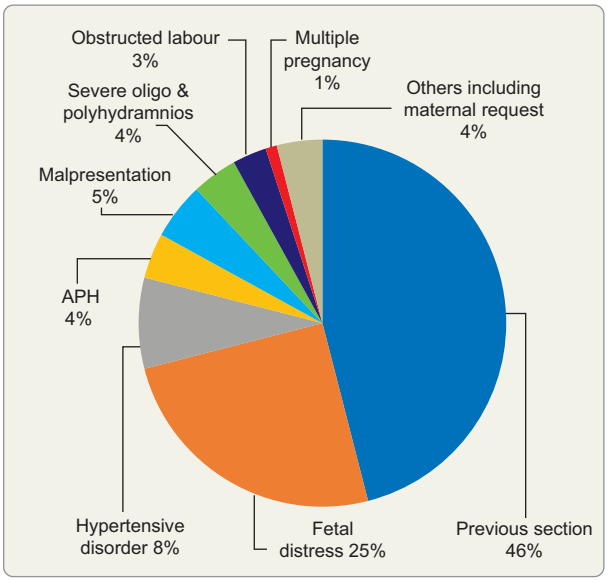

Fig.-1: *Clinical indication of caesarian sections*

Discussion:

Cesarean section is a key intervention to decrease maternal and neonatal morbidity and mortality. It is also one of the best indicators of the quality of maternal health services.[14] Despite its proven benefits, it has associated complications such as infection, bleeding, anesthetic accidents and even death. Future pregnancies can also be complicated by spontaneous preterm birth, uterine rupture, and abnormal placentation. These risks are higher for women in resource-limited settings with poor access to comprehensive obstetric care.[15,16]

Among the various classification systems for analysis of cesareans, the one by Robson and Denk has been found to be easy to understand, clear, mutually exclusive, reproducible and while also allowing prospective identification of categories.[17] After 2015, there have been many studies world over using the Robsons Ten Group Classification system (TGCS) to analyze cesareans.

The results of this analysis, based on 1727 women who gave birth in a semi urban hospital during one year, 2018.The study result showed that 46% of the total CS rate was contributed by Group 5 (327 repeat CS out of 715 women having caesarean section). Among 327 caesarian section 224 was elective after one CS. Another 54 women with one CS underwent repeat CS due to associated non recurrent indications either medical or obstetric including GDM, hypertensive disorder, oligohydramnios, APH, non-reassuring fetal status. It was seen that 49 CS out of 327 were done due to the indication of repeat more than one CS, giving an unavoidable fraction.

In the first half of the 20th century, a woman who had a CS was likely also to deliver by CS in subsequent pregnancies.[18] Currently, the rate of CS is many times higher among women who have had a previous CS (Robson Group 5), and this group makes a substantial contribution to the overall rate of CS.[19,20,21]

Therefore, the best way to reduce the overall rate of CS in these groups is to prevent the first procedure. [22]

The second most significant group was Group 1which contributed 6.5%. The group represents low risk women and the CS rate within this group is not expected to be higher than 3%.[23]

On analysis of indications of CS in primigravida group with spontaneous labor (Group 1), CS were performed following non-reassuring fetal status. Close monitoring of patients in this groups with adequate recording of foetal heart rate on partograph is required. Increasing the use of instrumental delivery by adequate training of staff is warranted to decrease primary caesarean among low-risk groups.[24] The interobserver difference in interpretation of CTG can be lowered by implementing frequent teaching workshops for the obstetric staff. [25]

Majority of women in groups 6 (nulliparous breech) and 9 (transverse or oblique lie) had caesarean births. This was not unusual, as these were women who had either foetal malposition or abnormal lie. Similar findings were reported in other studies.[26,27,28] It should be noted that the combined relative size of these two

groups was just 1.1% of total births, hence, their contribution to the total CS rate was minimal.

Among developed nations, a population based 10 year analysis from 2005-2014 in US reported an overall CSR was 31.6 with group 5 accounting for the most caesarean deliveries.[29] In most high income settings, groups 5, 2 and 1 are the major contributors to overall CSR unlike the studies from low-income settings.[30,31] The difference between high-income settings and our study may be due to fertility trends with stronger presentation of multiparous women (group 3) in our low-resource setting with high fertility rates. The fact that group 5 women were one of the major contributors both in high income and low-income settings indicates the importance of preventing primary caesarean if a meaningful reduction in overall CSR is to be achieved.[32] The practice of vaginal birth after C-section (VBAC) for non-recurrent indications in the previous C-section can be applied to reduce C-section in this group of patients.[33]

Conclusion:

All vaginal deliveries and cesarean sections should be universally categorized by the Robsons TGCS. The Robson 10-group Caesarean section classification system is a simple, standard tool to identify groups making the most signification contribution to the overall rate of CS. Groups contributing most to cesareans should be analyzed regularly and interventions initiated. Those interventions should be targeted at reducing primary cesareans and convincing patients for VBAC where possible. Institutional protocols for defining situations like fetal distress, non-progress of labour and failed induction should be available. Close monitoring of women in labour, increasing the use of instrumental delivery and practice of vaginal birth after C-section can significantly reduce the caesarian section rate. Inductions should be done only when necessary. All hospitals and health authorities use this standardized classification system as a key component of their quality improvement initiative for monitoring caesarian section rates. A regular audit should be done in all institutions to rationalize cesarean rates. Impact of interventions to reduce cesarean rates should be studied and documented.

References:

1. Betram AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, et al. Rates of caesarean section: analysis of global, regional and national estimates. Paediatr Perinat Epidemiol. 2007;21:98-113.
2. Zizza A, Tinelli A, Malvasi A, Barbone E, Stark M, De Donno A, et al. Caesarean section in the world: a new ecological approach. J Prev Med Hyg. 2011;52:161-73.
3. Litorp H, Kidanto H, Nystrom L, Darj E, Esse´n B. Increasing caesarean section rates among low-risk groups: a panel study classifying deliveries according to Robson at a university hospital in Tanzania. BMC Pregnancy Childbirth. 2013;13:107.
4. Timor-Tritsch IE, Monteagudo A. Unforeseen consequences of the increasing rate of caesarean deliveries:early placenta accreta and caesarean scar pregnancy. A review. Am J Obstet Gynecol. 2012; 207(1):14–29. DOI: 10.1016/j.ajog.2012.03.007 PMID:22516620
5. Gregory KD, Jackson S, Korst L, Fridman M. Caesarean versus vaginal delivery: whose risks? Whose benefits? Am J Perinatol. 2012;29(1):7–18. DOI: 10.1055/s-0031-1285829 PMID: 21833896.
6. WHO. Monitoring obstetric care: a handbook. Geneva: WHO Press, World Health Organization, 2009.
7. World Health Organization. Monitoring emergency obstetric care: a handbook. Geneva, Switzerland; 2009.
8. Althabe F, Belizán JM. Caesarean section: the paradox. (comment). Lancet 2006 Oct;368(9546):1472-1473.
9. Ye J, Betrán AP, Guerrero Vela M, Souza JP, Zhang J. Searching for the optimal rate of medically necessary caesarean delivery. Birth. 2014;41(3):237–44. DOI: https://doi.org/10.1111/birt.12104 PMid:24720614.
10. Robson MS. Can we reduce the cesarean section rate? Best Pract Res Clin Obstet Gynaecol 2001; 15:179–94.
11. Robson MS. Can we reduce the caesarean section rate? Best Pract Res Clin Obstet Gynaecol 2001 Feb;15(1):179-194.

12. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, Gulmezoglu M, et al. Classifications for cesa¬rean section: a systematic review. PLoS ONE. 2011;6(1):e14566. MJSBH Vol 17 Issue 2 July-Dec 2018

13. Robson MS. Classification of caesarean sections. Fetal and Maternal Medicine Review. 2001;12(1): 23-39.

14. WHO, UNFPA, UNICEF, AMDD. Monitoring emergency obstetric care: a handbook. Geneva: World Health Organization; 2009

15. World Health Organization. WHO statement on caesarean section rates, vol. WHO/RHR/15.02. Geneva: World Health Organization; 2015. (WHO/RHR/15.02).

16. Harrison MS, Pasha O, Saleem S, Ali S, Chomba E, Carlo WA, Garces AL, Krebs NF, Hambidge KM, Goudar SS. A prospective study of maternal, fetal and neonatal outcomes in the setting of cesarean section in low-and middle income countries. Acta Obstet Gynecol Scand. 2017;96(4):410–20.

17. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, et al. Classifications for cesarean section: a systematic review. PLoS ONE. 2011;6:14566–14566.

18. Paul RH, Miller DA. Cesarean birth: how to reduce the rate. Am J Obstet Gynecol 1995;172:1903–11

19. Robson MS. Can we reduce the cesarean section rate? Best Pract Res Clin Obstet Gynaecol 2001;15:179–94.

20. Robson MS. Classification of cesarean section. Fet Matern Med Rev 2001;12:23–39.

21. Robson MS, Scudamore IW, Walsh SM. Using the medical audit cycle to reduce cesarean section rates. Am J Obstet Gynecol 1996;174:199–205

22. Examining Caesarean Section Rates in Canada Using the Robson Classification System Sherrie Kelly, MSc,1,2 Ann Sprague, RN, PhD,1,2 Deshayne B. Fell, MSc,1,2 Phil Murphy, MSc,3 Nancy Aelicks, RN,4 Yanfang Guo, PhD,5 John Fahey, MSc,6 Leeanne Lauzon, RN, MSc, PNC(C),6 Heather Scott, MD, FRCSC,6 Lily Lee, RN, MSN, MPH,7 Brooke Kinniburgh, MPH,7 Monica Prince,1,2 Mark Walker, MD, MSc, MHCM1,2,5,8

23. Analysis of cesarean section rates using Robson ten group classification system in a tertiary teaching hospital, Addis Ababa, Ethiopia: a cross-sectional study. Ferid A. Abubeker1*, Biruck Gashawbeza1 , Thomas Mekuria Gebre1 , Mekitie Wondafrash1 , Alula M. Teklu2 , Demis Degu1 and Delayehu Bekele1

24. Delbaere I, Cammu H, Martens E, Tency I, Martens G, Temmerman M. Limiting the caesarean section rate in low risk pregnancies is key to lowering the trend of increased abdominal deliveries: an observational study. BMC pregnancy and childbirth. 2012

25. Dec;12(1):3. DOI: https://doi.org/10.1186/1471-2393-12-3 PMid:2223033 25.Bernardes J, Costa-Pereira A, Ayres-de-Campos D, van Geijn HP, PereiraLeite L. Evaluation of interobserver agreement of cardiotocograms. Int J Gynaecol Obstet 1997 Apr;57(1):33-37

26. Begum T, Nababan H, Rahman A, Islam MR, Adams A, Anwar I. Monitoring caesarean births using the Robson ten group classification system: a crosssectional survey of private for-profit facilities in urban Bangladesh. PLoS ONE. 2019;14(8):e0220693. https://doi.org/10.1371/journal.pone.0220693

27. Geze S, Tura AK, Fage SG, van den Akker T. Can the Robson 10 Group classification system help identify which groups of women are driving the high caesarean section rate in major private hospitals in eastern Ethiopia? A crosssectional study. BMJ Open. 2021;11(8):e047206. https://doi.org/10.1136/ bmjopen-2020-047206

28. Bolognani CV, Reis LBSM, Dias A, Calderon IMP. Robson 10-groups classification system to access C-section in two public hospitals of the Federal District/Brazil. PLoS ONE. 2018;13(2):e0192997. https://doi.org/10.1371/journal.pone.0192997.

29. Hehir MP, Ananth CV, Siddiq Z, Flood K, Friedman AM, D'Alton ME. Caesarean delivery

in the United States 2005 through 2014: a population-based analysis using the Robson 10-group classification system. Am J Obstet Gynecol. 2018 Apr. DOI:https://doi.org/10.1016/j.ajog.2018.04.012

30. Kelly S, Sprague A, Fell DB, Murphy P, Aelicks N, Guo Y, et al. Examining caesarean section rates in Canada using the Robson classification system. Journal of Obstetrics and Gynaecology Canada. 2013 Mar;35(3):206-14. DOI: https://doi.org/10.1016/S1701-2163(15)30992-0

31. Stavrou EP, Ford JB, Shand AW, Morris JM, Roberts CL. Epidemiology and trends for Caesarean section births in New South Wales, Australia: a population-based study. BMC pregnancy and childbirth. 2011 Dec;11(1):8DOI: https://doi.org/10.1186/1471-2393-11-8

32. Analysis of Caesarean Section Using Robson's 10-Group Classification at a Tertiary Level Hospital in Nepal. Rosy Vaidya Malla, Chanda Hamal, Bibhusan Neupane and Ratna Khatri.

33. Gardner K, Henry A, Thou S, Davis G, Miller T. Improving VBAC rates: the combined impact of two management strategies. Aust N Z J Obstet Gynaecol. 2014 Aug