Reporting Caesarean Delivery in district hospitals in Ouagadougou Using the Robson Classification System

KABORÉ C.[1*], BOCOUM F.[1], KANYALA/KABORÉ E.[2], BONANÉ/THIÉBA B.[2]

Abstract

The aim of this study was to provide a description of caesarean section rates in district hospitals in Ouagadougou according to Robson's classification. Delivery data were collected over a 6 months period in the three public district hospitals in Ouagadougou. We reported the relative size of each Robson group, the caesarean section rate in each group, and the absolute and relative contributions of each group to the overall caesarean section rate. A total of 5111 deliveries were recorded, of which 1248 were by caesarean section, giving a global caesarean section rate of 24.41%. According to Robson's classification, the main contributors to the overall rate of caesarean section were multiparous women with a singleton fetus in cephalic presentation at term and a previous caesarean section (group 5) with a relative contribution of 27.64%. The other contributors were women without previous uterine scar, at term in spontaneous labour , with a single foetus in cephalic presentation (group 1: nulliparous and group 3: multiparous) with relative contributions of 19.87% and 12.09 % respectively for group 1 and group 3. These three groups represented 60% of the total caesarean sections. Our results indicate that in district hospitals in Ouagadougou, the practice of caesarean section for women in groups 1, 3 and 5 should be given special attention.

Keywords: caesarean section, Robson classification, Ouagadougou, Burkina Faso.

Evaluation de la pratique de la césarienne dans les hôpitaux de district de la ville de Ouagadougou selon la classification de Robson

Résumé

Le but de cette étude était de fournir une description des taux de césariennes dans les hôpitaux de district de la ville de Ouagadougou selon la classification de Robson. Nous avons étudié les données d'accouchements sur une période de 6 mois dans les trois hôpitaux de district publics de la ville de Ouagadougou. Nous avons rapporté la taille relative, le taux de césarienne et les contributions, absolue et relative de chaque groupe de Robson au taux global de césarienne. Au total, 5 111 accouchements ont été enregistrés, dont 1 248 par césarienne, soit un taux global de césariennes de 24,41 %. Selon la classification de Robson, les principaux contributeurs au taux global de césarienne étaient les femmes multipares avec utérus cicatriciel, présentant une grossesse unique à terme, avec un fœtus en présentation céphalique (Groupe 5) avec une contribution relative de 27,64 %. Les autres contributeurs étaient les femmes sans cicatrice utérine antérieure, à terme, en travail spontané, avec une grossesse unique et fœtus en présentation céphalique (groupe 1 : nullipares et groupe 3 : multipares) avec des contributions relatives de 19,87 % et 12,09 % respectivement. Ces trois groupes représentaient 60 % de l'ensemble des césariennes pratiquées.
Nos résultats indiquent que dans les hôpitaux de district de la ville de Ouagadougou, la pratique de la césarienne chez les femmes des groupes 1, 3 et 5 devrait faire l'objet d'une attention particulière.

Mots-clés : césarienne, Classification de Robson, Ouagadougou, Burkina Faso.

[1] Research Institute of Health Sciences, Ouagadougou, Burkina Faso.
[2] Universitary hospitals Yalgado Ouédraogo, Ouagadougou, Burkina Faso.
* Corresponding author : Email: kaborewendyam@yahoo.fr

Introduction

Since the 1970s, the rate of caesarean section has increased significantly worldwide (1–5). The fight against maternal and perinatal mortality has been for a long time the main driver of more frequent use of caesarean section (6). However, there is no evidence that increases in caesarean section rates are necessarily accompanied by reductions in maternal and perinatal mortality (3,5,7–10). According to WHO recommendations, a population-based caesarean section rate of between 5% and 10% has an optimal effectiveness to preserve mothers and newborns health and rates greater than 10% are not associated with better outcomes. The increase in caesarean section rates is largely due to the increasing practice of caesarean section without medical reason that exposes mothers and newborns to unnecessary risks (11). These risks are even higher in Africa than in other continents, due to the lack of essential resources for quality obstetric care and the heterogeneity of practices in labour and delivery management (11). A recent study has shown that in low- and middle-income countries, the increases in caesarean rates were not associated with improved perinatal outcomes regardless of whether the starting caesarean rate was already high or not (12). High rates of cesarean delivery are of substantial concern owing to the potential harm to the mother and her baby associated with a medically unnecessary cesarean delivery and to the related costs of health care (13–21). Caesarean section should therefore only be performed when there is an obvious benefit, a benefit that could offset higher costs and additional health risks in the specific context of the operation. The lack of a standardized internationally-accepted classification system to monitor and compare caesarean section rates in a consistent and action-oriented manner is also one of the factors preventing a better understanding of this trend and underlying causes (22). In view of the significant increase in caesarean section rates worldwide, the WHO stated in 2015 (23) that "the priority should not be to reach a specific rate, but to make every effort to practice a caesarean section for all women who have need ". In this statement, the WHO recommends the use of Robson's classification as a global standard for assessment, monitoring and comparison of caesarean section rates in health facilities. This classification is easy to implement and interpret. In Burkina Faso, user fees for caesarean delivery have been reduced by 80% since 2007 in all public hospitals (24). Even though population-based cesarean rate remained very low (2%) in 2012, the facility-based caesarean delivery rates are rapidly increasing (25), and previous studies have shown that 12-24% of performed caesareans were not medically justified (25,26). The increase in caesarean section without medical indication could compromise this subsidy policy whose goal is to offer caesarean section to women who really need it. The aim of this study was to provide a description of caesarean section in district hospitals in Ouagadougou according to Robson's classification.

Materials and method

Setting, design and source of data

We conducted a 6-month observational cross-sectional study on women delivering in the three district hospitals in Ouagadougou (district hospitals of Bogodogo, Nongr-Massom and Boulmiougou) between May 2, 2016, and November 2, 2016. These hospitals were included in the DECIDE trial (Appropriate decision for cesarean delivery in Burkina Faso), which was designed to evaluate the effectiveness of a complex intervention in reducing unnecessary caesareans in Burkina Faso.

The DECIDE trial was approved by the Ethics Committee of the research center of the hospital of the University of Montreal, Canada (CR-CHUM) March 26, 2014 (No. 13356), and the National Ethics Committee of Burkina Faso February 5, 2014 (No. 2014-02-016). The DECICE trial is recorded on Current Controlled Trials at: http://www. Isrctn.com/ISRCTN48510263 and the protocol have been published elsewhere (27). All pregnant women with at least 28 weeks (or seven months) gestational age, and who delivered in one of the three public districts hospitals during the study period were included. We assume that newborn at gestational age less than 28 weeks or 7 months at delivery were not viable in these settings. Relevant information (parity, mode of previous deliveries and their indications, gestational age, onset of labour: spontaneous or induced) were daily collected by trained midwives, using a standardized questionnaire, and were evaluated on a quarterly basis by the study coordinator. The quality control of clinical data was ensured in two steps. First, on a quarterly basis, the coordinator of the study compared the number of delivered women in the hospital's birth registry with the number of women's forms collected, and assessed the completion of data collection and concordance of the data collected through a comparison with medical charts. The second data control step was conducted to check completeness and consistency by the data manager. Weekly feedback on the quality of data was provided to the midwives via mobile phone.

Definition of variables

The variables were: (I) Parity: nulliparous (women who have never given birth) or multiparous (at least one previous birth); (II) Type of gestation: defined as singleton (the presence of a single fetus) or multiple (more than one fetus); (III) Fetal presentation: cephalic or breech, with the fetus positioned longitudinally, and abnormal lie, with the fetus positioned transversely or obliquely; (IV) Previous C-section: presence of a uterine scar from a C-section for a previous gestation; (V) Onset of labor: spontaneous, induced, or absent, when the C-section was performed before the onset of labor and (VI) Gestational age, in full weeks at the time of the birth: calculated by the date of the last menstrual period (LMP) and/or ultrasound (USG) performed up to the 20th week of gestation. However, since gestational age in weeks is poorly documented due to the low accessibility of ultrasound, we also collected the gestational age in months that is usually collected in obstetrical records. Midwives were sensitized about the need to systematically collect women's gestational age in months when gestational age in weeks was not available. When the gestational age was collected in month, we considered a gestational age of at least 9 months to be equivalent to a gestational age of at least 37 weeks, and a gestational age less than 9 months to be equivalent to a gestational age of less than 37 weeks. Women with one or more missing data for theses variables were exclued from the study. The Robson classification system (10-group classification) is a recognized tool that fulfils international and local needs for caesarean section classification (28). Based on the obstetrical characteristics of the women (parity, number of fetuses, gestational age, onset of labour, fetal presentation, and previous caesarean section), the 10 categories are totally inclusive and mutually exclusive (29). Theses categories are presented in figure 1.

Groups	Clinical characteristics
1	Nulliparous, singleton, cephalic ≥ 37 weeks, spontaneous labor
2	Nulliparous, singleton, cephalic, ≥ 37 weeks, induced labo or caesarean section before labor
3	Multiparous without previous cesarean section, singleton, cephalic, ≥ 37 weeks, spontaneous labor
4	Multiparous without previous caesarean section, singleton, cephalic, ≥ 37 weeks, induced labor or caesarean section before labor
5	Multiparous with prior caesarean section, singleton, cephalic, ≥ 37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous caesarean section)
8	All multiple pregnancies (including previous caesarean section)
9	All pregnacies with transverse or oblique lie (including those previous caesarean section)
10	Singleton, cephalic, ≤ 36 weeks (including previous caesarean section)

Figure 1. Cesarean section groups according to the Robson classification, 2001 (29)

Analysis

We reported the relative size of each Robson group, the caesarean section rate in each group, and the absolute and relative contributions of each group to the overall caesarean section rate. All analyses were done with Stata statistical software, version 12.0. Because this was a descriptive analysis, no statistical testing was performed.

Results

During the study period, there were a total of 5111 deliveries. Among these deliveries, 1248 caesarean section were performed for a global caesarean section rate of 24.41%. Table 1 reports the births and caesarean section rate according to the Robson classification system.

Table 1. Classification of caesarean among the Robson classification system

Robson' groups	Number of women	Groupe size (%)	Number of caesarean section	Caesarean section rate (%)	Absolute contribution to the overall caesarean section rate (%)*	Relative contribution to the overall caesarean section rate (%) **
1	1583	30.97	248	15.66	4.85	19.87
2	89	1.74	80	89.88	1.56	6.41
3	2093	40.95	151	7.21	2.95	12.09
4	123	2.40	101	82.11	1.97	8.09
5	682	13.34	345	50.58	6.75	27.64
6	78	1.52	54	69.23	1.05	4.32
7	110	2.15	61	55.45	1.19	4.88
8	131	2.56	65	49.61	1.27	5.20
9	43	0.84	41	95.34	0.80	3.28
10	179	3.50	70	39.10	1.36	5.60
Total	**5111**	**100%**	**1248**	**24.41%**	**24.41%**	**100%**

* Proportion of caesarean sections in relation to the total population

** Proportion of each Robson group according to total number of caesarean rates.

A total of 3676 women had spontaneous labour, ie more than 72 % of the obstetrical population including 1583 nulliparaous (31%) and 2093 multiparous (41%). Multiparous women with a singleton fetus in cephalic presentation at term and a previous caesarean section (Robson group 5) represented 13.34% of the obstetrical population. According to Robson's classification, the main contributors to the overall rate of caesarean section were multiparous women with a singleton fetus in cephalic presentation at term and a previous caesarean section (Robson group 5) with absolute and relative contributions respectively of 6.75% and 27.64%. The other contributors were women without previous uterine scar, at term in spontaneous labour, with a single foetus in cephalic presentation (Robson group 1: nulliparous and group 3: multiparous) with absolute and relative contributions of 4.85% and 19.87% and 2.95% and 12.09 % respectively for group 1 and group 3. These three groups represented 60% of overall caesarean sections performed.

Discussion

We evaluated the caesarean section practice in three district hospitals in Ouagadougou. The global caesarean rate was 24%. Our results showed that women in groups 1, 3 and 5 were the largest contributors to the overall caesarean section rate in these hospitals. We assessed the caesarean section practice in a representative sample of district hospitals in Ouagadougou. Our results could be generalized to other urban district hospitals in Sub-Saharan Africa, where the policy of user fees removal has been implemented and where caesarean sections are performed by gynecologists- obstetricians.

Groups 2 and 4 accounted for only 4.14% of the obstetrical population suggesting that labour induction or elective caesarean section before labour is not a common practice in district hospitals in Ouagadougou. These results are similar to those found in previous studies in low-income countries (30).

Groups 1, 3 and 5 were the largest contributors to overall caesarean section rates. These results are in accordance with previous studies in low-income countries(30). Studies in middle and high income countries have identified groups 1, 2 and 5 as the largest contributors to overall caesarean section rate (30–32). Our results are in line with these studies regarding group 1 and 5 but different regarding group 3. These differences could be explained by the fact that the proportion of women in group 3 relatively to the obstetric population is higher in low-income countries. A recent study (30) using the Robson classification among several countries, using WHO data, showed that in high income countries: (a) the proportion of multiparous women decreased with a concomitant increase in the proportion of nulliparous women; (b) the proportion of women who had spontaneous labour (groups 1 and 3) decreased significantly in favour of women who delivered after induction or had a caesarean section before labour (groups 2 and 4), while in low income countries, three-quarters of the obstetric population had spontaneous labour and nearly half were multiparous.

Targeted interventions in groups 1, 3 and 5 could help to reduce the global caesarean section rate.

The high rates of caesarean section in groups 1 and 3, (15.66 % and 7.21 % respectively) suggest that a significant number of unnecessary cesareans are performed in low-risk women. Similarly to previous studies in high, middle and low-income countries (30–32), our results show that, women with a previous caesarean section (Robson group 5) have a significant contribution to the overall caesarean section rate and that the rate of caesarean section in these women is high (51%). These results highlight the so-called domino effect of caesarean section use: as caesarean section rates increase, more women in the obstetric population are in need of repeat caesarean section (30). Although caesarean section rate is still very low in Burkina (2% in 2010). Efforts to reduce unnecessary caesarean sections should be considered. To address this problem, evidence-based

interventions and programs to reduce primary and repeat caesarean section are needed. Previous studies have shown that the implementation of Robson's classification associated with audit and feedback of caesarean indications helped reduce unnecessary caesarean sections (33). Robson's classification is simple and clinically relevant. It allows assessing caesarean section practice, and identifying the groups with largest contributions to the overall caesarean section rate. The audit of caesarean section indications in these groups helps to identify the underlying causes and to guide interventions to reduce unnecessary caesarean sections.

Conclusion

Our results suggest that efforts to improve caesarean section practice in district hospital in Ouagadougou should focus on the removal of unnecessary primary caesarean section in women in spontaneous labour nulliparous and multiparous (groups 1 and 3) and improved management of childbirth in women with uterine scarring. Therefore, the implementation of best practices in labour and delivery management and audit of caesarean indications would be necessary.

Acknowledgments

We thank all the medical and administrative staff at the three participating hospitals for their contributions to this study and the data collectors.

References

1. World Health Organization: CDS INAS Bulletins 1995 – 2003. Christilaw JE. Cesarean section by choice: constructing a reproductive rights framework for the debate. Int J Gynaecol Obstet. 2006, 94: 262-268. 10.1016/j.ijgo.2006.04.006

2. Royal College of Obstetricians and Gynecology. National Collaborating Centre for Women's and Children's Health. Cesarean section: Clinical Guidelines. London: Royal College of Obstetricians and Gynecology; 2004. 2004.

3. BETRÁN A. P., MERIALDI M., LAUER J. A., 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 Mar;21(2):98–113.

4. ARIAS E., MACDORMAN M. F., STROBINO D. M., GUYER B. Annual summary of vital statistics--2002. Pediatrics. 2003 Dec;112(6 Pt 1):1215–30.

5. ALTHABE F., SOSA C., BELIZÁN J. M., GIBBONS L., JACQUERIOZ F., BERGEL E. Cesarean section rates and maternal and neonatal mortality in low-, medium-, and high-income countries: an ecological study. Birth Berkeley Calif. 2006 Dec;33(4):270–7.

6. 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. 2006 Jun 3;367(9525):1819–29.

7. BELIZÁN J. M., ALTHABE F., CAFFERATA M. L. Health consequences of the increasing caesarean section rates. Epidemiol Camb Mass. 2007 Jul;18(4):485–6.

8. HALL M. H., BEWLEY S. Maternal mortality and mode of delivery. Lancet Lond Engl. 1999 Aug 28;354(9180):776.

9. 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 Lond Engl. 2006 Jun 3;367(9525):1819–29.

10. VILLAR J., CARROLI G., ZAVALETA N., DONNER A., WOJDYLA D., FAUNDES A. *et al.* Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. BMJ. 2007 Nov 17;335(7628):1025.

11. SOUZA J. P., GÜLMEZOGLU A., LUMBIGANON P., LAOPAIBOON M., CARROLI G., FAWOLE B. *et al.* Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. BMC Med. 2010;8:71.

12. ZHAO Y., ZHANG J., ZAMORA J., VOGEL J. P., SOUZA J. P., JAYARATNE K. ***et al.*** Increases in Caesarean Delivery Rates and Change of Perinatal Outcomes in Low- and Middle-Income Countries: A Hospital-Level Analysis of Two WHO Surveys. Paediatr Perinat Epidemiol. 2017 Jul;31(4):251–62.

13. RCOG. National Collaborating Centre for Women's and Children's Health. Caesarean section: clinical guideline. London: RCOG Press, 2004.

14. Canadian Institute for Health Information. Giving birth in Canada: the costs. Ottawa: Canadian Institute for Health Information 2007. 2007.

15. ALEXANDER S., WILDMAN K., ZHANG W., LANGER M., VUTUC C., LINDMARK G. Maternal health outcomes in Europe. Eur J Obstet Gynecol Reprod Biol. 2003 Nov 28;111 Suppl 1:S78-87.

16. ALLEN V. M., O'CONNELL C. M., LISTON R. M., BASKETT T. F. Maternal morbidity associated with cesarean delivery without labor compared with spontaneous onset of labor at term. Obstet Gynecol. 2003 Sep;102(3):477–82.

17. HALL M. H., BEWLEY S. Maternal mortality and mode of delivery. Lancet. 1999 Aug 28;354(9180):776.

18. LEVINE E. M., GHAI V., BARTON J. J., STROM C. M. Mode of delivery and risk of respiratory diseases in newborns. Obstet Gynecol. 2001 Mar;97(3):439–42.

19. LIU S., HEAMAN M., JOSEPH K. S., LISTON R. M., HUANG L., SAUVE R. ***et al.*** Risk of maternal postpartum readmission associated with mode of delivery. Obstet Gynecol. 2005 Apr;105(4):836–42.

20. LYDON-ROCHELLE M., HOLT V. L., MARTIN D. P., EASTERLING T. R. Association between method of delivery and maternal rehospitalization. JAMA. 2000 May 10;283(18):2411–6.

21. ZANARDO V., SIMBI A. K., FRANZOI M., SOLDÀ G., SALVADORI A., TREVISANUTO D. Neonatal respiratory morbidity risk and mode of delivery at term: influence of timing of elective caesarean delivery. Acta Paediatr Oslo Nor 1992. 2004 May;93(5):643–7.

22. BETRÁN A. P., VINDEVOGHEL N., SOUZA J. P., GÜLMEZOGLU A. M., TORLONI M. R. A systematic review of the Robson classification for caesarean section: what works, doesn't work and how to improve it. PloS One. 2014;9(6):e97769.

23. BETRAN A. P., TORLONI M. R., ZHANG J. J, GÜLMEZOGLU A. M. WHO Working Group on Caesarean Section. WHO Statement on Caesarean Section Rates. BJOG Int J Obstet Gynaecol. 2016 Apr;123(5):667–70.

24. RIDDE V., RICHARD F., BICABA A., QUEUILLE L., CONOMBO G. The national subsidy for deliveries and emergency obstetric care in Burkina Faso. Health Policy Plan. 2011 Nov;26 Suppl 2:ii30-40.

25. KOUANDA S., COULIBALY A., OUEDRAOGO A., MILLOGO T., MEDA B. I., DUMONT A. Audit of cesarean delivery in Burkina Faso. Int J Gynaecol Obstet Off Organ Int Fed Gynaecol Obstet. 2014 Jun;125(3):214–8.

26. KABORÉ C., RIDDE V., KOUANDA S., AGIER I., QUEUILLE L., DUMONT A. Determinants of non-medically indicated cesarean deliveries in Burkina Faso. Int J Gynaecol Obstet Off Organ Int Fed Gynaecol Obstet. 2016 Nov;135 Suppl 1:S58–63.

27. KABORÉ C., RIDDE V., KOUANDA S., QUEUILLE L., SOMÉ P.-A., AGIER I. ***et al.*** DECIDE: a cluster randomized controlled trial to reduce non-medically indicated caesareans in Burkina Faso. BMC Pregnancy Childbirth. 2016 Oct 21;16(1):322.

28. TORLONI M. R., BETRAN A. P., SOUZA J. P., WIDMER M., ALLEN T., GULMEZOGLU M. ***et al.*** Classifications for cesarean section: a systematic review. PloS One. 2011 Jan 20;6(1):e14566.

29. ROBSON MS. (2001) Classification of caesarean sections. Fetal and Maternal Medicine Review 12: 23–39.

30. VOGEL J. P., BETRÁN A. P., VINDEVOGHEL N., SOUZA J. P., TORLONI M. R., ZHANG J. ***et al.*** Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Glob Health. 2015 May;3(5):e260-270.

31. BOLOGNANI C. V., REIS LB DE S. M., DIAS A., CALDERON I. de MP. Robson 10-groups classification system to access C-section in two public hospitals of the Federal District/Brazil. PloS One. 2018;13(2):e0192997.

32. ROBERGE S., DUBÉ E., BLOUIN S., CHAILLET N. Reporting Caesarean Delivery in Quebec Using the Robson Classification System. J Obstet Gynaecol Can JOGC. 2017;39(3):152–6.

33. BOATIN AA, CULLINANE F, TORLONI MR, BETRÁN AP. Audit and feedback using the Robson classification to reduce caesarean section rates: a systematic review. BJOG Int J Obstet Gynaecol. 2018 Jan;125(1):36–42.