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Cesarean Sections according to the Robson's Classification in Two University Hospitals of Yaoundé: Indications and Maternofetal Outcome

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Abstract

Introduction: Cesarean section is a surgical intervention which consists in the extraction of a fetus from the uterus after its incision. The rate of cesarean section varies depending on the country and the health facility. For this reason, in 2015, the World Health Organization (WHO) recommended the use of Robson's classification to evaluate the practice of cesarean sections in order to identify the groups of women who had abnormally high rates. The objective of our study was to evaluate cesarean sections using the Robson's classification in CHRACERH and in the Yaoundé Central Hospital (YCH). **Methodology:** We carried out a retrospective cross sectional and descriptive study in two (02) university hospitals in Yaoundé which took place from December 2017 to May 2018. We included in our study all women who gave birth over a period of two (02) years from January 2016 to December 2017 in these two health facilities. Our sampling was exhaustive over the study period. The parturients' information was collected using an anonymous and pretested questionnaire. The Robson's group of every parturient was determined. Descriptive parameters like mean and proportions were calculated. We compared the rates and indications of cesarean sections between the both hospitals using Chi^2 test. **Results:** Out of 330 deliveries realized in CHRACERH, we had 90 cesarean sections; hence, a rate of 27.2%. Out of 1863 deliveries carried out at the YCH, 462 were by cesarean section, hence a rate of 24.8%. The women who belonged to groups 1, 3 and 5 contributed to the highest rates of cesarean sections in both hospitals: in CHRACERH, group 5 (31.1%), group 3 (20%) and group 1 (15.6%), at YCH: group 3 (22.5%), group 1 (21.6%) and group 5 (17.3%). The indications of the cesarean sections varied

depending on the Robson's group and the hospital, the principal indication in group 1 was acute fetal distress (28.6%) in CHRACERH and cephalopelvic disproportion (36.7%) at YCH. Cephalopelvic disproportion was the predominant indication in groups 3 of CHRACERH (44.4%) and YCH (39.2%). In groups 5, CHRACERH and of YCH, a scarred uterus was the principal indication for the cesarean section at 82.4% and 78.4% respectively. At CHRACERH, the maternofetal complications were more frequent in groups 1 and 2 at the YCH, this was the case mostly in groups 1 and 3. **Conclusion:** The Robson's classification is an adequate tool for the evaluation and comparison of the rates of cesarean sections. The rates of cesarean section in CHRACERH (27.2%) and at YCH (24.8%) were higher than the rates recommended by WHO. Robson's groups 1, 3 and 5 were identified as the groups most at risk for cesarean sections in the both hospitals.

Keywords

Robson's Classification, Indication for Cesarean Section, Materno-Fetal Outcome

1. Introduction

Cesarean section is one of the most commonly performed surgical procedures in obstetrics. Since about 30 years, the WHO considered 10% to 15% as the ideal rate for cesarean sections [1]. Since then, delivery by cesarean section has been increasingly performed in both developed and developing countries [2]. Higher rates have not been associated with a reduction of maternal and neonatal morbi-mortality [3]. In the last decade, the rate of cesarean sections has greatly increased worldwide; as high as above 30% in certain regions [4]. For instance, in Great Britain and Scotland, the cesarean section rate increased from 16% in 1995 to 21.5% in 2000 [5]. The National Center for Health Statistics reported that the cesarean section rate in the United States increased from 20.7% in 1996 to 32.2% in 2014 [6]. The rates rose to 24.6% in the United Kingdom in 2008-2009 and to 20.8% in France in 2010 [7]. In Cameroon, a study carried out by Kemfang *et al.* on early maternal complications of cesarean section: about 460 cases in two university hospitals in Yaoundé found a cesarean section rate of 19.7% in the entire population [8]. When medically justified, a cesarean section can efficiently prevent maternal and perinatal morbidity and mortality [9]. However, no data has demonstrated the advantage for the mother or for the newborn of a cesarean section without indication [10]. Like any surgical intervention, cesarean section is associated with short as well as long term risks which can last for several years after delivery and affect the health of the woman and the child as well as the future pregnancies [11]. Till date, to the best of our knowledge, there exists no classification of cesarean section published in the literature on the topic. The Robson's classification had been widely used in several countries during the past years [12]. The WHO proposes to use the Robson's

classification like an international reference for the evaluation, the monitoring and the comparison of the rates of cesarean sections within health facilities with time and amongst them. The objectives of this study were to use the Robson's classification to identify the groups of women having had abnormally high rates of cesarean sections and to determine the early maternofetal outcome amongst these groups.

2. Materials and Methods

Ethical considerations: The study was carried out using the fundamental principles of research according to the Helsinki declaration. Ethical clearance was obtained from the Institutional committee of Ethics and Research of the faculty of Medicine and Biomedical sciences of the University of Yaoundé 1, while research authorizations were obtained from the administrations of the Yaoundé Central Hospital (YCH) and that of Centre Hospitalier de Recherche et d'Applicationen Chirurgie Endoscopiqueet Reproduction Humaine (CHRACERH). We included the files of all women who delivered by cesarean section during the study period.

We carried out a descriptive cross-sectional study with a retrospective data collection. It went from December 2017 to May 2018. The sampling was exhaustive. We included all women having delivered during a two years' period spanning from January 2016 to December 2017 in the both health facilities.

Data was collected using an anonymous and pretested questionnaire which was designed by the research team. The variables studied were; the age, parity, mode of labor onset, indication of the cesarean section, delivery mode, indication of the cesarean section, the occurrence or not of maternal or fetal complications. The data collected was registered and analyzed. Data codification, entry and analysis were done using the softwares CS Pro 7.0 and S.P.S.S 25.0. Tables were drawn using the software Microsoft Office Excel 2016. The Robson group of each parturient was determined using the Robson classification according to **Table 1** [13]. Descriptive parameters like mean and proportion were used. The association between variables and Robson's groups were searched using the Chi^2 method, and a p *value* < 0.05 and a confidence interval at 95% were considered statistically significant after logistic regression.

3. Results

At the end of the study, 3578 files had been analyzed. In CHRACERH, 330 deliveries were carried out during the study period amongst which 90 underwent cesarean sections, a rate of 27.2%. At the YCH, 1863 deliveries were carried out, amongst which 462 were by cesarean section. Hence, the rates of cesarean sections were 27.2% in CHRACERH and 24.8% at YCH. The patients were statistically of a higher educational level in CHRACERH than at YCH.

The women in groups 5, 3 and 1 had the highest rates of cesarean sections in CHRACERH with 31.1%, 20.0% and 15.6% respectively. The groups 3, 1 and 5

Table 1. Robson's Classification.

Group	Obstetrical characteristics
1	Nulliparous, single cephalic, >37 weeks in spontaneous labor
2	Nulliparous, single cephalic, >37 weeks, induced or CS before labor
3	Multiparous (excluding previous CS), single cephalic, >37 weeks in spontaneous labor
4	Multiparous (excluding previous CS), single cephalic, >37 weeks, induced or CS before labor
5	Previous CS, single cephalic, >37 weeks
6	All nulliparous breeches
7	All multiparous breeches (including previous CS)
8	All multiple pregnancies (including previous CS)
9	All abnormal lies (including previous CS)
10	All single cephalic, <36 weeks (including previous CS)

had the highest rates of cesarean section at YCH with 22.5%, 21.6% and 17.3% respectively (Table 2 and Table 3).

At CHRACERH, most of the cesarean sections of group 1 were indicated for acute fetal distress (28.6%). Cephalopelvic disproportion was the most frequent indication of cesarean sections in group 1 at YCH (36.7%) (Table 4).

Cephalopelvic disproportion was the most frequent indication of cesarean sections in group 3 in CHRACERH and at YCH with respective frequencies of 44.4% and 39.2%. There was no statistically significant difference ($p > 0.05$) in the indications of cesarean sections between groups 3 of CHRACERH and of YCH (Table 5).

At CHRACERH, all the cesarean sections of group 5 were indicated for scarred uterus (100%). At YCH, scarred uterus was the principal indication of cesarean sections within group 5 (65%). Many more cesarean sections were indicated for scarred uterus in CHRACERH than in YCH, with a statistically significant difference ($p < 0.05$) (Table 6).

At CHRACERH, groups 1, 2 and 5 had the highest rates of complications. Hemorrhagic and infectious complications were the most common in group5. In groups 1 and 2, the complications were exclusively hemorrhagic (Table 7).

At YCH, groups 1, 3 and 2 had the highest rates of maternal complications. The complications were mainly infectious in groups 1 and 3. In group 2, the complications were exclusively hemorrhagic. Other complications like thromboembolic complications, digestive and urinary tract injuries were neglectable (Table 8).

Groups 1, 2 and 3 had the highest fetal complications at CHRACERH. In group1, we had; neonatal infection in 66.7% of neonates delivered by cesarean sections (Table 9).

At YCH, groups 1, 3 and 10 had the highest rates of global fetal complications.

Table 2. Age distribution of the study population.

Variables	CHRACHERH (N = 330) n (%)	YCH (N = 1863) n (%)	P value
Age range			
<15	0 (0)	17 (0.9)	0.273
]15 - 20]	7 (2)	224 (12)	<0.001
]20 - 25]	29 (8.7)	468 (25.1)	<0.001
]25 - 30]	94 (28.5)	571 (30.7)	0.641
]30 - 35]	112 (34)	380 (20.4)	0.001
>35	88 (26.9)	203 (10.9)	<0.001

Table 3. Contribution of different Robson's groups to cesarean section rates at CHRACERH and at YCH.

Robson's group	Number of cesarean sections		Rates of cesarean sections (%)	
	CHRACERH N = 90	YCH N = 462	CHRACERH	YCH
1	14	100	15.6	21.6
2	12	50	13.3	10.8
3	18	104	20	22.5
4	6	30	6.7	6.5
5	28	80	31.1	17.3
6	0	10	0	2.2
7	4	26	4.4	5.6
8	2	30	2.2	6.5
9	4	8	4.4	1.7
10	2	24	2.2	5.2

Table 4. Indications of Cesarean Section within Robson's group1 at CHRACERH and YCH.

Indication of the surgery	Group 1		P value
	CHRACERH, N = 14 n (%)	HCY, N = 100 n (%)	
Acute fetal distress	4 (28.6)	28 (28.6)	0.975
Cephalopelvic disproportion	2 (14.3)	36 (36.7)	0.254
Placenta abruptio	0 (0)	6 (6.1)	0.506
Placenta prævia	2 (14.3)	0 (0)	0.007
Severe preeclampsia/eclampsia	0 (0)	8 (8.2)	0.438
Infertility	2(14.3)	0 (0)	0.007
Fetal macrosomia	0 (0)	4 (4.1)	0.59

Table 5. Indications of cesarean section in Robson's group 3 at CHRACERH and at YCH.

Indication of the surgery	Group 3		P value
	CHRACERH, N = 18 n (%)	YCH, N = 104 n (%)	
Acute fetal distress	4 (22.2)	10 (9.8)	0.273
Cephalopelvic disproportion	8 (44.4)	40 (39.2)	0.734
Placenta prævia	0 (0)	2(1.9)	0.68
Severe preeclampsia/eclampsia	2 (11.1)	2 (6.1)	0.153
Dystocic fetal presentation	0 (0)	18 (17.3)	0.176
Cord prolapse	0 (0)	5 (3.9)	0.55
Fetal macrosomia	0 (0)	11 (11.8)	0.283

Indication of the surgery	Group 5		P value
	CHRACERH, N = 28 n (%)	YCH, N = 80 n (%)	
Scarred uterus	28 (100)	52 (65)	0.01
Acute fetal distress	0 (0)	4 (5)	0.394
Cephalopelvic disproportion	0 (0)	4 (5)	0.394
Dystocic fetal presentation	0 (0)	4 (5)	0.394
Uterine prerupture Syndrome	0 (0)	10 (12.5)	0.165
Fetal macrosomia	0 (0)	4 (5)	0.394

Table 6. Indications of Cesarean Section within Robson's group 5 at CHRACERH and YCH.

Indication of the surgery	Group 5		P value
	CHRACERH, N = 28 n (%)	YCH, N = 80 n (%)	
Scarred uterus	28 (100)	52 (65)	0.01
Acute fetal distress	0 (0)	4 (5)	0.394
Cephalopelvic disproportion	0 (0)	4 (5)	0.394
Dystocic fetal presentation	0 (0)	4 (5)	0.394
Uterine prerupture syndrome	0 (0)	10 (12.5)	0.165
Fetal macrosomia	0 (0)	4 (5)	0.394

Table 7. Early maternal outcome after cesarean section according to Robson's groups at CHRACERH.

Robson's group	Rate of complications n (%)	Hemorrhagic Complications n (%)	Infectious Complications n (%)	Contribution to the global rate of complications (%)
1	0/14 (0)	0 (0)	0 (0)	0
2	2/12 (16.7)	2(100)	0 (0)	25
3	2/18 (11.1)	2(100)	0 (0)	25
4	0/6 (0)	0 (0)	0 (0)	0
5	4/28 (14.3)	2 (50)	2 (50)	50
6	0/0 (0)	0 (0)	0 (0)	0
7	0/4 (0)	0 (0)	0 (0)	0
8	0/2 (0)	0 (0)	0 (0)	0
9	0/4 (0)	0 (0)	0 (0)	0
10	0/2 (0)	0 (0)	0 (0)	0

At CHRACERH, groups 5, 2 and 3 were the highest contributors to poor maternal outcome. The most frequent complications were due to postpartum hemorrhage.

Table 8. Early maternal outcome after cesarean section according to Robson's groups at YCH.

Robson's group	Rate of complications n (%)	Hemorrhagic Complications n (%)	Infectious Complications n (%)	Contribution to the global rate of complications (%)
1	32/100 (32)	8 (25)	22 (68.8)	43.3
2	10/50 (20)	10 (100)	0 (0)	13.5
3	18/104 (17.3)	6 (33.3)	12 (66.7)	24.3
4	0/30 (0)	0 (0)	0 (0)	0
5	2/80 (2.5)	0 (0)	2 (100)	2.7
6	2/10 (20)	0 (0)	2 (100)	2.7
7	2/26 (7.7)	2 (100)	0 (0)	2.7
8	2/30 (6.7)	2 (100)	0 (0)	2.7
9	0/8 (0)	0 (0)	0 (0)	0
10	6/24 (25)	4 (66.7)	2 (33.3)	8.1

At YCH, groups 1, 3 and 2 were the highest contributors to poor maternal outcome. The most frequent complications were due to infections in group 1 and 3 and postpartum hemorrhage in group 2.

Table 9. Early fetal outcome after cesarean section according to Robson's groups at CHRACERH.

Robson's group	Rate of complications n (%)	*APGAR score < 7 n (%)	Neonatal infection n (%)	Neonatal death n (%)	Contribution to the global rate of complications (%)
1	6/14 (42.9)	0/6 (0)	4/6 (66.7)	0/6 (0)	25
2	6/12 (50)	2/6 (33.3)	2/6 (33.3)	0/6 (0)	25
3	6/18(33.3)	0/6(0)	0/6 (0)	0/6 (0)	25
4	0/6 (0)	0/0 (0)	0/0 (0)	0/0 (0)	0
5	4/28 (14.3)	0/4(0)	0 (0)	2/4 (50)	16.7
6	0/0 (0)	0/0 (0)	0/0 (0)	0/0 (0)	0
7	2/4 (50)	0/2(0)	0/2(0)	0/2(0)	8.3
8	0/2 (0)	0/0 (0)	0/0 (0)	0/0 (0)	0
9	0/4 (0)	0/0 (0)	0/0 (0)	0/0 (0)	0
10	0/2 (0)	0/0 (0)	0/0 (0)	0/0 (0)	0

At CHRACERH the highest contribution to fetal complications came from cesarean deliveries in groups 1, 2 and 3 respectively. The most frequent complication was neonatal infection

In group 2, we had neonatal asphyxia and neonatal infection, each in 33.3% (Table 10).

4. Limitations of the Study

We encountered some difficulties and limitations, namely:

- The retrospective nature of data collection following which patient files were excluded for missing key data.
- Restricted access to the HCY archives room which opened at 8:00 a.m. and closed at 3:30 p.m. making our data collecting difficult.

5. Discussion

The mean age of the parturients at CHRACERH was 31.2 ± 5.07 years. This is similar to that of Mbungu *et al.* in 2017 in RDC in which the mean age was 30.07 ± 6.25 years [14]. The mean age of patients at YCH was 27 ± 6.01 years. Other authors reported a mean age similar to ours; Kemfang *et al.* in 2015 in Cameroun with a mean age of 28.1 ± 0.93 years [8], Xavier Kinenkinda *et al.* in 2017 in RDC, who reported a mean age of 28.8 ± 6.8 years [15]. There was a statistically significant difference between the age of patients at CHRACERH and those of YCH. This could be due to the fact that CHRACERH is a reference center receiving an important pool of patients consulting for infertility problems, mostly at an advanced age.

The socio-professional class which was the most represented at CHRACERH

Table 10. Early fetal outcome after cesarean section according to Robson's groups at YCH.

Robson's group	Rate of complications n (%)	*APGAR score < 7 n (%)	Neonatal infection n (%)	Neonatal death n (%)	Contribution to the global rate of complications (%)
1	36/100 (36.0)	16/36 (44.4)	6/36 (16.7)	10/36(27.8)	27.7
2	12/50 (24.0)	6/12 (50)	4/12 (33.3)	6/12 (50)	9.2
3	28/104 (26.9)	16/28(57.1)	2/28 (7.1)	8/28 (28.6)	21.5
4	8/30 (26.7)	2/8 (25)	1/8 (12.5)	0/8 (0)	6.2
5	12/80 (15.0)	6/12 (50)	0/12 (0)	8/12 (66.7)	9.2
6	4/10 (40.0)	2/10 (20)	4/10 (40)	0/10 (0)	3.1
7	4/26 (15.4)	2/4 (50)	2/4 (50)	0/4 (0)	3.1
8	8/30 (26.7)	2/8 (25)	2/8 (25)	0/8 (0)	6.2
9	0/8 (0.0)	0/0 (0)	0/0 (0)	0/0 (0)	0
10	18/24 (75.0)	6/18 (33.3)	2/18 (11.1)	2/18 (11.1)	13.8

At YCH the highest contribution to fetal complications came from cesarean deliveries in groups 1, 3 and 10 respectively. The most common complication was neonatal asphyxia.

was that of public servants; 34.0%. The socio-professional class which was the most represented at of YCH was that of unemployed women making up 37.7% of patients, similar to that reported by Mbungu *et al*. in 2017 in RDC who reported that majority *i.e.*, 74.2% of parturients in their study were unemployed [14]. There was a statistically significant difference ($P < 0.05$) between the unemployed women at CHRACERH and those of YCH. This could be due to the fact that the cost of health care is more affordable at YCH than at CHRACERH, hence parturients who are more financially stable sought the services of CHRACERH.

In our study, the rate of cesarean section was at 27.2% at CHRACERH and 24.8 % at YCH. These findings were in accordance with those of literature which report a global increase in the rate of cesarean sections [2], way above the limit of 15% recommended by WHO [1]. Certain authors found results similar to ours; Mbungu *et al*. in 2017 in RDC reported 31.2% [14]. Hehir *et al*. in 2018 in the United States of America reported a global cesarean section rate of 31.6% [16].

This rise of cesarean section in our context could be explained by; advanced maternal age, an increase in the frequency of scarred uterus, the fear of complication of vaginal delivery, vulgarization of medically assisted procreation associated with a high frequency of associated multiple gestation.

At CHRACERH and YCH, groups 1, 3 and 5 were the groups with the highest rates of cesarean sections. This result is similar to that of Tura *et al*. in 2018 who reported groups 3, 5 and 1 with global cesarean rates of 21.4%, 21.1% and 19.3%

respectively [17]. The high rates in groups 1 and 3 could be due to the relatively large sizes of these groups in the parturients' population. Concerning the great contribution of group 5 in the rate of cesarean section, this could be explained by the increase in the frequency of scarred uterus in the population.

At CHRACERH, most of the cesarean sections of group 1 were indicated for acute fetal distress at 28.6%. This result was similar to that of Tahira *et al.* in 2012 at Muscat who reported that acute fetal distress was the principal indication of cesarean sections in group1 [18]. At YCH, most cesarean sections of group 1 were indicated for cephalopelvic disproportion *i.e.*, 36.7%. This difference was probably due to differences in technical support, monitoring of parturients was easier at CHRACERH compared to HCY due to the availability of cardiotocographs at CHRACERH. Moreover, contrary to CHRACERH, YCH receives more parturients referred from surrounding health centers usually with poor pregnancy follow up, in stationnarylabour for continuation of care.

Cephalopelvic disproportion was the predominant indication of cesarean section in groups 3 of both CHRACERH and YCH at 44.4% and 39.2% respectively. These results were similar to those of Tura *et al.* in 2018 in Ethiopia who reported that cephalopelvic disproportion was the predominant indication of cesarean section in groups 3 with 35.2% [17].

In group 5, we had more cesarean sections indicated for scarred uterus at CHRACERH than at YCH, the difference was statistically significant ($p < 0.05$). At CHRACERH, we noticed that all the women (82.4%) who underwent a cesarean section, all had as indication a scarred uterus (100%). At YCH 78.4% of women in group 5 had delivered cesarean section. This could be explained by the small sample size at CHRACERH. Tura *et al.* in 2018 in Ethiopia had equally obtained uterine scar like the main indication for cesarean section in group 5 with 65% [17].

At CHRACERH, the groups which had the highest rates of maternal complications were groups 5, 1 and 2 with 50%, 25% et 25% respectively. The complications were hemorrhagic (50%) and infectious (50%) in group 5. In groups 1 and 2, the complications were only hemorrhagic (100%). At the YCH, the groups with the highest maternal complications were groups 1, 3 and 2 respectively with 43.3%, 24.3% and 13.5%. The complications were principally infectious at 68.8% and 66.7% in groups 1 et 3. In group 2, the complications were solely hemorrhagic at 100%. These results were due to the fact that hemorrhage is a very common happening during deliveries. Infections remain frequent in our setting.

At CHRACERH, groups 1, 2 and 3 had the highest fetal complications at 25% each. In group 1, we had: neonatal infections and transfer to the neonatal unit in 66.7% of children delivered by cesarean section. In group 2, we had neonatal asphyxia and neonatal infections in 33.3% each. At YCH, groups 1, 3 and 10 had the highest rates of fetal complications notably 27.1%, 21.5% and 13.8% respectively. In groups 1, 2 and 10 of YCH, neonatal infection was the main neonatal

complication at 44.4%, 50% and 33.3% respectively. This could be explained by the high frequency of fetal morbidity in relation with surgery.

6. Conclusion

The Robson's classification is an important tool in the evaluation of cesarean section rates in health facilities. In our context, the rates of cesarean section are high. Groups 1, 3 and 5 were the groups with the highest rates of cesarean sections at CHRACERH and YCH. The principal indications of cesarean sections in groups 1, 3 and 5 were respectively acute fetal distress, cephalopelvic disproportion and scarred uterus at CHRACERH. At YCH, they were cephalopelvic disproportion in groups 1 and 3 and scarred uterus in group 5.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix: Questionnaire

IDENTIFICATION:			
1.	File number		
2.	Hospital	1. CHRACERH 2. YCH	
3.	Initials of first and last name		
SOCIODEMOGRAPHIC PROFILE:			
4.	Age:	1. ≤15 years 2. 16 - 20 years 3. 21 - 25 years 4. 26 - 30 years 5. 31 - 35 years 6. >35 years	
5.	Marital status	1. Single 2. Married 3. Divorced 4. Widow	
6.	Religion	1. Catholic 2. Muslim 3. Protestant 4. Pentecostal 5. Jehovah's Witness 6. Presbyterian	
7.	Region of origin	1. Adamawa 2. Central 3. East 4. Far North 5. North 6. Litorral 7. Northwest 8. South 9. Southwest 10. West 11. Foreign	
8.	Socio-professional class	1. Private sector employee 2. State employee 3. Unemployed woman	
9.	Level of education	1. None 2. Primary 3. Secondary 4. Superior	
10.	Residence		

OBSTETRIC HISTORY			
11.	Group according to Robson's classification	1. Group 1 (Nulliparous, ≥37 weeks, spontaneous labor) 2. Group 2 (Nulliparous, ≥37SA, induced labor) 3. Group 3 (Multiparous, ≥37 weeks, spontaneous labor) 4. Group4 (Multiparous, ≥37SA, induced labor) 5. Group 5 (Scarred uterus, ≥37 weeks) 6. Group6 (Nulliparous, breech presentation) 7. Group 7 (Multiparous, breech presentation) 8. Group 8 (Multiple pregnancies) 9. Group9 (abnormal presentation except breech) 10. Group10 (term ≤ 36SA)	
12.	Number of pregnancies		
13.	Number of living children		
14.	Previous pregnancies	1. Normal 2. Abortions 3. Stillbirth 4. Premature 5. Macrosomia 6. IUGR	
15.	Previous cesarean section	1. yes 2. no	

Continued

16.	Number of ANCs carried out:	1.1 2. 2 3.3 4.4 5. More than 4	
17.	Place of pregnancy follow up	1. Health center 2. Public hospital 3. Private clinic	
18.	Agent who gave birth	1. Traditional birth attendant 2. Midwife 3. Nurse 4. General Practitioner 5. Obstetrician Gynecologist	
19.	Pelviscan	1. Done 2. Notdone	
	HISTOIRE DE LA DERNIERE GROSSESSE		
20.	Number of fetuses	1. one 2. two 3. More than two	
21.	Presentation of the fetus(es)	1. Cephalic 2. Breech 3. Transverse	
22.	Induction of labor	1. Spontaneous 2. Artificial	
23.	Labor stimulation	1. Yes 2. No	
24.	State of the membranes on admission	1. Intact 2. Ruptured	
25.	Appearance of amniotic fluid	1. clear 2. Tinted with meconium 3. Blood-tinted	
26.	Birth weight	1. less than 2500g 2. Between 2500g and 4000g 3. Greater than 4000g	
27.	Fetal heart rate during labor	1. Normal 2. Bradycard 3. Tachycard 4. Absent	
	CESAREAN SECTION		
28.	Operative indication	1. Scarred uterus 2. Fetal distress 3. Feto-pelvic disproportion 4. Retroplacental hematoma 5. Placenta previa 6. Severe preeclampsia 7. Gestational diabetes 8. Multiple pregnancy 9. Dynamic dystocia 10. Previa obstacle 11. Twin pregnancy with abnormal presentation of the 1st twin 12. Obstructed labor 13. Uterine rupture 14. Genital malformation 15. Convenience of the mother 16. Maternal distress 17. IVF 18. Cord prolapse 19. Others	

Continued

29.	Management speed	1. Extreme emergency (≤15min) 2. True emergency (≤30min) 3. Relative urgency (≤60min) 4. Scheduled cesarean section	
30.	Type of anesthesia	1. General anesthesia 2. Epidural anesthesia 3. Spinal anesthesia	
31.	Type of surgery	1. Abdominal 2. Vaginal	
32.	Type of laparotomy	1. Pfannenstiel incision 2. Mochel incision 3. Bastien incision 4. Rapin-küstner incision 5. Joel Cohen's incision 6. Midline incision 7. Paramedian incision	
33.	Type of hysterotomy	1. Low transverse segmental incision (Kerr) 2. Low vertical incision (Krönig) 3.Classic or corporal incision	
MATERNAL OUTCOME			
34.	Complication occurrence	1. Yes 2. No	
35.	Morbidity	a. Postpartum hemorrhage 1. yes 2. No	
		b. Gestational Hypertension 1. yes 2. No	
		c. Infections 1. yes 2. No 1a. Urinary Infection 1b. Endometritis 1c. Pelvic Phlebitis 1d. Infection of the surgical .wound	
		d. Reintervention 1. yes 2. No	
		e. Digestive wound 1. yes 2. No	
		f. Urinary wound 1. yes 2. No	
		g. Thromboembolic disease 1. yes 2. No	
		h. Anemia 1. yes 2. No	
36.	Maternal death	1. yes 2. No	
FETAL OUTCOME			
37.	Complication occurrence	1. yes 2. No	
38.	Morbidity	a. Neonatal asphyxia (poor APGAR) 1. yes 2. No	
		b. Reanimation 1. yes 2. No	
		c. Transfer to neonatology 1. yes 2. No	
		d. Humerus fracture 1. yes 2. No	
		e. Brachial plexus palsy 1. yes 2. No	

Continued

		f. Anemia 1. yes 2. No	
39.	Neonatal death	1. yes 2. No	