Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2017, 7, 1132-1140
http://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

How Referred Patients Influence Cesarean Sections Rate Pattern: Analysis according to the Robson Classification

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How to cite this paper: Achille, K., Didier, K.A., Charles, K., Roland, A.C., Alice, D.F., Anicet, K. and Pacome, N'G.K.L. (2017) How Referred Patients Influence Cesarean Sections Rate Pattern: Analysis according to the Robson Classification. *Open Journal of Obstetrics and Gynecology*, **7**, 1132-1140.
https://doi.org/10.4236/ojog.2017.711114

Received: May 17, 2017
Accepted: October 17, 2017
Published: October 20, 2017

Abstract

Objective: To improve the practice of cesarean section by analyzing the cesarean section according to Robson's classification. **Methodology:** This was a cross-sectional and descriptive study carried out at the University Hospital of Cocody. It covered the Cesarean sections performed during the year 2015 and ranked according to the 10 groups of Robson. **Results:** The overall Cesarean section rate in 2015 was 42.8% (3100 cesarean sections for 7229 deliveries). Group 1 was the largest contributor to overall Cesarean section with a rate of 20.5% followed by Group 3 (18.6%), Group 5 (16.4%) and Group 10 (12.2%), unlike other data in the literature where groups were in descending order Groups 5, 1, 3. This difference was driven by medical evacuations and our working conditions. **Conclusion:** The Cesarean section rate is constantly increasing in our department. Referred patients played a huge role in the distribution of C-section along the Robson's 10 groups classification.

Keywords

Cesarean Section, Robson Classification, Evacuation, Referred Patients

1. Introduction

Cesarean section was introduced to save the mother and her baby's life. 1) [1] Like any surgical intervention, it is associated with short- and long-term risks that can persist for several years after delivery and affect the health of the woman and her baby and subsequent pregnancies. Since 1985, the WHO recommends that the Cesarean section rate should not exceed 10% to 15% for the entire population of a country. This rate is currently set at 10% below which the delivery of

Cesarean section no longer contributes to the reduction of maternal and neonatal mortality. 2) [2] Yet, today there is an increase in Cesarean rates in highly medicalized countries [1].

It is true that several publications show the inverse correlation between Cesarean section rate and maternal and newborn mortality in a country. However, rates above 10% without net benefit for both mother and child are not acceptable, especially for developing countries that are beginning to implement free-of-charge policies for the Cesarean section supported by the taxpayer.

In Côte d'Ivoire, prior to the implementation of the free-form policy, the Cesarean rate was 6.4% in 2010 [1]. Being aware of the danger of unnecessary Cesarean sections, we decided to monitor the rate of Cesarean section at the maternity of the Cocody University hospital in order to limit the excesses. The Robson classification is an objective tool recommended by the WHO to achieve this goal. Indeed, many studies have been done around the world mainly in developed countries. And authors found that Robson high risk groups are those which are mostly contributing to the rate of C-section in industrialized countries [1] [3] [4] [5]. Is it the same pattern in UHC of Cocody in Côte d'Ivoire?

2. Methodology

2.1. Methods and Patients

We carried out a descriptive cross-sectional study at the maternity of the University Hospital Center of Cocody (CHU of Cocody). It took place over a period of one year from 1 January 2015 to 31 December 2015.

All patients that underwent Cesarean section during the study period were included in the study. All Cesarean sections on pregnancies of less than 28 gestation weeks and/or fetuses weighing less than 1000 grams were excluded from the study.

All Cesarean sections were classified according to groups as described by Robson and recommended by the WHO.

In UHC of Cocody, Cesarean section is free of charge. This hospital is situated at the third level of the health care system in Côte d'Ivoire. UHC of Cocody is surrounded by peripheral maternities which not have the ability to provide C-section when necessary. Therefore, referred patients represent the majority of pregnant women treated in this hospital.

2.2. Variables

Variables necessary for applying the Robson classification that we used were: number of fetus (single or multiple); fetal presentation (cephalic, breech, or transverse); previous obstetric record (parity, uterine scar); onset of labor and delivery (spontaneous, induced, or prelabor C-section); and gestational age at the time of delivery.

We classified patients into the 10 groups described by Robson [5].

Sociodemogaphic and clinical variables were: age (<20, 20 - 24, 35 - 39, 40+);

occupation (Housewife, informal sector, student, owning a wage); parity (0, 1, 2, 3, 4+); pass history of C-section; Admission mode (referred, not referred) and the type of Cesarean section performed (Emergency C-section or Prelabor C-section).

2.3. Operational Definitions

We considered pregnant women into labor when they reached 4 cm of cervical dilatation. Induced labor was defined as the use of any uterotonic drugs (oxytocin and protaglandins) in order to initiate the labor. Prelabor C-section group included all patients who underwent C-section before being into labor neither beneficiated from labor induction.

3. Results

3.1. The Cesarean Rate

During the year 2015, 7229 births were delivered at the maternity hospital of the CHU of Cocody. From these deliveries, 3441 caesarean sections were performed with a rate of 47.6%. The criteria of inclusion and non-inclusion allowed us to retain 3200 caesarean sections or a caesarean section rate of **42.8%**.

3.2. The Socio-Demographic and Clinical Characteristics

The socio demographic and clinical characteristics are summarized in Table 1.

First, the majority of Caesarean patients (73.1%) were evacuated from the peripheral maternity wards. The majority (71.3%) was in the 20 to 35 age group with a median age of 28 years. It was then observed that 43.6% of the Caesarea patients were in the informal sector. These included hairdressing, sewing and small shops. The median parity was 1, and nulliparous were the most represented at 38.3% of cases. These women had a previous Caesarean section in 21.9% of cases. Finally, we found that the rate of emergency caesarean section was 69.9% of the total study population.

3.3. The Robson Classification Groups (Table 2 & Table 3)

Group 3 (30.2%) and Group 1 (26.1%) accounted for the majority of all deliveries regardless of the mode of delivery (vaginal or caesarean), with a rate of 56.3%. Robson groups with more caesarean sections were Group 1 (20.5%), Group 3 (18.6%), Group 5 (16.4%) and Group 10 (12.2%) as shown in Table 2. These four groups accounted for 67.8% of caesarean women.

Of the 7729 deliveries performed in the department, 2154 were delivered in patients who were not referred. Among none-referred patients, 835 women underwent a caesarean section. In this group, Robson's classification was as follows in Table 3. The main groups that contributed to the rate of caesarean sections were Group 5 (21.6%) followed by Group 1 (16.3%) and Group 3 (15.9%).

We showed the evolution of C-section's rate along the Robson's ten group classification first with the entire patients in Table 2 and secondly without referred patients in Table 3.

Table 1. Distribution of patients by socio-demographic and clinical characteristics.

Parameters	Number	Percentage (%)
Age in years		
<20	264	8.5
20 - 35	2210	71.3
35 - 40	500	16.1
>40	126	4.1
Minimum = 13 years Median = 28 years	Mean = 28.2 years	Maximum = 51 years
Occupation		
Housewife	890	28.7
Informal sector	1353	43.6
Pupil-Student	302	9.7
Salaried	555	17.9
Parity		
0	1187	38.3
1	810	26.1
2 - 3	806	26.0
4+	297	9.6
Minimum = 0	Median = 1	Maximum = 10
Pass history of Cesarean Section		
No	2421	78.1
Yes	679	21.9
Admission mode		
Referred	2265	73.1
Not referred	835	26.9
Type of Cesarean section		
Emergency C-section	2166	69.9
Elective C-section	934	30.1
Total	**3100**	**100**

4. Discussion

During our study period, 3200 caesarean sections out of a total of 7229 deliveries were performed, giving a caesarean section rate of 42.8%. On the analysis of the literature data, we find that this rate is higher than those found in the same department by Abauleth [6], Koffi [7] and Kopoin [8] who found in 1994, 2003 and 2013 rates of 15.34%, 27.2% and 32.7% respectively. Ouedraogo *et al.* [9] found rates of 29.9%, 22.7% and 21.6% respectively at CHU of Treichville and CHNYO in Ouagadougou in 2001. The significant rate of caesarean section in our study is largely due to the recruitment of patients on the one hand and on

Table 2. Distribution of patients according to the contribution of Robson's 10 groups.

	ROBSON'S GROUP	Total delivery n = 7229		Cesarean section n = 3100		
		A	Frequency	B	Relative contribution of each group to the overall rate of cesarean section	Rate of cesarean section in each group
		Number	(A/Total delivery) × 100	Number	(B/Total cesarean) × 100	(B/A) × 100
1	Nullipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, spontaneous labor	1887	26.1%	637	20.5%	33.7%
2	Nullipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, onset of labor or cesarean section before labor	318	4.4%	277	8.9%	87.1%
3	Multipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, spontaneous labor, without cicatricial uterus	2184	30.2%	577	18.6%	26.4%
4	Multipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, onset of labor or caesarean before work, without cicatricial uterus	347	4.8%	270	8.7%	77.8%
5	Previous cesarean section all multipara with at least a uterine scar, single pregnancy, cephalic presentation, gestational age ≥37 SA	767	10.6%	508	16.4%	66.2%
6	All nullipara, single pregnancy, seat presentation	145	2%	95	3.1%	65.5%
7	All multipara, single pregnancy seat presentation, cicatricial uterus included	246	3.4%	157	5.1%	63.8%
8	All multiple pregnancies, cicatricial uterus included	341	4.7%	153	4.9%	44.8%
9	All single pregnancies with transversal presentation, cicatricial uterus included	47	0.6%	47	1.5%	100%
10	All single pregnancies with cephalic presentation, gestational age <37 SA, cicatricial uterus included	947	13.1%	379	12.2%	40%
	Total	**7229**	**100%**	**3100**	**100%**	**42.8%**

the other hand to the increasing trend of caesarean sections. Indeed, the CHU of Cocody is a center of reference of the maternities of the communes and suburbs located in the North of the city of Abidjan some of which are provided with operating theater suites. This is why the majority of the patients who undergone surgery (71.1%) were evacuated. With regard to the increasing trend of indications, breech position in the past did not constitute an indication of caesarean section in patients who have already given birth by natural route. It should be added to this, the realization of elective Caesarean sections today for circular cord. However, our Caesarean section rates are between 35.2% and 52.1% reported by Farghali *et al.* [10] respectively in two Cairo hospitals (academic and

Table 3. Distribution according to the contribution of Robson's 10 groups without referred patients.

	GROUPE DE ROBSON	Total delivery n = 2154		Césariennes VEM n = 835		
		A	Frequency	B	Relative contribution of each group to the overall rate of cesarean section	Rate of cesarean section in each group
		Number	(A/Total delivery) × 100	Number	(B/Total cesarean) × 100	(B/A) × 100
1	Nullipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, spontaneous labor	561	26%	136	16.3%	24.2%
2	Nullipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, onset of labor or cesarean section before labor	91	4.2%	87	10.4%	95.6%
3	Multipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, spontaneous labor, without cicatricial uterus	720	33.4%	133	15.9%	18,5%
4	Multipara, single pregnancy, cephalic presentation, gestational age ≥37 SA, onset of labor or caesarean before work, without cicatricial uterus	101	4.7%	97	11,6%	96%
5	Previous cesarean section all multipara with at least a uterine scar, single pregnancy, cephalic presentation, gestational age ≥37 SA	275	12.8%	180	21.6%	65.5%
6	All nullipara, single pregnancy, seat presentation	33	1.5%	30	3.6%	90.9%
7	All multipara, single pregnancy seat presentation, cicatricial uterus included	73	3.4%	59	7,1%	80.8%
8	All multiple pregnancies, cicatricial uterus included	78	3.6%	40	4.8%	51.3%
9	All single pregnancies with transversal presentation, cicatricial uterus included	8	0.4%	8	1%	100%
10	All single pregnancies with cephalic presentation, gestational age <37 SA, cicatricial uterus included	214	9.9%	65	7.8%	30.4%
	Total	**2154**	**100%**	**835**	**100%**	**38.8%**

cord. However, our Caesarean section rates are between 35.2% and 52.1% reported by Farghali *et al.* [10] respectively in two Cairo hospitals (academic and military) in Egypt in 2014. In Tanzania in 2013, Litorp *et al.* [11] noted a dramatic increase in the caesarean section rate in a decade from 19% to 49%. The average caesarean rate in this university hospital was 46% during the study period.

Specifically for caesarean sections, the main groups that contributed the most to the overall caesarean section were Group 1 (20.5%), Group 3 (18.6%), Group 5 (16.4%), and Group 10 (12.2%). These four groups accounted for 67.8% of all

Caesarean sections. Litorp *et al.* [11] in Dar es Salaam-Tanzania also found that Groups 1, 3 and 5 are the largest contributors to the overall caesarean section rate in their university hospitals.

Group 1 (Nullipara with single pregnancy in cephalic presentation, 37 weeks gestation, in spontaneous labor) was the largest contributor to the overall Caesarean section rate at 20.5%. The rate of caesarean section in this group (20.5%) is higher than those observed by Betrán *et al.* [12] and Kelly *et al.* [4], who found 12.6% and 13.19% respectively in Latin America and Canada. This difference could be put down to the fact that these are highly medicalized countries and the figures come from statistics at the country and continent levels.

Kazmi *et al.* [13] in a reference hospital like ours in Iran has found a 13% contribution for this group.

Group 3 was the second group with 18.6% of the overall caesarean section. Here, Kazmi *et al.* [13] noted only 2.6% of caesarean sections in their institution in Iran; a clear difference that could be explained by the different conditions of obstetric practice.

Group 5 (previous Cesarean section, all multiparous with at least one uterine scar, single pregnancy, cephalic presentation, gestational age ≥37 SA) was the third largest contributor to overall cesarean section, with a rate of 16.4% [4]. This accounted for 27.1% and 26.3% respectively.

This group is the first group of Caesarean patients in developed countries due to caesarean sections of convenience, so that obstetric gynecologists find themselves with many scarred uteruses explaining the high number of cesarean sections in this group. In our department, there are no cesarean sections of convenience. However, elective Cesarean sections for circular cord explain that we have more and more cicatricial uteruses (21.9% in 2015 versus 14.4% in 2003 [6]). This may explains why Group 5 was the third largest provider of caesarean sections.

Group 10 (Unique pregnancy in cephalic presentation <37 weeks of gestation, including women with a previous Cesarean section) is composed of premature deliveries. Its contribution to the overall cesarean section rate was 12.2% [4]. In Canada who had noted 5.6%. The reason mentioned to explain this high rate of cesarean in this group is the status of center of reference of the CHU of Cocody. This situation justifies many in utero transfers of premature to our department.

Thus, in our department, the largest groups contributing to Cesarean section rates are in descending order namely Group 1, Group 3, and Group 5.

This is contrary to the literature performed in developed countries, which shows that the largest contributors to Cesarean sections are in descending order, Groups 5, Group 1 and Group 3 [1] [3] [4] [5]. This difference could be explained by the context in which obstetric emergency medical evacuations occurred, so that 73.1% of our Cesarean sections were performed in evacuated patients. Thus, when we classify Robson with only not referred patients (**Table 3**), we also find that the largest contributor is Group 5 followed by Groups 1 and 3 as observed in developed countries.

5. Conclusion

Unlike highly medicalized countries, low-risk groups are the ones that contribute the most to the increase of the overall rate of cesarean section in our department. This difference is due to a high rate of cesarean section in referred patients. Would medical referral be a factor of unnecessarily Cesarean section? Subsequent studies could answer this question.

Limitation of the Article

Patients who involved in this study were mostly referred from peripheral maternities which do not have any operating room for Cesarean section practice. So, the selection of those patients for emergency C-section might be led to bias.

References

[1] Gibbons, L., Belizán, J.M., Lauer, J.A., Betrán, A.P., Merialdi, M. and Althabe, F. (2010) The Global Numbers and Costs of Additionally Needed and Unnecessary Caesarean Sections Performed per Year: Overuse as a Barrier to Universal Coverage. WHO Report, 1-31.

[2] WHO Department of Reproductive Health and Research. (2014) WHO Statement on Caesarean Section Rates. 8 p.

[3] Chung, W.H., Kong, C.W. and To, W.W.K. (2017) Secular Trends in Caesarean Section Rates over 20 Years in a Regional Obstetric Unit in Hong Kong. *Hong Kong Medical Journal*, **23**, 340-347.

[4] Kelly, S., Sprague, A., Fell, D.B., Murphy, P., Aelicks, N. and Guo, Y. (2013) Examining Cesarean Section Rates in Canada Using the Robson Classification System. *Journal of Obstetrics and Gynaecology Canada*, **35**, 206-214. https://doi.org/10.1016/S1701-2163(15)30992-0

[5] Robson, M. (2001) Classification of Caesarean Sections. *Fetal and Maternal Medicine Review*, **12**, 23-39. https://doi.org/10.1017/S0965539501000122

[6] Abauleth, Y. (1994) Abdominal Cesarean Section: Indication, Techniques and Maternal Risks by the Mode of Admission to the University Hospital Center of Cocody from 1989 to 1991. Thesis, Medical Sciences, University of Cocody-Cote D'Ivoire.

[7] Koffi, A., Boni, S., Abauleth, R., Baligrosse, S., Effoh, D., Bohoussou, M., *et al.* (2004) Iterative Cesarean Section at Cocody CHU: Indications and Feto-Maternal Prognosis. *SAGO*, **5**, 36-39.

[8] Kopoin, G. (2013) Cesarean and Its Complications at the Maternity of the University Hospital of Cocody. Thesis, Université Félix Houphouet Boigny de Cocody, Abidjan.

[9] Ouédraogo, C., Zoungrana, T., Dao, B., Dujardin, B., Ouédraogo, A. and Thiéba, B. (2001) Quality Cesarean Section of in the CHNYO of Ouagadougou. Analysis of Core Determinants of 478 Cases in the Obstetrics Gynecology Department. *Medicine of Black Africa*, **48**, 443-451.

[10] Farghali, M.M., Rashed, A.R., Fathi, H., Moustafa, A.M. and Rahman, W.S.A. (2014) The Impact of Non-Clinical Factors on the Rate of Caesarean Section in Egypt. *The Medical journal of Cairo University*, **82**, 215-222.

[11] Litorp, H., Kidanto, H.L., Nystrom, L., Darj, E. and Essén, B. (2013) Increasing Caesarean Section Rates among Low-Risk Groups: A Panel Study Classifying Deli-

veries according to Robson at a University Hospital in Tanzania. *BMC Pregnancy Childbirth*, **13**, 107. https://doi.org/10.1186/1471-2393-13-107 http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3655870&tool=pmcentrez&rendertype=abstract

[12] Betrán, A.P., Gulmezoglu, A.M., Robson, M., Merialdi, M., Souza, J.P., Wojdyla, D., *et al.* (2009) WHO Global Survey on Maternal and Perinatal Health in Latin America: Classifying Caesarean Sections. *Reproductive Health*, **6**, 18. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2779175&tool=pmcentrez&rendertype=abstract

[13] Kazmi, T., Sarva Saiseema, V. and Khan, S. (2012) Analysis of Cesarean Section Rate—According to Robson's 10-Group Classification. *Oman Medical Journal*, **27**, 415-417. https://doi.org/10.5001/omj.2012.102