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CESAREAN SECTION CLASSIFICATION ACCORDING TO THE ROBSON MODEL, OBSTETRICS UNIT, SAN FELIPE GENERAL HOSPITAL, HONDURAS, APRIL-JUNE, 2017

Clasificación de cesáreas según el modelo de Robson, Unidad Obstétrica, Hospital General San Felipe, Honduras, abril-junio de 2017

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ABSTRACT

Objective: To classify cesarean sections according to the Robson Model in the obstetrics unit of an intermediate complexity hospital.

Materials and methods: Descriptive cross-sectional study conducted in the obstetrics unit of the San Felipe General Hospital (HGSF), Tegucigalpa, Honduras, between April and June 2017. Out of 477 clinical records of patients undergoing elective and/or emergency surgery during the study period, 89 were selected using probabilistic random selection. A descriptive analysis of sociodemographic variables, clinical/obstetric indications, and categories of the Robson model was conducted. Authorization from the institution was obtained.

Results: The proportion of cesarean sections during the study period was 59.8% (477/797; 95% CI:56.3-63.3). Of the cases studied, 48/89 (53.9%) were classified as "no risk pregnancy" (categories 1-4); the most frequent indications in this group were low fetal reserve in 22/48 (22/48*100%) and cephalopelvic disproportion in 16/48 (16/48*100%). In the "risk group" (categories 5-10), in 41/89 (46.1%), indications were cephalopelvic disproportion and breech presentation, (8/41) (8/41*100%), respectively. The main contributors to cesarean section were groups 1 (17/89; 19.1%), 2 (20/89, 22.5%) and 5 (20/89; 22.5%), for a total of 64.1%.

Conclusion: The Robson model is applicable in our setting and the classification provides information that can be used as a diagnostic and surveillance tool for cesarean sections in a level II institution.

Key words: Cesarean section; classification; morbidity and mortality indicators; maternal health services.

RESUMEN

Objetivo: clasificar las cesáreas según el modelo de Robson en la unidad obstétrica de un hospital de nivel medio de complejidad.

Materiales y métodos: estudio descriptivo, transversal, llevado a cabo en unidad obstétrica

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del HGSF, Tegucigalpa, Honduras, entre abril y junio de 2017. Se seleccionan 89 de 477 historias clínicas de pacientes sometidas a cesárea electiva o de emergencia en el periodo del estudio mediante selección aleatoria probabilística. Se realiza análisis descriptivo de variables sociodemográficas, indicaciones clínicas/obstétricas y categorías del modelo de Robson. Se obtuvo autorización institucional.

Resultados: la proporción de cesáreas en el periodo fue 59,8 % (477/797; IC 95 %:56,3-63,3). Se clasificaron 48/89 (53,9%) cesáreas estudiadas como embarazo "sin riesgo" (categorías 1-4); la indicación más frecuente en este grupo fue baja reserva fetal 22/48 (22/48*100 %) y desproporción céfalo-pélvica 16/48 (16/48*100 %). En el grupo "de riesgo" (categorías 5-10) en 41/89 (46,1 %) las indicaciones fueron desproporción céfalo-pélvica y presentación pélvica (8/41) (8/41*100 %) respectivamente. Los principales aportantes de cesárea fueron los grupos 1 (17/89; 19,1 %), 2 (20/89, 22,5 %) y 5 (20/89; 22,5 %) para totalizar 64,1 %.

Conclusión: el modelo de Robson es aplicable en nuestro medio y la clasificación aporta información como herramienta de diagnóstico y vigilancia en la realización de cesáreas en una institución de segundo nivel.

Palabras clave: cesárea; clasificación; indicadores de morbimortalidad; servicios de salud materna.

INTRODUCTION

Cesarean section (c-section) is a procedure whereby the fetus can be born through the abdominal (laparotomy) and uterine walls (hysterotomy), when vaginal delivery becomes difficult. Etimologically, the word comes from the latin *secare*, which means "cutting" (1). In the past, it was considered a frightful intervention because of very high rates of maternal and fetal morbidity and mortality. However, these rates have dropped thanks to the use of antibiotics, improved surgical and anesthesia-analgesia techniques, and the creation of blood banks. As a result, it has become a useful and well appreciated surgery, but this has given rise to abuse. At present, it is considered the most frequently performed surgery (1). The growing number of c-section births exceed the frequency of 15% recommended by the World Health Organization (WHO), and is detrimental to the health systems because of increased costs associated with maternal care (2). In the early 1990s, rates ranged between 16.8 and 40% (1, 3), whereas the current frequency is as high as 70% (1, 3). In a recent study carried out in 150 countries to explore the trends of cesarean sections between 1990 and 2014, the authors report a 19.4% increase in frequency (from 22.8% in 1990 to 42.2% in 2014) in Latin America and the Caribbean; 15.1% in Asia (from 4.4% in 1990 to 19.5% in 2014); Oceania 14.1% (from 18.5% in 1990 to 32.6% in 2014); 13.8% in Europe (from 11.2% in 1990 to 25% in 2014); and 10% in North America (from 22.3% in 1990 to 32.3% in 2014) (4). Specifically in the case of Latin America, with approximately 11 million births per year, two million births are by c-section, with a mean rate of 18% (1), compared to figures ranging between 30% in the United States and 46% in Colombia (2, 5, 6).

Besides cost increases, c-section heightens the risk of maternal and perinatal morbidity and mortality. This intervention is associated with complications and disabilities in 12-15% of patients, with severe obstetric morbidity occurring in 0.05-1.09% of cases (1, 2, 7, 8). This is compounded by fetal and neonatal complications and more admissions to neonatal intensive care units (2, 5, 9). The above defines the size and magnitude of a health problem that could impact the expansion of public health system coverages (1, 5, 6, 10). In 2014, the WHO Human Reproduction Programme recommended the Robson model for initial assessment, research into processes, and definition of strategies for reducing the number of c-sections in obstetrics units, as well as monitoring and comparisons between units regarding the c-section frequency in accordance with the risk or the initial need of the pregnant woman. This model is based on categories derived from obstetrical history, the course of labor,

and gestational age (2, 5, 6, 8, 11, 12). It has been described that for adequate decision making on high rates of c-sections, any steps taken should necessarily be based on reliable data and a simple analysis; moreover, each unit may set criteria in accordance with Robson's groups where the largest number of c-sections are concentrated (13).

There is a similar trend towards an increase in the number of c-sections in Honduras. In 1985, the Latin-American Perinatology Center/Pan American Health Organization (CLAP/PAHO) reported a prevalence of 9.3% of c-sections in this country, which by 1988 had increased to 19.6% in tertiary institutions such as the Social Security Institute of Honduras (IHSS) and to 27.3% in 2014 at Hospital Escuela Universitario (HEU) (6, 14, 15). The growing trend towards performing c-sections in itself represents a public health problem that may impact the workings of the entire system and must be tackled with strategies adapted to every individual hospital setting.

Consequently, the objective of this study was to classify c-sections in accordance with the Robson Model in the Obstetrics Unit of the San Felipe General Hospital in Tegucigalpa (Honduras), with the aim of evaluating the applicability of this model as an assessment and monitoring tool for identifying low risk groups taken to c-sections and defining strategies designed to limit their performance.

MATERIALS AND METHODS

Design and population. Descriptive cross-sectional study carried out in the obstetrics unit of San Felipe General Hospital (HGSF) in Tegucigalpa, Honduras, during the period between April and June 2017. This is a public, intermediate and high complexity level hospital that serves patients with low and high obstetric risk in the health system. Inclusion criteria were all the clinical records of patients taken to elective or emergent c-section during the study period. The sample of 89 cases was calculated from a universe of 477 clinical records of women taken to elective or emergent c-section by obstetric indication during the study period. Sample determination was based on a maximum expected prevalence of 50% as a measure of maximum representation of the universe in one sample, a margin of error of 10%, and a 95% confidence level. Probabilistic sampling was performed by creating a table of random numbers used to pull the records from the general list designated as the universe (EpiTable 1.0, CDC, Atlanta, EUA, 2001).

Procedure. The review of the records was performed by a single gynecologist/perinatologist researcher, applying a tool designed for that purpose, the content of which had been previously validated in a pilot test. It consisted of sociodemographic variables, clinical/obstetric indications, and the classification according to the Robson model. Data quality control was ensured by means of double check following data entry. The information about the number of deliveries and c-sections was provided by the hospital's Statistics Department.

Measured variables. Measured variables were maternal age, schooling, marital status, place of origin, ethnicity and occupation. The clinical and obstetric variables considered in order to make the classification into the 10 groups of the Robson model were parity (nulliparous, multiparous), number of gestations, gestational age at the time of childbirth (37 weeks or more, < 37 weeks); presentation (cephalic, podalic/breech, transverse/oblique); gestation multiplicity (singleton/multiple); initiation of labor (spontaneous, induced), and the history of cesarean section; the diagnosis indicating the need for c-section, and the Robson model classification into the 10 recommended groups.

Statistical analysis. Nominal qualitative variables were described with absolute and relative frequencies and their respective 95% confidence intervals (95% CI); on the other hand, the information on the quantitative variables was summarized using central trend and scatter, according to variable normality tests. The proportion of c-section births

in the institution during the study period reported by the Statistics Department was obtained, with the numerator being the number of c-sections and the denominator the total number of births. Frequency tables are presented. The Epi-Info 7.0 software package (CDC, Atlanta, GA, EUA, 2016) was used.

Ethical considerations. Authorization for conducting the study and accessing patient records was obtained from the ethics committee of the institution. Privacy of the information was ensured.

RESULTS

The proportion of c-sections over the total number of deliveries in the institution during the study period was 59.8% (477/797; 95% CI: 56.3-63.3).

In the sample group studied, mean age was 26.4 years (± 5.9; 17-43 years); the highest frequency was found in the group 18-35 years of age (92.1%). The most frequent level of schooling was complete secondary education in 23 (25.8%); 38/89 (42.7%) came from the marginal urban area (Table 1).

Regarding the clinical characteristics, it was found that 77/89 (86.6%) had 37-40 weeks; 42/89 (47.2%) were primiparous; and 24/89 (27.0%) had a history of c-section. According to the classification by type of c-section, it was found that 54/89 (60.7%) were elective (Table 1).

By order of frequency, the obstetric indications for c-section in the study sample were cephalopelvic disproportion (CPD), 24/89 (27.0%; 95% CI: 18.1-37.4); low fetal reserve, 23/89 (25.8%; 95% CI:17.1-36.2); breech presentation (complete breech), 8/89 (9.0%; 95% CI: 4-16.9); podalic presentation (incomplete breech), 6/89 (6.7%; 95% CI: 2.5-14.2); previous c-section, 7/89 (7.9%; 95% CI: 3.2-15.5); severe oligohydramnios, 6/89 (6.7%; 95% CI: 2.5-14.2); other causes, 15/89 (16.7%) which included a history of three and two c-sections, transverse position, fetal macrosomia, contractility dystocia, condylomatosis and bleeding placenta previa. In the no-risk group, the most frequent obstetric indication for c-section was low fetal reserve, 22/89 (24.7%; 95% CI: 16.2-35.0). In cases classified as "pregnancy with no risk for c-section," the most frequent indication was CPD and breech presentation, 8/89 (9%; 95% CI: 4-16.9).

According to the classification under the Robson model, 48/89 cases (53.9%; 95% CI: 43,0-64,5) were identified under the group of "pregnant women with no risk" for c-section (groups 1-4); in the group of "pregnant women with risk" of c-section (groups 5-10), 41/89 (46.1%; 95% CI: 35.4-57) were identified (Table 2).

DISCUSSION

The results of this study show that the model is applicable in our setting in Central America. Moreover, the study found an overall proportion of c-sections of 59.8%, a high figure when compared to that reported by Jiménez *et al.* (2) in Bogotá (Colombia), who reported a proportion of c-sections of 37.0% in the study entitled "Rate of c-sections by Robson groups in an intermediate complexity institution in the city of Bogota" ("*Tasa de cesáreas por grupos de Robson en una institución de mediana complejidad de la ciudad de Bogotá 2012-2014*") (2). However, it is similar to the 53.10% reported by Anaya *et al.* (16) in Popayán (Colombia) (16), and to the report by Carreño *et al.* (17) in a comparative study between two hospitals in Chile where the proportions of c-sections were 55.7% versus 35.7%, the former being similar to the one found in this study (17).

According to the results derived from the application of the Robson model in the obstetrics unit, it was found that the low risk groups (groups 1 and 2) accounted for 19 to 22% of the total number of c-sections performed. Group 5 contributed with 21% of the c-sections, similar to the report by Vargas *et al.* (18), who determined that group 5 accounted for the largest proportion at 65.2%, and similar to the figure reported by Smithies *et al.* (19) at 75.1% in Canada (15). Our results regarding the frequency of c-sections in pregnant women considered to be at low risk are lower than those found in a WHO report of a study carried out in 120 obstetrics

Table 1
Sociodemographic and clinical characteristics of pregnant women seen at HGSF, Tegucigalpa, Honduras, April-June 2017

Sociodemographic characteristics	Frequency	Percentage
Age		
< 18 years	1	1,1
18-35 years	82	92,1
35 years	6	6,7
Level of schooling		
Illiterate	10	1,2
Incomplete primary education	9	10,1
Complete primary education	19	21,3
Incomplete secondary education	19	21,3
Complete secondary education	23	25,8
Incomplete higher education	7	7,9
Complete higher education	2	2,2
Marital status		
Free union	49	55,1
Single	21	23,6
Married	19	21,3
Department of origin		
Francisco Morazán	80	89,9
Comayagua	4	4,5
El Paraíso	4	4,5
Choluteca	1	1,1
Occupation		
Housewife	68	76,4
Student	13	14,6
Merchant	8	9
Clinical characteristics		
Weeks of gestation:		
< 37 weeks	2	2,2
37-40 weeks	77	86,6
Over 40 weeks	10	11,2
History of cesarean section		
Yes	24	27,0
No	65	73,0
Type of c-section		
Elective	54	60,7
Emergency	35	39,3
Total	**89**	**100**

Source: study data.

Table 2
Classification according to the Robson model of categories of pregnant women at HGSF, Tegucigalpa, Honduras, April-June 2017

Robson model classification	Frequency	Percentage
Group 1. Nulliparous women with singleton cephalic pregnancy, ≥ 37 weeks gestation in spontaneous labor	17	19,1
Group 2. Nulliparous with singleton cephalic pregnancy, with labor induction or c-section before labor initiation	20	22,5
Group 3. Multiparous women without a previous uterine scar, with singleton cephalic pregnancy, ≥ 37 weeks and spontaneous labor	5	5,6
Group 4. Multiparous women without a previous uterine scar, with singleton cephalic pregnancy, ≥ 37 weeks, with labor induction or c-section before labor initiation	6	6,7
Group 5. All multiparous women with at least one previous uterine scar, with singleton cephalic pregnancy ≥ 37 weeks gestation	20	22,5
Group 6. All nulliparous women with singleton breech pregnancy	6	6,7
Group 7. All multiparous women with a singleton breech pregnancy, with or without previous uterine scare	7	7,9
Group 8. All women with multiple pregnancies, including women with previous uterine scars	1	1,1
Group 9. All women with singleton pregnancies with a transverse or oblique lie, with or without previous uterine scars	6	6,7
Group 10. All women with singleton pregnancies, 36 weeks gestation or less, with or without previous uterine scar	1	1,1
Total	**89**	**100**

Source: study data.

centers in 8 Latin American countries that included 97,095 women; it reported that pregnant women classified as low risk for c-section accounted for 60% of the proportion of c-sections performed. In that study, the contribution by groups 1 and 2 to the proportion of c-sections was 18.3% and 15.3%, respectively (10), similar to the finding in our study (10). Consequently, groups 1, 2 and 5 appear to be the potential targets for the implementation of a process of field research. The finding for group 5 is consistent with the report by Aleem *et al.* (20) in a large series studied in Egypt in 2016, which found that group 5 contributed with 25.5% of the cases; however, excess number of c-sections in the group classified as no-risk was 14.2% in total (Robson groups 1-4), lower than the figure of 53.9% found in this study (Robson groups 1-4) (19). In contrast, in the study by Anaya *et al.* (16), the groups with the largest contribution of c-sections were 5, 8 and 9, although the highest contribution came from group 5, at 12.17% (17).

The strengths of this study include the use of a probabilistic random selection and the application of the tool exclusively by the author. This ensures uniformity at the time of applying the Robson model for the classification. In terms of limitations, the study period was short and it could have been extended had more resources been available. Additionally, pregnant women who did not undergo c-sections were not included as was the case in other

Latin American reports (11), since only patients taken to c-section were included.

CONCLUSIONS

The applicability of the Robson model to the classification of c-sections as a tool to diagnose and monitor the proportion of c-sections in a Level II institution is demonstrated. Regular surveillance of c-section indications helps identify opportunities for institutional performance improvement in order to comply with WHO recommended frequencies. Further studies are required to assess interventions in those groups in which c-sections could be avoided.

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