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Characterization of pregnant women who gave birth in 2016 at the Hospital de La Samaritana, Bogotá D.C., Colombia

Caracterización de gestantes con atención del parto durante 2016 en el Hospital Universitario de La Samaritana, Bogotá D.C., Colombia

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Abstract

Introduction: Maternal mortality and severe maternal morbidity are serious public health problems, so it is essential to work on the identification, recognition and situation analysis of patients treated at high-risk pregnancy centers.
Objectives: To characterize the pregnant women treated at the Hospital Universitario de la Samaritana (HUS), Bogotá, Colombia, from a demographic, social and clinical point of view in order to identify common factors that may be intervened and, thus, avoid adverse outcomes.
Materials and methods: Cross-sectional study. 785 medical records of patients with a gestational age >24 weeks treated at the HUS in 2016 were analyzed. Sociodemographic data were collected, as well as data on the following variables: history of diseases, antenatal care, biopsychosocial risk, and obstetric outcomes. A univariate analysis was performed for each variable; measures of central tendency and dispersion and absolute and relative frequencies were calculated for quantitative and qualitative variables, respectively. Maternal health indicators were also calculated.
Results: 47.51% of the pregnant women had a low educational level, 34.39% were single mothers, 32.10% had a previous comorbidity, and 5.85% had insufficient antenatal care. The proportion of preterm births was 23.6 (95%CI: 20.63%-26.69%), the severe maternal morbidity ratio was 157.96/1 000 live births, and the maternal mortality rate was 246/100 000 live births.
Conclusions: Pregnant women treated at the HUS are mainly young women from areas where the health system is not easily accessible, and who have insufficient antenatal care and a low schooling level. This population has a high rate of severe maternal morbidity and maternal mortality compared to the national reference value, so they would benefit from educational interventions or risk approaches that prioritize these factors in order to prevent adverse maternal outcomes.
Keywords: Pregnant Women; High-Risk Pregnancy; Maternal Mortality; Pregnancy; Complications; Premature Obstetric Labor (MeSH).

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Resumen

Introducción. La mortalidad materna y la morbilidad materna extrema son serios problema de salud pública, por lo que es fundamental trabajar en la identificación, reconocimiento y análisis situacional de las pacientes que acuden a los centros de alto riesgo obstétrico.
Objetivos. Caracterizar las gestantes atendidas en el Hospital Universitario de la Samaritana (HUS), Bogotá, Colombia, desde el punto de vista demográfico, social y clínico con el fin de identificar factores en común potencialmente intervenibles y, de esta forma, evitar desenlaces adversos.
Materiales y métodos. Estudio transversal. Se analizaron 785 historias clínicas de pacientes con edad gestacional >24 semanas atendidas durante 2016 en el HUS. Se recolectaron datos sociodemográficos y sobre las siguientes variables: antecedentes patológicos, controles prenatales, riesgo biopsicosocial y desenlaces obstétricos. Se realizó análisis univariado de cada variable: para las variables cuantitativas se calcularon medidas de tendencia central y de dispersión, mientras que para las cualitativas, frecuencias absolutas y relativas. También se calcularon indicadores de salud materna.
Resultados. 47.51% de las gestantes tenían un bajo nivel educativo, 34.39% eran madres solteras, 32.10% tenían comorbilidad previa y 5.85% no asistieron a ningún control prenatal. La proporción de parto pretérmino fue de 23.6 (IC95%:20.63%-26.69%), la razón de morbilidad materna extrema fue 157.96/1 000 nacidos vivos y la tasa de mortalidad materna, 246/100 000 nacidos vivos.
Conclusiones. Las gestantes atendidas en el HUS son predominantemente mujeres jóvenes, provenientes de áreas con difícil acceso al sistema de salud, con insuficiente atención prenatal y con bajo nivel educativo. Esta población presenta una alta razón de morbilidad materna extrema y mortalidad materna comparada con el valor de referencia nacional y se beneficiaría de intervenciones educativas o enfoques de riesgo que prioricen estos factores con el fin de prevenir desenlaces maternos adversos.
Palabras clave: Embarazo; Gestantes; Embarazo de alto riesgo; Trabajo de parto prematuro; Mortalidad materna; Muerte materna (DeCS).

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Introduction

During pregnancy, women experience a large number of anatomical, physiological, and biochemical changes, which make them more susceptible to health alterations, such as hypertensive disorders, bleeding, or even pregnancy-related infections; all of these complications can lead the patient to a state of significant morbidity, and even death.[1] According to the Pan American Health Organization, in 2016, 40% of women suffered complications during pregnancy, childbirth and/or puerperium, and 15% of such complications were life-threatening.[2]

The World Health Organization (WHO) defines maternal death as an event occurring during pregnancy, childbirth, or within 42 days after birth.[3,4] This is also a negative event that seriously impacts the family nucleus and generates expenses for the health system and social costs, as the loss of productivity of a young woman who dies from pregnancy-related causes results in a loss to society of approximately 93 million Colombian pesos,[5] which translates into an increased economic burden on the family and, indirectly, fewer educational and social opportunities for orphaned children.

Therefore, the death of pregnant women is a significant public health problem resulting from a number of factors related to the socioeconomic context, highlighting the inequity and inequality faced by women, which influence their development during the reproductive stage.[3] At this point, it is essential to define severe maternal morbidity (SMM), which, according to WHO, refers to "a woman who almost dies but survives a complication during pregnancy, childbirth, or within 42 days after termination of pregnancy"[6] and is a precursor to maternal mortality (MM).

The Instituto Nacional de Salud de Colombia (National Institute of Health of Colombia - INS),[7] in order to combat MM, has implemented a public health surveillance system for SMM that aims to identify mothers with potentially life-threatening conditions to ensure they receive timely and adequate care and prevent their death. In the country, also according to data from the INS,[7] there has been an increase in the SMM rate since 2012, so it is critical to consider the influence of sociodemographic factors on the occurrence of these events, which include age, ethnicity, marital status, schooling, number of pregnancies, gestational age, place of delivery, person attending the birth, accessibility to and use of health services, among others.[8]

The Hospital Universitario de la Samaritana (HUS) is a public tertiary care center located in Bogotá that serves the population from the 116 municipalities of Cundinamarca and the only high-complexity referral center in the department, which explains why the MM ratio is higher than the national reference value. Moreover, it is worth noting that, according to internal reports, an exponential increase in the MM indicator was observed in 2015 and 2016 in that hospital.

The limited information on the sociodemographic and clinical characteristics of patients treated at HUS highlights the need to work on the identification, recognition, and situational analysis of maternal and perinatal health of pregnant women attending this hospital. In this sense, the objective of the present research was to characterize, from a demographic, social and clinical point of view, the pregnant women treated at the HUS to identify common risk factors that may be addressed and, thus, avoid adverse outcomes.

Materials and methods

Cross-sectional study. The study population was selected by convenience sampling; all pregnant women who visited the HUS emergency department between January 1 and December 31, 2016, and whose outcome was delivery care, natural or cesarean delivery (N=808), were included. Pregnant women with incomplete medical records were excluded from this group (n=7), as well as those who gave birth in another center (n=2) or had a gestational age <24 weeks (n=8), and those whose medical records were not available (n=6), so the final sample was made up of 785 women. Data were collected by the researchers during 2018 from a review of electronic medical record logs.

Demographic data —age, place of origin, educational level, marital status, and modality of admission to the center (referral, spontaneous demand, collective intervention plan, or outpatient consultation)— were collected, as well as on the following variables: health history (history of gynecologic surgery or obstetric condition in previous pregnancy), antenatal care checkups, gestational age at the beginning of antenatal checkups, biopsychosocial risk according to the scale of Herrera *et al.*,[9] obstetric outcomes (delivery route, preterm birth, SMM, and MM), and relevant laboratory tests performed in each trimester according to the *Guía de control prenatal y factores de riesgo* (Guidelines for prenatal care and risk factors) issued by the Bogotá Health Office and the Bogotá Association of Obstetrics and Gynecology.[10]

The SMM variable was assessed based on the criteria established in the INS public health surveillance protocol for this event.[8] The definition of the variable preterm birth of the American College of Obstetricians and Gynecologists, which states that it occurs between weeks 20 0/7 and 36 6/7 of gestation, was adopted to carry out this study.[11] The first trimester ultrasound was taken as a reference for all measurements related to the calculation of gestational age; in cases where these data were not available, gestational age was calculated using the Ballard test. Data were stored in Microsoft Excel 2007 and analyzed with the statistical software IBM SPSS version 25.0 and STATA/SE version 16.0.

A univariate statistical analysis was performed for each variable: absolute frequencies and relative frequencies (percentages) were calculated for qualitative variables, while measures of central tendency and dispersion (mean, median, maximum value, minimum value, standard deviation, and range) were estimated for quantitative variables.

A Kolmogorov–Smirnov test was performed to verify the normality of the continuous variables. Since it was established that they did not have a normal distribution and extreme values were identified, it was decided to report them in terms of medians. 95% confidence intervals were calculated for proportions.

This study took into account the ethical principles for medical research on human subjects established by the Declaration of Helsinki[12] and the provisions on health research of Resolution 8430 of 1993 of the Colombian Ministry of Health.[13] Moreover, the protocol was reviewed and approved by the HUS Research Ethics Committee through Minutes No. 14.01 of December 14, 2017. This study did not require informed consent since there was no direct participation of the patients.

Results

The median gestational age of the participants at the time of admission to the center was 38.2 weeks and the main modality of admission was spontaneous demand (46.24%, 95%CI: 42.71-49.80), although a considerable percentage were admitted by referral (35.28%, 95%CI: 31.94-38.74) (Table 1). The average number of births per month was 65.41; however, the highest number of births was concentrated in the third quarter of the year (25.99%), with September being the month with the highest number of births attended. Most patients were enrolled in the subsidized health insurance scheme (95.15%, 95%CI: 93.41-96.55) and came from the municipalities of Cundinamarca (83.15%), but they also came from Bogotá D.C. (10.7%), Casanare (2.93%), Tolima (1.53%), Chocó (0.39%), Amazonas (0.26%), and other departments (1.04%).

Table 1. Demographic characteristics of the study population.

Characteristics		Absolute frequency	Relative frequency (%)	95%CI
Age per five-year period	<15 years	14	1.78%	(0.097-2.97)
	15-19 years	186	23.69%	(20.75-26.82)
	20-24 years	222	28.28%	(25.15-31.57)
	25-29 years	152	19.36%	(16.65-22.30)
	30-34 years	106	13.5%	(11.18-16.09)
	35-39 years	59	7.51%	(5.77-9.58)
	40-44 years	40	5.09%	(3.66-6.87)
	45-49 years	6	0.76%	(0.28-1.65)
Marital status	Single	270	34.39%	(31.07-37.83)
	Domestic partnership	430	54.77%	(51.21-58.29)
	Married	84	10.70%	(8.62-13.07)
	Divorced	1	0.12%	(0.003-0.7)
Level of educational attainment	None	150	19.10%	(16.41-22.03)
	Primary	223	28.40%	(25.27-31.70)
	Secondary	352	44.84%	(41.32-48.39)
	University	59	7.51%	(5.77-9.58)
	Specialization	1	0.12%	(0.003-0.7)
Modality of admission	Spontaneous demand	363	46.24%	(42.71-49.80)
	Plan for collective interventions	33	4.20%	(2.91-5.85)
	Outpatient service	78	9.93%	(7.93-12.24)
	Emergency room	34	4.33%	(3.01-6.00)
	Referral	277	35.28%	(31.94-38.74)
Type of insurance	Subsidized	747	95.15%	(93.41-96.55)
	Contributory	36	4.58%	(3.23-6.29)
	Private	2	0.25%	(0.030-0.91)

Source: Own elaboration.

Similarly, the median age of the patients was 23 years (95%CI: 24.49-25.51) and the five-year period with the highest proportion of patients was found in the range of 20 to 24 years. Regarding educational level, the minority of pregnant women had higher education (7.64%, CI95%: 5.88-9.72), while most had only primary or less as the highest level of education (47.51%. 95%CI: 43.97-51.07). It was also noteworthy that although most pregnant women had a partner and lived in a domestic partnership (54.77%, CI95%: 51.21-58.29) or were married (10.70%,

8.62-13.07), a significant proportion of single women was observed (34.39%, CI95%: 31.07-37.83) (Table 1).

Furthermore, 32.10% (95%CI: 28.84-35.49) of the patients had some significant clinical history, with pre-eclampsia in a previous pregnancy being the most frequent (6.36%), followed by the diagnosis of some metabolic disease (4.96%), history of gynecologic surgery (3.69%), and the presence of hematologic disease (3.56%).

The median number of antenatal checkups of the participants was 6 and the median gestational age at the first checkup was 13.6 weeks; however, 5.85% of the pregnant women did not attend any antenatal checkups. Moreover, 83.69% (95%CI: 80.92-86.21) of pregnancies were considered high risk from an obstetric point of view.

With respect to delivery care, it was found that the proportion of vaginal and cesarean deliveries was similar (51.2% and 48.8%, respectively) and that there was a low percentage of instrumental deliveries (2.3%).

The proportion of preterm births was 23.56% (95%CI: 20.63-26.69); the SMM ratio was 157.96/1 000 live births; the MM ratio was 246/100 000 live births; and the SMM/MM ratio was 62. All maternal deaths were due to indirect causes (Table 2).

Table 2. Outcomes related to pregnancy, childbirth, and puerperium in the study population.

Variable		Absolute frequency	Relative frequency (%)	95%CI
Obstetric risk	Low risk	128	16.30%	(13.78-19.07)
	High risk	657	83.69%	(80.92-86.21)
Psychosocial risk	Low risk	435	55.41%	(51.85-58.92)
	High risk	349	44.45%	(40.94-48.01)
1st trimester lab tests	If done	484	61.65%	(58.15-65.07)
	Not done	301	38.34%	(34.92-41.84)
2nd trimester lab tests	If done	622	79.23%	(76.22-82.02)
	Not done	163	20.76%	(17.97-23.77)
3rd trimester lab tests	If done	565	71.97%	(68.69-75.09)
	Not done	220	28.02%	(24.9-31.3)
Delivery route	Vaginal delivery	384	48.91%	(45.36-52.47)
	Instrumental delivery	18	2.29%	(1.36-3.59)
	Cesarean section	383	48.78%	(45.23-52.34)
Preterm birth	No	600	76.43%	(73.30-79.36)
	Yes	185	23.56%	(20.63-26.69)
Breastfeeding counselling	Yes	615	78.34%	(75.29-81.17)
	No	170	21.65%	(18.82-24.70)
Postpartum contraception	Yes	531	67.64%	(64.24-70.90)
	No	254	32.35%	(29.09-35.75)
Postpartum follow-up appointment	Yes	555	70.70%	(67.37-73.86)
	No	230	29.29%	(26.13-32.62)

Source: Own elaboration.

The most frequent diseases in the group of patients admitted for delivery care were hypertensive disorders of pregnancy, including gestational hypertension (7%), preeclampsia (4.2%), and severe preeclampsia (12.99%), which affected 24.19% of all participants. Complications resulting from these disorders, such as eclampsia (0.12%) and HELLP syndrome (2.03%), had a prevalence of 2.15%.

It was also found that the study population required care due to fetal growth restriction (intrauterine growth restriction and small fetus for gestational age) in 13.24% of cases and premature rupture of membranes (PROM) in 12.73%. 4.31% had perinatal infection: 0.38% with human immunodeficiency virus, 0.5% with syphilis, 2.42% with toxoplasmosis; and 1.01% with vector-borne infections. Obstetric hemorrhage was observed in 4.05% of pregnant women (2.03% due to postpartum hemorrhage, 1.01% due to placenta previa, and 1.01% due to placenta abruption). Gestational diabetes was also an important source of morbidity in participants, with a prevalence of 3.82%.

During the study period, fetal death occurred in 1.01% of pregnancies and two cases of voluntary termination of pregnancy were identified, both due to multiple fetal malformations. The prevalence of chorioamnionitis was 3.82% and of postpartum endometritis was 0.50%. Figure 1 presents the 10 most prevalent conditions in the study population. It should be noted that a significant number of patients (24.58%) were admitted to maternal care due to previous cesarean section.

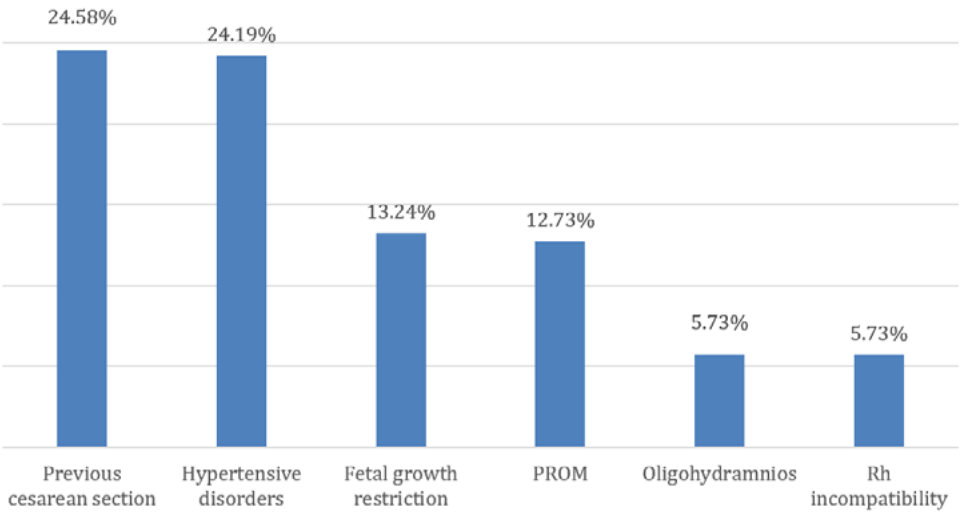

Figure 1. Most frequent obstetric conditions in pregnant women admitted for delivery at the Hospital Universitario de la Samaritana. 2016.
PROM: premature rupture of membranes
Source: Own elaboration.

Discussion

Currently, the HUS is consolidated as a reference center, both in Cundinamarca and throughout Colombia, for the care of highly complex obstetric cases under the subsidized insurance scheme, so the present study contributes significantly to closing the knowledge gap regarding high-risk pregnant women in the department. Based on the findings, it could be established that 83.69% of pregnancies were at high obstetric risk, a figure much higher than the estimate of 20% reported by Donoso-Bernales & Oyarzun-Ebensperger.[14]

Regarding the age of pregnant women, the present study found that the majority (28.28%) were in the five-year period of 20 to 24 years, which coincides with the statistics at the national, departmental and district levels published by the National Administrative Department of Statistics (DANE by its acronym in Spanish)[15] in 2017. Nevertheless, the percentage of deliveries among children under 15 years of age was 1.78%, a figure twice as high as that reported by Amaya *et al.*[16] for children under 14 years of age (0.8%, n=180) in a cohort study based on the analysis of 22 280 deliveries of women between the ages of 10 and 29 treated in Bogotá. In this regard, several studies have reported that adolescent pregnancy (or in children under 15 years of age, as in this case) is related to malnutrition, delayed diagnosis of pregnancy, delayed access to antenatal care, low socioeconomic status, poor education and migrant status.[17,18] Therefore, it is established that pregnancy in children under 15 is a factor associated with increased perinatal risk and complications, which gives account of the public health problem that this phenomenon represents from the social and legal point of view.[19,20]

According to the literature, most deaths in pregnant women occur in populations of low socioeconomic and educational levels,[21] while a secondary or higher level has been described as a protective factor for this type of outcomes.[22,23] In the present study, 19.1% of the pregnant women had no educational level, which may partly explain the observed morbidity burden, as illiteracy, being a limiting factor for understanding information, conditions self-care, health, hygiene and nutrition behaviors in women, thereby affecting their sexual and reproductive health.[23]

This is important in that it has been established that low economic income, difficult access to health services, and lack of consultation or preconception counseling hinder early identification of risks associated with pregnancy and increase maternal and perinatal morbidity and mortality.[24] Furthermore, the literature has described that being a single mother, which is a common factor in the present study (34.39%), is associated with an increased risk of fetal death and infant mortality.[25,26]

It should be noted that 32.10% of the patients studied had some relevant medical history. This is consistent with the findings of Martinez-Royert & Pereira-Penate,[27] who conducted a study of 123 high-risk obstetric pregnant women treated at a public healthcare center in Sucre, Colombia, between February and March 2015, in which they found that 34% of participants had a previous condition.

Knowing a pregnant woman's medical history is critical since this helps to prevent complications, which, as stated by Semper-Gonzalez *et al.*,[28] account for up to 75% of maternal deaths. Among these complications, the authors highlight serious bleeding (mostly after delivery), infections (usually after delivery), hypertension in pregnancy (preeclampsia and eclampsia), complications during childbirth, and unsafe abortions.[28]

As for antenatal checkups, it can be concluded that what was found in the study population is outside the established national targets of at least 10 checkups for nulliparous women and 7 for multiparous women, ideally starting before week 10.[29] Compliance with quarterly screening lab tests was found to be between 60% and 80% in the present study, which can be explained by the late start and low adherence to antenatal checkups,

as this number would be expected to be close to 100%. The absence or low number of antenatal checkups is often related to poor education, poverty, lack of access to the media, and living in rural areas,[30,31] aspects observed in the demographic characteristics of patients treated at the HUS.

According to the Federación Colombiana de Obstetricia y Ginecología (Colombian Federation of Obstetrics and Gynecology), the cesarean section rate is increasing in the country, going from 24.9% in 1998 to 45.7% in 2013.[32] In the sample studied here, cesarean sections accounted for 48.8% of deliveries, although they were performed for medical reasons in all cases. The high prevalence of deliveries by this route in the HUS is associated with high obstetric risk and a high percentage of patients admitted for delivery with a history of cesarean section in previous pregnancies.

According to the WHO,[33] the average rate of preterm birth in low-income countries is 12%, while it is 9% in high-income countries. This information differs from the findings of the present study since the prevalence of deliveries before week 37 was 23.6%, about twice the estimate for low-income countries such as Colombia.

Hypertensive disorders of pregnancy —especially severe preeclampsia (12.99%), which causes most cases of SMM— were the most prevalent conditions in the study population. On the other hand, the prevalence of postpartum hemorrhage was relatively low (2.03%), which is noteworthy given that postpartum hemorrhage predominates as one of the main causes of MM at the national and district level.[34]

The present study, by describing the characteristics of the pregnant women treated at the HUS in 2016, allows to identify the risk factors for maternal and perinatal morbidity and mortality in this population, thus serving as a tool for developing timely care programs for pregnant women throughout Cundinamarca.

One of the limitations of this study is that not all the pregnant women attended at the unit were included, which would have enriched the spectrum of diseases and comorbidities of the pregnant women referred to this institution. Moreover, due to the retrospective nature of the study, the review of medical records did not allow finding much data that are not mandatory to report but could be of interest, especially in the framework of social determinants.

Conclusions

Most pregnant women treated at the HUS are young, single women from areas with limited access to the health system, with insufficient antenatal care, and low educational level. Furthermore, a considerable proportion does not attend antenatal checkups, and those who do so have low adherence and initiate them late, which reduces the opportunity to detect and intervene obstetric diseases early.

The population studied has a high rate of SMM and MM compared to the national reference value, so educational interventions that address these risk factors should be designed to prevent the occurrence of adverse maternal and perinatal outcomes.

Conflicts of interest

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