Risk factors associated with the development of postpartum hemorrhage. A single-center observational study.

Andrea Viviana Dutan Flores [1] ID *, Astrid Anabelle Hidalgo Ordóñez [1] ID *, Carlos Vizueta Chavez [1] ID
1. School of Medicine, Faculty of Medical Sciences, Guayaquil State University, Ecuador.

Abstract

Introduction: Postpartum hemorrhage is recognized as one of the leading causes of morbidity and mortality in low-income countries. It is defined as blood loss of 500 ml or more during the physiological postpartum period, 1000 ml or more during the immediate postpartum period, and blood loss, irrespective of volume, that leads to hemodynamic instability in postpartum women after childbirth or cesarean section. This study aimed to identify the causes and complications of postpartum hemorrhage among postpartum women aged 15--45 years at Dr. León Becerra General Hospital in Milagro, Ecuador, from February 2018–February 2020.

Methodology: This observational, retrospective study was conducted at the León Becerra Hospital in Milagro (Ecuador) from January 2018 to December 2020. The study included women aged 15 to 45 years with postpartum hemorrhage. The risk factors were maternal age, gestational age, multiple gestations, medical history, delivery route, and comorbidities. The sample was probabilistic, and descriptive statistics were used.

Results: In 34 patients, 62% were between 15 and 25 years old, 29% were between 26 and 35 years old, and 9% were between 26 and 35 years old. There were multiple pregnancies in 68% of the cases and optimal prenatal care in 70%; most cases involved vaginal delivery (71%). A total of 56% (n=19) had no risk factors, with prolonged delivery (17%) (n=6), followed by previous cesarean sections (12%) (n=4). Anemia and hypovolemic shock accounted for 84% of the complications. The cause of hemorrhage was uterine tone failure in 59% of the patients.

Conclusions: These findings underscore the importance of surveillance and early intervention in young and multigestating women, as well as the need for effective preventive and management strategies for uterine atony and other causes of postpartum hemorrhage, to reduce the incidence of serious complications such as anemia and hypovolemic shock.

Keywords:

Postpartum Hemorrhage, Risk Factors, Uterine Atony

Abbreviations

PPH: Postpartum hemorrhage.

Additional information

No supplementary materials are declared.

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Authors' contributions

Andrea Viviana Dután Flores: Conceptualization, research, writing—original draft, resources, software, supervision.

Astrid Anabelle Hidalgo Ordóñez: Conceptualization, research, writing – original draft, resources, software, supervision.

Carlos Vizueta Chávez: Methodology, data curation, formal analysis, funding acquisition, project administration, validation, visualization, and writing – review and editing.
All the authors read and approved the final version of the manuscript.

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Availability of data and materials

The datasets used and analyzed during the present study are available from the corresponding author upon reasonable request.

Introduction

In developing countries, young women face significant challenges in terms of their reproductive health. Two of the leading causes of mortality in this population are ovarian cancer and postpartum hemorrhage [1]. Although they may seem unrelated, they share a common denominator: lack access to adequate and timely health services. Postpartum hemorrhage, often the result of unassisted births or complications during delivery, can be devastating if not treated promptly. On the other hand, patients with ovarian cancer, which is usually diagnosed at advanced stages due to a lack of screening and follow-up, can have a dismal prognosis. The convergence of these two conditions as leading causes of mortality in young women in developing countries underscores the urgent need to improve access to reproductive health services, including prenatal and postnatal care, cancer screening, and timely treatment for complications during delivery. Only by implementing effective interventions and strengthening health systems can we significantly reduce maternal mortality and improve the health and well-being of young women in these countries. However, the absolute risk of death is indeed much lower in more developed countries because of early diagnosis, timely management, and the use of appropriate resources for the prevention of this condition. Thus, PPH is the main reason for hospitalization in intensive care units because of the high incidence of maternal morbidity and mortality that it can cause in women during puerperium [2].

Most of these deaths can be prevented with the prophylactic use of uterotonic agents during the delivery phase through timely and appropriate monitoring and treatment.

According to the WHO, approximately 830 women die every day worldwide from complications related to pregnancy or childbirth. In 2015, an estimated 303,000 women died during pregnancy, during childbirth or after birth. Since 1990, the maternal mortality of some sub-Saharan countries has decreased by half. Progress has been even more significant in other regions, such as Asia and North Africa [3].

Between 1990 and 2015, maternal deaths per 100,000 live births decreased by only 2.3% per year. However, since 2000, there has been an accelerated reduction. In different countries, annual decreases in maternal mortality between 2000 and 2010 exceeded 5.5% [4].

Ecuador is in fourth place among all the countries in America that have the highest maternal mortality rate. According to the INEC (National Institute of Statistics and Census) in 2011, the rate was 70%; however, by 2015, its incidence was significantly reduced, with a maternal death rate of 49%, of which postpartum hemorrhage represented 16.2% (27 deaths), eclampsia 10.8% (18 deaths), and gestational hypertension 7.2% (12 deaths), among others [5].

It is well known that postpartum hemorrhage is a serious obstetric complication, but it should be noted that this hemorrhagic condition is highly preventable; therefore, health personnel must understand the factors that are associated with a greater risk of suffering from this pathology and thus be able to reduce its incidence.

Through this research, the research questions are as follows: What are the factors associated with the development of postpartum hemorrhage and its complications in women aged 15--45 years treated at the León Becerra Hospital in Milagro from 2018--2020? An observational study was proposed in a regional obstetric reference center.

Materials and methods

Study design

This study is observational. The source is retrospective.

Scenery

The study was conducted at the León Becerra de Milagro Hospital of the Ministry of Public Health of Ecuador, located in the Milagro Canton of the Guayas Province, from January 2018 to December 2020.

Participants

Patients aged 15--45 years who presented with clinical symptoms of postpartum hemorrhage were included. No patients were excluded.

Variables

The variables used as risk factors were the mother's age, gestational age, multiple gestations, pathological history, delivery route, and comorbidities.

Data sources/measurements

The source was indirect; an electronic form was filled out from the institutional clinical history data. The following ICD-10 root codes were searched for inclusion in the study: O72.0, O72.1, O72.2, and O72.3.

Biases

The application of the participant selection criteria avoided observation and selection bias. The principal investigator kept the data using a guide and records approved in the research protocol to prevent interviewer, information, and memory bias. Two researchers independently analyzed each record in

Table 1. General characteristics of the study group.

Variable	Frequency N=34	Percentage
Origin		
Miracle	20	65%
Little orange	8	17%
Yaguachi	3	9%
Triumph	2	6%
Orange Grove	1	3%
Parity		
Multigestation	23	68%
Primigravida	11	32%
Prenatal check-ups		
0	2	6%
1	8	24%
2-5	11	32%
6 or more	13	38%
Type of delivery		
Vaginal	24	71%
Cesarean section	10	29%

duplicate, and the variables were recorded in the database once their concordance was verified.

Study size

The sample was probabilistic. In a population of women between 15 and 45 years old in the Milagro canton of 19,905 women, the pregnancy prevalence of 80 per 1000 women estimates the presence of 1592 pregnancies. EPI info ™ (Stat Calc, Epi Info, CDC, Atlanta. Version 7.2.6 [October, 2023]); with an expected frequency of patients with postpregnant hemorrhage of 2%, with a confidence limit of 5% and a confidence level of 95%, the sample size was 30 cases.

Quantitative variables

Descriptive statistics were used. The results are expressed as frequencies and percentages. Scale variables were not converted to categorical variables.

Statistical analysis

Qualitative variables are presented as frequencies and percentages. Proportions were compared with chi-square tests. The statistical package used was IBM Corp. (released from 2018). IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.

Results

Participants

Thirty-four patients were included in the study.

Main characteristics of the study group

Among the 34 patients, 62% were between 15 and 25 years old, 29% were between 26 and 35 years old, and 9% were between 26 and 35 years old. By place of origin, the majority were from the canton belonging to the institution. Most cases were multigestational (68%) (Table 1). Prenatal care was optimal in most cases (70%), and most cases were resolved by vaginal delivery (71%).

Frequency of risk factors

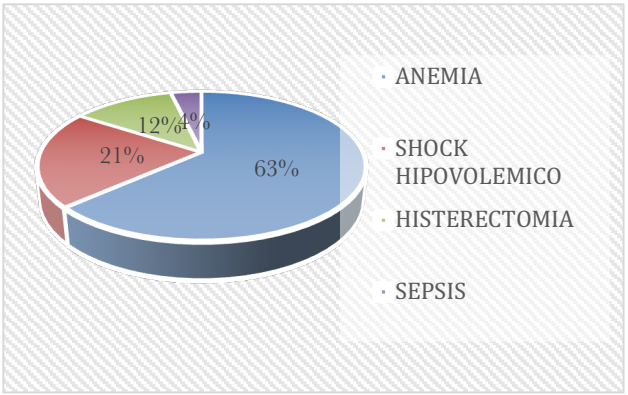
For risk factors, 56% (n=19) had no risk factors. The main factor present was prolonged labor (17%, n=6), followed by previous cesarean sections (12%, n=4) (Table 2).

Anemia and hypovolemic shock accounted for 84% of the associated complications (Figure 1). The cause of hemorrhage was uterine tone failure in 59% of the patients (Table 2).

Table 2. General characteristics of the study group.

Variable	Frequency N=34	Percentage
Risk factors		
No risk factors	19	56%
Prolonged labor	6	17%
Previous cesarean sections	4	12%
Placental accreta	3	9%
Hypertensive disorders	2	6%
Associated complications		
Anemia	21	63%
Hypovolemic shock	7	21%
Hysterectomy	4	12%
Sepsis	2	4%
Causes of bleeding		
Tone	20	59%
Tissue	6	18%

Figure 1. Complications of postpartum bleeding.



Discussion

According to the results obtained in the research at the León Becerra Hospital in Milagro, the leading cause of postpartum hemorrhage is uterine atony, which occurs with a higher incidence in young women aged 15--25 years, who generally do not have predisposing risk factors. Nevertheless, those who do have a minority have a prolonged delivery or previous uterine scar, and the beginning of their sexual life is early; therefore, they are multipregnant mothers at an early age, subjecting their still immature uterus to early pregnancy and with a high risk of suffering from this clinical picture as a complication.

The second cause of postpartum hemorrhage in the present study was trauma or lacerations; that is, young mothers experienced some tear of the vaginal wall or cervix during the active phase of labor, producing postpartum bleeding, which is easily controlled with trachelorraphy.

Finally, PPH occurs due to placental retention or incomplete delivery, thus confirming the 4-T theory, which states that the leading cause of postpartum hemorrhage is uterine atony or hypotonia, with an incidence of 70%, 20% trauma, 10% tissue damage and, finally, 1% coagulopathy.

Among the complications of puerperal women who suffer from HPP, acute anemia and hypovolemic shock occur as a consequence of the loss of blood in large quantities [6]. Importantly, the response to acute anemia in young women is replaced through bone marrow function [7], which could provide a future line of research for this study group. A weakness of the study is the lack of registration of the outcome of women with hypovolemic shock in acute renal failure. Future studies should focus on these outcomes and their relationships with hypotensive effects and mortality [8, 9].

Conclusions

This study revealed that postpartum hemorrhage, a significant complication in women aged 15--45 years, predominantly affects young women aged 15--25 years. Most of the treated patients were from the Milagro canton and were multipregnant. Uterine atony is identified as the leading cause of postpartum hemorrhage, with anemia being the most frequent complication. Although a significant percentage of patients did not present identifiable risk factors, prolonged labor and previous cesarean sections were relevant associated factors. These findings underscore the importance of surveillance and early intervention in young and multipregnant women, as well as the need for effective preventive and management strategies for uterine atony and other causes of postpartum hemorrhage, to reduce the incidence of serious complications such as anemia and hypovolemic shock.

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Statements

Ethics committee approval and consent to participate

The bioethics committee of the Faculty of Medical Sciences, University of Guayaquil, Guayaquil, Ecuador, approved the study.

Consent to publish

This information was not needed because the present study did not publish images, radiographs, or specific patient studies.

Conflicts of interest

The research has no financial interests or conflicts of interest.

Author information

Andrea Viviana Dután Flores, Doctor from the University of Guayaquil, (Guayaquil 2020), Specialist in occupational health and safety with a mention of occupational health from the Pontifical Catholic University of Ecuador (Guayaquil, 2023).
Email: andreadutan04@outlook.es
ORCID https://orcid.org/0009-0003-4988-2614

Astrid Anabelle Hidalgo Ordóñez, Doctor from the University of Guayaquil, (Guayaquil 2020).
Email: astridanabelle.1@hotmail.com
ORCID https://orcid.org/0009-0000-1893-2736

Carlos Vizueta Chávez, Doctor in Medicine and Surgery from the University of Guayaquil (Ecuador, 2004). Diploma in Higher Education from the University of Guayaquil (Ecuador, 2003). Specialist in Gynecology and Obstetrics from the University of Guayaquil (Ecuador, 2004).
Email: carlos.vizueta@ug.edu.ec
ORCID https://orcid.org/0009-0007-3097-7110

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Correspondence: Andrea Viviana Dután Flores. Email: andreadutan04@outlook.es
Address: R492+MJF, Av. Kennedy, Guayaquil 090514, School of Medicine, Faculty of Medical Sciences, University of Guayaquil, Guayas, Ecuador.
Telephone: [593] 04228 1148.