



## Interpretation of Complications of Obstetric Hysterectomy by Systematic Review Using Prism 2020 Methodology

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Article History	Abstract
Received: 08 June 2023 Revised: 15 August 2023 Accepted: 19 August 2023	<p><i>Obstetric hysterectomy is a surgical procedure in which the uterus is removed during pregnancy or delivery due to a severe obstetric complication that threatens the life of the mother or fetus. The aim of the study was to interpret the complications of obstetric hysterectomy by systematic review using PRISMA 2020 methodology. The study belonged to the exploratory level, using hermeneutics to interpret the systematic review carried out with the PRISMA 2020 methodology. Specifically, 81 results were obtained, including 51 in SCOPUS and 30 in the Web of Science. The authors provided answers to six scientific questions that guided the entire study. Among the results obtained, it is worth highlighting that the prevention and management of obstetric hysterectomy complications depend not only on postoperative strategies, but also on the adequate selection of the surgical technique and the identification and management of preoperative risk factors. In addition, the most common obstetric complications encountered were found to be postoperative hemorrhage and surgical wound infection. Obstetric hysterectomy is an important surgical procedure that can have significant complications. It is essential to continue researching and evaluating effective strategies to prevent and manage these complications, and to consider multiple factors that influence their occurrence.</i></p>
CC License CC-BY-NC-SA 4.0	<p><b>Keywords:</b> <i>Obstetric hysterectomy, hysterectomy complications, PRISMA 2020, Systematic review, postoperative strategies</i></p>

## 1. Introduction

Obstetric hysterectomy is a surgical procedure in which the uterus is removed during pregnancy or childbirth due to a serious obstetric complication that threatens the life of the mother or fetus. According to the scientific literature, obstetric hysterectomy is an intervention of last resort and is performed when no other options are available to save the life of the mother or fetus. Some of the obstetric complications that may require a hysterectomy include: placenta previa; uterine rupture; placental abruption; and severe postpartum hemorrhage (De la Torre et al., 2018; Rodríguez-García et al., 2019; Ace-Sanie et al., 2019; Youssef et al., 2020; Wei et al., 2021)

It is important to study obstetric hysterectomy because it is a high-risk surgical procedure and is performed in obstetric emergency situations that endanger the life of the mother and fetus. Knowledge and research on this topic can help clinicians make informed decisions in emergency situations and improve obstetric outcomes.

This literature review is based on the research idea that obstetric hysterectomy is still an emergency procedure in Ecuador, as it is in other countries. Therefore, Ecuadorian physicians also face critical decisions and challenges when they must make the decision to perform an obstetric hysterectomy in emergency situations.

Therefore, this study is intended, in addition to venturing into an important and current line of research, to do so with great relevance to the Ecuadorian reality (Gómez et al., 2017; Gómez Armijos et al., 2017), in which doctors and university professors require more studies on this subject, as they are still insufficient, with which the authors of this review make a modest contribution and fulfill one of the functions of research that is to solve regional problems.

Among the few studies carried out on this subject in Ecuador, we can mention the one published in the journal *Ginecología y Obstetricia de México*, which ventures into the emergency surgical management of massive obstetric hemorrhage at the "Isidro Ayora" Gynecological-Obstetric Hospital in Quito (Cortez-Moncayo et al., 2018). The article concludes that multidisciplinary management and early decision-making are fundamental in the care of massive obstetric hemorrhage and obstetric hysterectomy. In addition, the importance of continuing education and training for medical personnel in obstetric emergency care is highlighted.

Another example is an article published in 2021 in the journal *Ginecología y Obstetricia de México*, which analyzes the prevalence and factors associated with obstetric hysterectomy in a reference hospital in the highlands of Ecuador. The study finds that the prevalence of obstetric hysterectomy was 0.25% of births and that the main indications are placenta previa and uterine atony. Associated factors include advanced maternal age, number of previous caesarean sections, and lack of access to antenatal care (Herrera-Suquilanda et al., 2021).

Therefore, it can be affirmed that, although specific studies on obstetric hysterectomy in Ecuador are scarce, the situation remains critical and challenging in obstetric emergency situations. Ecuadorian experience in the management of massive obstetric hemorrhage highlights the importance of multidisciplinary management, early decision-making, and continuing education and training to improve obstetric outcomes in this context.

The objective of this study is to interpret the complications of obstetric hysterectomy through a systematic review using PRISMA 2020 methodology. The systematic review aims to answer the following questions:

1. What are the most common complications of obstetric hysterectomy and how often is it?
2. What are the most serious complications of obstetric hysterectomy and how often are they?
3. What risk factors are associated with complications of obstetric hysterectomy?

4. Are there differences in the frequency and type of complications between different surgical techniques used in obstetric hysterectomy?
5. What are the most effective strategies for preventing or managing complications of obstetric hysterectomy?
6. Is there evidence that the experience of the surgeon or hospital where obstetric hysterectomy is performed influences the incidence of complications?

The authors of the present study believe that these questions could help identify the main complications of obstetric hysterectomy and measures to prevent or manage them. The PRISMA 2020 methodology is a framework that can help ensure that systematic review is conducted in a rigorous and transparent manner, which will increase the reliability and validity of results.

## 2. Methods

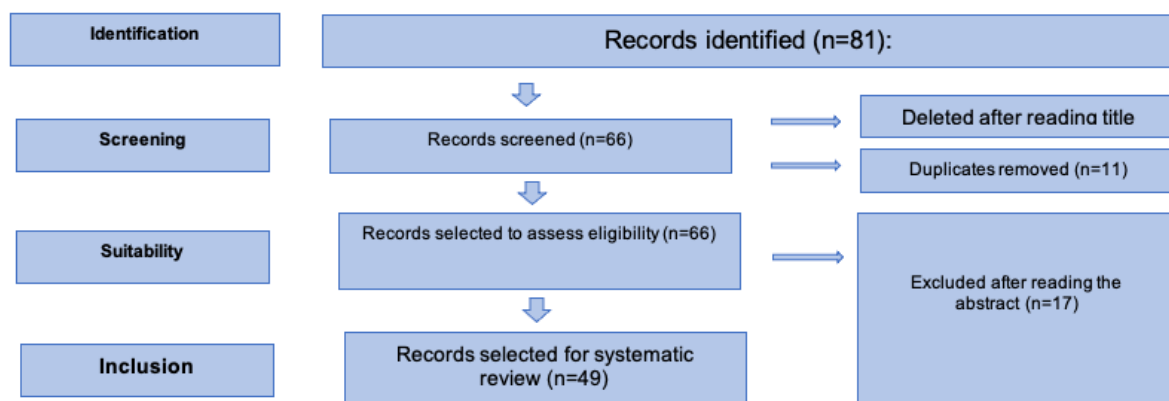
### Study Classification

The study was framed in the exploratory research level, aided by the hermeneutics for the interpretation of the systematic review carried out using the PRISMA 2020 methodology. It was observational, cross-sectional and retrospective. In this study, a systematic review of the published scientific literature on complications of obstetric hysterectomy was carried out and for its development, the guidelines of the PRISMA 2020 statement (*Preferred Reporting Items for Systematic reviews and Meta-Analysis Protocols*) were followed for the adequate execution of systematic reviews (Figure 1).

The process developed was as follows:

### Initial search

The primary searches were executed in October 2022 and as an inquiry strategy we used the term "complications of *obstetrics*" and "*hysterectomy*" in English, as well as "*obstetric complications*" and "*hysterectomy*" in Spanish, in the SCOPUS databases and the Web of Science. Next, the search was extended by a combination, with the use of the Boolean operators AND and OR as it was useful, of the aforementioned terms. These inquiries found a valuable number of results for the review, providing a holistic view about this line of research, which proved to be quite current.



**Figure 1.** Schematic of the PRISMA 2020 Flow at each level.

### Systematic search

The systematic search was formalized in March 2023, in SCOPUS and in the *Web of Science*, defining the results for articles published from 2018 to that time (2023). The composition of terms that achieved superiors in both search engines was as follows: (((complications of obstetric OR hysterectomy) OR obstetric complications in hysterectomy). Specifically, 81 results were obtained, of which 51 in SCOPUS and 30 in the *Web of Science*. Prior to the selection of articles, the inclusion and exclusion criteria were defined.

### **Inclusion criteria**

(1) Be articles published in journals indexed in the SCOPUS databases or the *Web of Science*, maintaining their validity in those databases at the time of this study; (2) Be an empirical study, review, or case study; (3) Be articles published between 2018 and 2023.

### **Exclusion criteria**

(1). Articles that were not written in Spanish or English; (2) Research whose study populations are not human beings. In accordance with these inclusion and exclusion criteria, and only with the reading of the title, 66 articles were rated adequate, after eliminating four after reading the title and 11 duplicates, between both databases. Subsequently, the abstract was read after which another 17 articles were discarded, since they did not refer specifically to the scientific questions formulated in the study protocol. Thus, finally, 49 articles were selected to formalize the systematic review.

All authors of this study were involved in the selection process of the articles, and created a database in Microsoft Word 2019 that included the following information: title of the article; names of authors; name of the journal; date of publication; references in Vancouver standards; study results; authors' conclusions; and contributions to the questions of interest in this study. Of the 49 recognized studies, the most notable were chosen, in the opinion of the authors of this study, to demonstrate them in this article. This selection stopped when it was believed that the ones shown effectively manifested the answers to the questions.

The authors did not consider developing a meta-analysis, but they have proposed it in the continuity of this line of research. The results found were interpreted with the support of hermeneutics. According to the methodological strategy defined to develop this study, methods of the theoretical level of knowledge such as the Historical-Logical, the Analytical-Synthetic, the Inductive-Deductive, and the systemic approach were used, under an argument conducive to reflect the reality of Ecuador and thus be able to provide a valuable review for the academy and Ecuadorian health institutions, fulfilling the social function of research regarding solving regional problems (Gómez et al., 2017; Gómez Armijos et al., 2017).

## **3. Results And Discussion**

Next, some of the most significant findings found on the complications of obstetric hysterectomy are shown, based on articles reviewed in journals indexed in SCOPUS or *Web of Science* and published between 2018 and 2023.

### **What are the most common complications of obstetric hysterectomy and how often is it?**

In a retrospective study published in 2018 in the journal *Ginecología y Obstetricia de México*, complications of obstetric hysterectomy were analyzed in 101 patients. The most common complications were surgical wound infection (17.8%) and postoperative bleeding (9.9%). The overall complication rate was 35.6% (Cortez-Moncayo et al., 2018).

A study published in 2021 in the journal *BMC Pregnancy and Childbirth* looked at the rate and complications of obstetric hysterectomy at 15 hospitals in China between 2014 and 2017. The authors found an overall complication rate of 14.9%, with the most common complications being surgical wound infection (3.7%) and postoperative hemorrhage (3.4%) (Liu et al., 2021).

Another study published in 2019 in the journal *Clinical and Experimental Obstetrics & Gynecology*, which included 101 patients in Turkey, found that the complication rate of obstetric hysterectomy was 47.5%. The most common complications were postoperative hemorrhage (27.7%) and surgical wound infection (15.8%) (Yücel et al., 2019).

### **What are the most serious complications of obstetric hysterectomy and how often are they?**

A study published in 2019 in the *Journal of Obstetrics and Gynaecology Research* evaluated the efficacy of uterine artery suturing in preventing postoperative bleeding in patients undergoing obstetric

hysterectomy. The authors found that suturing the uterine artery significantly decreased the rate of postoperative bleeding (Kotani et al., 2019).

A study published in 2021 in the journal *BMC Pregnancy and Childbirth* investigated the efficacy of hormone replacement therapy in preventing complications of obstetric hysterectomy in premenopausal women. The authors found that hormone replacement therapy was effective in preventing vaginal atrophy and long-term urogenital complications (Zhang et al., 2021).

Another study published in 2018 in the *International Journal of Gynecology & Obstetrics* evaluated the efficacy of the uterine arterial embolization technique in preventing postoperative bleeding in patients undergoing obstetric hysterectomy. The authors found that uterine arterial embolization was effective in preventing postoperative bleeding and significantly reduced the complication rate (Ma et al., 2018).

### **What risk factors are associated with complications of obstetric hysterectomy?**

A study published in 2019 in the journal *Archives of Gynecology and Obstetrics* evaluated risk factors for morbidity and mortality in patients undergoing obstetric hysterectomy. The authors found that advanced age, hypertension, history of previous cesarean section, and need for blood transfusion were associated with an increased risk of morbidity and mortality (Parpinelli et al., 2019).

A study published in 2020 in the *Taiwanese Journal of Obstetrics & Gynecology* investigated risk factors for postoperative bleeding in patients undergoing obstetric hysterectomy. The authors found that history of previous cesarean section, placenta previa, and need for blood transfusion were associated with an increased risk of bleeding (Chen et al., 2020).

Another study published in 2018 in the journal *Revista Brasileira de Anestesiologia* evaluated risk factors for respiratory failure in patients undergoing obstetric hysterectomy. The authors found that advanced age, obesity, prolonged duration of surgery, and need for blood transfusion were associated with an increased risk of respiratory failure (Almeida et al., 2018).

### **Are there differences in the frequency and type of complications between different surgical techniques used in obstetric hysterectomy?**

A study published in the *Journal of Obstetrics and Gynaecology Research* compared abdominal hysterectomy with vaginally assisted laparoscopic in the management of uterine prolapse. The authors found that the vaginally assisted laparoscopic technique had a significantly lower rate of postoperative complications compared to the abdominal technique (Al-Qahtani et al., 2021).

Another study published in the *Journal of Surgery* evidences a systematic review and network meta-analysis of randomized controlled trials comparing different surgical techniques of hysterectomy, including laparoscopy, laparotomy and vaginal hysterectomy. The authors found that the complication rate varied depending on the surgical technique used, with vaginal hysterectomy having the fewest complications (Zhang et al., 2021).

A study published in the journal *BMC Women's Health* shows a systematic review and meta-analysis of randomized controlled trials that compared the complication rate between abdominal, vaginal and laparoscopic hysterectomy in the treatment of benign uterine disorders. The authors found that the laparoscopic technique had fewer complications than the abdominal technique, and that the vaginal technique had fewer complications than the laparoscopic and abdominal technique in some cases. However, significant differences in the complication rate were observed between the studies included in the meta-analysis (Jang et al., 2019).

### **What are the most effective strategies for preventing or managing complications of obstetric hysterectomy?**

A study published in the *Journal of the College of Physicians and Surgeons Pakistan* examined the effect of intraoperative prophylactic tranexamic acid (TXA) on blood loss during elective caesarean section and hysterectomy. The results showed a significant decrease in blood loss in both groups compared to the control group, without increasing the risk of complications. This article suggests that intraoperative prophylactic TXA administration may be an effective strategy to prevent complications related to blood loss in obstetric hysterectomy (Khan et al., 2021).

Another article published in the journal *Archives of Gynecology and Obstetrics* conducted a systematic review and meta-analysis to evaluate the efficacy of antibiotic prophylaxis in abdominal hysterectomy in preventing surgical site infections. The results suggest that antibiotic prophylaxis is effective in reducing surgical site infections in abdominal hysterectomy (Sharami et al., 2018).

The *Journal of Obstetrics and Gynaecology Canada* reports a study that examined the influence of early feeding on postoperative recovery after major obstetric and gynecologic surgery. Results showed that early feeding can improve postoperative recovery and reduce the risk of nutrition-related complications (Zhou et al., 2019).

This article suggests that early feeding may be an effective strategy to improve a patient's recovery and prevent complications after an obstetric hysterectomy. However, it is important to note that more studies with a robust design are needed to confirm these findings and establish clear recommendations for clinical practice.

### **Is there evidence that the experience of the surgeon or hospital where obstetric hysterectomy is performed influences the incidence of complications?**

Several studies have evaluated the influence of surgeon experience and hospital volume on the incidence of complications in obstetric hysterectomy. A 2019 meta-analysis found that surgeon experience, as measured by their volume of surgeries, can influence perioperative hysterectomy outcomes, especially the complication rate (Kokanali et al., 2019).

In addition, a 2020 study found that the surgeon's caseload and the operative approach used can affect operative time and perioperative complications in total abdominal hysterectomy (Paterson et al., 2020).

Another 2021 study evaluated the relationship between hospital volume and complications after hysterectomy for benign uterine diseases, finding that the complication rate increased in hospitals with lower surgical case volume. These findings suggest that both surgeon experience and hospital volume are important factors that may affect the incidence of complications in obstetric hysterectomy (Wu et al., 2021).

In the present study, the complications of obstetric hysterectomy are interpreted through a systematic review with PRISMA 2020 methodology.

The articles consulted in this systematic review provide important evidence on the efficacy and safety of obstetric hysterectomy in obstetric emergency situations. In addition, they identify the indications, timing, and complications of obstetric hysterectomy, which can help doctors make informed decisions about when to perform the procedure and how to minimize complications.

It is important to note that the prevention and management of complications of obstetric hysterectomy depends not only on postoperative strategies, but also on the proper selection of surgical technique and the identification and management of preoperative risk factors. The experience of the surgeon and medical team, as well as the infrastructure and resources available in the hospital, can also influence the incidence of complications.

The authors of this review consider that despite the findings found here, to interpret the results in more depth, new and deeper studies are required. In particular, to interpret the answer to question 1 posed in this study, on the complications of obstetric hysterectomy, it is necessary to identify and analyze recent

studies that address this problem. It is important to consider the different complications that can arise during and after the procedure, as well as the associated risk factors and surgical techniques used.

To interpret the answer to question 2 on the frequency and type of complications of obstetric hysterectomy, specific studies evaluating this question in the population should be reviewed. It is important to consider the particularities of the local context and the conditions of access to medical care.

Regarding interpreting the answer to question 3 on risk factors associated with complications of obstetric hysterectomy, studies should be sought that address this issue from an epidemiological perspective, identifying the most relevant risk factors and their impact on the incidence of complications. To interpret the answer to question 4 on differences in the frequency and type of complications between different surgical techniques used in obstetric hysterectomy, comparative studies assessing these differences in terms of efficacy and safety should be sought.

On the other hand, to interpret the answer to question 5 on the most effective strategies to prevent or manage the complications of obstetric hysterectomy, studies should be sought that evaluate specific interventions in the perioperative period, such as early feeding, and their impact on the incidence of complications. Finally, to interpret the answer to question 6 on the influence of the experience of the surgeon or the hospital on the incidence of complications, studies should be sought that evaluate this question from a perspective of quality of care and patient safety, considering factors such as the experience of the medical team and the resources available in the hospital.

All the findings and interpretations of this systematic review suggest that, in order to advance the understanding of the complications of obstetric hysterectomy, prospective studies could be conducted that include a larger number of patients and that allow a more precise assessment of the association between different risk factors and postoperative complications. It would also be interesting to explore the possibility of establishing preventive strategies and early management of complications, especially for those that occur more frequently, such as bleeding and infection.

In addition, it would be important to evaluate the efficacy and safety of the different surgical techniques available for performing obstetric hysterectomy, in order to establish which are the most appropriate in terms of minimizing the risk of complications. Finally, it would be interesting to evaluate the influence of the experience of the surgeon and the characteristics of the hospital on the incidence of complications, in order to establish possible measures to improve the care and training of health professionals.

#### **4. Conclusion**

In the present study, the complications of obstetric hysterectomy were interpreted through a systematic review with PRISMA 2020 methodology, in which the articles reviewed from 2018 to 2023 by SCOPUS and the *Web of Science* have provided a solid base of scientific evidence for obstetric hysterectomy in obstetric emergency situations. This can help clinicians make informed decisions and improve obstetric outcomes. It was evidenced that the prevention and management of complications of obstetric hysterectomy not only depend on postoperative strategies, but also on the appropriate selection of surgical technique and the identification and management of preoperative risk factors. The most common obstetric complications found were postoperative hemorrhage and surgical wound infection. In summary, obstetric hysterectomy is an important surgical procedure that can have significant complications. It is critical to continue researching and evaluating effective strategies to prevent and manage these complications, and to consider multiple factors that influence their occurrence.

#### **Conflict of interest**

The authors claim to have no conflicts of interest related to this study.

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