MATERNAL SAFETY: THE IMPACT OF NURSING PRACTICES ON THE MANAGEMENT OF POSTPARTUM HEMORRHAGE

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ABSTRACT

This study aims to analyze postpartum hemorrhage (PPH) as an obstetric emergency and to highlight the role of nursing in its management. PPH represents one of the leading causes of maternal death globally, with 14 million cases annually and 140,000 deaths, and is particularly prevalent in developing countries. A narrative literature review was carried out in databases such as Google Scholar, PAHO, Ministry of Health, and COFEN, using descriptors related to PPH and nursing care, with publications between 2009 and 2022. The results showed the evolution of the guidelines for PPH, currently considering blood loss ≥1000 mL or signs of hypovolemia. Significant risk factors were identified, such as previous history of PPH and multiple pregnancies, and the importance of the "4Ts" Rule (Tone, Trauma, Tissue and Thrombin) for etiological identification. The study revealed critical failures in maternal management, including delayed diagnosis and insufficient postpartum monitoring. It was found that nursing care is crucial in the management of PPH, through the systematic assessment of vital signs, monitoring of blood loss, and implementation of interventions such as oxytocin administration, uterine massage, and promotion of immediate breastfeeding. The Systematization of Nursing Care emerges as an essential methodology to ensure individualized and evidence-based care, contributing significantly to the reduction of maternal morbidity and mortality related to PPH.

Keywords: Postpartum hemorrhage. Nursing care. Obstetric care. Maternal mortality. Emergencies.

INTRODUCTION

Postpartum hemorrhage (PPH) is recognized as one of the leading causes of maternal death in the world, with an estimated 14 million cases annually and about 140 thousand deaths, which is equivalent to one death every four minutes (Basso, 2022; Michels et al., 2022). This condition is particularly prevalent in developing countries, where most cases are preventable through specific clinical interventions (Costa et al., 2021; Galvão, 2023).

PPH is often associated with failures in obstetric management and deficiencies in care during childbirth, which can result in serious and even fatal complications (Costa, 2023; Barros et al., 2022). Epidemiological data indicate that PPH is responsible for a significant proportion of maternal deaths, especially in the first 24 hours after delivery. Studies show that uterine atony is the leading cause of PPH, accounting for a large portion of deaths related to this condition (Romero & Galarza, 2017; Padilha et al., 2020).

In addition, risk factors such as advanced maternal age, multiparity, history of PPH, and conditions such as uterine fibroids and anemia are often reported to contribute to the incidence of hemorrhages (Pinto et al., 2022; TOSS, 2023).

An analysis of maternal mortality data reveals that, in many cases, lack of access to adequate care and poor hospital infrastructure have aggravated the situation, resulting in high mortality rates (Costa et al., 2021; Brito, 2023).

The discussion on maternal mortality due to PPH should include the analysis of management practices and the importance of education and training of health professionals. The implementation of care protocols and the training of nursing teams are essential to improve outcomes and reduce mortality (Rabêlo et al., 2021; Souza et al., 2023). The use of medications such as misoprostol for the treatment of PPH is also a recommended practice, as it can help control bleeding effectively (Koch & Rattmann, 2019; Betti, 2023).

In summary, postpartum hemorrhage remains a leading cause of maternal death, especially in settings where access to appropriate obstetric care is limited. Early identification of risk factors and the implementation of practical interventions are crucial for reducing maternal mortality associated with this condition (Santos et al., 2023; Silva, 2023; Achkar, 2022). Ongoing research and improvement of care practices are critical to addressing this public health challenge.

Continuing education and simulation training are strategies that are shown in the preparation of professionals to deal with this obstetric emergency (MELO, 2023; Silva, 2023).

Thus, this literature review aims to discuss puerperal hemorrhage and the importance of nursing care.

MATERIALS AND METHODS

This research consists of a narrative literature review, using updated tools for data collection and analysis. The search for relevant studies was carried out in several databases, including Google Scholar, the Pan American Health Organization (PAHO), the Ministry of Health, and the Federal Council of Nursing (COFEN).

The descriptors used to guide the research were: postpartum hemorrhage; postpartum nursing care; nursing care in the postpartum period; drug treatment for postpartum hemorrhage; and diagnosis for postpartum hemorrhage. The survey of the theoretical framework was conducted in the period between April 2022 and December 2022, covering an interval of nine months of intensive search.

The inclusion criteria established for the selection of material included books, theses, scientific articles and manuals of the Ministry of Health, published in Portuguese and English. The time frame for the selection of publications was defined between the years 2009 and 2022, thus ensuring the inclusion of recent studies, but also allowing a historical perspective on the topic. At the end of the selection and analysis process, twenty-six references were incorporated into the study, forming the corpus of the review.

This methodological approach allows a broad and up-to-date view of the theme of postpartum hemorrhage, encompassing aspects such as nursing care, diagnosis, and drug treatment. The diversity of sources consulted, including academic databases and recognized health organizations, contributes to the robustness and reliability of the review. In addition, the inclusion of different types of publications, such as scientific articles, theses, and technical manuals, provides a multifaceted understanding of the subject, integrating theoretical and practical perspectives.

RESULTS/DISCUSSION

The American College of Obstetricians and Gynecologists (ACOG) guidelines for postpartum hemorrhage (PPH) underwent a major revision between 2006 and 2017. Previously, the definition of PPH was based on distinct blood loss volumes for vaginal and cesarean deliveries. The 2017 update adopted a unified definition, considering PPH to be blood loss ≥1000 mL, regardless of the type of delivery, or the presence of signs of hypovolemia. This change reflects a broader perspective, recognizing that even minor losses can be clinically significant. The new guideline also emphasizes the need to

investigate losses >500 mL in vaginal deliveries, although the threshold for characterizing PPH has been raised, with a view to prioritizing interventions in the most severe cases (Brito, 2023).

Postpartum hemorrhage (PPH) can manifest in the antepartum and intrapartum periods, and is influenced by a variety of risk factors. Studies show that many of these factors are present before and during labor, increasing susceptibility to PPH. Antepartum hemorrhage is characterized by vaginal bleeding after the 20th week of gestation, while intrapartum hemorrhage occurs during labor (Puertas, 2024; Pinto et al., 2022)

Among the antepartum risk factors, the history of postpartum hemorrhage (PPH) deserves to be highlighted, which can triple the probability of occurrence. Additionally, other conditions such as excessive uterine stretching, coagulation disorders, use of anticoagulants, and the presence of placenta previa or low insertion also contribute to the risk (Puertas, 2024; Pereira, 2024; Matos et al., 2022). Priparity after 40 years of age and maternal obesity are equally relevant in increasing the risk of PPH (Puertas, 2024; Pinto et al., 2022; Moreira, 2023).

Multiple pregnancy, as consistently demonstrated by Puertas (2024), Pereira (2024), and Matos et al. (2022), imposes a considerable risk of PPH, raising the probability by three to five times. This magnitude suggests the need for specific protocols for multiple pregnancies, with more rigorous monitoring. Preeclampsia and gestational hypertension reinforce this concern. In the intrapartum period, Pereira (2024) and Brito (2023) highlight that prolonged or precipitated labor, third and fourth degree vaginal or perineal lacerations, and induction of labor with oxytocin are factors that require extra attention. Oxytocin induction, in particular, deserves careful analysis to optimize its use and minimize risks.

Puertas (2024), Pereira (2024), and Moreira (2023) agree that chorioamnionitis, infection of the fetal membranes, and placental retention are factors that contribute significantly to the risk of PPH. This association reinforces the importance of surveillance and proper management of these conditions. Puertas (2024) and Michels et al. (2022) also highlight that cesarean section, especially in emergencies, is associated with a high risk of complications, including PPH, due to factors such as infections and lacerations. This suggests that the decision to perform an emergency caesarean section should be carefully weighed, considering the risks and benefits.

Puertas (2024), Pereira (2024) and Brito (2023) emphasize that the early identification and management of these risk factors are crucial for the prevention of PPH. This emphasis on primary prevention should guide clinical practice. However, studies also suggest that oxytocin administration, while widely recommended, may have limited efficacy

in women with a history of cesarean section or other significant risk factors (Puertas, 2024; Pereira, 2024; Brito, 2023). This implies that alternative or adjunctive strategies may be necessary in these cases.

Chart 1 - Most of the risk factors for PPH are present in the antepartum and intrapartum periods.

Antepartum Risk Factors	Intrapartum Risk Factors
1. History of PPH (increases risk by 3 times)	1. Prolonged labor (>24h)
2. Excessive uterine stretching (macrosomia, polyhydramnios, multiple pregnancy)	2. Precipitous labor (<3h)
3. Congenital or acquired coagulation disorders (e.g., von Willebrand's disease)	3. 3rd/4th degree vaginal/perineal laceration
4. Use of anticoagulants (e.g., heparin, warfarin)	4. Extensive episiotomy
5. Previous caesarean section (risk of placenta accreta)	5. Placental abruption
6. Placenta previa or low insertion	6. Labor induction (oxytocin use)
7. Multiple pregnancy (3-5 times higher risk)	7. Chorioamnionitis (infection of fetal membranes)
8. Preeclampsia/Eclampsia	8. Arrest of cephalic pole progression
9. Gestational or chronic hypertension	9. Instrumented delivery (forceps or vacuum-extractor)
10. Anemia during pregnancy (Hb <11 g/dL)	10. Retained placental (>30 min after delivery)
11. Primiparity after 40 years	11. Oxytocin Overuse During Childbirth
12. Multiparity (≥5 deliveries)	12. Emergency cesarean delivery
13. Maternal obesity (BMI >30)	13. Uterine rupture
14. Uterine fibroids	14. Uterine inversion
15. Smoking	15. Pelvic birth
16. Gestational or pre-existing diabetes	16. Fetal Macrosomia (>4000g)
17. Previous uterine surgery (myomectomy)	17. Intrapartum fever

Souza et al. (2023) warn of failures in maternal management, which represent a series of critical factors capable of compromising patient safety. Delay in diagnosing PPH and lack of proper assessment of risk factors are initial problems that can trigger severe complications. This urgency requires an immediate review of existing protocols. Oliveira & Santos (2022) complement this analysis, highlighting that inadequate management of the third stage of labor and failures in the timely administration of uterotonics are common errors that significantly increase the risk of PPH. Therefore, it is necessary to act to correct these failures and ensure the safety of all patients.

Other worrisome aspects of maternal management include delays in performing surgical interventions when necessary, lack of continuous postpartum monitoring, and errors in estimating blood loss. These factors can result in late and inadequate interventions, compromising maternal health (Rodrigues et al., 2024). The literature, as pointed out by Silva & Pereira (2023), highlights that the continuous training of health professionals and the implementation of strict protocols are essential to mitigate these risks.

With regard to infrastructure and care, the absence of standardized protocols for the management of PPH represents a significant problem in many health institutions (Almeida et al., 2022). The lack of essential equipment, such as blood bags and oximeters, as well as the shortage of uterotonic drugs, can seriously compromise the ability to respond in cases of PPH (Ferreira & Costa, 2023). The absence of a blood bank or insufficient stock is particularly critical, as it can prevent adequate blood replacement in cases of severe hemorrhage (Martins et al., 2024).

The lack of trained professionals in obstetric emergencies and the absence of obstetric intensive care units constitute important gaps in health infrastructure that can directly affect the outcome of PPH cases (Carvalho & Lima, 2023). In addition, difficulties in transportation to specialized centers and lack of access to adequate antenatal care are factors that can contribute to the worsening of PPH cases, especially in remote areas or with limited resources (Nunes et al., 2022).

Finally, the absence of efficient communication systems between teams can lead to critical delays in care and decision-making in emergency situations (Barbosa & Oliveira, 2024). Improving these aspects of infrastructure and care is essential to reduce the morbidity and mortality associated with PPH and ensure quality and safe obstetric care for all pregnant women.

Chart 2 - Failures in Maternal Management and Lack of Care and Infrastructure Problems.

Failures in Maternal Management	Lack of Care and Infrastructure Problems
Delay in diagnosis of PPH	Absence of standardized protocols for PPH management
Lack of proper assessment of risk factors	Lack of essential equipment (e.g. blood bags, oximeters)
Inadequate management of the third stage of labor	Shortage of uterotonic drugs
Fault in timely administration of uterotonics	Absence of a blood bank or insufficient stock
Delay in performing surgical interventions when necessary	Lack of trained professionals in obstetric emergencies
Lack of continuous postpartum monitoring	Absence of obstetric intensive care unit
Error in estimating blood loss	Difficulties in transporting to specialized centers
	Lack of access to adequate antenatal care
	Absence of efficient communication systems between teams

Source: WHO, 2018.

The reduction in the risk of hemorrhage after delivery occurs when breastfeeding increases the levels of oxytocin, a substance that acts both to assist the release of milk and to favor uterine contraction (CIAMPO; CIAMPO, 2018).

To detect the causes of PPH, the "4T Rule" (Tone, Trauma, Tissue and Thrombin) is used. This rule helps in the identification of different etiologies, such as Uterine Atony, Trauma (lacerations, hematoma, rupture, inversion), Tissue Lesions (retained placenta and placenta of abnormal adhesion) and Thrombin (coagulopathies) (TEIXEIRA et al., 2021).

Thus, the evaluation of uterine tone is of paramount importance, as it is through it that uterine atony caused by the excessive use of oxytocin in labor can be identified. In these cases, the pregnant woman may experience several contractions, but the uterus does not respond adequately to oxytocin stimuli. Uterine atony is characterized by inadequate contraction of the uterine muscles, which can trigger hemostasis and cause hemorrhage (ALVES et al., 2020).

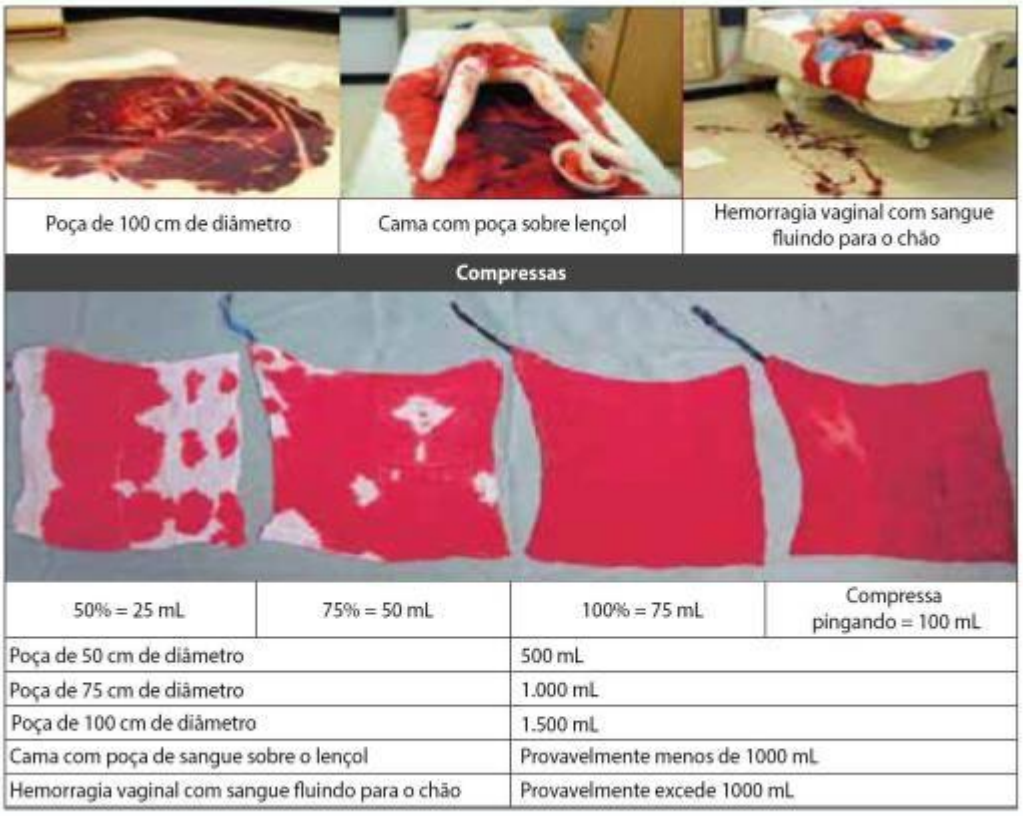
Revision of the uterine canal is necessary to observe the presence of signs of lacerations, hematoma, rupture, inversion, and to confirm the performance of episiotomy and episiorrhaphy (PAHO, 2018). Trauma is defined as the integrity of perineal tissue impaired due to the presence of laceration, hematoma, and the like. In cases of laceration, the affected tissues are characterized by four degrees (PREFEITURA DE BELO HORIZONTE, 2015).

It is necessary to inspect the uterine cavity for the presence of placental remnants and placental accreta. In some cases, the placenta does not detach from the uterine bed in the expected time, requiring manual extraction (PAHO, 2018).

It is also important to check the history of congenital coagulopathies or the risk of acquired coagulopathies, to identify if the pregnant woman has any coagulation impairment (ALVES et al., 2020), which hinders hemostasis and, consequently, the prevention of hemorrhage and thrombosis. Coagulopathies can be classified into three categories: disseminated intravascular coagulation (DIC) by infusion of thromboplastins into the bloodstream, present in cases of preeclampsia and placental abruption (PPD); consumption coagulopathy, which occurs after profuse bleeding during childbirth; and specific blood clotting deficiency (ALMEIDA; CARVALHO, 2020).

The identification of PPH occurs mainly through visual recognition of bleeding higher than expected (Figure 1). In addition, the measurement of compresses and the evaluation of clinical patterns are used, including the identification of signs of hypovolemic shock (SILVA ML, 2022).

Figure 1 - Estimation of volume loss through the visual strategy.



Poça de 50 cm de diâmetro	500 mL
Poça de 75 cm de diâmetro	1.000 mL
Poça de 100 cm de diâmetro	1.500 mL
Cama com poça de sangue sobre o lençol	Provavelmente menos de 1000 mL
Hemorragia vaginal com sangue fluindo para o chão	Provavelmente excede 1000 mL

Source: PAHO, 2018.

The weighing of swabs, surgical drapes, and sheets used during childbirth is of great relevance, especially to detect PPH related to cesarean sections and hysterectomies. It is essential that the professional knows precisely the weight of dry hospital supplies and after blood absorption, for a correct diagnosis. This strategy is based on the equivalence between 1 ml of blood and 1 gram of weight, with blood loss in milliliters being calculated by the difference between the weight of blood-containing materials and their dry weight (MAIN, E. K. et al., 2015).

Monitoring of vital signs (blood pressure, heart rate) is used to identify hemodynamic changes that indicate volume loss. Although these manifestations are delayed, they are important to determine the worsening of hypovolemic shock and to assess the need for massive transfusion. Therefore, hemodynamic instability should not be waited for to start maneuvers to control puerperal hemorrhage (PREFEITURA DE BELO HORIZONTE, 2015).

Situations in which the puerperal woman presents a shock index where the heart rate (HR) is greater than or equal to the systolic blood pressure (SBP) indicate the need for a quick and intensive approach, considering the probability of blood transfusion (PREFEITURA DE BELO HORIZONTE, 2015).

Another diagnostic method of puerperal hemorrhage is the use of collecting devices, such as bags, sacks, or diapers (Figure 2). These are usually positioned after vaginal delivery (avoiding mixing with other secretions such as amniotic fluid), in a lower position than the patient and without external compression (to prevent overflow). At the end of the procedure, it is possible to quantify blood loss more accurately (PAHO, 2018).

Figure 2 - Estimation of volume loss through the collector device.

Source: PAHO, 2018.

The estimation of volume loss through the weighing of compresses, according to PAHO (2018), is done as follows:

Weight of blood packs (grams) – Calculated weight of dry packs (grams) = Estimate of the volume of blood lost (milliliters).

The clinical estimate by means of the Shock Index (CI), according to the Guidelines for Multidisciplinary Care (PREFEITURA DE BELO HORIZONTE (2015), is as follows:

Maternal heart rate ÷ Systolic blood pressure = If CI greater than or equal to 0.9: massive transfusion.

NURSING CARE AT HPP

Because they are 24 hours at the bedside, nursing plays a fundamental role in the management and prevention of PPH (Carvalho; Cerqueira, 2020). It is through nursing care that the postpartum woman receives the necessary assistance to avoid hemorrhages or prevent the evolution of the pathology to death (PAHO, 2018).

Due to the high rate of maternal morbidity and mortality associated with obstetric hemorrhages, it is essential that the professional who accompanies the pregnant woman during the pregnancy-puerperal period remains continuously in a state of alert and is aware of the main conducts to be taken (DA SILVAI, 2021).

Basic nursing care, such as measuring vital signs, assessing oximetry, and measuring blood loss, allow PPH to be identified early, interrupting its progression to

hypovolemic shock and maternal death (DILLARD, 2017). The Ministry of Health Guidelines recommend that maternal evaluation be performed immediately after delivery, including systematic review of the placenta and appendages, measurement of vital signs every 15 minutes in the first hour postpartum, and verification of uterine contractility through abdominal palpation to certify the presence of Pinard's safety globe, which promotes hemostasis of the placental insertion site and controls vaginal bleeding (VIEIRA et al., 2018).

It is essential to observe signs of hypovolemic shock, perform uterine palpation, reassess the birth canal, collect data from the medical record or from family members about a history of coagulopathies, and keep the companion informed about the clinical condition (PAHO, 2018).

To implement appropriate clinical management, nurses need to know how to identify PPH and determine the etiology of bleeding. Uterine atony, responsible for 80% of puerperal hemorrhages, should be the first condition to be investigated (COMMITTEE ON PRACTICE BULLETINS-OBSTETRICS, 2017). When assessing tone, one of the 4Ts (Tone, Tissue, Trauma and Thrombin), the nursing professional verifies the presence of uterine atony through palpation, identifying whether the organ is returning to its non-pregnancy state or if it is not responding to physiological stimuli (MONTENEGRO; RESENDE FILHO, 2014).

As an initial intervention, intramuscular administration of oxytocin after the baby's shoulder is removed is recommended (ALVES et al., 2020). In case of worsening of the hemorrhage or impossibility of administration of oxytocin, methylergometrine is indicated as a second option, promoting uterine contraction, but is contraindicated for hypertensive patients. As a third therapeutic alternative, when oxytocin and/or methylergometrine do not achieve the expected result, the use of misoprostol is indicated, which also induces uterine contraction (KOCH; RATTMANN, 2019).

To reduce mortality from postpartum bleeding, tranexamic acid can be used in the first few hours, and is considered important in the prophylaxis of hemorrhage because it acts on the mechanisms of containing blood loss (GALEANO-TORO et al., 2018; VOGEL et al., 2018).

Another beneficial intervention is to promote skin-to-skin contact between mother and newborn during the "golden hour" of breastfeeding, when the baby has his first feeding. This practice strengthens the mother-child bond and stimulates the release of oxytocin in the blood system of the puerperal woman, helping in uterine involution (CIAMPO; CIAMPO, 2018). Additionally, the non-surgical clinical management of uterine

atony includes uterine massage and the administration of medications that improve uterine tone (COELHO et al., 2021).

Thrombin, another of the 4Ts, represents alterations in the patient's coagulation and can be managed by the nurse and his team through the evaluation of laboratory tests and the puncture of two large venous accesses for possible blood transfusions. It is essential to check the patient's blood type in the medical record, communicate with the institution's blood center, and inform the doctor in charge (ALVES et al., 2020).

The tissues, also part of the 4Ts, refer to placental waste not completely eliminated during the fourth stage of labor. The nurse should clinically assess the presence of these placental remains through vital signs, anamnesis, and physical examination. Warning signs include a temperature above 38°C, dark, sticky, or smelly discharge, situations that require immediate communication to the medical team, and establishment of large-scale venous access (PAHO, 2018).

Finally, traumas, the last of the 4Ts, are identified through physical examination and anamnesis, and are generally related to lacerations and bruises that occur during the expulsive phase. It is important to check if episiotomy and episiorrhaphy have been performed, procedures that can be performed by both the obstetrician and the obstetric nurse. Since these interventions increase the risk of vaginal and anal lesions, they should not be performed routinely. It is through these clinical management that nurses and their team can implement the appropriate treatment of PPH, contributing significantly to the reduction of maternal mortality due to hemorrhages (PAHO, 2018).

CONCLUSION

Postpartum Hemorrhage (PPH) represents one of the main causes of maternal mortality in developing countries and the primary cause of maternal deaths globally, affecting approximately 2% of parturients. However, careful evaluation and qualified care for postpartum women until the moment of hospital discharge, with early identification of risk situations, are determining factors to preserve maternal life.

This study showed that the nursing team plays a fundamental role in the prevention, identification and management of PPH. Through adequate and timely nursing care, the postpartum woman receives the necessary assistance to avoid bleeding complications or reverse conditions already installed, significantly reducing the risk of fatal outcomes.

In this context, the Systematization of Nursing Care (NCS) emerges as an essential tool, allowing nurses to apply their technical and scientific knowledge to organize, plan and

execute actions, in addition to equipping the entire team responsible for care (OLIVEIRA et al., 2019).

The effective implementation of NCS enables nursing professionals to identify the basic human needs affected or at risk in patients and, consequently, to establish accurate diagnoses and appropriate interventions, enabling individualized, comprehensive and evidence-based care. This methodology aims not only to identify the nursing care that is indispensable in the various health-disease situations, but also to support interventions for the promotion, prevention, recovery and rehabilitation of women's health, considering their family and community context (Federal Nursing Council, 2009).

Therefore, investing in the continuous training of the nursing team, in the systematic implementation of NCS, and in the development of specific protocols for the management of PPH is a fundamental strategy to reduce maternal morbidity and mortality related to this severe obstetric complication.

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