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**Barriers to Early Detection in Women Experiencing a Postpartum Hemorrhage: An
Integrative Review**

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Abstract

Aim: The aim of this integrative review is to explore barriers to early detection in women experiencing postpartum hemorrhage.

Background: Women in the United States are more likely to die from childbirth complications than any other women living in other developed countries. Despite advances in maternity care, postpartum hemorrhage is the cause of nearly 70,000 maternal deaths every year, comparable to one woman dying of postpartum hemorrhage blood loss every eight minutes. Most maternal deaths are avoidable, as the solutions to prevent and manage these deadly complications are well known. Risk factors, assessment tools, causes, interventions, and outcomes are well studied and have extensive evidence-based research to support. However, significant challenges, such as accurate monitoring, assessment of blood loss, early identification of risk factors, and timely recognition of postpartum hemorrhage remain. Very few studies have explored where the gap lies in patient care, as postpartum hemorrhage continues to remain the leading cause of maternal mortality and morbidity worldwide.

Method: This integrative review followed Whittemore and Knafl's five-step methodologic framework. A comprehensive search was conducted, identifying studies published between 2016 and 2023 using predetermined inclusion criteria, exclusion criteria, and search terms. Nursing databases that were searched included CINAHL, OVID Nursing Collection, Health Source Nursing, Medline Complete, and PubMed. Data was screened and all sampling decisions were made transparent, justified, displayed, and outlined in a PRISMA flowchart. The retrieved articles were then critically appraised for quality, reliability, value, and relevance to the context using the Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool. A thematic analysis was utilized that revealed emergent themes and subthemes in relevance to the aim of this integrative review.

Results: The thematic analysis identified six main themes that included undervaluing preventative measures, knowledge gap of detection practices, inadequate exposure, availability of resources, increasing disparities, and timely referral. Sixteen subthemes emerged and are described more in-depth among the central themes. While most studies exemplified more than one theme, no single theme was present in all ten reviewed studies.

Conclusion: The evidence elaborated on in this review highlights the barriers to early detection to bring awareness, share education, and make recommendations for ways to remove these barriers to help prevent poor maternal outcomes. Improvement in maternal health will require dedicated efforts in screening, prevention, detection, education, and management, beginning in the preconception period and continuing throughout the first year postpartum. Improving the quality of care and health outcomes can be done with thorough preparation, anticipating risk factors, coordinating a healthcare team, and ensuring access to care with timely interventional procedures. Further research is needed on screening tools, training programs, and care management worldwide as healthcare is striving to improve maternal morbidity and mortality.

Barriers to Early Detection in Women Experiencing a Postpartum Hemorrhage: An Integrative Review

Women in the United States are more likely to die from childbirth complications than any other women living in other developed countries (U.S. Department of Health and Human Services, 2022). The United States also has the highest maternal mortality rate of any developed country, with rates continuing to rise. In the United States, maternal mortality has more than doubled in the last 30 years, with postpartum hemorrhage accounting for 11% of these deaths (Watkins & Stem, 2020). According to data from the National Vital Statistics System, the maternal mortality rate for 2020 in the United States was 23.8 deaths per 100,000 live births, compared to 20.1 deaths per 100,000 live births in 2019 (Hoyert, 2022). Rates increase with maternal age, low-income settings and are significantly higher for non-Hispanic Black women, with 55.3 deaths per 100,000 live births in 2020. Georgia is the second-highest rate state for maternal mortality, with 48.4 per 100,000 births (World Population Review, 2022). Healthy People 2030 has developed objectives which aim at reducing/preventing pregnancy complications, decreasing maternal deaths, and reducing severe maternal complications identified during delivery hospitalizations, however these objectives are remaining at baseline or getting worse (U.S. Department of Health and Human Services, 2022).

According to Ifeadike et al. (2018), the majority of births are anticipated to be straightforward; however, every skilled birth attendant must be cognizant of potential complications and emergent situations that can arise. These complications can happen during pregnancy (antepartum care), childbirth (intrapartum care), immediately after birth, and the weeks following delivery (postpartum and postnatal care). The primary complications that account for 80% of all maternal deaths include severe bleeding postpartum, infections, high

blood pressure during pregnancy, and unsafe abortion (WHO, 2019). Of these listed, postpartum hemorrhage (PPH) is the leading cause of maternal mortality globally, affecting up to 10% of all deliveries (Andrikopoulou & D'Alton, 2019). Additionally, postpartum hemorrhage is the leading cause of almost 25% of all pregnancy-related deaths, and women living in low-resource settings are particularly at risk (Watkins & Stem, 2020). Despite advances in maternity care, postpartum hemorrhage is the cause of nearly 70,000 maternal deaths every year, comparable to one woman dying of postpartum hemorrhage blood loss every eight minutes (Owen et al., 2021).

Historically, many definitions have been used to define postpartum hemorrhage. The American College of Obstetricians and Gynecologists (ACOG), in an effort to standardize clinical definitions in women's health, defines postpartum hemorrhage as cumulative blood loss greater than or equal to 1000 mL of blood loss or signs and symptoms of hypovolemia within 24 hours of delivery whether a cesarean section or vaginal birth (ACOG, 2017). Broken down further, there are two categories of postpartum hemorrhage: primary and secondary. Primary postpartum is the most common type and occurs within the first 24 hours after delivery, and secondary postpartum hemorrhage occurs after the first 24 hours of birth. According to AWHONN (2021), 54-93% of maternal hemorrhage-related deaths can be prevented with improved clinical response. Most maternal deaths are avoidable, as the solutions to prevent and manage these deadly complications are well known (WHO, 2019). However, significant challenges, such as accurate monitoring, assessment of blood loss, early identification of risk factors, and timely recognition of postpartum hemorrhage, remain (Andrikopoulou & D'Alton, 2019).

Background

Postpartum hemorrhage and its related factors are well-researched and detailed throughout the research. These standard components include risk factors, assessment tools, diagnoses, interventions, preventions, and outcomes.

Risk Factors

Risk factors are variables associated with an increased chance of developing a disease, infection, or complication. In addition, risk factors can lead to awareness and preparedness, with risk assessments being performed often and continuously throughout care. Risk factor assessments for postpartum hemorrhage can occur during prenatal visits, antepartum care, admission to labor and delivery, during labor, and during the postpartum period (Andrikopoulou & D'Alton, 2019). Continuous assessment of these risk factors is essential as these factors can change or evolve throughout pregnancy and at birth. Postpartum hemorrhage risk factors, preventative strategies, and etiology are well documented; however, despite the available information, the prevalence remains consistent, and postpartum hemorrhage cases are still considered unexpected and unavoidable (Anderson & Etches, 2007).

Risk assessment for postpartum hemorrhages can be categorized into four classifications: medical or surgical history, fetal concerns, maternal issues, and placental/uterine problems (Watkins & Stem, 2020). According to Watkins and Stem (2020), medical or surgical history risk factors are considered any previous cesarean delivery, postpartum hemorrhage, or uterine fibroids. Fetal concern risk factors include multiple gestation, polyhydramnios, large for gestational age infants, and fetal macrosomia. Maternal issues risk factors include a history of hypertensive disorders, anemia, coagulopathies that include von Willebrand disease and HELLP syndrome, trial of labor after a previous cesarean delivery, prolonged labor, induction or

augmentation of labor, arrest of progress during the second stage of labor, prolonged third stage of labor and instrumentation during delivery such as a vacuum extractor or forceps. Lastly, the risk factors associated with placental/uterine problems include placental abruption, placenta previa, retained placenta, chorioamnionitis, uterine inversion, and subinvolution of the uterus. Despite these known risk factors, women will still develop postpartum hemorrhage without any known determinant (ACOG, 2017).

Assessment Tools

Current assessment tools for postpartum hemorrhage include a physical assessment of the patient with a focus on the patient's hemodynamic status (Watkins & Stem, 2020). During the assessment, the medical team is simultaneously working to identify the etiology of the blood loss. Common clinical assessments include measuring obstetric-related blood loss by estimating and quantifying blood loss, assessing the patient's vital signs and symptoms, and identifying their change in hemodynamic status due to hemorrhage. In addition, laboratory testing is also used to determine the significance of the postpartum hemorrhage; these labs include BUN, D-dimer, fibrinogen, hemoglobin and hematocrit, liver enzymes, lactate, serum magnesium, calcium, and potassium. The American College of Obstetricians and Gynecologists (2019) and the California Maternal Quality Care Collaborative (2022) have identified that visual estimation increases the chances of underestimating blood loss when volumes are high and overestimating blood loss when volumes are low and therefore recommend evidence to support that quantification of blood loss promotes a more reliable clinical assessment of maternal status (Association of Women's Health, Obstetric and Neonatal Nurses, 2021). Quantifying blood loss includes gravimetric measurements of blood-soaked items such as chux pads, bed sheets, blankets, gowns, pads, panties, and other linens to obtain an accurate blood loss volume (Ayala et al., 2023). In many

low-resource settings, there are no standardized assessment methods, and untrained healthcare workers may only be aware once women show apparent signs and symptoms, when interventions may be too late (Wilcox et al., 2016).

Diagnosis of Postpartum Hemorrhage

To determine a diagnosis of postpartum hemorrhage, the healthcare team must identify excess bleeding and thoroughly examine the patient to determine the cause of the bleeding. The causes of postpartum hemorrhage can be classified using the Four T's mnemonic: tone, trauma, tissue, and thrombin (Watkins & Stem, 2020). Tone refers to uterine atony and is the lack of active contraction from the smooth muscles in the uterus. This accounts for most causes at about 70% and above. Possible causes of uterine atony include infection, over-distention, prolonged induction, prolonged second stage of labor, maternal infusion of magnesium sulfate, multiparity, and a full bladder. Trauma accounts for about 20% of causes, and involves lacerations, hematomas, rupture, inversion, or vascular/soft tissue injury. Tissue refers to retained products of conception. Causes of tissue include retained placental tissue, blood clots, or invasive placentation, such as accrete, increta, and percreta, which account for about 10% of the incidences. Thrombin accounts for about 1% of the causes and refers to any coagulopathies (Alaska Native Medical Center, 2021). Effective management of postpartum hemorrhage requires understanding the potential causes and working diligently to treat the cause.

Interventions

Management of the postpartum hemorrhage should be tailored to the etiology of the bleeding and any other co-existing conditions (Alaska Native Medical Center, 2021). Early diagnosis and interventions are crucial in reducing mortality from postpartum hemorrhage, and simultaneously, the healthcare team must manage the patient's hypovolemia (Evensen et al.,

2017). The most effective management of postpartum hemorrhage is using medications such as Oxytocin and uterine massage. According to Evensen et al. (2017), the most effective approach to prevent postpartum hemorrhage is active management of the third stage of labor (AMTSL). This approach includes three components: administering a uterotonic drug (Oxytocin) with or soon after delivery of the anterior shoulder, controlled cord traction, and uterine massage after delivery of the placenta. AMTSL can decrease the incidence of postpartum hemorrhage by 68% (Anderson & Etches, 2007).

Additional interventions include those actions related to the cause, such as bimanual uterine compression, uterine massage, and emptying of the bladder to treat uterine atony. Administration of additional uterotonic medications such as Hemabate, Cytotec, Methergine, and Tranexamic Acid are also interventions for uterine atony. If trauma is the diagnosed cause, interventions include suturing and repairing lacerations, draining hematomas, and replacing the inverted uterus. Treatment of a tissue problem would include interventions such as manual removal of the retained placenta, curettage, and administration of Methotrexate. Lastly, a diagnosis of thrombin as the cause, interventions would include replacing blood products with the administration of fresh frozen plasma, packed red blood cells, platelets, and clotting factors. (Alaska Native Medical Center, 2021). The interventions mentioned above are considered the initial management of postpartum hemorrhage, while aggressive management would be the next step if these interventions do not work. Interventions for severe unidentified causes of hemorrhage with uterus-conserving treatments include uterine packing or tamponade procedure, artery ligation, B-lynch uterine compression sutures, artery ligation, and uterine artery embolization (Evensen et al., 2017). Finally, a hysterectomy is the last definitive intervention for a severe postpartum hemorrhage. For these reasons, it is imperative that a quick interdisciplinary

team approach is used, as it is critical for the improvement of outcomes and decreasing maternal mortality rates.

Outcomes

Outcomes of postpartum hemorrhage are related to the potential complications that can occur after a severe occurrence. These complications can be severe with sequelae such as Sheehan syndrome caused by anterior pituitary ischemia that results in a delay or failure of lactation, fatigue, anemia, myocardial ischemia, orthostatic hypotension, postpartum depression, postpartum anxiety, post-traumatic stress disorder, dilutional coagulopathy, and death (Evensen et al., 2017). Optimization of management with aggressive surgical, radiological, and hemostatic interventions to stop the bleeding and begin resuscitation with fluids and blood products is crucial for improving maternal outcomes and survival (Henriquez et al., 2018).

Problem Identification

In each of these areas discussed above, risk factors, assessment tools, causes, interventions, and outcomes are well studied and have extensive evidence-based research to support. However, very few studies have explored where the gap lies in patient care, as postpartum hemorrhage continues to remain the leading cause of maternal mortality and morbidity worldwide. Despite education, protocols, bundles, and more, postpartum hemorrhage remains an issue globally (Owen et al., 2021). Therefore, this integrative review aims to synthesize studies found in the literature review that explore barriers to early detection in women experiencing postpartum hemorrhage.

Methods

Design

This integrative review followed Whittmore and Knafl's (2005) five-step methodologic framework: problem identification, literature search, data evaluation, data analysis, and presentation. In addition, Toronto and Remington's (2020) text was used as supplemental material for a more in-depth understanding of conducting an integrative review using the Whittmore and Knafl (2005) framework. Each text was assessed and screened before inclusion into the integrative review, keeping the question's relevance at the forefront. The articles selected were subjected to abstract review and appraisal, and those that met the requirements were then stored in RefWorks. The sampling decisions were made apparent and displayed in a PRISMA flowsheet. The publications were then further evaluated using the John Hopkins Nursing Evidence-Based Practice (JHNEBP) appraisal tool for quality, level rating, and credibility. The definitive findings were displayed in a matrix, and patterns, themes, and relationships were identified in the literature. The results were then synthesized to support the purpose of the integrative review.

Search Strategy

Initially, a systematic and comprehensive search of pertinent literature was completed through the Kennesaw State University online library with the librarian's support. The librarian helped support the rigor of the review by building searches, identifying documentation tools, and decreasing bias. Several of the nursing databases were reviewed that would be conducive to this nursing topic. The determination was made to search electronic databases that included CINAHL, OVID Nursing Collection, Health Source Nursing, Medline Complete, and PubMed. These are comprehensive databases for nursing research, evidence, life sciences, nursing journal

content, biomedical and life science, and behavioral and social sciences (Toronto & Remington, 2020). Gray literature was also searched, including conference proceedings, handsearching online journals, citation chaining, professional organizations, and Google Scholar (Toronto & Remington, 2020). The literature was searched intermittently throughout March 2022 until February 2023.

Inclusion/Exclusion Criteria

The inclusion criteria for this study included: (1) written in English language, (2) studies within and outside the United States for a global approach, (3) articles published between 2016 and 2023, (4) peer-reviewed studies, (5) full-text articles and (6) hospital setting only. Exclusion criteria included (1) articles not published in English, (2) articles outside of the date range of the past eight years, (3) articles that focused on secondary postpartum hemorrhage events, and (4) settings outside of the hospital. The inclusion and exclusion criteria helped to make the amount of literature screened more manageable to prevent confounding variables.

Search Terms

According to Toronto and Remington (2020), exploratory searches are needed to uncover all relevant terms, and through that process, synonyms for the concepts can be identified. Therefore, the key terms are the key concepts in the question: postpartum hemorrhage, postpartum emergency, barriers, challenges, obstacles, detection, recognition, identification, and hospital setting. The searches conducted used these key terms in the databases, in subject headings, and in Medical Subject Headings (MeSH), using both natural and controlled language. This process is consistent with Toronto and Remington (2020) in that it began with natural language, the most relevant search results were found, and then the controlled language or subject terms associated with the results were identified.

Data Screening and Evaluation

The data screening techniques included applying filters to the primary screening on the databases and examining the titles and abstracts of the articles for which ones were relevant and which were candidates for full-text screening. Any works that did not meet the criteria were removed. The articles were then stored in RefWorks to help eliminate any duplicates. All sampling decisions are made transparent and justified and displayed in a literature search audit trail for the presentation that is outlined in a PRISMA flowchart in Appendix A. The retrieved articles were then critically appraised for quality, reliability, value, and relevance to the context using the Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool (Toronto & Remington, 2020). The evidence levels include Level I, II, and III studies. Level I is the highest, consisting of experimental studies and randomized controlled trials (RCT). Level II studies are quasi-experimental, and Level III are non-experimental or qualitative. Additionally, the studies are rated based on quality, looking at consistent, generalized results, sufficient sample size for the study, adequate control, definitive conclusions, and consistent recommendations, with a grade of A, B, or C. Grade A is high quality, grade B is good quality and grade C is considered low quality with significant flaws. This information is displayed in the matrix in Appendix B.

Literature Data Analysis

According to Torracco (2016), as cited in Toronto and Remington (2020), using a rigorous method of data analysis, the author will be able to recast, combine, reorganize, and integrate concepts across a body of literature to create new knowledge. The first step is to deconstruct each article into its most basic elements, pull out information that is closely aligned with the purpose of the review, and construct a matrix with this information. The author begins to create order out of chaos by taking apart and abstracting information, unfolding what is known and

unknown about the topic. According to Toronto and Remington (2020), the data analysis stage requires the author to order, code, and categorize data from multiple sources with varying methodological perspectives.

Thematic analysis was the method used to review patterns and analyze the data. Thematic analysis involves searching multiple literature sources to identify and organize the main recurrent or essential themes or concepts across multiple literature sources. A six-phase process helps guide thematic analysis, which includes familiarizing with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report (Toronto & Remington, 2020).

Results

The thematic analysis identified six main themes: undervaluing preventative measures, knowledge gap of detection practices, inadequate exposure, availability of resources, increasing disparities, and timely referral. Several subthemes emerged and are described more in-depth among these central themes. While most studies exemplified more than one theme, no single theme was present in all ten reviewed studies.

Presentation of Findings

Description of Studies

This integrative review is comprised of 10 studies. Regarding the level of evidence and quality rating, there are (n=5) Level I articles, (n=1) Level II articles, (n=4) Level III articles, (n=6) high-quality articles and (n=4) good quality articles. Included are four quantitative design articles, four qualitative design articles, and one mixed-method design. Of these, three are randomized controlled trials, two cross-sectional designs, three exploratory, descriptive designs, one experimental interventional, and one exploratory mixed-methods design. Of the ten articles,

nine were conducted outside the United States, in locations such as Madagascar, Brazil, Tanzania, Ethiopia, Afghanistan, England, and Rwanda. This global approach helps identify early detection barriers in lower resource settings.

Emerging Themes

Through diligent synthesis and vigilant attention paid during the data analysis the review supports the information that was determined across multiple sources (Toronto & Remington, 2020). The themes identified displayed the barriers to early detection while the subthemes described the barriers in greater detail and elaborated on individual categories within that theme. Dissemination of the themes and subthemes contained in each article that emerged from this process are displayed in Table 1 and Table 2.

Table 1- Emerging Themes

Article Name	Undervaluing Preventative Measures	Knowledge Gap of Detection Practices	Inadequate Exposure	Availability of Resources	Increasing Disparities	Timely Referral
(Wilcox et al., 2016).		✓		✓		
(Flanagan et al., 2021).		✓	✓		✓	✓
(Bento et al., 2021).		✓	✓	✓		✓
(Bazirete et al., 2020).		✓	✓	✓	✓	✓
(Lima et al., 2019).	✓		✓		✓	
(Egenberg et al., 2017).		✓	✓			
(Woldeyes et al., 2018).	✓			✓	✓	✓
(Al-beity et al., 2020).				✓		✓
(Ansari et al., 2020).	✓	✓	✓	✓	✓	
(Hancock et al., 2021).		✓	✓			

Table 2: Themes and Subthemes

Articles	Focus Question	Themes	Sub-Themes
(Lima et al., 2019). (Woldeyes et al., 2018). (Ansari et al., 2020).	What are the barriers to early detection of women experiencing a PPH?	Undervaluing Preventative Measures	1. No AMTSL 2. No Prenatal Care 3. Monitoring
(Wilcox et al., 2016). (Flanagan et al., 2021). (Bento et al., 2021). (Bazirete et al., 2020). (Egenberg et al., 2017). (Ansari et al., 2020). (Hancock et al., 2021).		Knowledge Gap of Detection Practices	1. Signs & Symptoms
(Flanagan et al., 2021). (Bazirete et al., 2020). (Hancock et al., 2021). (Egenberg et al., 2017). (Bento et al., 2021). (Lima et al., 2019). (Ansari et al., 2020).		Inadequate Exposure	1. Practical Competencies 2. Training Scenarios 3. Limited Experience
(Wilcox et al., 2016). (Bazirete et al., 2020). (Woldeyes et al., 2018). (Al-beity et al., 2020). (Ansari et al., 2020). (Bento et al., 2021).		Availability of Resources	1. Skilled birth attendants/staff 2. Financial Resources 3. Facility Resources 4. Lack of Guidelines/Policy
(Bazirete et al., 2020). (Lima et al., 2019). (Woldeyes et al., 2018). (Ansari et al., 2020). (Flanagan et al., 2021).		Increasing Disparities	1. Health Disparities 2. Socioeconomic Disparities 3. Geographic Disparities
(Flanagan et al., 2021). (Bento et al., 2021). (Bazirete et al., 2020). (Woldeyes et al., 2018). (Al-beity et al., 2020).		Timely Referral	1. Continuity of Care 2. Workload

Theme 1: Undervaluing Preventative Measures

Three of the reviewed studies identified the theme of undervaluing preventative measures as a barrier to early detection of postpartum hemorrhage. Within this theme, three subthemes include active management of the third stage of labor (AMTSL), prenatal care, and monitoring. Each of these preventative measures has been shown to reduce the risk of postpartum

complications and hemorrhage, and without these practices taking place, it creates a barrier inhibiting effective detection. Lima et al. (2019) elaborates that the identification of possible failures in the care provided and the time needed to receive adequate care are the most essential factors in improving outcomes. In this study, the factor associated with maternal near misses was fewer than six prenatal visits. In another cross-sectional study by Woldeyes et al. (2018), patient-related factors contributing to the delay were an absence of antenatal care after the second half of pregnancy.

Ansari et al. (2020) discuss another preventative measure that includes active management of the third stage of labor. AMTSL includes administering uterotonic medications, checking the uterus immediately following the delivery of the placenta, checking the placenta for completeness, checking the vagina for tears, monitoring vital signs within 15 minutes, palpating the uterus within 15 minutes, checking and massaging the fundus, and monitoring the client for excessive vaginal bleeding. These preventative measures statistically have been shown to reduce the risk of postpartum hemorrhage. In this study, over half the deliveries identified did not receive uterotonics within one minute of delivery as per the WHO recommendations. In addition, Ansari et al. (2020) also discuss the importance of rigorous monitoring and elaborate that evidence-based practices for detecting complications are needed to be routine care for every delivery. Numerous gaps in quality care and preventative practices of skilled birth attendants contribute to maternal morbidity and mortality.

Theme 2: Knowledge Gap of Detection Practices

Seven of the reviewed studies identified the theme knowledge gap of detective practices. The subtheme of this category is signs and symptoms. Several studies identified discrepancies involving how a postpartum hemorrhage is detected, blood loss measurement, and what

constitutes as a hemorrhage. In the cross-sectional qualitative study by Flanagan et al. (2021), the authors examined barriers to effective detection and management in Madagascar. A critical behavior insight the authors noted was that since very few women present with PPH, providers do not assume it will happen and, therefore, are only systematically estimating or monitoring for blood loss once visible cues promote them to do so.

Several studies highlighted the inability to accurately estimate blood loss appropriately as a frequent delay in providing appropriate care (Bazirete et al., 2020; Egenberg et al., 2017; Hancock et al., 2021; Wilcox et al., 2016). The quasi-experimental interventional study by Egenberg et al. (2017) lists visual estimation of blood loss as the standard measurement of PPH globally because it is easy, fast, and cheap. However, this nonstandard detection practice tends to give underestimated and subjective results. In the exploratory mixed methods study by Hancock et al. (2021), they further discuss how measurements of blood loss are used retrospectively for recording purposes rather than initially to guide the management. Lastly, Ansari et al. (2020) examined how performance gaps were found in their study on what should have been standard detection guidelines, such as checking the placenta, assessing uterine tone, examining for excessive bleeding, and checking for genital tears.

Theme 3: Inadequate Exposure

The theme of inadequate prior exposure was identified in seven of the reviewed studies. This theme has three subthemes: inadequate exposure surrounding training scenarios, practical competencies, and limited experience in the clinical setting. These articles indicated that a barrier to detection was that healthcare providers needed to get the proper training, learning experiences, or clinical contact with PPH to know how to diagnose and treat accurately. The Egenberg et al. (2017) article investigated the effect of scenario-based simulation training and hypothesized that

implementing multi-professional scenario training could improve team efficiency and reduce blood loss and transfusions. These training experiences included the entire medical staff with repeated objective learning experiences and reflective debriefings with a positive significance of 47% reduction in whole blood transfusions. In addition, Ansari et al. (2020) highlighted the lack of training opportunities for skilled birth attendants as a factor affecting quality care provision.

In the qualitative descriptive exploratory study conducted by Bazirete et al. (2020), an influencing factor for the prevention of PPH and early detection is practical competencies and the need for continuous training on PPH as new advancements and technologies emerge and as healthcare workers change jobs. Many new staff may need to be made aware of PPH prevention techniques and protocols in caring for these patients. Additionally, participants in the study verbalized that proper prevention of PPH includes increasing awareness and ease of identification of risk factors as early as possible through annual and practical competencies. Lima et al. (2020) agree that professional training is needed for early identification and adequate care for women with complications.

Three of the reviewed articles indicate inadequate exposure related to limited experience as a barrier to early detection. Flanagan et al. (2021) stated, "due to the low prevalence of PPH, many providers focus on other delivery and postpartum complications, which leads to undervaluing the importance of strict compliance with preventative measures" (p.4). Participants from this study verbalized rarely having seen or heard of a case of PPH with slow and continuous bleeding. Similarly, two studies found that intuition and gut feeling play an essential role in clinical judgment in terms of classifying the severity of the bleeding, informing actions, and rapid response in treatment (Bento et al., 2021; Hancock et al., 2021).

Theme 4: Availability of Resources

The theme of availability of resources was identified in six reviewed studies. This theme has four subthemes concerning the description of resources, including skilled birth attendants/staff, financial resources, facility resources, and lack of guidelines/policy resources. Three of these four articles mentioned the availability of skilled birth attendants and the critical shortage of these specialized health professionals (Bazirete et al., 2020; Wilcox et al., 2016; Woldeyes et al., 2018). Bazirete et al. (2020) highlight that having a small number of knowledgeable staff on shift creates problems for everyone. Wilcox et al. (2016) found that without trained health workers and other proper resources, the diagnosis of a PPH is delayed and often not made until it is too late.

The second subtheme, financial resources, elaborated by Ansari et al. (2020), mentioned several factors that affect the performance of skilled birth attendants. These include a lack of equipment and supplies, low salaries, poor living conditions, poor supervision, and no training opportunities. The authors attributed these issues to a need for more financial resources in Afghanistan. The study suggests considering the scarcity of resources and adopting innovative and cost-effective developments and approaches. Bento et al. (2021) found that the facility's structure is another financial resource difficulty. These include the distance between the rooms and the nursing station and the monetary burden of rebuilding or reconstructing that area, which is another financial resource difficulty.

The third subtheme is facility resources and the availability of the equipment. Three studies found this barrier as a critical determinant of maternal outcomes (Al-beity et al., 2020; Bazirete et al., 2020; Bento et al., 2021). Al-beity et al. (2020), a qualitative study in Tanzania, explored health worker's perception of their facility's readiness to treat PPH. They found that consistency and availability of resources improve timely care and increase poor outcomes. These

facility resources include medical supplies, medications, blood products, refrigerators to store medications, and emergency carts.

The fourth subtheme is a lack of guidelines/policy resource that helps guide and direct healthcare workers during a PPH. Wilcox et al. (2016) emphasized that there are no standardized protocols for identifying blood loss following delivery in low-resource settings. Ansari et al. (2020) found that a lack of policy in the management of PPH is common in low-resource settings and contributes to the provision of quality care and the performance of skilled birth attendants. Bento et al. (2021) suggested strategically setting PPH protocols while continuously promoting educational courses.

Theme 5: Increasing Disparities

Five reviewed studies identified the theme of increasing disparities (Ansari et al., 2020; Bazirete et al., 2020; Flanagan et al., 2021; Lima et al., 2020; Woldeyes et al., 2018). Within this theme, there are three subthemes related to increasing disparities. These subthemes include health, socioeconomic, and geographical disparities. According to the Agency for Healthcare Research and Quality (2023), healthcare disparities are variances in access to care, availability of medical facilities and services. In addition, there are disabilities between population groups that are defined by socioeconomic characteristics such as age, ethnicity, economic resources, gender, and geographical location. Each article mentioned all the subthemes as obstacles to early detection, with socioeconomic status being the most prevalent. Woldeyes et al. (2018) listed transportation to health facilities and distance from the final facility as a reason for the delay in receiving care for women with severe maternal morbidity. Flanagan et al. (2021) also mention challenges, such as lack of electricity in facilities, pressure to charge low-income clients for

services, and challenges with family members traveling long distances at great expense for a higher level of care.

Theme 6: Timely Referral

The final theme of timely referral was identified in five of the reviewed studies. This theme has two subthemes: continuity of care and workload. Three of the included articles identified continuity of care as a barrier and illustrated the consequences of that disconnect regarding timely referral (Al-beity et al., 2020; Flanagan et al., 2021; Woldeyes et al., 2018). As illustrated by Flanagan et al. 2021, posters and clinical algorithms, although helpful, were not available in remote locations, and providers identified the challenge in a timely referral even with using the poster. Many providers discussed understanding the challenge of having to refer to a book and poster when heavy bleeding occurs because their care plan is not intuitive or straightforward. Woldeyes et al. (2018) reported that only 55% of women who arrived for a referral did not have orders or any treatment plan initiated in the transfer, nor was appropriate care reached even after transferring to another facility. Lastly, Al-beity et al. (2020) saw that unclear referral pathways with unclear and unreliable referral systems create a challenge for all that ultimately leads to delays in care and increase poor outcomes for postpartum hemorrhages.

Two articles identified the final subtheme of the care team's workload (Bazirete et al., 2020; Bento et al., 2021). Both articles discussed the work demands and highlighted what is fueling this decrease in detection. Some common challenges included staff problems, fatigue, poor communication, busy work demands, and insufficient information. Patients also reported a lack of focus from the providers, with many distractions impeding the healthcare team from providing quick and timely treatment.

Discussion

Comparison to Background Literature

Postpartum hemorrhage remains a significant cause of maternal complications and the leading preventable cause of maternal illness and death worldwide (Bienstock et al., 2021). A woman dies from postpartum hemorrhage every eight minutes. However, a plethora of literature has been published on the risk factors, assessment tools, diagnosis criteria, interventions, and outcomes of postpartum hemorrhage. With the continued increase in this issue, even with the available literature, the question of this integrative review was developed.

This integrative review aimed to explore barriers to early detection in women experiencing postpartum hemorrhage. This methodological review attempted to address this gap in the literature by identifying these barriers outside of what is commonly known about postpartum hemorrhage. These five barriers identified are undervaluing preventative measures, knowledge gap of detection practices, inadequate exposure, availability of resources, increasing disparities, and timely referral. Lima et al. (2020) state that it is essential to study women who survive these complications to overcome this challenge and help identify discrepancies in the healthcare systems and possible failures in the care provided to overcome and reduce severe maternal outcomes. Numerous gaps in quality of care and prevention were identified, with multiple articles leading to similar conclusions with overlapping themes. Therefore, this review extends what is known and adds to the available information by diving deeper.

Strengths and Limitations of the Review

This integrative review thoroughly sought articles that addressed the barriers to early detection of postpartum hemorrhage. During the search, it became apparent that there was much information on postpartum hemorrhage in the United States and globally. This is seen as both a

strength and a limitation, as this review included articles from across the world but only included one article from the United States. Additionally, strengths of the review included using a thorough theoretical framework by Whitemore and Knafl, establishing specific inclusion and exclusion criteria, comprehensively searching several nursing databases with a specialized librarian to support the rigor and decrease the bias, and lastly, using the JHNEBP appraisal tool for data for validity. Limitations of the review included only using published work and studies written in English. This could have inadvertently excluded relevant articles written in another language. Another review limitation included only having a single reviewer to screen and appraise the articles, thus leaving room for bias.

Limitations of the Literature Included in the Review

Upon critical appraisal of the included studies, this review contains various designs, levels, quality, and locations of articles. Six of the articles were considered of high quality (Bento et al., 2020; Flanagan et al., 2021; Lima et al., 2019; Wilcox et al., 2016; Woldeyes et al., 2018), and four of the articles were considered good quality (Ansari et al., 2020; Bazirete et al., 2020; Egenberg et al., 2017; & Hancock et al., 2021). There was a mix of quantitative and qualitative designs, with many different geographical locations included. However, only three of the articles were a randomized control trial. None of the articles identified all six of the themes, but two articles identified five out of six themes (Ansari et al., 2020 & Bazirete et al., 2020).

Implications for Nursing Research, Practice, and Education

Ten articles were included in this review, with these themes overlapping within each of them. Several recommendations in practice, research, and education were made to help improve this significant issue and positively impact maternal outcomes. Lima et al. (2020) highlight the need for improved quality and quantity of prenatal care and visits as a preventative measure. In

addition, Bazierete et al. (2020) suggest developing improved screening tools for early detection. Other researchers recommend improving and retaining the skills of birth attendants through on-site continuous training and the development of a culture of audits (Ansari et al., 2020; Egenberg et al., 2017; Flanagan et al., 2021; Woldeyes et al., 2018). Al-beity et al. (2020) and Bento et al. (2021) further discuss the need for PPH protocols, referral processes, educational courses that teach non-clinical skills such as teamwork, conflict resolution, and facility readiness, as well as formal team training with drills, checklists, and hemorrhage carts. Another consideration for future research would be to explore ways to inform women, educate them on signs and symptoms, and enable them to contribute to their care decisions (Hancock et al., 2021). Lastly, Wilcox et al. (2016) recommend implementing detection interventions such as the SAPHE Mat in low-resource settings where maternal death from hemorrhage is the highest.

Conclusion

Postpartum hemorrhage continues to be a leading cause of maternal death worldwide. There are many known risk factors and etiologies for postpartum hemorrhages, yet this complication continues to be fatal despite evidence of effective interventions and management. The evidence elaborated on in this review highlights the barriers to early detection to bring awareness, share education, and make recommendations for ways to remove these barriers to help prevent poor maternal outcomes. Improvement in maternal health will require dedicated efforts in screening, prevention, detection, education, and management, beginning in the preconception period and continuing throughout the first year postpartum. Improving the quality of care and health outcomes can be done with thorough preparation, anticipating risk factors, coordinating a healthcare team, and ensuring access to care with timely interventional

procedures. While included studies have identified known barriers, further research is needed on screening tools, training programs, and care management worldwide.

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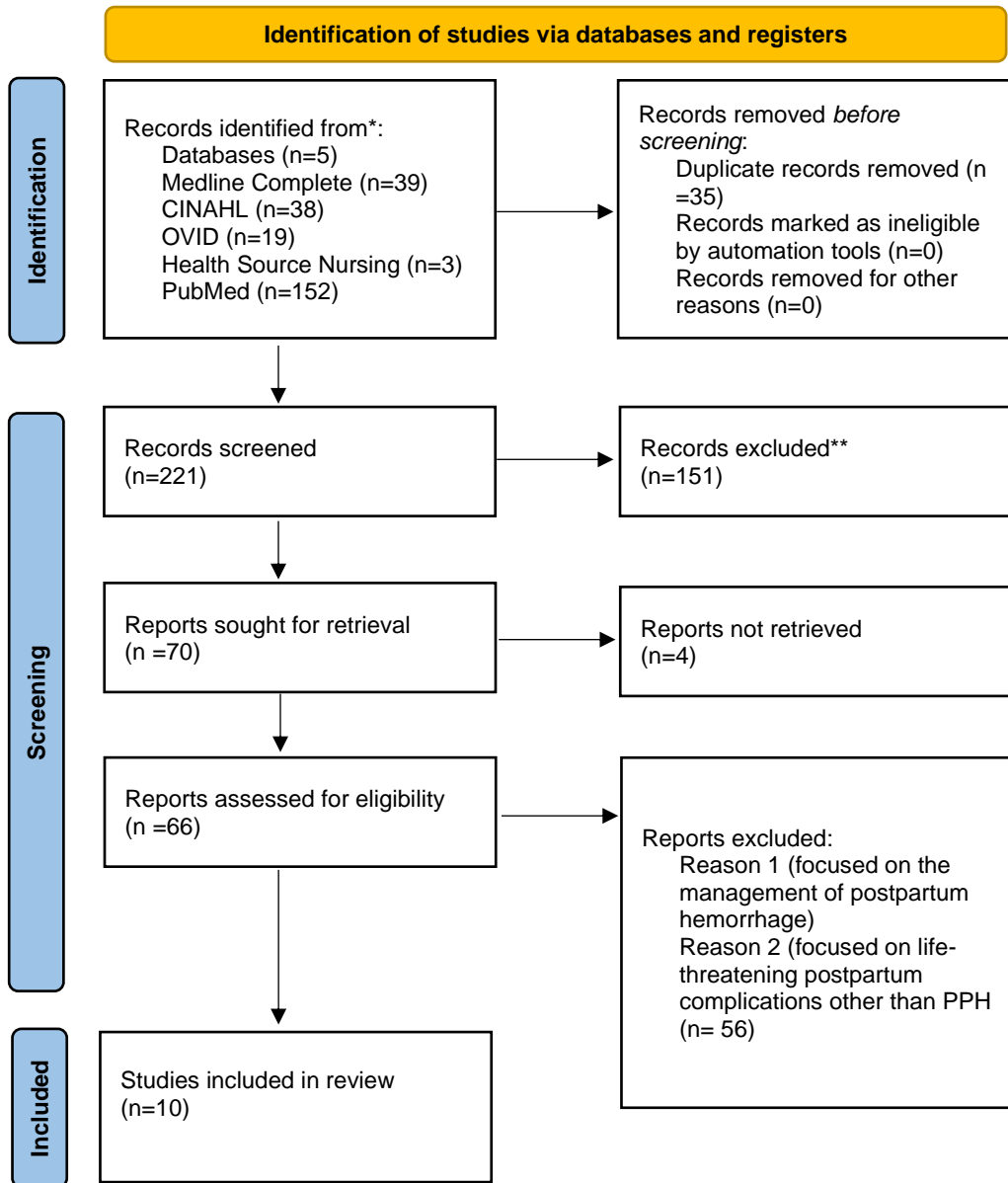
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Appendix A



Appendix B

Authors	Article Name	Aim/Sample/Setting	Design	Level and Quality Rating	Major Findings
(Wilcox et al., 2016).	Diagnosing Postpartum Hemorrhage: A New Way to Assess Blood Loss in a Low-Resource Setting	36 patients gave birth using the SAPHE Mat, and visual estimation and calculated blood loss estimation were compared with 69% of visual blood loss within 100mL of the calculated blood volume and 97% of the time within 200mL. Texas	Quantitative	Level: 1 Quality: A High	The SAPHE Mat can provide a visual estimate of blood loss highly correlated with the actual blood loss on the mat. Barriers: -symptom recognition -timely diagnosis
(Flanagan et al., 2021).	Barriers inhibiting effective detection and management of postpartum hemorrhage during facility-based births in Madagascar: findings from a qualitative study using a behavioral science lens.	Conducted 47 in-depth interviews in 19 facilities and five communities in Madagascar and interviewed providers, postpartum women, medical supervisors, community health volunteers, and birth attendants.	Cross-sectional qualitative research study	Level: III Quality: A High	Identified seven critical behavioral insights representing a range of factors that may contribute to delays: <ol style="list-style-type: none"> 1. Undervaluing of the importance of strict compliance with preventative measures due to focus on other delivery complications 2. Knowledge gap on how to treat with

					<p>Oxytocin in the AMTSL.</p> <ol style="list-style-type: none"> 3. Providers default assumption that there will not be cases of PPH and do not systematically estimate blood loss until visible cues indicate otherwise. 4. Inadequate monitoring and reliance on family members. 5. Discharge patients with slow continuous blood loss with the perceived idea that it is supposed to be a rapid and extreme loss. 6. Not enough cases are treated, and it is easy to forget steps (most facilities lack accessible and understandable visual reminders or clinical procedures). 7. There is a mismatch between what providers are trained on and what is
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					feasible in the facilities.
(Bento et al., 2021).	Understanding How Health Providers Identify Women with Postpartum Hemorrhage: A Qualitative Study	Aim: to identify how health providers recognize PPH early and the difficulties involved in it Brazil 27 health professionals (nurses, doctors, medicine professors, etc.) working in a tertiary-level hospital in women's health	Exploratory, descriptive qualitative study	Level: III Quality: A High	Thematic analysis: 1. Perception of the severity (lack of knowledge about the frequency and severity of PPH with fewer cases. Women with no risk factors, the providers become distracted and may need to pay attention.) 2. Difficulties in the early diagnosis: difficulties in daily practice, workload, adequate staffing, negligence, inexperience with recognizing/uneducated fear of providing proper evaluation with a fundal massage, difficulty in distance from rooms to nurses' station. 3. The process to improve care: Residents need to remember the sequence of steps to treat PPH and need an easy-to-access flowchart. Also, it is challenging to define PPH and the criteria to identify it as a PPH.
(Bazirete et al., 2020)	Influencing factors for prevention of	Aim: to explore the influencing factors for preventing PPH and	A qualitative descriptive	Level: III Quality: B Good	-Beliefs, knowledge, and understanding of PPH, such

	postpartum hemorrhage and early detection of childbearing women at risk in Northern Province of Rwanda: Beneficiary and health worker perspectives	early detection of childbearing women at risk as perceived by beneficiaries and health workers in the Northern Province of Rwanda. 11 women who experienced PPH in 6 months	exploratory study		as limited training from the healthcare providers -Organizational Factors: availability of resources such as refrigerators to store Oxytocin and lack of qualified and specified health professionals -Timely diagnosis: healthcare providers have a heavy workload, which hampers the recognition and detection -Perceived risk factors and sign and symptom recognition with lack of continuity of care -Health Disparities: The socioeconomic status of the family and delays to receiving care is a significant barrier, as well as living in poverty
(Lima et al., 2019)	Maternal near miss determinants at a maternity hospital for high-risk pregnancy in northeastern Brazil: A prospective study	Aim: to identify MNM determinants in the Alagoas region Santa Monica University Maternity Hospital Sample: 1149 pregnant women seeking treatment at the hospital	Quantitative	Level: I Quality: A High	An increase in MNM criteria, which would also be a barrier to detection, would be fewer than 6 prenatal visits. Barrier: inadequate identification of innovative and viable models of labor and delivery care that value normal delivery and decrease

					<p>the percentage of unnecessary cesarean sections</p> <p>-Undervaluing preventative care with fewer than 6 prenatal visits significantly increase the risk of MNMs by two-fold</p> <p>-Increasing Disparities: This study highlighted the relationship between poor socioeconomic conditions and high incidence of adverse health events</p>
(Egenberg et al., 2017).	Impact of multi-professional, scenario-based training on postpartum hemorrhage in Tanzania: A quasi-experimental, pre- vs. post-intervention study.	<p>Aim: The primary aim of this study was to determine whether this multi-professional, scenario-based training in managing PPH was associated with changes in blood transfusion rates.</p> <p>Sample:</p> <p>Pre-training - 1667</p> <p>Post training - 1641</p> <p>Setting: Tanzania</p>	Quasi-experimental interventional design	Level: II Quality: B Good	<p>Barriers:</p> <ol style="list-style-type: none"> 1. Inadequate training, with the suggestion of scenario-based training, could contribute to enhanced competence in PPH management with reflective training, and the involvement of all maternity staff may contribute to improved outcomes. 2. Suggestion of preventative measures because 2/3^{rds} of pregnant women

					develop PPH have no known risk factors
(Woldeyes et al., 2018)	Incidence and determinants of severe maternal outcome in Jimma University teaching hospital, south-West Ethiopia: a prospective cross-sectional study	<p>Aim: To determine the incidence and determinants of SMM (severe maternal morbidity) and SMO (severe maternal outcome). In addition, the quality of maternal health care provided at JUTH was assessed using WHO near-miss approach and calculated indicators recommended by WHO.</p> <p>Sample: 364 cases with potential life-threatening complications</p> <p>Setting: Ethiopia</p>	Quantitative	Level: I Quality: A High	<p>1. Delay in seeking care</p> <ul style="list-style-type: none"> -absence of prenatal care after second half of pregnancy -arriving with complications after home delivery <p>2. Reaching the appropriate health facility</p> <ul style="list-style-type: none"> -Distance >40 km to nearest final facility -Transportation Problem <p>3. Receiving the appropriate care after arrival</p> <ul style="list-style-type: none"> -Referred without initiation of treatment needed -Logistics (bed, blood, services, lab, medications)

(Al-Beity et al., 2020).	“We do what we can do to save a woman” health workers’ perceptions of health facility readiness for management of postpartum haemorrhage	<p>Aim: In order to better understand these findings, and particularly the contribution of contextual factors on the observed effects, we explored health workers’ perceptions of their health facilities readiness to provide PPH care.</p> <p>Sample: 7 focus group discussions and 12 in-depth interviews</p> <p>Setting: Tanzania</p>	Qualitative	Level: III Quality: A High	<p>Barriers:</p> <ul style="list-style-type: none"> -Availability of resources necessary to assess and treat PPH -Availability of guidelines and protocols – inconsistent availability of resources limiting provision of care (Preventative measures) -Prioritization of women experiencing PPH (Knowledge Gap) -Facility staffing -Delivery loads (number of patients delivering to staff) -Insufficient support from supervisors -Low facility readiness
(Ansari et al., 2020).	Quality of care in prevention, detection and management of postpartum hemorrhage in hospitals in Afghanistan: an observational assessment	<p>Aim: the purpose of this study is to examine the quality of prevention, detection and management of PPH in both public and private hospitals in Afghanistan in 2016 and compare the quality of care in district hospitals with care in provincial, regional, and specialty hospitals.</p> <p>Sample: It covers a census of all accessible</p>	Quantitative	Level: I Quality: B Good	<p>Detection practice observed during the third stage of labor and immediately postpartum, such as checking the uterus immediately following the delivery of the placenta, examining the placenta for completeness, checking the perineum for tears, assessing vital signs, and palpating the uterus within 15 minutes.</p> <ul style="list-style-type: none"> • Numerous gaps in detection of PPH by SBA’s were found.

		<p>public hospitals, including 40 district hospitals, 27 provincial hospitals, five regional hospitals, and five specialty hospitals, as well as 10 purposively selected private hospitals.</p> <p>Setting: Afghanistan</p>			<p>Early detection of PPH requires skilled care and rigorous monitoring; maternal monitoring appears to be weak in hospitals in Afghanistan, endangering women's lives.</p> <p>*Supportive strategies are needed to ensure SBAs take time to include evidence-based practices for detection of obstetric complications in routine care for every woman.</p>
(Hancock et al., 2021).	<p>The Recognition of Excessive Blood Loss At Childbirth (REACT) Study: a two-phase exploratory, sequential mixed methods inquiry using focus groups, interviews, and a pilot, randomised crossover study</p>	<p>Aim: To explore how childbirth-related blood loss is evaluated and excessive bleeding recognized, and to develop and test a theory of postpartum hemorrhage (PPH) diagnosis.</p> <p>Sample: Women (following vaginal birth with and without PPH), birth partners, midwives, and obstetricians.</p> <p>Setting: Northwest England</p>	<p>Exploratory, sequential mixed methods design</p>	<p>Level I Quality: B Good</p>	<p>Clinicians responded automatically to speed of visible blood flow, rather than volume of blood loss.</p> <p>Reacting to blood loss: fast, visible and continuous blood loss was referred to as a 'proper PPH' which 'automatically raised alarm bells' and was the main trigger for eliciting a PPH response (treatment or escalation).</p> <p>-Descriptions, such as pouring and pumping out continuously, often depicted</p>

					<p>the speed and nature of blood loss.</p> <ul style="list-style-type: none"> -Sometimes, the extent of bleeding was delayed and only recognized once a woman became unwell. -Other reasons for delayed diagnosis: regular vital signs measurements in the early postnatal period, especially if the woman appeared well of it staff reassured by normal blood pressure reading -Instinctive gut reaction, a sense of unease were felt by those with previous experiences. -Fast PPH response was associated with a fast blood loss
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