

Literature Review: Risk Factors Associated with Postpartum Hemorrhage

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Article Info	Abstract
Article History Submitted, 2026-05-13 Accepted, 2026-06-24 Published, 2026-06-30 Keywords: Risk factors, bleeding, postpartum	Postpartum hemorrhage is a leading cause of maternal death worldwide, influenced by various maternal and obstetric risk factors. This literature review aims to describe the risk factors associated with postpartum hemorrhage. This literature review employed a literature review method. A systematic search was conducted using a computerized search of articles published between 2021 and 2025 using the Google Scholar database. A total of 15 articles were searched and 10 articles were found that were in accordance with the topic of this literature review. Only articles with a quantitative design and full text were included in this analysis. Key data were searched using the PICO (Population Intervention Compare Outcome) technique. Results of this study was of the 15 articles searched, 10 matched the topic of this literature review. These 10 articles showed several factors consistently associated with postpartum hemorrhage, including age, parity, anemia, placenta previa, prolonged labor, and labor induction. Additionally, other factors such as retained placenta, uterine atony, birth canal lacerations, and placental abruption are also direct causes contributing to postpartum hemorrhage. Meanwhile, pregnancy spacing and parity have shown inconsistent results in several studies, influenced by differences in respondent characteristics. Preeclampsia has also been shown to increase the risk of postpartum hemorrhage through vascular and coagulation system disorders. Conclusion of this study was ostpartum hemorrhage is a multifactorial condition that requires special attention in prevention and management. Early identification of risk factors and appropriate management during pregnancy, delivery, and the postpartum period are crucial to reducing the incidence and complications of postpartum hemorrhage.

Introduction

According to a World Health Organization (WHO) report within the framework of the Sustainable Development Goals (SDGs), there is a collective commitment from various countries to accelerate the reduction of the global maternal mortality rate by 2030. One specific target in SDG 3 is to reduce the Maternal Mortality Rate (MMR) to below 70 deaths per 100,000 live births. Data from 2023 shows that the global MMR remains at 197 per 100,000 live births. To achieve this target by 2030, an annual rate of decline of approximately 15% is required, a historically difficult acceleration (WHO, 2025).

Based on data from the 2024 Indonesian Health Profile, the maternal mortality rate decreased from 4,482 in 2023 to 4,150 in 2024. Geographically, West Java recorded the highest number of maternal deaths, with 749 cases, while Highlands Papua had the lowest, with 4 cases. East Kalimantan Province ranked seventh with 126 maternal deaths. Clinically, the leading cause of maternal death in 2024 was non-obstetric complications during pregnancy, which accounted for 1,351 cases. The next leading causes were hypertension associated with pregnancy, childbirth, and the postpartum period (988 cases), and obstetric hemorrhage (955 cases) (Kemenkes RI, 2025).

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The impact of postpartum hemorrhage (PPH) is very serious because it is not only a leading cause of maternal death but also causes various short- and long-term complications that can threaten the mother's safety and quality of life. Postpartum hemorrhage causes acute blood loss that can lead to hypovolemic shock, decreased tissue perfusion, organ hypoxia, metabolic acidosis, coagulation disorders, and disseminated intravascular coagulation (DIC). If not promptly treated, it can lead to multiple organ failure and maternal death (Giouleka et al., 2022).

Postpartum hemorrhage can occur due to various factors, which are generally divided into direct and predisposing factors. Direct factors include uterine atony, retained placenta, birth canal tears, uterine inversion, coagulopathy, uterine rupture, and retained placenta (Wormer et al., 2024). Predisposing factors associated with postpartum hemorrhage in women include maternal age, parity, anemia, pregnancy-birth interval, preterm labor (PEB), type of delivery, prolonged labor, retained placenta, infant weight, and gestational age (Azizah et al., 2025).

Based on this description, it can be concluded that postpartum hemorrhage is a complex and multifactorial health problem, involving interactions between maternal, obstetric, and pathological factors. Therefore, a comprehensive literature review of the risk factors associated with postpartum hemorrhage is needed as a basis for prevention, early detection, and appropriate management to reduce the incidence and its impact. This literature review aims to analyze the risk factors associated with postpartum hemorrhage based on current evidence and to provide recommendations for early identification and prevention strategies to improve maternal outcomes.

Methods

This literature review employed the Literature Review (LR) method, which involves a systematic and structured process of collecting, identifying, and evaluating existing research evidence. The purpose of this literature review was to identify risk factors associated with postpartum hemorrhage. A systematic search was conducted using Google Scholar, PubMed, ScienceDirect, and ProQuest databases. The search was limited to articles published between 2021 and 2025. The keywords used were "risk factors," "bleeding," and "postpartum."

The article search strategy was guided by the PICO framework to formulate the review question and identify relevant studies. The PICO components included: Population (P): postpartum women; Intervention/Exposure (I): maternal and obstetric risk factors associated with postpartum hemorrhage; Comparison (C): postpartum women without identified risk factors or without postpartum hemorrhage, when applicable; and Outcome (O): the occurrence of postpartum hemorrhage.

The inclusion criteria for this literature review were: (1) articles focusing on risk factors associated with postpartum hemorrhage; (2) full-text articles published between 2021 and 2025; (3) articles written in Indonesian or English; and (4) original research articles. The exclusion criteria were: (1) undergraduate theses or dissertations; (2) articles that were not freely accessible; and (3) literature review articles.

The article selection process began with identifying studies from the selected databases using the predetermined keywords. Retrieved articles were screened based on their titles and abstracts according to the PICO framework and eligibility criteria. Duplicate records were removed, and the remaining full-text articles were assessed for eligibility. Articles that met all inclusion criteria and none of the exclusion criteria were subsequently included in the final analysis of this literature review.

Results and Discussion

A literature review was conducted on 10 selected articles. The publications ranged from 2021 to 2026. The results of the journal analysis are presented in Table 1 as follows:

Table 1. Results of Journal Analysis

No	Research	Method	Results
1.	Prevalence and risk factors of severe postpartum hemorrhage: a retrospective cohort study (Liu et al., 2021)	The type of research is a case control study. The population used in this study were all women who gave birth with a gestational age of ≥28 weeks in the period January 2015 – August 2019. The sample consisted of a case group: mothers who experienced SPPH (Severe Postpartum Hemorrhage) with blood loss ≥1000 mL and transfusion ≥4 units and a control group: mothers who did not experience SPPH. The sampling technique was purposive	1. There is a relationship between age and postpartum hemorrhage (p=0.018) 2. There is a relationship between anemia and postpartum hemorrhage (p=0.001) 3. There is a relationship between placenta previa and postpartum hemorrhage (p=0.001) 4. There is a relationship between prolonged labor and postpartum hemorrhage

		retrospective sampling. Data analysis used Chi-Square and logistic regression.	(p=0.003) 5. There is a relationship between placental abruption and postpartum hemorrhage (p=0.014) 6. There is a relationship between induction and postpartum hemorrhage (p=0.001)
2.	Risk factors and recurrence of cause-specific postpartum hemorrhage: A population-based study (Linde et al., 2022)	This study used a population-based retrospective cohort study. The study population was all births recorded in the Medical Birth Registry of Norway (MBRN) from 1967 to 2017. A total sample of 3,003,025 births was selected using a total sampling technique. Multivariate analysis using multilevel logistic regression was used to calculate the odds ratio (OR) and 95% CI.	There is a relationship between uterine anotia, birth canal laceration, placenta previa, placental retention, placental abruption with postpartum hemorrhage.
3.	Predisposing Factors Associated with Postpartum Hemorrhage at Indramayu Regional General Hospital in 2022 (Feriya et al., 2023)	his study used an analytical survey method with a cross-sectional approach. The population used in this study was all postpartum mothers in the 3rd and 4th wards of Indramayu Regional General Hospital in 2022, a total of 3,343 women. The sampling technique for this study was random sampling, with the entire population being sampled, totaling 356 women. Data analysis used Chi-Square.	1. There is a relationship between parity and postpartum hemorrhage (p = 0.000). 2. There is a relationship between age and postpartum hemorrhage (p = 0.000). 3. There is a relationship between pregnancy spacing and postpartum hemorrhage (p = 0.001). 4. There is a relationship between anemia and postpartum hemorrhage (p = 0.000).
4.	Analysis of Factors Influencing the Incidence of Postpartum Hemorrhage in Bangkalan Regency (Mayasari et al., 2023)	This study was a retrospective descriptive case-control study. The study population was 124 women giving birth in Bangkalan Regency, both with and without hemorrhage. Random sampling was used as the sampling technique. Data analysis using chi-square and rank-sum tests	1. There is a relationship between parity and postpartum hemorrhage (p = 0.049). 2. There is a relationship between age and postpartum hemorrhage (p = 0.001). 3. There is a relationship between anemia and postpartum hemorrhage (p = 0.028). 4. There is a relationship between retained placenta and postpartum hemorrhage (p = 0.001). 5. There is a relationship between prolonged labor and postpartum hemorrhage (p = 0.001). 6. There is a relationship between birth canal laceration and postpartum hemorrhage (p = 0.003). 7. There is a relationship between induction and postpartum hemorrhage. 8. There is no relationship between pregnancy spacing and postpartum hemorrhage (p = 0.346).
5.	Risk factors for early postpartum hemorrhage: A retrospective, population-based, cohort analysis	This study was a population-based retrospective cohort study. The population was all women who gave birth (both normal and cesarean sections). The sampling technique used a total sampling	1. There is a relationship between anemia and postpartum hemorrhage (p=0.001). 2. There is a relationship between placenta previa and

	(Abecassis et al., 2024)	of 322,497 respondents. Data analysis used the chi-square test and logistic regression.	postpartum hemorrhage (p=0.001). 3. There is a relationship between preeclampsia and postpartum hemorrhage (p=0.001). 4. There is a relationship between placental abruption and postpartum hemorrhage (p=0.0001). 5. There is a relationship between prolonged labor and postpartum hemorrhage (p=0.001). 6. There is a relationship between induction and postpartum hemorrhage (p=0.001).
6	Analysis of factors associated with the incidence of postpartum hemorrhage (Delfiani B.P et al., 2024)	This was a retrospective analytical study using a case-control approach. The study involved 71 women who experienced postpartum hemorrhage as cases and 71 women who did not experience postpartum hemorrhage as controls at Lamaddukkelleng Regional Hospital, Wajo, from January 1 to December 31, 2023. The sample was selected using simple random sampling according to inclusion and exclusion criteria. Data analysis used chi-square test	1. There was a relationship between parity and postpartum hemorrhage (p = 0.000). 2. There was a relationship between age and postpartum hemorrhage (p = 0.002). 3. There was a relationship between anemia and postpartum hemorrhage (p = 0.001).
7	Factors Associated with Postpartum Hemorrhage at Bakti Timah Hospital, Pangkalpinang City, 2024 (Marleni & Megawati, 2024)	This study used a case-control design with secondary data obtained from medical records. The study population consisted of 1,002 mothers who gave birth at the hospital, with a sample of 104 respondents divided into 52 case subjects (mothers who experienced postpartum hemorrhage) and 52 control subjects (mothers who did not experience postpartum hemorrhage). Data analysis used Chi-Square	1. There was a relationship between parity and postpartum hemorrhage (p = 0.000). 2. There was a relationship between age and postpartum hemorrhage (p = 0.002). 3. There was a relationship between anemia and postpartum hemorrhage (p = 0.001).
8	Factors Associated with Postpartum Hemorrhage at Bangkinang Regional Hospital in 2020 (Nislawaty et al., 2024)	This study was an analytical study using a retrospective case-control design. The population consisted of all 233 women who gave birth in 2019. The sample size was 66, using a 1:1 ratio to compare the case and control groups. The case sample consisted of all 33 women who experienced postpartum hemorrhage in 2019, and the control sample consisted of 33 women who gave birth at Bangkinang Regional Hospital in 2019. Data analysis using Chi-Square	1. There is a relationship between parity (p = 0.003) and postpartum hemorrhage. 2. There is a relationship between age (p = 0.003) and postpartum hemorrhage. 3. There is a relationship between retained placenta (p = 0.001) and postpartum hemorrhage. 4. There is a relationship between uterine atony (p = 0.007) and postpartum hemorrhage. 5. There is a relationship between birth canal laceration (p = 0.007) and postpartum hemorrhage.
9	Risk Factors for Postpartum Hemorrhage at the Puruk Cahu Regional General Hospital	This research used an analytical survey with a case-control study approach. The sampling technique used was nonprobability sampling with purposive sampling. The sample	1. There was a relationship between parity (p 0.000 and OR 6.5) and postpartum hemorrhage. 2. There was a relationship between pregnancy spacing

	(UPTD) in Murung Raya Regency (Istiningsih et al., 2024)	consisted of 61 mothers who experienced postpartum hemorrhage and a control group of 61 mothers who did not experience postpartum hemorrhage. They were treated in the Delivery and Postpartum Ward at Puruk Cahu Regional Hospital, Murung Raya Regency. The statistical test used was the Chi-Square test	(p 0.000 and OR 30.5) and postpartum hemorrhage. 3. There was a relationship between retained placenta (p 0.002 and OR 3.6) and postpartum hemorrhage. 4. There was a relationship between anemia (p 0.003 and OR 5.0) and postpartum hemorrhage. 5. There was a relationship between prolonged labor (p 0.009 and OR 5.7) and postpartum hemorrhage.
10	Risk factors for postpartum hemorrhage after elective cesarean deliveries for twin pregnancies (Wan et al., 2024)	This was a retrospective cohort study. The population of 532 women was analyzed and classified into the PPH group (n = 70) and the non-PPH group (n = 462). The sampling technique was random sampling. Data analysis used chi-square and multivariate logistic regression	1. There was an association between preeclampsia and postpartum hemorrhage (p = 0.005). 2. There was an association between placenta previa and postpartum hemorrhage (p = 0.001). 3. There was an association between anemia and postpartum hemorrhage (p = 0.003). 4. There was no association between age and postpartum hemorrhage (p = 0.67). 5. There was no association between parity and postpartum hemorrhage (p = 0.59).

The findings of this literature review are further supported by evidence from studies beyond the reviewed articles. A systematic review and meta-analysis identified several major risk factors contributing to postpartum hemorrhage, including retained placenta, multiple pregnancy, episiotomy, previous postpartum hemorrhage, prolonged labor, and hypertensive disorders during pregnancy. The study emphasized that postpartum hemorrhage is a multifactorial obstetric complication resulting from the interaction between maternal characteristics, pregnancy-related conditions, and intrapartum factors. In addition, the authors highlighted the importance of early identification of women at risk through comprehensive antenatal assessment and vigilant intrapartum monitoring to facilitate timely preventive and therapeutic interventions. These findings reinforce the results of the present review, which consistently demonstrated that maternal age, anemia, parity, prolonged labor, placental abnormalities, retained placenta, preeclampsia, and induction of labor are significant determinants of postpartum hemorrhage. Therefore, strengthening risk screening during antenatal care and improving preparedness for emergency obstetric management are essential strategies to reduce maternal morbidity and mortality associated with postpartum hemorrhage.

Based on the results of the analysis of 10 articles conducted by researchers, the results obtained were risk factors related to postpartum hemorrhage, namely:

Age

Maternal age is an important determinant of postpartum hemorrhage. Several studies have shown a significant association between age and postpartum hemorrhage. Studies by Liu et al. (2021), Feriyal et al. (2023), Mayasari et al. (2023), Delfiani et al. (2024), Marleni & Megawati (2024), and Nislawaty et al. (2024) consistently showed a p-value <0.05, indicating a significant association between maternal age and postpartum hemorrhage. This indicates that mothers with high-risk ages (<20 years and >35 years) tend to experience greater labor complications. However, Wan et al. (2024) found a different result, stating that there was no significant association between age and postpartum hemorrhage (p=0.67). This difference is likely due to the specific sample characteristics of twin pregnancies with cesarean sections.

Maternal age influences the physiological function of the reproductive system, which plays a direct role in postpartum hemostasis. In women under 20 years of age, reproductive organs are not yet fully developed, resulting in suboptimal myometrial contractions. Conversely, in women over 35 years of age, uterine tissue elasticity and oxytocin receptor sensitivity decrease, resulting in ineffective uterine contractions after placental delivery. This condition inhibits blood vessel compression at the placental implantation site, increasing the risk of bleeding. Furthermore, advanced age is often accompanied by comorbidities such as hypertension and

diabetes, which worsen vascular conditions. This is supported by studies showing a significant association between extremes of age and the incidence of PPH (Delfiani et al., 2024; Linde et al., 2022; Abecassis et al., 2024).

Parity

Parity is a factor related to the uterus's ability to contract after delivery. Research shows that parity is significantly associated with postpartum hemorrhage. This is evidenced by Feriyal et al. (2023), Mayasari et al. (2023), Delfiani et al. (2024), Marleni & Megawati (2024), Nislawaty et al. (2024), and Istiningsih et al. (2024) with a p-value <0.05. High parity can cause decreased uterine muscle elasticity, thereby increasing the risk of uterine atony. However, a study by Wan et al. (2024) showed no significant association between parity and postpartum hemorrhage ($p=0.59$), possibly influenced by the context of the study, which involved twin pregnancies, which allowed other factors to dominate.

High parity causes structural changes in the uterus due to repeated stretching during pregnancy. This stretching results in decreased uterine muscle tone and reduced contraction capacity after delivery. As a result, the blood vessels at the placental implantation site are inadequately compressed, resulting in bleeding. In primiparas, the risk may also be increased due to a lack of childbirth experience, potentially leading to more frequent obstetric interventions, which can increase birth canal trauma. Studies indicate that grandemultiparas have a higher risk of uterine atony, the primary cause of PPH (Feriyal et al., 2023; Linde et al., 2022; Abecassis et al., 2024).

Pregnancy Spacing

Pregnancy spacing is a factor that influences the physiological readiness of the uterus for subsequent pregnancies. Research by Feriyal et al. (2023) and Istiningsih et al. (2024) showed a significant association between pregnancy spacing and postpartum hemorrhage ($p<0.05$). Istiningsih et al. (2024) even reported a high OR (OR=30.5), indicating a very high risk. However, Mayasari et al. (2023) found a different result, finding no significant association ($p=0.346$). This difference may be due to variations in sample size, respondent characteristics, and the analysis methods used.

Spacing pregnancies too closely together prevents the mother's body from having sufficient time to recover physiologically, including restoring iron reserves and regenerating uterine tissue. This condition results in the uterus being less responsive to contraction stimulation during labor. Furthermore, nutritional deficiencies due to short pregnancy spacing increase the risk of anemia, which worsens bleeding. Physiologically, an incompletely healed endometrium can also lead to impaired placental implantation, increasing the risk of complications. This is evidenced by studies that indicate that pregnancy spacing is a significant factor in the incidence of PPH (Istiningsih et al., 2024; Delfiani et al., 2024; Abecassis et al., 2024).

Birth Canal Lacerations

Birth canal lacerations are a direct cause of postpartum hemorrhage, stemming from birth trauma. Mayasari et al. (2023) and Nislawaty et al. (2024) showed a significant association between birth canal lacerations and postpartum hemorrhage ($p<0.05$). Furthermore, Linde et al. (2022) also confirmed that lacerations are a major contributing factor to postpartum hemorrhage. This condition occurs due to tissue tears that lead to active bleeding if not promptly treated.

Birth canal lacerations cause bleeding due to direct damage to the tissue and blood vessels in the cervix, vagina, or perineum. Unlike bleeding due to uterine atony, bleeding due to lacerations persists even when the uterus is well contracted. The mechanism of bleeding occurs due to the opening of arteries and veins without adequate tissue compression. The risk of lacerations increases with delivery of a large baby, the use of assistive devices (forceps/vacuum), and rapid delivery. Research shows that birth canal trauma is a major cause of postpartum hemorrhage, in addition to impaired uterine contractions (Feriyal et al., 2023; Linde et al., 2022; Abecassis et al., 2024).

Placental Retention

Placental retention is a condition where the placenta fails to be expelled, which can cause severe bleeding due to impaired uterine contractions. Research shows that placental retention is significantly associated with postpartum hemorrhage, as reported by Mayasari et al. (2023), Nislawaty et al. (2024), and Istiningsih et al. (2024) with a p-value <0.05. Furthermore, Linde et al. (2022) also confirmed that placental retention is an important risk factor for postpartum hemorrhage.

Placental retention inhibits uterine contractions because the undelivered placenta keeps the blood vessels open. Physiologically, after the placenta is delivered, the uterus contracts to close the spiral blood vessels. However, in placental retention, this process is disrupted, resulting in continued bleeding. Furthermore, placental retention is often associated with placental

adhesion abnormalities such as placenta accreta, which further increases the risk of massive hemorrhage. Studies indicate that placental retention is a strong risk factor for PPH (Delfiani et al., 2024; Linde et al., 2022; Abecassis et al., 2024).

Placenta Previa and Postpartum Hemorrhage

Placenta previa is an abnormal placental implantation condition that carries a high risk of bleeding. Liu et al. (2021), Abecassis et al. (2024), and Wan et al. (2024) showed a significant association between placenta previa and postpartum hemorrhage ($p < 0.05$). Furthermore, Linde et al. (2022) also identified placenta previa as a major contributing factor to postpartum hemorrhage. This is due to the placenta's location in the lower uterine segment, which has a lower contractile capacity.

Placenta previa causes the placenta to implant in the lower uterine segment, which has a lower contractile capacity than the uterine fundus. After delivery, this area is unable to contract optimally to close open blood vessels. Furthermore, placental detachment from this location makes bleeding more difficult to control. This condition often requires surgical procedures such as cesarean sections, which increase the risk of further bleeding. Research shows that placenta previa is a significant predisposing factor for PPH (Linde et al., 2022; Abecassis et al., 2024).

Uterine Atony

According to research by Linde et al. (2022) and Nislawaty et al. (2024), there is a significant association between uterine atony and postpartum hemorrhage ($p < 0.05$). This condition occurs when the uterus fails to contract effectively after delivery, causing the blood vessels at the placental implantation site to remain open, causing bleeding.

Uterine atony is a major cause of postpartum hemorrhage, which occurs when the uterus fails to contract effectively after delivery. Physiologically, uterine contractions are necessary to compress the blood vessels at the placental implantation site. When contractions are inadequate, the blood vessels remain open, resulting in severe bleeding. Risk factors for atony include uterine overdistension, muscle fatigue, and long-term oxytocin use. Studies show that most cases of PPH are caused by uterine atony, making it a dominant factor in postpartum hemorrhage (Linde et al., 2022; Istiningsih et al., 2024; Abecassis et al., 2024).

Placental Abruptio

Placental abruptio is a condition in which the placenta separates prematurely and can cause serious bleeding. Liu et al. (2021) and Abecassis et al. (2024) showed a significant association between placental abruptio and postpartum hemorrhage ($p < 0.05$). Furthermore, Linde et al. (2022) also identified placental abruptio as an important risk factor. This condition disrupts hemostasis and uterine contractions. Placental abruptio not only causes bleeding before delivery but also increases the risk of PPH after delivery. Another mechanism involved is coagulopathy due to the release of large amounts of thromboplastin into the circulation, which interferes with the blood clotting process. This makes bleeding difficult to stop (Linde et al., 2022; Abecassis et al., 2024).

Prolonged Labor

Research by Liu et al. (2021), Mayasari et al. (2023), Istiningsih et al. (2024), and Abecassis et al. (2024) showed a significant association between prolonged labor and postpartum hemorrhage ($p < 0.05$). A prolonged labor process increases the risk of trauma and impaired uterine contractions. Prolonged labor causes uterine muscle fatigue due to prolonged contractions. This fatigue results in the uterus being unable to contract effectively after delivery, increasing the risk of uterine atony. Furthermore, prolonged labor increases the likelihood of medical intervention and birth canal trauma, which also contribute to bleeding. Physiologically, myometrial fatigue reduces the response to oxytocin (Istiningsih et al., 2024; Delfiani et al., 2024; Abecassis et al., 2024).

Preeclampsia

Preeclampsia is a pregnancy complication that affects the vascular and coagulation systems. Abecassis et al. (2024) and Wan et al. (2024) showed a significant association between preeclampsia and postpartum hemorrhage ($p < 0.05$). This condition increases the risk of blood clotting disorders, which can worsen bleeding.

Preeclampsia causes endothelial dysfunction and impaired coagulation, which impact the body's ability to stop bleeding. Furthermore, preeclampsia is often associated with impaired placental perfusion, which can lead to complications such as placental abruptio. This condition also causes decreased blood flow to the uterus, affecting contractility after delivery. The resulting coagulation disorders increase the risk of more severe bleeding (Linde et al., 2022; Abecassis et al., 2024).

Anemia

Anemia is a factor consistently associated with postpartum hemorrhage. Nearly all studies, including Liu et al. (2021), Feriyal et al. (2023), Mayasari et al. (2023), Abecassis et al. (2024), Delfiani et al. (2024), Marleni & Megawati (2024), Nislawaty et al. (2024), Istiningsih et al. (2024), and Wan et al. (2024), show a significant association ($p < 0.05$). Anemia in pregnant women does not directly cause postpartum hemorrhage, but it worsens the mother's condition when bleeding occurs. Mothers with anemia have low hemoglobin reserves, making them more susceptible to shock.

Anemia plays a role in worsening the mother's condition during bleeding due to low hemoglobin reserves. Furthermore, anemia also affects uterine muscle function by reducing oxygen supply to the tissues, which can lead to ineffective uterine contractions. This condition increases the risk of uterine atony. Anemia also impacts hemostasis, resulting in suboptimal blood clotting. Research shows that anemia is a contributing factor to the increased risk and severity of PPH (Delfiani et al., 2024; Istiningsih et al., 2024; Abecassis et al., 2024).

Labor Induction

Labor induction is also associated with an increased risk of postpartum hemorrhage. This was demonstrated by Liu et al. (2021), Mayasari et al. (2023), and Abecassis et al. (2024), who found a significant association between induction and postpartum hemorrhage ($p < 0.05$). Induction can cause uterine fatigue due to excessive contraction stimulation, thereby increasing the risk of uterine atony.

Labor induction, especially with long-term use of oxytocin or prostaglandins, can cause desensitization of oxytocin receptors in the myometrium. As a result, after delivery, the uterus does not respond optimally to endogenous oxytocin, resulting in ineffective contractions. This increases the risk of uterine atony, a major cause of PPH. Furthermore, labor induction is often associated with longer labor and additional interventions that increase the risk of complications. Research shows that labor induction is a significant risk factor for postpartum hemorrhage (Linde et al., 2022; Abecassis et al., 2024).

Conclusion

Based on the literature review of these 10 articles, it can be concluded that postpartum hemorrhage is influenced by various risk factors, including maternal and obstetric factors, as well as direct complications. The most consistently associated factors are anemia, age, parity, placenta previa, prolonged labor, and labor induction. Meanwhile, factors such as pregnancy spacing and parity show varying results across studies. Uterine atony, retained placenta, and birth canal lacerations are the most dominant direct causes. Therefore, early detection and appropriate management of these risk factors are necessary to reduce the incidence of postpartum hemorrhage and its complications.

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