

ARTICLE INFORMATION

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Analysis of risk factors for uterine atonia prolonged part, anemia, age and parity: A literature review

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Abstract

Background: Uterine atony is defined as the leading cause of postpartum hemorrhage, which is the largest contributor to maternal mortality. Numerous studies have shown that factors such as prolonged labor, anemia during pregnancy, maternal age, and parity are associated with the incidence of uterine atony

Purpose: to analyze and synthesize findings from five journals related to these risk factors.

Method: The method used was a literature review of journals with a cross-sectional and case-control approach, with a total sampling technique and chi-square and Fisher correlation tests.

Results: The results show that prolonged labor increases uterine muscle fatigue, resulting in decreased contractions. . Anemia causes reduced oxygen supply to uterine tissue, which impacts contraction failure. Maternal age under 20 and over 35 increases the risk due to unpreparedness and decreased organ function. High parity also contributes to decreased elasticity and strength of uterine contractions.

Conclusion: The conclusion of this review indicates that all of these factors are significantly associated with the incidence of uterine atony, so preventive efforts through early detection and improving the quality of antenatal care are needed.

Keywords: Age; Anemia; Parity; Postpartum Hemorrhage; Risk Factors; Uterine Atony.

INTRODUCTION

Uterine atony is a condition of weak uterine tone or contractions, which causes the uterus to be unable to close open bleeding from the placental implantation site after the baby and placenta are born (Mahayani, Wanadiatri, & Shammakh, 2023). Predisposing factors that contribute to uterine atonic bleeding are divided into antepartum and intrapartum risk factors. Antepartum risk factors include anemia in pregnancy, age, and parity, while intrapartum risk factors include prolonged labor (Julizar, Effendi, & Sukandar, 2019).

Maternal mortality and morbidity are serious health problems worldwide, especially in developing countries. According to the 2019 World Health Organization (WHO) report, the global maternal mortality rate (MMR) was 303.000 people who died

during and after childbirth. The maternal mortality rate (MMR) in several developing countries was also reported to be quite high, such as in Africa (179.000), South Asia (69.000), and Southeast Asia (16.000) (Kristianingsih, Mukhlis, & Ermawati, 2019).

Based on the 2019 Indonesian Health Profile, the maternal mortality rate in Indonesia was 305 per 100,000 live births (Ministry of Health, 2020). This rate is still far below the Sustainable Development Goals (SDGs) target of reducing the maternal mortality rate to 70 per 100,000 live births by 2030. Achieving this target requires hard work, especially when compared to several Association of Southeast Asian Nations (ASEAN) countries, where the maternal mortality rate in Indonesia remains relatively

high. The maternal mortality rate in ASEAN countries averages 40-60 per 100,000 live births. In fact, the maternal mortality rate in Singapore is only 2-3 per 100,000 live births (Susiana, 2019).

Uterine atony is the leading cause of postpartum hemorrhage and contributes significantly to maternal mortality. Based on an analysis of five reviewed journals, several factors contribute to this. The occurrence of uterine atony, namely postpartum hemorrhage, age, parity, and anemia, with varying characteristics of influence (Miller & Ansari, 2022).

Postpartum hemorrhage in various journals is not positioned as an initial causative factor, but rather as a direct consequence of uterine atony. This condition occurs due to the failure of the myometrium muscle to contract adequately after delivery, thereby incapable of compressing the blood vessels at the placental implantation site. This causes severe bleeding that can lead to shock and maternal death if not treated quickly and appropriately. Thus, postpartum hemorrhage is better understood as the main clinical manifestation of uterine atony rather than a risk factor (Kristianingsih, Mukhlis, & Ermawati, 2020).

Maternal age also shows a significant relationship with the occurrence of uterine atony. One journal shows a significant relationship between maternal age and the occurrence of uterine atony ($p = 0.004$). Physiologically, maternal age that is too young (<20 years) or Women who are too old (>35 years) are at risk of reproductive dysfunction, including decreased elasticity and uterine muscle contraction ability. However, not all journals focus on age as the primary focus of research, so this factor tends to be a predisposing factor that increases the risk rather than a direct cause (Natalis, Andriyani, & Jingsung, 2024).

Parity is also an important factor in the occurrence of uterine atony. Mothers with high parity (multiparous or grandemultiparous) have a greater risk of uterine atony due to the condition of the uterine muscles that have undergone repeated stretching. This stretching causes decreased myometrial tone and elasticity, resulting in suboptimal uterine contractions after delivery. One journal showed a significant association between parity and the incidence of uterine atony ($p = 0.004$). This indicates that the higher the parity, the greater the risk of uterine atony (Wiknjastro, Hanifa, 20110).

Furthermore, anemia is the most consistent factor found across all journals as a cause of uterine atony.

Several studies have shown a highly significant association between anemia during pregnancy and the incidence of uterine atony ($p < 0.05$) (Salsabila, 2020). Physiologically, anemia causes a decrease in hemoglobin levels, which function to transport oxygen in the blood. Lack of oxygen in the uterine tissue results in impaired muscle metabolism, resulting in weak or ineffective uterine contractions. As a result, the uterus is unable to close the blood vessels from the placental implantation site and triggers postpartum hemorrhage (Panjaitan, 2016).

RESEARCH METHOD

This study employed a literature review method, examining five scientific journals related to uterine atony. Data sources were obtained through electronic databases such as Google Scholar and accredited national journals. Inclusion criteria included journals discussing factors related to uterine atony, published between 2022 and 2026, and using quantitative research methods such as cross-sectional and case-control studies. Exclusion criteria included journals that were irrelevant to the topic or lacked complete data.

Data analysis was conducted by comparing research results from each journal, identifying similarities and differences, and synthesizing them to draw comprehensive conclusions. This study used a Systematic Literature Review (SLR) approach following the PRISMA 2020 guidelines to ensure transparency, replicability, and high scientific validity. The study focused on analyzing the risk factors of prolonged labor, anemia, age, and parity on the incidence of uterine atony. The literature search strategy was carried out comprehensively on several reputable international databases indexed by Scopus, namely Scopus, PubMed, ScienceDirect, and Google Scholar.

The publication range was limited to January 2015 to December 2025 to ensure the relevance and recency of the scientific evidence. The search strategy used a combination of Boolean operators as follows: ("uterine atony" OR "postpartum hemorrhage") AND, ("prolonged labor" OR "prolonged labor") AND, ("anemia in pregnancy") AND, ("maternal age") AND, ("parity"). Exclusion criteria included review articles, editorials, single case reports, duplications, articles without a valid DOI, and studies that did not report clear statistical results. The

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analysis was conducted using a narrative synthesis approach, grouping the results based on four main variables: prolonged labor, anemia, age, and parity. Furthermore, the strength of the association was

evaluated using the odds ratio (OR), relative risk (RR), and p-value. The validity of the study was assessed using critical appraisal based on epidemiological standards.

RESEARCH RESULTS

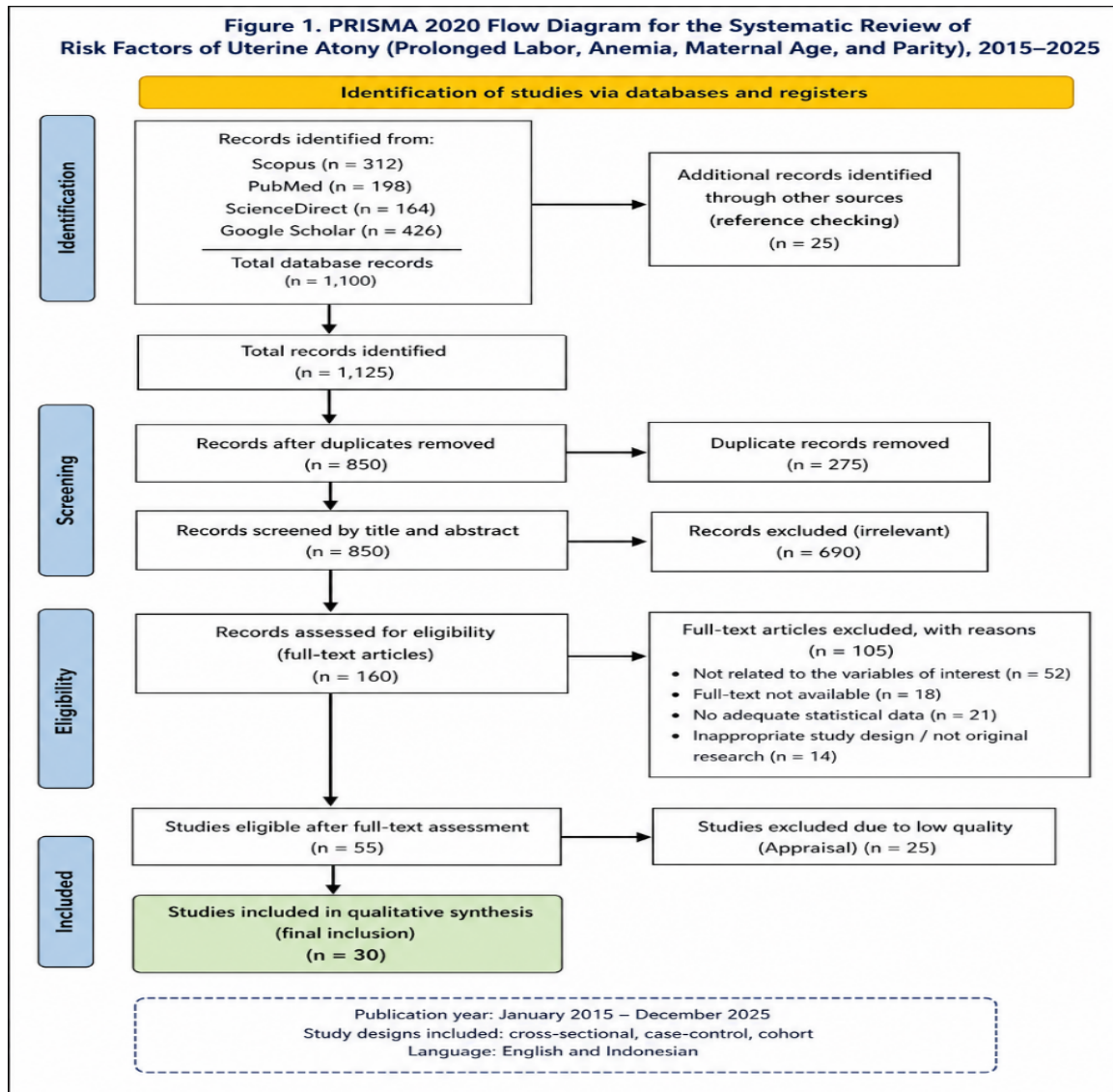


Figure PRISMA Flow Diagram

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Table Summary of Selected Articles

(Author, Year)(Country)	Purpose	Design & Method	Results
(Mahayani et al., 2023) (Indonesia)	To find out the relationship of prolonged labor and anemia in pregnancy with the incidence of uterine atonia in women giving birth.	This study is observationally analytical using case-control design. The sampling technique is total sampling. The research sampel consisted of 60 samples with each case and control 30 samples that fit the inclusion and exclusion criteria. The data obtained were analyzed with the chi-square correlation test.	The results of the study showed that 18 (71.7%) women experienced prolonged labor, while 43 (71.7%) did not. Furthermore, 34 (56.7%) women with anemia, and 26 (43.3%) women without anemia, experienced uterine atony.
(Amiyanti, 2025) (Indonesia)	Knowing the relationship between anemia in pregnant women and the occurrence of uterine atony.	Cross sectional	There is a significant relationship between anemia and the incidence of uterine atony ($p=0.000$)
(Purwati et al., 2022) (Indonesia)	To determine the relationship between anemia in pregnant women and the occurrence of uterine atony.	This study method is observational analytic with cross sectional approach which was conducted at Charis Medika Hospital, Batam city. Data was taken using Medical Record data. The sampling technique in this study used total	The characteristics of patients with anemia and uterine atony as were 7 people (0.3%) patients with anemia but no atony were 58 people (2.2%) patients who were not anemia but had

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		sampling with a total sample of 2,627 respondents. The results of the study were presented in the form of a frequency distribution and were cross tabulated and then tested with Fisher to determine the existence of a relationship.	atony were 22 people (0.8%) and patients who are not anemia and do not experience uterine atony were 2.540 people (96.7%). Fisher's analysis obtained $p = 0.000$ (<0.05 H_0 is rejected, which means that there is a relationship between anemia in pregnancy and the incidence of uterine atony.
(Natalis et al., 2024) (Indonesia)	To determine the relationship between age and maternal parity with the incidence of uterine atony in mothers giving birth.	This type of research is a quantitative study with a cross sectional approach. The research instrument used is secondary data. This research was conducted for 10 days, from Mei 3 to Mei 13, 2023 at the Kendari City Regional General Hospital and the population taken was all women who had uterine atony, totaling 373 with a total sample of 373 mothers.	The results showed that there was a significant relationship between age and parity of the mother with the incidence of uterine atony in women giving birth. The results of the Chisquare statistical test at the age of the mother obtained a value of $p \text{ value} = 0.004$, which means that $p \text{ value} < \alpha 0.05$, which means that H_0 is rejected and H_a is accepted, which means there is a relationship between maternal age and the incidence of uterine atony and in the second variable on

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		maternal parity, the results of the chi-square statistical test obtained p value= 0.004, which means that p value< α 0.05, which means that H_0 is rejected and H_a is accepted, which means There is a relationship between maternal parity and the incidence of uterine atony.
(Rizki et al., 2026) (Indonesia)	To analyzing the relationship between uterine atony treatment and KBI/KBE actions	Cross sectional There is a significant relationship between the treatment of uterine atony and KBI/KBE actions ($p=0.032$)

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DISCUSSION

Based on a synthesis of the five journals analyzed, the incidence of uterine atony is influenced by various interrelated factors, with varying degrees of correlation in each study. In general, anemia and prolonged labor show the most consistent association, while age and parity act as supporting risk factors. On the other hand, one study emphasized the management aspect, providing a different perspective on the management of uterine atony.

Comparatively, most journals indicate that anemia in pregnancy is significantly associated with the occurrence of uterine atony (Salsabil, 2022). This consistency is seen in several studies with a p-value <0.05 , confirming that anemia is a strong risk factor. The underlying mechanism for this condition is a decrease in hemoglobin levels, which results in reduced oxygen supply to the uterine muscles, resulting in ineffective uterine contractions after delivery. However, there are differences in how each study positions anemia, with some considering it a direct cause, while others categorize it as a predisposing factor acting in conjunction with other factors. This difference indicates variations in conceptual and analytical approaches between studies (Amelia, 2019).

In addition to anemia, prolonged labor also shows a significant association with the occurrence of uterine atony (Wijayanti, 2020). This case-control study showed that prolonged labor significantly increases the risk of uterine atony. Physiologically, prolonged labor causes uterine muscle fatigue due to prolonged contractions, so that the uterus is unable to contract optimally after delivery. However, not all journals consider prolonged labor a primary factor, as some studies focus more on other factors such as anemia or maternal characteristics. This suggests that the importance of prolonged labor can vary depending on the focus and variables studied (Fibrianti, 2020).

Age and parity have also been found to be associated with uterine atony, although not as strongly as anemia and prolonged labor (Sugesti, Wahyu, & Yuniyanti, 2021). Research shows that mothers with an age at risk (<20 years or >35 years) and mothers with high parity are more likely to experience uterine atony. This is related to the physiological condition of the reproductive organs,

where being too young or too old can affect uterine readiness, while high parity causes decreased uterine muscle elasticity due to repeated stretching. However, not all journals discuss these two factors in depth, so they are considered more of a supporting factor than a primary factor (Fransiska, 2022).

On the other hand, One journal highlighted aspects of uterine atony management, specifically through internal and external bimanual compression. The results of this study indicate that appropriate management plays a crucial role in controlling postpartum hemorrhage due to uterine atony. This difference in focus demonstrates that research on uterine atony is not limited to causal factors but also encompasses management aspects, thus providing a broader picture in case management efforts (Nurfalah & Danefi, 2023).

The differences in results between journals may be caused by several factors. First, differences in study designs, such as cross-sectional and case-control, affect the strength of determining causal relationships. Case-control designs tend to be more robust in identifying risk factors than cross-sectional designs, which only examine relationships at a single point in time. Second, differences in sample size and respondent characteristics, such as maternal health, nutritional status, and access to health services, can influence study results. Third, differences in the variables studied, as not all studies include all risk factors simultaneously, resulting in varying results. Fourth, differences in study location and context, such as referral hospitals or primary health care facilities, can also influence the incidence of uterine atony. Thus, it can be concluded that although there were variations in results between studies, overall there were similarities.

CONCLUSION

Based on the results of a literature review of five analyzed journals, it can be concluded that the hypothesis stating a relationship between anemia, prolonged labor, age, and parity with the incidence of uterine atony is acceptable. The incidence of uterine atony is multifactorial, with various factors contributing to an increased risk of this condition. As a follow-up, efforts are needed to improve early detection of risk factors during pregnancy and childbirth, particularly through hemoglobin level

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testing, labor monitoring to prevent prolonged labor, and monitoring of mothers of at-risk age and parity. Furthermore, further research is recommended to use a more robust design, such as a cohort or experimental study, with a larger sample size and a more comprehensive assessment of risk factors to obtain more accurate results that can be used as a basis for maternal health policy-making.

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