

Review Article: Systematic Review, Meta-Analysis, Integrative Review, Scoping Review

PREVENTION AND TREATMENT OF POSTPARTUM HEMORRHAGE: A LITERATURE REVIEW

Yohana Rita Bitbit^{1*}, Mardiana Ahmad¹, Isharyah Sunarno²

¹ Midwifery Study Program, Graduate School Hasanuddin University, Makassar, Indonesia

² Department of Obygn and Gynecology, Faculty of Medicine Hasanuddin University, Makassar, Indonesia

***Correspondence:**

Yohana Rita Bitbit

Midwifery Study Program, Graduate School Hasanuddin University, Makassar, Indonesia

Graduate School, Hasanuddin University Makassar, Jln. Perintis Kemerdekaan KM.10

Makassar-90245

Email: bitbityr20p@student.unhas.ac.id

Article Info:

Received: August 16, 2021

Revised: June 21, 2022

Accepted: June 25, 2022

DOI:

<https://doi.org/10.36720/nhjk.v11i1.304>

Abstract

Background: The main cause of morbidity and maternal mortality is hemorrhage postpartum, with an increasing incidence around the world. Various risk factors for postpartum bleeding are expected to be an effective treatment by health professionals and have a role as advocates, collaborators, educators, service providers, and as researchers must have the latest knowledge in providing optimal and comprehensive care.

Objectives: This study aimed to find out the prevention and treatment of hemorrhage postpartum.

Design: This study design is a systematic review to search and review articles from database and the descriptive theory.

Data Sources: Search scientific articles using the Mendeley application by entering the keywords "Postpartum, Hemorrhage, Prevention, and Treatment" with publication year 2019-2021, English, full text, and open access.

Review Methods: The literature review method uses a narrative review to discuss postpartum hemorrhage, its prevention, and treatment. The inclusion criteria are the year of publication 2019-2021, international publications, articles in English, original articles, full text, and open access. Data were collected and a journal summary was made which included the name of the researcher, year of publication of the journal, research title, method, and a summary of the results or findings.

Results: From 9 journals that meet the conclusion that active management of the third stage, administration of uterotonic and bimanual compression, is the initial treatment for the prevention and treatment of postpartum hemorrhage.

Conclusion: In the prevention of risk factors for postpartum hemorrhage, it is recommended to carry out good active management of the third stage, use of uterotonic drugs according to the recommended dose, early initiation of breastfeeding, and increase the knowledge and skills of health workers.

Keywords: *Prevention, Treatment, Hemorrhage, Post-Partum.*

INTRODUCTION

The death rate is also one of the important indicators in determining the health status of

mothers in a country (Rosida et al., 2019). Currently, the maternal mortality rate is still

high, especially in developing countries (Kochanek et al., 2016; Kramer et al., 2013).

The main cause of maternal morbidity and mortality is postpartum hemorrhage, with an increasing incidence worldwide (Evensen et al., 2017; Huang et al., 2020; Kramer et al., 2013), 3-5% of mothers give birth to postpartum hemorrhage and cause a quarter of deaths worldwide and 12% of maternal deaths in the United States (Evensen et al., 2017; Huang et al., 2020; Kochanek et al., 2016).

The World Health Organization (WHO) reports that Indonesia is among the top 10 countries that contribute to maternal mortality (WHO, UNICEF, 2015). The maternal mortality rate in Indonesia until 2019 ranges from 305/100,000 live births (Indonesian Health Ministry, 2019), while in Papua Province in 2017, 289/100,000 live births (Dinas Kesehatan Provinsi Papua, 2019), and in Biak Numfor District, the maternal mortality rate in 2012 amounted to 17/1,588 live birth (*Profil Kesehatan Provinsi Papua*, 2012).

National Health development goals in *Sustainable Development Goals (SDGs)*, setting maternal mortality rate is 70/100,000 live births by 2030 (Hastuti, 2018). Based on this target, the maternal mortality rate in Indonesia is still high and still far from the national target (Kementerian Kesehatan, 2014).

The biggest cause of maternal death is bleeding, which occurs 24 hours after childbirth. *World Health Organization* reveals that the leading cause of maternal death is postpartum bleeding (Dunkerton et al., 2018; Khan et al., 2006; Lalonde, 2012; Weeks, 2015). The highest mortality rate in Indonesia was in 2013 at 30.3% of deaths caused by postpartum bleeding (Kemenkes RI, 2015). And in Biak Numfor district hemorrhage is the biggest cause of maternal death (Aswar et al., 2019).

Postpartum bleeding is defined as blood loss >500 ml in childbirth of vaginal and >1000 ml after Caesarean section (SC) (Diaz et al., 2018; Feduniw et al., 2020; "Prevention and Management of Postpartum Haemorrhage: Green-Top Guideline No. 52," 2017).

Hemorrhage Postpartum on the time of occurrence is distinguished by primary bleeding (*Early Postpartum Hemorrhage*) occurs within 24 hours after delivery is caused by uterine atony, birth canal tear, placental retention, and the rest of the placenta. While secondary postpartum bleeding (*Late Postpartum Hemorrhage*) occurs after 24 hours postpartum caused by infection, residual placenta, uterine contractions are not good. And the most common cause of maternal death is primary postpartum hemorrhage. (Rosida et al., 2019).

The risk factors that influence maternal death are divided into obstetric disorders such as bleeding, preeclampsia/eclampsia, and infections or diseases suffered by the mother before or during pregnancy, such as heart disease, malaria, tuberculosis, kidney, and *Acquired Immunodeficiency Syndrome*. Then the determination between such factors as maternal health status, reproductive status, access to health services, and behavior of the use of health care facilities, in general, is far related to demographic and sociocultural factors. Low public awareness of pregnant women's Health, poor female empowerment, educational background, family socioeconomic, community and political environment, and policies are indirectly thought to play a role in increasing maternal mortality (Aeni, 2013; L.T. et al., 2017; Susiana, 2019).

By looking at the above risk factors, it is expected that effective handling by health *professionals* and have a role as advocates, collaborators, educators, service providers, and researchers must have the latest knowledge in providing optimal and comprehensive care (Rosida et al., 2019).

Fawcus and Moodley are the only ones who have been in the area. (2011), in Ofile M Kabelo (2013) said it is crucial all levels of Health are able to provide emergency services for postpartum bleeding events as well as be aware of the factors necessary to prevent it. It requires adequate facilities, supplies, and skilled officers. Improvements in the

application of the health system and proper training for doctors and midwives at all levels of care are essential if death is to be lowered (Olefile et al., 2013).

From this condition, it appears that the main cause of death is bleeding in developing countries, including Indonesia. In Indonesia, various treatments and treatments are carried out to stop bleeding by using uterotonic drugs, preventing shock, which is recommended by those *who* are doing bimanual compression and further treatment to stop bleeding (Manuel Muñoz et al., 2019).

Then prevention of bleeding requires the implementation of good active management of the third stage, in addition to reducing risk factors from the cause of bleeding such as uterine atony and uterine rupture and reducing intervention during the delivery process. (Oyelese & Ananth, 2010).

Most articles in Indonesia only explain the incidence of bleeding by looking for the relationship between risk factors and the occurrence of postpartum hemorrhage, so that research on the types and methods of intervention and management carried out to overcome postpartum hemorrhage is still limited. So that various information is needed for health workers in dealing with postpartum hemorrhage.

METHODS

Design

The design of this research is Literature Review or library review. A literature review is a study that critically examines knowledge (Mengist et al., 2020; Shaffril et al., 2021), ideas, or findings contained in the body of *academic-oriented literature*, as well as formulating its theoretical and methodological contributions to a particular topic.

The nature of this research is descriptive analysis, namely regular decomposition of data that has been obtained, then given understanding and explanation in order to be well understood by readers.

Search Methods

Search scientific articles using the Mendeley application by entering the keywords "Postpartum, Hemorrhage, Prevention, and Treatment" 2019-2021. Articles are selected based on:

- a. Inclusion Criteria
 - a. The article discusses hemorrhage postpartum, prevention, and treatment;
 - b. The publication year 2019-2021;
 - c. International Publications;
 - d. Articles in English; and
 - e. The original article, full text, and open access
- b. Exclusion Criteria
 - a. Articles other than English; and
 - b. Types of literature research and RCT

Search Outcome

From this search, 756 articles were found by entering the keywords "*Hemorrhage, Postpartum, Prevention, and Treatment*" after filtering for the year 2019-2021, 121 articles were obtained, then selecting the categories of journals, duplication, open access, and the research design was taken, namely the study mix method, cross-sectional study, correlation analysis, and qualitative study. Get 36 articles.

The final process is to select journals based on inclusion criteria; nine journals that meet the requirements for review are obtained. Article Search Strategy can be seen in Figure 1.

Quality Appraisal

Literature Review is synthesized using narrative methods by grouping similar extraction data according to the measured results to answer the objectives (Pesut et al., 2020; Simpson et al., 2022). Research journals that comply with the inclusion criteria are then collected and made a summary of the journal, including the name of the researcher, the year of publication of the journal, the title of the study, the method, and summary of the results or findings.

The summary of the research journal is included in the table according to the format above. To further clarify, abstract analysis and

full-text journals are read and observed. The summary of the journal has then analyzed the content contained in the research objectives and the results/findings of the study. Analysis of the contents of the journal then conducted coding on the contents of the journal reviewed based on the outline or core of the research conducted by unraveling in a sentence then if it has been collected then sought similarities and differences in each study and then discussed to draw conclusions.

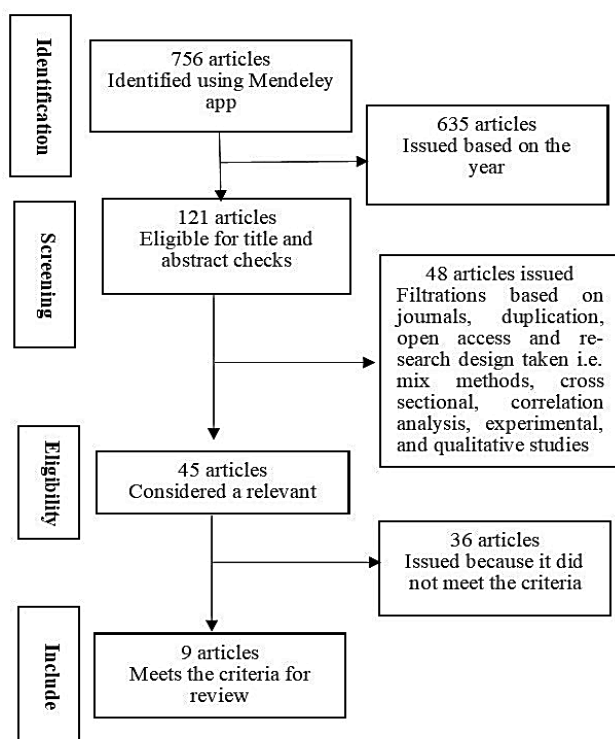


Figure 1. Article Search Strategy.

Data Abstraction

Researchers accompanied by two supervisors simultaneously review and read the full relevant article, then discussion to agree on the decision of the article tailored to the criteria of inclusion.

Data Analysis/ Synthesis

The nine articles selected are based on inclusion criteria that discuss the prevention and treatment of hemorrhage postpartum.

RESULTS

From the article search using the Mendeley application, only nine articles met the criteria.

Figure 1. indicates the smoothing of the selection of articles from the database. Additional information, including author name, year of publication, research design, sample, and data analysis, can be seen in table 1.

Table 1. Extraction of Research Results.

Title	Author/Year	Types of Research and Sample	Data Analysis	Result
The magnitude and associated factors of postpartum hemorrhage among mothers who delivered at Debre Tabor general hospital 2018	Habitamu <i>et al.</i> , 2019	Institution-based latitude-cut studies. 144 mothers.	Chi-square test	There is a link between postpartum bleeding with gravid, parity, antenatal visits, and a history of previous postpartum hemorrhage. Then uterine atony, placental retention, and genital tracheal trauma

					are the most common causes of postpartum hemorrhage.
Prevention and treatment of postpartum hemorrhage: Focus on hematological aspects of management	(McLintock, 2020)	Case study. Discuss case examples and then be given appropriate treatment.	Descriptive analysis		Initial treatment for bleeding that much after childbirth is massage the uterus and giving uterotonics
Association between postpartum depression and synthetic oxytocin use for postpartum hemorrhage prevention and treatment	(Karakuş & Pulatoğlu, 2019)	Quasi-experimental 2 group intervention and control. 200 mothers gave birth.	Shapiro Wilks test Mann Whitney U test Chi-square test		The use of oxytocin affects postpartum bleeding and decreased symptoms of depression
Significance of uterotonics for the prevention and treatment of postpartum hemorrhage	(Hösli & Büchel, 2019)	Case study. Focusing on a case	Descriptive		Treatment of PPH includes gradual management in accordance with the D-A-CH algorithm, i.e. oxytocin or carbetocin is a single-dose first-line drug or in combination with prostaglandins.
Core outcome sets for prevention and treatment of postpartum hemorrhage: an international Delphi consensus study	(Meher et al., 2019)	A two-round Delphi survey and face-to-face meeting. Healthcare professionals and women's representatives.	Lectures, discussions and voting were used to agree how to report COS outcomes.		Core outcome sets will help standardize outcome reporting in PPH trials.
Patient blood management in obstetrics: Prevention and treatment of postpartum hemorrhage. A NATA consensus statement: A multidisciplinary consensus statement	(Manuel Muñoz et al., 2019)	Case Study. Guideline. A multidisciplinary panel of physicians with expertise in obstetrics, anaesthesia, haematology, and transfusion medicine was convened by the Network for the Advancement of Patient Blood Management,	Grading of Recommendations Assessment, Development, and Evaluation (GRADE) working group. The recommendations in this consensus statement are intended for use		The aim of the multidisciplinary panel of physicians with expertise in obstetrics, anesthesia, hematology and transfusion medicine has been to generate recommendations based on the best available evidence

			Haemostasis and Thrombosis (NATA) in collaboration with the International Federation of Gynaecology and Obstetrics (FIGO), the European Board and College of Obstetrics and Gynaecology (EBCOG), and the European Society of Anaesthesiology (ESA).	by clinical practitioners managing perinatal care of women in all settings, and by policymakers in charge of decision making for the update of clinical practice in health care establishments	to assist clinical decision-making by practitioners managing the perinatal care of women in all settings, putting patient safety at the forefront at all times.
Uterotonics for prevention of postpartum hemorrhage: EN-BIRTH multi-country validation study	(Ruysen et al., 2021)		Observational studies. EN-BIRTH study takes place in five hospitals in Bangladesh, Nepal and Tanzania.	Comparing observation data with women's reports in interview surveys	Routine registers have the potential to track uterotonic coverage – the register data is highly accurate in two EN-BIRTH hospitals, compared to coverage consistently underestimated by survey reports.
Patient blood management in obstetrics: management of anemia and hematinic deficiencies in pregnancy and in the postpartum period: NATA consensus statement	(M. Muñoz et al., 2018)		Case study. Focusing on a case.	Descriptive	Recommendations should be tailored to the specific situation, resources and strategies of each country and region.
Pharmacologic Prevention and Treatment of Postpartum Hemorrhage	(Drew & Carvalho, 2021)		Guideline. Latest evidence of postpartum bleeding treatment	Descriptive	Traneksamic acid is safe and highly effective and should be administered both for cases with a high risk of PPH as well as in early bleeding.

DISCUSSION

Postpartum bleeding is the most common cause of serious blood loss during pregnancy and childbirth, namely blood loss of more than 500 ml after vaginal delivery and 1000 ml for

cesarean delivery; physiologically, the mother who has given birth will experience bleeding of about 500 ml if there is no homeostatic disorder because with hematocrit changes 10% after childbirth can be said hemorrhage postpartum

(“Green-Top Guideline No. 52: Prevention and Management of Postpartum Haemorrhage,” 2017; Ummah et al., 2018) (Lowdermilk, Perry & Cashion, 2013).

Postpartum hemorrhage is a major problem that causes high maternal mortality rates in developing countries and some developed countries. (van de Ven et al., 2017). The causes of postpartum hemorrhage are easier to memorize by considering the 4T tone, tissue, trauma, and thrombin with greater attention on uterine atony as the most common cause of postpartum hemorrhage. (L.T. et al., 2017; Lier et al., 2018)

Uterine atonia is the main cause of postpartum bleeding, namely the inability of the uterus to contract properly after childbirth; there is a disorder in the myometrium fibers because in the myometrium fibers, there are smooth muscles and passed by large blood vessels of the mother so that if the uterus does not contract or the uterus undergoes relaxation after the birth of the placenta, then there will be bleeding, blood vessel clotting becomes disrupted and continues until the uterus contracts again (Ruiz Sánchez et al., 2021; Shahbazi Sighaldehy et al., 2020).

In Negara develop, there are other factors that will increase the incidence of maternal mortality such as difficulty accessing health services, inadequate resources, mothers who have anemia, and health workers who do not understand the handling of bleeding and active management treatment when III (Chen et al., 2021; Zaineb et al., 2021).

We know that it is better to prevent than to treat possible complications. Therefore, the main attention is paid to the prevention methods summarized from several articles that consist of 1) management of the third stage can reduce the risk of postpartum hemorrhage; 2) Oxytocin (10 IU), administered intramuscularly, is the preferred treatment of postpartum bleeding prevention in vaginal childbirth and has a low risk. Given after this drug after giving birth to anterior shoulder; 3) Intravenous oxytocin infusion (20 to 40 IU in 1000 mL, 150 mL per hour) is an alternative that can be given; 4)

Oxytocin bolus IV, 5 to 10 IU (administered for 1 to 2 minutes), can be used to prevent postpartum bleeding after childbirth vaginal but is not recommended for elective Caesarean section; 5) Ergometric can be used for the prevention of postpartum bleeding but can be considered as the second option for oxytocin due to the greater risk of maternal side effects and the need to remove the leftover placenta manually contraindicated in hypertensive patients; 6) Carbetosin 100 µg administered as bolus IV for 1 min, should be used instead of continuous oxytocin infusion in the elective cesarean section for the prevention of postpartum bleeding and to reduce the need for therapeutic uterotonics; 7) For women who give birth to vaginal with hemorrhage postpartum risk factors, carbetocin 100 µg IM to prevent postpartum bleeding when compared to oxytocin infusion; 8) Ergometrine 0.2 mg IM, and misoprostol, 600 to 800 µg administered via oral, sublingual, or rectal, can be offered as alternatives to vaginal delivery when oxytocin is not available; 9) If possible, delaying umbilical cord clamping by at least 60 seconds is better than rapid clamping in premature newborns (37 weeks gestational age) due to less intraventricular bleeding and fewer transfusion needs in those who experience late clamping; and 10) For newborns within months, the increased risk of neonatal jaundice requiring phototherapy should be considered against the physiological benefits of greater hemoglobin and iron levels up to the age of 6 months caused by delayed umbilical cord clamping (Charles et al., 2019; J.L. et al., 2015; Manuel Muñoz et al., 2019).

Besides prevention, it also summarizes the treatment of postpartum hemorrhage, as follows 1) Estimating blood loss, the doctor should use clinical markers (signs and symptoms) rather than visual estimation; 2) Ongoing management of postpartum bleeding requires a multidisciplinary approach that involves maintaining hemodynamic stability while identifying and treating the causes of blood loss; 3) All midwifery units must have a regularly inspected postpartum bleeding

emergency instrument containing appropriate equipment; 4) Uterine tamponade can be an efficient and effective intervention to temporarily control active postpartum bleeding due to uterine atony that does not respond to medical therapy; and 5) Surgical techniques such as internal iliac artery ligation, compression stitches, and hysterectomy should be used for the management of insurmountable postpartum bleeding and are unresponsive to medical procedures (Koch & Rattmann, 2020; Tunçalp et al., 2013).

In addition, other factors that must be considered in the framework of postpartum prevention are the equalization of the construction of health facilities in each region, so that it is easily accessible by the community, the availability of trained human resources, and supporting facilities.

Indonesia applies bimanual compression to treat postpartum bleeding treatment. This action is effective in overcoming bleeding, while in developed countries for example, the UK performs compression by using a butterfly-like tool on midwifery beads only because it is still proven a new tool to handle postpartum bleeding treatment. This tool is a plastic terrarium platform designed with a handle to facilitate the user in pressing the uterus. There are channels to determine the location of bleeding, but this tool still requires clinical evidence, and it is recommended to conduct follow-up research on patients directly (Althabe et al., 2020; Andreatta et al., 2012).

A study in Egypt used another technique to tackle atonia. This maneuvering technique can be done to overcome postpartum bleeding; balloon tampons can be a treatment option that can be done to overcome postpartum bleeding.

Early Breastfeeding Initiation (EBI) is a technique that can affect the occurrence of uterine involution quickly so that it will stimulate the hormone oxytocin that serves to stimulate the breast muscles and retraction of the uterine muscles, will suppress blood vessels so that there is a lack of blood supply to the uterus, and this process helps reduce the placenta implantation and reduce bleeding. The

release of the hormone oxytocin also makes the mother calm, relax, euphoric, increase the threshold of pain so that she can love her baby.

Early Breastfeeding Initiation processes such as touch, suction, and licking on the nipple will stimulate the release of oxytocin hormone, which is very important to increase uterine contractions and reduce the risk of bleeding in the mother. Early breastfeeding initiation also helps the mother to relax and away from stressful conditions, oxytocin production can increase (Rosida et al., 2019).

CONCLUSION

In the prevention of risk factors for postpartum hemorrhage, it is recommended to carry out good active management of the third stage, use of uterotonic drugs according to the recommended dose, early initiation of breastfeeding and increase knowledge and skills of health workers.

ACKNOWLEDGMENT

Thank you to the supervisor who has taken the time to direct in the preparation of the literature study.

DECLARATION OF CONFLICTING INTEREST

This comprehensive summary or systematic review is independent writing, so there is no conflict of interest in the writing.

FUNDING

This systematic review is writing independently, not funded or get funding from any party.

AUTHOR CONTRIBUTION

Yohana Rita Bitbit: Designed the study, collected and analyzed articles, and contributed to the completion of a systematic review

Mardiana Ahmad: Contribution as a supervisor guide and discuss the final results of the review literature manuscript.

Isharyah Sunarno: Contribution as a supervisor involved in planning and supervision in the completion of the literature review.

ORCID

Yohana Rita Bitbit

None.

Mardiana Ahmad

<https://orcid.org/0000-0002-0798-0457>

Isharyah Sunarno

None.

REFERENCES

- WHO, UNICEF, U. and the W. B. (2015). Trends in Maternal Mortality: 1990 to 2015, Trends in Maternal Mortality: 1990 to 2015. *WHO, Geneva*.
- Aeni, N. (2013). Faktor Risiko Kematian Ibu. *Kesmas: National Public Health Journal*.
<https://doi.org/10.21109/kesmas.v7i10.4>
- Althabe, F., Therrien, M. N. S., Pingray, V., Hermida, J., Gülmezoglu, A. M., Armbruster, D., Singh, N., Guha, M., Garg, L. F., Souza, J. P., Smith, J. M., Winikoff, B., Thapa, K., Hébert, E., Liljestrand, J., Downe, S., Garcia Elorrio, E., Arulkumaran, S., Byaruhanga, E. K., ... Miller, S. (2020). Postpartum hemorrhage care bundles to improve adherence to guidelines: A WHO technical consultation. *International Journal of Gynecology and Obstetrics*.
<https://doi.org/10.1002/ijgo.13028>
- Andreatta, P., Perosky, J., & Johnson, T. R. B. (2012). Two-Provider Technique for Bimanual Uterine Compression to Control Postpartum Hemorrhage. *Journal of Midwifery and Women's Health*.
<https://doi.org/10.1111/j.1542-2011.2011.00152.x>
- Aswar, S., Pamungkas, S. E., & Ulfiani, N. (2019). Determinan Kejadian Pendarahan Postpartum Di Rsud Kabupaten Biak Numfor. *Jurnal Keperawatan Tropis Papua*, 2(1), 73–79.
<https://doi.org/10.47539/jktp.v2i1.53>
- Charles, D., Anger, H., Dabash, R., Darwish, E., Ramadan, M. C., Mansy, A., Salem, Y., Dzuba, I. G., Byrne, M. E., Breebaart, M., & Winikoff, B. (2019). Intramuscular injection, intravenous infusion, and intravenous bolus of oxytocin in the third stage of labor for prevention of postpartum hemorrhage: A three-arm randomized control trial. *BMC Pregnancy and Childbirth*.
<https://doi.org/10.1186/s12884-019-2181-2>
- Chen, J., Cox, S., Kuklina, E. V., Ferre, C., Barfield, W., & Li, R. (2021). Assessment of Incidence and Factors Associated with Severe Maternal Morbidity after Delivery Discharge among Women in the US. *JAMA Network Open*.
<https://doi.org/10.1001/jamanetworkopen.2020.36148>
- Diaz, V., Abalos, E., & Carroli, G. (2018). Methods for blood loss estimation after vaginal birth. In *Cochrane Database of Systematic Reviews*.
<https://doi.org/10.1002/14651858.CD010980.pub2>
- Dinas Kesehatan Provinsi Papua. (2019). *Laporan Kinerja Dinas Kesehatan Provinsi Papua*.
https://dinkes.jatimprov.go.id/userfile/dokumen/LAPKIN_DINKES_JATIM_2019_FINAL.pdf
- Drew, T., & Carvalho, J. C. A. (2021). Pharmacologic Prevention and Treatment of Postpartum Hemorrhage. In *Current Anesthesiology Reports* (Vol. 11, Issue 1).
<https://doi.org/10.1007/s40140-021-00444-7>
- Dunkerton, S. E., Jeve, Y. B., Walkinshaw, N., Breslin, E., & Singhal, T. (2018). Predicting Postpartum Hemorrhage (PPH) during Cesarean Delivery Using the Leicester PPH Predict Tool: A Retrospective Cohort Study. *American*

- Journal of Perinatology*.
<https://doi.org/10.1055/s-0037-1606332>
- Evensen, A., Anderson, J. M., & Fontaine, P. (2017). Postpartum hemorrhage: Prevention and treatment. *American Family Physician*.
- Feduniw, S., Warzecha, D., Szymusik, I., & Wielgos, M. (2020). Epidemiology, prevention and management of early postpartum hemorrhage - a systematic review. In *Ginekologia Polska*.
<https://doi.org/10.5603/GP.2020.0009>
- Green-top Guideline No. 52: Prevention and Management of Postpartum Haemorrhage. (2017). *The Obstetrician & Gynaecologist*.
<https://doi.org/10.1111/tog.12384>
- Habitamu, D., Goshu, Y. A., & Zeleke, L. B. (2019). The magnitude and associated factors of postpartum hemorrhage among mothers who delivered at Debre Tabor general hospital 2018. *BMC Research Notes*, 12(1).
<https://doi.org/10.1186/s13104-019-4646-9>
- Hastuti, T. N. (2018). *Tantangan dan Strategi Menurunkan Angka Kematian Ibu*.
https://www.sdg2030indonesia.org/another-component/media/upload-book/Tri_Hastuti_-_Aisyiyah.pdf
- Hösli, I., & Büchel, J. (2019). Significance of uterotonics for the prevention and treatment of postpartum hemorrhage. In *Gynakologe*.
<https://doi.org/10.1007/s00129-019-4446-2>
- Huang, C., Deng, J., Xu, Y., Wu, H., Peng, C., Wu, L., Ye, J., & Ma, J. (2020). Early age at menarche and risk of postpartum hemorrhage: a retrospective study in Chinese women. *Journal of Maternal-Fetal and Neonatal Medicine*.
<https://doi.org/10.1080/14767058.2020.1784871>
- Indonesian Health Ministry. (2019). Profil Kesehatan Indonesia Tahun 2019 (Indonesian Health Profile 2019). In *Kementrian Kesehatan Republik Indonesia*.
- J.L., S., C., V. D. V., S., R., D., Ø., V., L., M., J., K., E., L., S., J., L., C., G., P., W., B., O., Sorensen, J. L., van der Vleuten, C., Rosthoj, S., Ostergaard, D., LeBlanc, V., Johansen, M., Ekelund, K., ... Ottesen, B. (2015). Simulation-based multiprofessional obstetric anaesthesia training conducted in situ versus off-site leads to similar individual and team outcomes: A randomised educational trial. *BMJ Open*.
- Karakuş, R., & Pulatoğlu, Ç. (2019). Association between postpartum depression and synthetic oxytocin use for postpartum hemorrhage prevention and treatment. *Zeynep Kamil Tip Bulteni*.
- Kemendes RI. (2015). *Pusat Data Informasi Kementerian Kesehatan RI*.
- Kementerian Kesehatan. (2014). *Profil Kesehatan Penyebab Kematian Ibu*.
- Khan, K. S., Wojdyla, D., Say, L., Gülmezoglu, A. M., & Van Look, P. F. (2006). WHO analysis of causes of maternal death: a systematic review. *Lancet*.
[https://doi.org/10.1016/S0140-6736\(06\)68397-9](https://doi.org/10.1016/S0140-6736(06)68397-9)
- Koch, D. M., & Rattmann, Y. D. (2020). Use of misoprostol in the treatment of postpartum hemorrhage: a pharmacoepidemiological approach. *Einstein (Sao Paulo, Brazil)*.
https://doi.org/10.31744/einstein_journal/2020AO5029
- Kochanek, K. D., Murphy, S. L., Xu, J., & Tejada-Vera, B. (2016). Deaths: Final Data for 2014. National vital statistics reports: from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System. In *National vital statistics reports: from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System*.
- Kramer, M. S., Berg, C., Abenhaim, H., Dahhou, M., Rouleau, J., Mehrabadi, A., & Joseph, K. S. (2013). Incidence, risk

- factors, and temporal trends in severe postpartum hemorrhage. *American Journal of Obstetrics and Gynecology*. <https://doi.org/10.1016/j.ajog.2013.07.007>
- L.T., N., I., S., B., S.-P., S., P., I., A.-Z., M., R., A.F., J., S., V., Nyflot, L. T., Sandven, I., Stray-Pedersen, B., Pettersen, S., Al-Zirqi, I., Rosenberg, M., Jacobsen, A. F., & Vangen, S. (2017). Risk factors for severe postpartum hemorrhage: A case-control study. *BMC Pregnancy and Childbirth*.
- Lalonde, A. (2012). Prevention and treatment of postpartum hemorrhage in low-resource settings. In *International Journal of Gynecology and Obstetrics*. <https://doi.org/10.1016/j.ijgo.2012.03.001>
- Lier, H., Von Heymann, C., Korte, W., & Schlembach, D. (2018). Peripartum Haemorrhage: Haemostatic Aspects of the New German PPH Guideline. In *Transfusion Medicine and Hemotherapy*. <https://doi.org/10.1159/000478106>
- McLintock, C. (2020). Prevention and treatment of postpartum hemorrhage: Focus on hematological aspects of management. *Hematology (United States)*. <https://doi.org/10.1182/HEMATOLOG.Y.2020000139>
- Meher, S., Cuthbert, A., Kirkham, J. J., Williamson, P., Abalos, E., Aflaifel, N., Bhutta, Z. A., Bishop, A., Blum, J., Collins, P., Devane, D., Ducloy-Bouthors, A. S., Fawole, B., Gülmezoglu, A. M., Gutteridge, K., Gyte, G., Homer, C. S. E., Mallaiah, S., Smith, J. M., ... Alfirevic, Z. (2019). Core outcome sets for prevention and treatment of postpartum haemorrhage: an international Delphi consensus study. *BJOG: An International Journal of Obstetrics and Gynaecology*, *126*(1). <https://doi.org/10.1111/1471-0528.15335>
- Mengist, W., Soromessa, T., & Legese, G. (2020). Method for conducting systematic literature review and meta-analysis for environmental science research. *MethodsX*. <https://doi.org/10.1016/j.mex.2019.100777>
- Muñoz, M., Peña-Rosas, J. P., Robinson, S., Milman, N., Holzgreve, W., Breyman, C., Goffinet, F., Nizard, J., Christory, F., Samama, C. M., & Hardy, J. F. (2018). Patient blood management in obstetrics: management of anaemia and haematinic deficiencies in pregnancy and in the postpartum period: NATA consensus statement. *Transfusion Medicine*, *28*(1). <https://doi.org/10.1111/tme.12443>
- Muñoz, Manuel, Stensballe, J., Ducloy-Bouthors, A. S., Bonnet, M. P., De Robertis, E., Fonet, I., Goffinet, F., Hofer, S., Holzgreve, W., Manrique, S., Nizard, J., Christory, F., Samama, C. M., & Hardy, J. F. (2019). Patient blood management in obstetrics: Prevention and treatment of postpartum haemorrhage. A NATA consensus statement: A multidisciplinary consensus statement. *Blood Transfusion*. <https://doi.org/10.2450/2019.0245-18>
- Olefile, K. M., Khondowe, O., & M'Rithaa, D. (2013). Misoprostol for prevention and treatment of postpartum haemorrhage: A systematic review. *Curationis*. <https://doi.org/10.4102/curationis.v36i1.57>
- Oyelese, Y., & Ananth, C. V. (2010). Postpartum hemorrhage: Epidemiology, risk factors, and causes. In *Clinical Obstetrics and Gynecology*. <https://doi.org/10.1097/GRF.0b013e3181cc406d>
- Pesut, B., Greig, M., Thorne, S., Storch, J., Burgess, M., Tishelman, C., Chambaere, K., & Janke, R. (2020). Nursing and euthanasia: A narrative review of the nursing ethics literature. In *Nursing Ethics*. <https://doi.org/10.1177/0969733019845127>

- Prevention and Management of Postpartum Haemorrhage: Green-top Guideline No. 52. (2017). *BJOG: An International Journal of Obstetrics and Gynaecology*. <https://doi.org/10.1111/1471-0528.14178>
- Profil Kesehatan Provinsi Papua*. (2012).
- Rosida, D., Hermayanti, Y., & S, S. (2019). Interventions and Management of Postpartum Hemorrhage: A Literature Review. *Journal of Nursing Care*. <https://doi.org/10.24198/v2i2.18242>
- Ruiz sánchez, E., Peinado Rodenas, J., Gil Martínez-Acacio, L., Arones Collantes, M., Villar García, M., García de la Torre, J. P., & Amezcua Recover, A. N. (2021). Uterine necrosis. A rare complication of embolisation due to post-partum haemorrhage. *Journal of Gynecology Obstetrics and Human Reproduction*. <https://doi.org/10.1016/j.jogoh.2020.101773>
- Ruysen, H., Shabani, J., Hanson, C., Day, L. T., Pembe, A. B., Peven, K., Rahman, Q. S. ur, Thakur, N., Shirima, K., Tahsina, T., Gurung, R., Tarimo, M. N., Moran, A. C., Lawn, J. E., Rahman, A. E., Zaman, S. Bin, Ameen, S., Hossain, T., Siddique, A. B., ... Cousens, S. (2021). Uterotonics for prevention of postpartum haemorrhage: EN-BIRTH multi-country validation study. *BMC Pregnancy and Childbirth*, 21. <https://doi.org/10.1186/s12884-020-03420-x>
- Shaffril, H. A. M., Samah, A. A., & Samsuddin, S. F. (2021). Guidelines for developing a systematic literature review for studies related to climate change adaptation. In *Environmental Science and Pollution Research*. <https://doi.org/10.1007/s11356-021-13178-0>
- Shahbazi Sighaldehy, S., Nazari, A., Maasoumi, R., Kazemnejad, A., & Mazari, Z. (2020). Prevalence, related factors and maternal outcomes of primary postpartum haemorrhage in governmental hospitals in Kabul-Afghanistan. *BMC Pregnancy and Childbirth*. <https://doi.org/10.1186/s12884-020-03123-3>
- Simpson, A. I. F., Gerritsen, C., Maheandiran, M., Adamo, V., Vogel, T., Fulham, L., Kitt, T., Forrester, A., & Jones, R. M. (2022). A Systematic Review of Reviews of Correctional Mental Health Services Using the STAIR Framework. In *Frontiers in Psychiatry*. <https://doi.org/10.3389/fpsy.2021.747202>
- Susiana, S. (2019). *Angka Kematian Ibu : Faktor Penyebab Dan Upaya Penanganannya*.
- Tunçalp, Ö., Souza, J. P., & Gülmezoglu, M. (2013). New WHO recommendations on prevention and treatment of postpartum hemorrhage. *International Journal of Gynecology and Obstetrics*. <https://doi.org/10.1016/j.ijgo.2013.06.024>
- Ummah, N., Ngadiyono, N., & Ulfiana, E. (2018). FAKTOR RESIKO PENYEBAB PERDARAHAN POSTPARTUM DI PUSKESMAS PAMOTAN KABUPATEN REMBANG. *JURNAL KEBIDANAN*. <https://doi.org/10.31983/jkb.v7i15.3249>
- van de Ven, J., Fransen, A. F., Schuit, E., van Runnard Heimel, P. J., Mol, B. W., & Oei, S. G. (2017). Does the effect of one-day simulation team training in obstetric emergencies decline within one year? A post-hoc analysis of a multicentre cluster randomised controlled trial. *European Journal of Obstetrics and Gynecology and Reproductive Biology*. <https://doi.org/10.1016/j.ejogrb.2017.07.020>
- Weeks, A. (2015). The prevention and treatment of postpartum haemorrhage: What do we know, and where do we go to next? In *BJOG: An International Journal of Obstetrics and Gynaecology*. <https://doi.org/10.1111/1471->

0528.13098
Zaineb, S., Akbar, A., Ikram, M., Mahboob,
S., Mahmood, A., & Khan, A. W. (2021).
Incidence and risk factors for maternal
surgical site infection after cesarean

section. *The Professional Medical
Journal*.
[https://doi.org/10.29309/tpmj/2021.28.1
0.6187](https://doi.org/10.29309/tpmj/2021.28.10.6187)

Cite this article as: Bitbit, Y.R., Ahmad, M., Sunarno, I. (2022). Prevention and treatment of postpartum hemorrhage: A literature review. *Nurse and Health: Jurnal Keperawatan*, 11 (1), 124-136. <https://doi.org/10.36720/nhjk.v11i1.304>