POST-PARTUM HEMORRHAGE AND ANEMIA AS ITS MODIFIABLE RISK FACTOR: A LITERATURE REVIEW

Mekar Dwi Anggraeni, Rahmi Setiyani, Nina Setiawati

Department of Nursing, Faculty of Health Sciences, Universitas Jenderal Soedirman

ABSTRACT

Maternal mortality is an indicator of a country's health status. Postpartum hemorrhage is the main cause of maternal mortality. Understanding the postpartum hemorrhage risk factors useful to develop strategy in order to reduce maternal mortality. The aim of this study was to find modifiable postpartum hemorrhage's risk factors. This study used 6 steps which include formulating the research questions and objectives, searching the extant literature, screening for inclusion, assessing the quality of primary studies, extracting data, and analyzing data. The article was searched from Google Scholar and NCBI databases using bilingual keywords: "faktor-faktor, perdarahan postpartum, risk factors, and postpartum hemorrhage". There were 1736 papers founded and only 14 articles met the inclusion criteria and included in the analysis. This review revealed that anemia, age, parity, birth passage laceration, obstetric history, multiple pregnancy, placental retention, prolonged labor, atonia uteri, pre-eclampsia, pregnancy induced hypertension, section caesarian, placental complication, history of post-partum hemorrhage, episiotomy, high neonatal birth weight. Anemia is the only modifiable risk factor which may be prevented by nurses.

Key words: Postpartum hemorrhage, risk factors, anemia

ABSTRAK

Angka kematian ibu merupakan salah satu indikator derajat kesehatan di suatu negara. Perdarahan setelah melahirkan merupakan penyebab utama kematian ibu. Mengetahui faktor penyebab perdarahan setelah melahirkan bermanfaat untuk pengembangan strategi penurunan AKI sesuai masalah yang ada. Tujuan dari penelitian ini adalah untuk menemukan faktor risiko perdarahan postpartum yang bisa dimodifikasi oleh perawat. Penelitian ini menggunakan 6 langkah yang meliputi merumuskan pertanyaan dan tujuan penelitian, mencari literatur yang ada, skrining sesuai inklusi, menilai kualitas artikel, mengekstraksi data, dan menganalisis data. Artikel diperoleh dari database Google Cendekia dan NCBI menggunakan kata kunci dwibahasa: "faktor, perdarahan postpartum, risk factors, and postpartum hemorrhage". Ada 1736 artikel yang ditemukan dan hanya 14 artikel yang memenuhi kriteria inklusi dan dimasukkan dalam analisis. Hasil literature review menunjukkan bahwa anemia, usia, paritas, laserasi kelahiran, riwayat obstetric, kehamilan kembar, retensi plasenta, persalinan lama, atonia uterus, pre-eklampsia, hipertensi dalam kehamilan, operasi caesar, komplikasi plasenta, riwayat perdarahan postpartum, episiotomi, berat badan lahir bayi. Anemia adalah satu-satunya faktor risiko yang dapat dimodifikasi dan dapat dicegah oleh perawat.

Keywords: perdarahan postpartum, faktor resiko, anemia

Corresponding Author : Mekar Dwi Anggraeni
Email : mekar.dwi@unsoed.ac.id

BACKGROUND

Maternal Mortality Rate (MMR) refers to the number of maternal deaths during pregnancy or within a period of 42 days after the end of pregnancy due to all causes associated with or aggravated by pregnancy or treatment but not caused by an accident / injury (World Health Organization, 2015). Every day, there were 810 women died during pregnancy and childbirth, moreover, 94% of maternal deaths occur in developing countries (WHO, 2019). MMR in Indonesia is the second highest in the South East region (ASEAN, 2017). Based on the results of the Indonesian Demographic and Health Survey (IDHS) showed that MMR in Indonesia was 305 per 100,000 live births (Indonesia, 2018). This is still far from the Sustainable Development Goals which target of MMR is 126/100,000 live births.

Maternal deaths caused by several factors as a result of complications develop during pregnancy and childbirth. The most maternal death was caused by severe bleeding after childbirth, infections, high blood pressure, birth complications, and unsafe abortion (WHO, 2019). The maternal death's influencing factors in Indonesia are quite similar with worldwide causes. According to Indonesia Ministry of Health (Kementrian Kesehatan, 2017), the causes of MMR in Indonesia are postpartum hemorrhage, eclampsia, pre-eclampsia, infections, and abortion. Almost all previous studies (Abdella, 2010; Haeri & Dildy III, 2012; Main, 2010; Montgomery, Ram, Kumar, Jha, & Collaborators, 2014) highlighted postpartum hemorrhage as the primary factor of MMR and the majority of postpartum bleeding may be prevented (Lalonde & Committee, 2012; Rajan & Wing, 2010; Tunçalp, Souza, & Gülmezoglu, 2013) .

According to WHO (2012), several strategies to prevent postpartum hemorrhage, such as using uterotonics, initial fluid resuscitation with isotonic crystalloids, cord management, uterine massage, and active management at the third labor. Bimanual uterine compression, external aortic compression, and the use of non-pneumatic anti-shock garments can be used before the substantive care is available (WHO, 2012). Nevertheless, the number of postpartum hemorrhage is still high particularly in developing countries. Finding the most influencing modifiable factors of postpartum hemorrhage will be useful.

Nurse should focus on a modifiable risk factors of postpartum hemorrhage in order to develop an appropriate preventive program. Understanding the influencing factors of postpartum hemorrhage will help nurse to provide appropriate care to prevent postpartum hemorrhage. There were several previous studies evaluated factors influenced postpartum hemorrhage, however majority of them focus on non-modifiable variables. There are no previous studies reviewing modifiable factors of postpartum hemorrhage. Thus, a literature review focus on modifiable variable using recent study results is highly needed.

PURPOSE

This literature review aimed to explore modifiable factors influencing postpartum hemorrhage.

METHODS

The literature review process is several steps. As explained Templier and Paré (2015), there are six general steps involved in conducting a review article. These 6 steps which include formulating the research questions and objectives, searching the extant literature, screening for inclusion, assessing the quality of primary studies, extracting data, and analyzing data. This literature review focuses on information related to factors that contribute to postpartum hemorrhage. This literature review is carried out using a Scoping Review approach where is inclusion and exclusion criteria must be established to help researchers eliminate studies that are not aligned with the research questions (Paré & Kitsiou, 2016). It is also recommended that at least two independent coders review abstracts yielded from the search strategy and then the full articles for study selection (Daudt, Mossel, & Scott, 2013). The inclusion criteria were correlation research design, the last ten years of publication, and have

a full text. There are 5 steps in a Scoping Review approach which are determining the literature topic, finding and searching sources, choosing the most relevant sources, organizing and analyzing, and lastly summarizing (Widiasih et al., 2019).

The strategy for searching research articles is done comprehensively through a database of research journals from Google Scholar and NCBI databases. The keywords used were bilinguals: Indonesia and English, including "faktor-faktor, perdarahan postpartum, risk factors, and postpartum hemorrhage". A total of 1736 papers from 2009-2019 were retrieved. However, only 14 articles met the inclusion criteria and included in the analysis. After selecting the articles, the next step was analyzing the content which includes method, sample and results. The result is presented in a table. Next was identifying and grouping the similar findings. The last was making a summary.
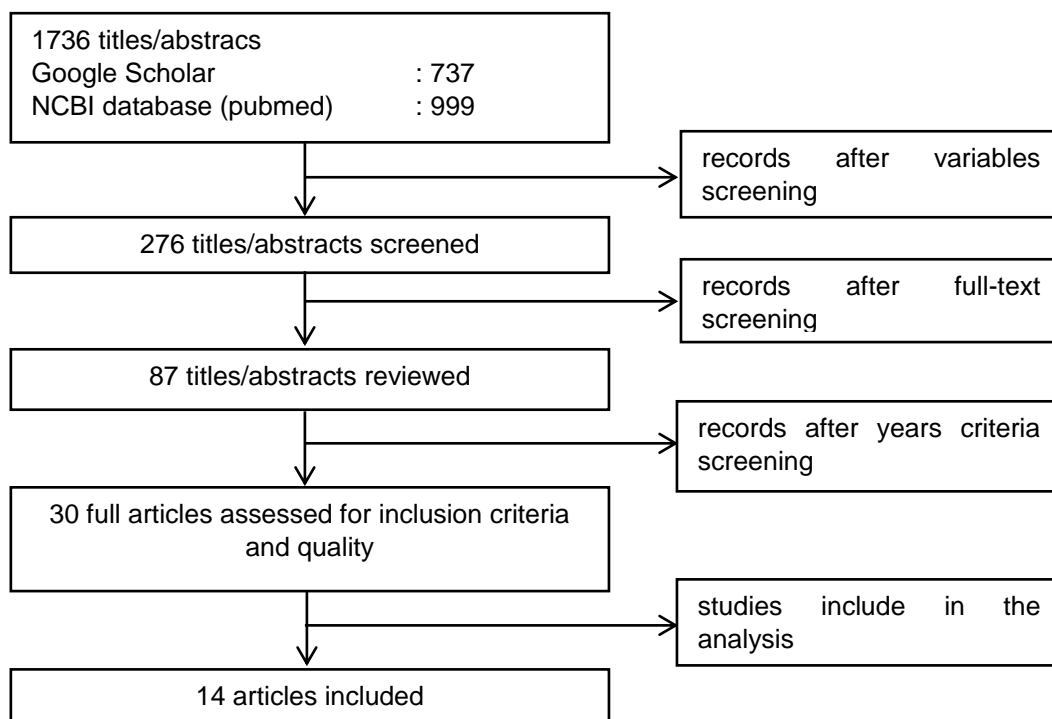
RESULTS

There are 14 articles published in the last ten years (2009-2018) included in the review. Majority of the studies used a case control (retrospective cohort) design (n=12). Only one study by Ononge, Mirembe, Wandabwa, & Campbell (2016) used a prospective cohort design and one study by Wetta et al. (2013) used a double blind randomized controlled trial design. In regards to study setting, 6 studies were conducted in developed countries, including Norway (Nyflot et al., 2017), US (Kramer et al., 2013), England (Wetta et al., 2013), Italia (Biguzzi et al., 2012), New Zealand (Davis et al., 2012), and French (Driessen et al., 2011). While 8 other studies were conducted in developing countries including Indonesia (Fatimah, 2015; Megasari, 2013; Satriyandari & Hariyati, 2017; Ummah, Ngadiyono, & Ulfiana, 2018; Wardani, 2017; Yuliyati, 2017), Uganda (Ononge et al., 2016) and Thailand (Rueangchainikhom, Srisuwan, Prommas, & Sarapak, 2009). Sample size was quite diverse across studies between 69 to 8,571,209 women or deliveries due to differences in the research method. Some studies used samples from one hospital/ health facility only, for certain period of time (months until years). However, some other used > 1 hospitals/ health facilities, even two studies used nationwide data (population based studies) (Driessen et al., 2011; Kramer et al., 2013).

In regards to outcome, six studies only focused in the occurrence of

postpartum hemorrhage in general (PPH vs non-PPH). Other studies have gone further to specifically looked at its severity (Biguzzi et al., 2012; Davis et al., 2012; Driessen et al., 2011; Kramer et al., 2013; Nyflot et al., 2017; Ononge et al., 2016) or its timing (primary or secondary) (Fatimah, 2015). Some studies used criteria of blood loss ≥500ml (vaginal delivery) or ≥1,000ml (caesarean delivery) to define PPH, and ≥1,000ml or ≥1,500ml or change in hemoglobin of 4 g/dL or more for severe PPH. Some other used ICD-9 criteria or the need of treatment (eg. blood transfusion) to define it. The incidence of PPH was quite varies across studies between 1.98% to 24% (Biguzzi et al., 2012; Ononge et al., 2016; Rueangchainikhom et al., 2009). While severe PPH occurred in 0.3% up to 7% of all deliveries (Biguzzi et al., 2012; Davis et al., 2012; Nyflot et al., 2017; Ononge et al., 2016; Wetta et al., 2013) or 20.9% of women with PPH (Driessen et al., 2011).

Study or exposure variables in all the studies consisted of a set of potential risk factors for post-partum hemorrhage. In general, the study variables can be divided into three large categories, 1) unmodifiable risk factors (before pregnancy), 2) risk factors before labor and delivery, and 3) risk factors during labor and delivery. The explanation of each risk factors were presented as follows.

Unmodifiable risk factors refer to variables which can't or less possibly to be altered or changed since it was most likely to already exist before the pregnancy begin. The factors included maternal age<20 or >35 years old (Fatimah, 2015; Kramer et al., 2013; Megasari, 2013; Ummah et al., 2018; Wardani, 2017), parity 1 and > 3 (Biguzzi et al., 2012; Driessen et al., 2011; Fatimah, 2015; Megasari, 2013; Satriyandari & Hariyati, 2017; Ummah et al., 2018; Wardani, 2017; Yuliyati, 2017), inter pregnancy interval < 2 or > 5 years (Wardani, 2017; Yuliyati, 2017), history of PPH (Driessen et al., 2011; Nyflot et al., 2017; Wardani, 2017), history of SC (Driessen et al., 2011), history of spontaneous abortion (Yuliyati, 2017), poor obstetric history (Fatimah, 2015; Yuliyati, 2017), ethnicity (Wetta et al., 2013), low education level (Megasari,

2013), and working status (Megasari, 2013).

Second category is health condition during pregnancy both mother and fetus. Some of them are treatable, but some others may not. Modifiable risk factors of postpartum hemorrhage were antenatal care <4 times (Megasari, 2013), anemia (Biguzzi et al., 2012; Driessen et al., 2011; Fatimah, 2015; Megasari, 2013; Nyflot et al., 2017; Satriyandari & Hariyati, 2017; Ummah et al., 2018; Wardani, 2017; Yuliyati, 2017), PIH (Rueangchainikhom et al., 2009), pre-eclampsia or HELLP syndrome (Kramer et al., 2013; Nyflot et al., 2017; Wetta et al., 2013), HIV positive sero-status (Ononge et al., 2016), and obesity (Wetta et al., 2013). While, less modifiable factors were including, uterine fibroma (Kramer et al., 2013; Nyflot et al., 2017), anticoagulant medication (Nyflot et al., 2017), multiple pregnancy (Kramer et al., 2013; Nyflot et al., 2017; Ononge et al., 2016; Rueangchainikhom et al., 2009; Wetta et al., 2013), placenta previa (Kramer et al., 2013; Rueangchainikhom et al., 2009; Yuliyati, 2017), CPD (Rueangchainikhom et al., 2009), abnormal presentation (Rueangchainikhom et al., 2009), and macrosomia (Biguzzi et al., 2012; Ononge et al., 2016; Rueangchainikhom et al., 2009).

The third category is potential factors during labor and delivery related to postpartum hemorrhage. The risk factors were (eg. prolonged labor (Driessen et al., 2011; Ummah et al., 2018; Wardani, 2017), placental complication/ retention (Biguzzi et al., 2012; Fatimah, 2015; Nyflot et al., 2017; Rueangchainikhom et al., 2009), assisted delivery (Kramer et al., 2013; Nyflot et al., 2017), SC delivery (Kramer et al., 2013; Ononge et al., 2016), induction of labor (Rueangchainikhom et al., 2009; Satriyandari & Hariyati, 2017; Wetta et al., 2013), vaginal laceration (Driessen et al., 2011; Fatimah, 2015; Kramer et al., 2013; Rueangchainikhom et al., 2009), uterine rupture (Kramer et al., 2013), uterine atony (Nyflot et al., 2017), episiotomy (Biguzzi et al., 2012; Driessen et al., 2011), amnionitis (Kramer et al., 2013; Wetta et al., 2013), and active management of labor (Davis et al., 2012).

Anemia is founded in majority of the study becoming a significant modifiable risk factor influencing postpartum hemorrhage (9 out of 14).

DISCUSSION

This literature review determined factors influencing postpartum hemorrhage. Regarding non-modifiable risk factors, the previous studies reported that maternal demographic's characteristics, such as age, parity, inter pregnancy interval, history of PPH, history of SC, history of spontaneous abortion, poor obstetric history, ethnicity, education, and working status were significantly related to postpartum hemorrhage. Similarly, previous studies results reported that maternal characteristics were significantly associated with PPH (Durmaz & Komurcu, 2018; Fukami et al., 2019).

Health condition during pregnancy both mother and fetus were significantly correlated with PPH. The review found that some modifiable risk factors of PPH were number of antenatal care, anemia, pre-eclampsia or HELLP syndrome, HIV positive sero-status, and obesity. While, less modifiable factors were including, uterine fibroma, anticoagulant medication, multiple pregnancy, placenta previa, CPD, abnormal presentation, and macrosomia. This finding is consistent with a study revealed that maternal diseases before and during pregnancy may causes PPH (Ononge et al., 2016). Similarly, one previous study reported obese women were more likely to experience PPH than those with normal weight women (Blomberg, 2013).

The literature also revealed that anemia become a significant modifiable risk factor contributing to postpartum hemorrhage. Anemia was defined as hemoglobin level <11gr/dl. Some studies provided specific information regarding the timing (eg. at booking, trimester III), but some other didn't. Anemia was found to be significantly associated to PPH with OR range from 1.8 to 16.97. Even, a study found that anemia was the greatest risk factor for PPH among other risk factors (Driessen et al., 2011; Nyflot et al., 2017; Wardani, 2017). The factor was really

potentially modifiable. Study by Biguzzi et al. (2012) found that the odds ratio of PPH was 0.86 for each 1 gr/dL increase in ante-partum hemoglobin. Thus, intervention to prevent anemia during pregnancy would be promising as a strategy to lowering the risk of PPH.

Anemia during pregnancy have a large impact on mother, fetal, and child's growth and developments in the future. Anemia among pregnant women have significant associations with postpartum bleeding, perinatal death (Nair et al., 2015), uterine or placental bleeding, gastrointestinal bleeding, peripartum blood loss, and higher risk for peripartum blood transfusion (Breymann, 2015). Furthermore, anemia during pregnancy also affect fetal and child's growth and developments. Anemia during pregnancy cause low infant's cognitive and motor development (Mireku et al., 2016), low iron stores of newborn (Terefe, Birhanu, Nigussie, & Tsegaye, 2015), anemia in infant and young children (Abu-Ouf & Jan, 2015), low birth weight, pre-term birth, perinatal mortality, neonatal mortality (Rahman et al., 2016), small for gestational age babies (Nair et al., 2015), infant's anthropometrics and infant's neurobehavioral disorders (Menon et al., 2016), intra uterine growth retardation, prematurity, feto-placental miss ratio (Breymann, 2015), and child mortality (Scott, Chen-Edinboro, Caulfield, & Murray-Kolb, 2014).

The limitation of this study are including only full text paper downloaded freely, written in English and Bahasa Indonesia, and published in Google Scholar and NCBI databases. Future studies should extend selected paper into subscription papers and unpublished research results.

CONCLUSION AND RECOMMENDATION

This literature review highlighted that anemia was the most potential modifiable factor to prevent PPH. Nurse should put high risk women due to several maternal characteristics and health conditions into consideration. Anemia prevention, early detection, and

medication should be the highest priority of maternal mortality prevention.

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