The Effectiveness of Obstetric Emergency Interventions in Enhancing Mother and Fetal Well-Being: A Systematic

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Abstract

Background: An obstetric emergency is a condition that can threaten the life of a pregnant woman and the fetus, which occurs during pregnancy, childbirth and the puerperium. This review aimed to analyze the effectiveness of emergency obstetric interventions based on previous studies. Methods: the study was a systematic review carried out in seven stages through three databases from Ebsco, Pubmed and Proquest. The keywords used were (pregnant women) AND (emergency intervention) AND (nursing OR nurse) NOT (systematic review). The inclusion criteria in this study were: full-text, peer review, English, articles for the last five years, subject: nursing, nurses, emergency medical care, nursing care, emergency services, and document type: articles. Based on the search database, 10,496 papers were obtained, 733 documents that matched the inclusion criteria and seven papers that fit the theme were obtained. Results: Based on the initial stage of the literature search, four interventions were adequate, including ACLS training, multidisciplinary management, making coloured ribbons for premature pregnancy detection, and maternal near-miss detection tools. Interventions with less effective based on statistical test results were supportive care, home visits with IPV (intimate partner violence) interventions, and administration of CPR, defibrillation, ETT insertion, and administration of epinephrine. Conclusions: Nurses still carry out a few emergency developmental interventions. It is necessary to develop engagement interventions related to maternal emergencies to improve the welfare of mothers and babies. Further study is needed to strengthen the evidence base of innovative interventions for specific obstetric emergencies.

Keywords: Fetal well-being, Obstetric emergencies, Women's Health

Introduction

The World Health Organization (WHO) website announced that the maternal mortality rate is very high, namely 287.000 in 2020 (World Health Organization, 2023). The causes of death are bleeding, hypertension, infection, abortion, prolonged labour, and others (Kementerian Kesehatan RI [Health Ministry of Indonesia], 2018). Additionally, according to a study by Darmawati et al. (2020) anaemia is the one factor of maternal death. Other causes are indirect causes of maternal death include cancer, kidney disease, heart disease, and tuberculosis. When these diseases are not treated, they will result in obstetric emergencies. An obstetric emergency is a condition that can threaten a person's life; this can occur during pregnancy, childbirth, and postpartum (Leta et al., 2022). Many diseases and disorders during pregnancy can endanger the safety of the mother and the baby to be born (Taras et al., 2022). This emergency must be treated immediately because it will cause death in the mother and newborn.

Maternal emergencies can threaten not only the mother but also the baby. Various conditions can be called maternal emergencies. Research states that maternal emergencies can be interrupted by ectopic pregnancy, vaginal bleeding during pregnancy, postpartum bleeding, pregnancy with stroke, preeclampsia, trauma, shoulder dystocia, etc (Cahyanti et al., n.d.; Dahlke et al., 2017; Lawani et al., 2013; Sevene et al., 2021; Young & White, 2019). Based on a study conducted by Dahlke, Bhalwal, and Chauhan (2017), shoulder dystocia and postpartum haemorrhage are the two cases that most often result in obstetric emergencies. These cases can occur in all maternal periods, both prenatal, intranatal, and postnatal. These two cases require rapid assessment and management to avoid morbidity and mortality (Leta et al., 2022). If left untreated, maternal emergencies can threaten the welfare of the mother and baby. According to WHO, maternal well being is healthy condition not only physical aspect, but also pshycologic aspect of mothers during prenatal, childbirth, and post-partum period (World Health Organization, 2023). Physiological and psychological aspects can affect fetal well being (Walsh et al., 2014). To improve maternal and fetal well being and prevent morbidity and mortality, it must be treated with effective interventions. Therefore, health workers should improve the quality of healthcare especially on maternal (Kabo et al., 2019). The interventions that can be carried out include home visit, supportive care, multidiscipline role, delivered tool for preterm detection, and emergency management.

One of the interventions that can be done by nurses in handling emergency cases is to do triage. Triage is a process of selecting patients based on priority, so that intervention can be given immediately and improve patient safety (Ruhl et al., 2020). Research conducted by Mostafa et al. (2023) states that triage training for nurses can increase the knowledge and confidence of nurses in the post-training period. With triage, nurses are expected to be able to sort patients based on the severity of their condition and be able to provide interventions according to set priorities (Wibowo, 2020). A study conducted by Zewde (2022) states that delays in obtaining health services and referrals, triage inaccuracies, and delays in receiving emergency treatment are associated with severe maternal outcomes. So various interventions are needed to overcome emergency obstetric cases. Nurses have a role in developing or innovating nursing interventions to improve the quality of nursing care and patient satisfaction (McMillian-Bohler & Richard-Eaglin, 2021). The development of nursing interventions can be carried out by conducting literature reviews and research. This literature review aims to analyze the effectiveness of emergency obstetric care interventions based on previous research.

Research Methods

P (Population)	I (Intervention)	C (Comparison)	O (Outcome)
Pregnant woman (prenatal, intranatal, postnatal)	**Emergency intervention**	**-**	**Significance level of intervention**

This systematic review uses the PICO method to determine the population, intervention, comparison, and outcome. From the table above, it is found that the population is pregnant women (prenatal, intranasal, postnatal), the intervention is an emergency intervention, and the comparison component is not used because the purpose of this review is not to compare one intervention to another, and the outcome component is the level of significance of the existing interventions.

Research Design

The design used in this review is a Systematic Review with stages according to Campbell et al. (2020).

Inclusion and Exclusion criteria

The inclusion criteria used were full-text, peer review, English, articles from the last five years, subject: nursing, nurses, emergency medical care, nursing care, emergency services, dan document type: article.

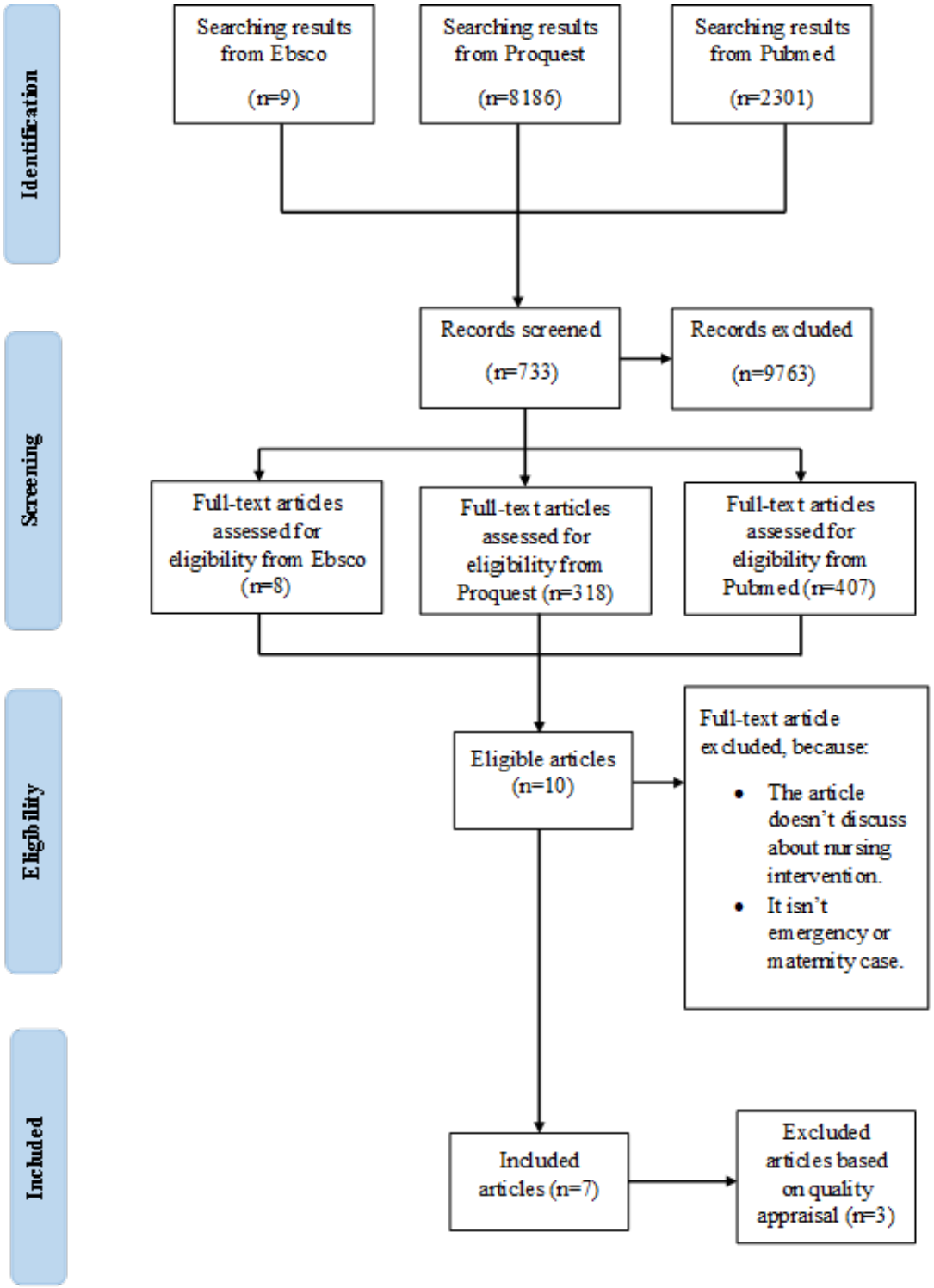
Searching Strategy

Article searches were conducted through three databases: Ebsco, Pubmed and Proquest. An electronic data search was conducted in May 2019. Articles were searched through three stages according to the presence of three populations being searched, namely pregnant, childbirth and postpartum women. The keywords used were (pregnant women) AND (emergency intervention) AND (nursing OR nurses) NOT (systematic review). Other keywords (intranatal or labour or labour or birth delivery) AND (emergency intervention) AND (nursing OR nurses) NOT (systematic review). Next, (Postpartum) AND (emergency intervention) AND (nursing OR nurses) NOT (systematic review). The search found 10.496 articles.

Data Extraction

The data extraction process used the PRISMA flowchart diagram. The first step is the identification of articles from the database used, which in this review used three databases, PubMed, CINAHL, and Proquest and a total of 10,496 articles were obtained. The articles were screened based on the full-text category and 10 articles were selected again based on eligibility, so that the final result was seven articles.

PRISMA Flowchart Diagram



Data synthesis

Articles that match the inclusion criteria obtained a total of 733 articles. Then the author reads the title of the paper and filters the articles according to the theme of the article, namely emergency perinatal intervention. Finally, there were seven articles that match the theme of the literature review.

Results

Based on the search, seven articles were found related to emergency perinatal interventions. Four of the seven articles included prenatal, about how to prevent emergencies in at-risk pregnancies, and three about postpartum troubles. Table 1 describes the content of each article.

Table 1. Emergency Interventions in Perinatal Periods

No	Title and author	Country	Design	Sample	Intervention	Result
1.	Effect of addition of an intimate partner violence intervention to a nurse home visitation program on maternal quality of life a randomized clinical trial Author: Jack et.al. (2019)	USA	Single-blind randomized clinical trial	492 women (16-18 years old)	Home visit with IPV Intervention (Intimate Partner Violence) Intervention group: Nurses obtained education about IPV and deliver standard home visit nursing program and IPV intervention specifically developed to identify women who exposed from IPV. Control group: Nurses visited participants regularly from early pregnancy to the child's second birthday.	There was no statistically significant difference between the intervention and control groups.
2.	The effects of intrapartum supportive care on fear of delivery and labor outcomes: a single-blind randomized controlled trial Author: Isbir and Sercekus (2017)	Turki	Single-blind randomized controll ed trial	72 women giving birth	Supportive Care Intervention group: The intervention group was provided with continuous supportive care during labour and delivery, as recommended by Adams and Bianchi (2008) and The Royal College of Midwives (2018). Control group: Participants in the control group received routine care that would normally be provided at the hospital.	There is a difference, although not significant, between the intervention and control groups.
3	Developing a systematic approach to Obstetric Emergencies Author: Green, Rider, Ratcliff, and Woodring (2015)	USA (Washington D.C)	Survey before and after intervention	67 participants	ACLS Training 1st day: Participants complete Basic Life Support (BLS) and ACLS competencies. 2nd day: Exercise simulations and observations are completed in the patient room using mannequins, case scenarios and emergency kits.	There was an improvement in the confidence and competence of nurses compared to before the intervention.

4.	**Multidisciplinary Management of Maternal Diaphragmatic Hernia** **Author: Yukihiro et.al. (2014)**	**USA (California)**	**Case study**	**1 pregnant woman who suffered from diaphragmatic hernia**	**Multidiscipline Management** **Programme: Team leaders for maternity and ICU nurses develop an emergency to-do list to monitor the mother and newborn up to 34 weeks gestation when the second surgery is planned. Weekly multidisciplinary meetings are held to discuss maternal and fetal progress, update treatment plans and identify intervention.**	**All multidisciplinary teams communicate on patient care to obtain good results for patients.**
5	**A Color-Coded Tape for Uterine Height Measurement: A Tool to Identify Preterm Pregnancies in Low Resource Settings** **Author: Althabe et al. (2015)**	**1st phase: Kongo, India and Pakistan** **2nd phase: Argentin a, India, Pakistan, and Zambia**	**Tool development and prospective cross-se ctional study**	**1029 pregnant women**	**Colourful tape tool development for premature pregnancy detection. The ribbon is made of non-tear and non-stretchable paper, produced centrally by the Global Network Data Coordination Center (DCC), Research Triangle Institute (RTI). The band is divided into three parts, the yellow part corresponds to <24.0 weeks of gestation, the red piece to 24 to 36 weeks, and the green part to >36 weeks.**	**The tape is effective in identifying pregnancy at 20,0-35,6 weeks.**
6.	**Severe maternal outcomes in Eastern Ethiopia: Application of the adapted maternal near miss tool** **Author: Tura et al. (2018)**	**Ethiopia**	**Prospec tive cohort study**	**1054 women**	**Maternal detection use tool developed based on the maternal instrument near miss tool from WHO.** **The detection uses MNM from WHO tools: The tool can identify 128 MNM cases and 26 deaths. The detection uses Sub-Saharan Africa: The tool can identify 594 MNM cases and 28 deaths.**	**MNM tool identification which WHO adopts can detect pregnant women who suffer from MNM with a lesser mortality rate.**
7.	**A 32-year-old woman with postpartum cardiac arrest** **Author: Taylor and Taylor (2018)**	**USA (Michigan)**	**Case Review**	**1 post-partum woman with cardiac arrest**	**The patient receives treatments such as CPR, defibrilation, ETT, and epinephrine 1 mg.**	**The patient passed away after 4 hours received resuscitation because the patient had re-cardiac arrest and disseminated intravascular coagulopathy (DIC).**

Discussion

Based on previous research, this review analyses the effectiveness of emergency obstetric care interventions. The literature search found four adequate interventions: ACLS training, multidisciplinary management, making coloured bands to measure uterine height, and detecting maternal near-miss tools. The results of statistical tests, less effective interventions were supportive care, home visits with IPV (intimate partner violence), and administration of CPR, defibrillation, ETT insertion, and epinephrine administration. But, other interventions such as ACLS training, multidiscipline management, and using detection tools were effective.

Programs

Based on the literature, there are four interventions in the form of programs: nurse home visits with additional IPV interventions, intrapartum supportive care, ACLS training, and multidisciplinary management. The first program is nurse home visits with other IPV interventions from the research by Jack et al. (2019). The research results with this program showed no difference between standard nurse home visits and nurse home visits with the addition of IPV intervention. This IPV intervention consists of a safety assessment or case assessment to identify IPV exposure and empathetic response to IPV, risk assessment, empowerment, discussion of safety options and mental health assessments, medication use, and readiness to define a care plan tailored to the woman's needs focusing on safety, awareness of IPV effects, self-efficacy, and system navigation. Navigating this system involves actively identifying, referring, and facilitating IPV.

Based on research from Goldfeld et al. (2022) involved 722 mothers and divided them into two groups, of which 363 women were in the intervention group, and 359 other women were in the control group. This study's results indicate significant benefits from the home visit program on the physical and psychological well-being of mothers and babies as well as relationships with other family members. Home visits are essential to be carried out by health workers because pregnancy and postpartum are vulnerable times for mothers and babies. There is a need for a home visit program that aims to improve the welfare of mothers and their babies so that their health conditions can be monitored regularly (Olds et al., 2014).

The second intervention in the form of a program is supportive care for women giving birth, according to research by Isbir and Sercekus (2017). The intervention group was assigned continuous supportive care during labour as recommended by Adams and Bianchi (2008) and The Royal College of Midwives (2018) did research related to routine care. The intervention began on admission to the hospital until the end of the third stage of labour. The study showed no significant difference between women receiving supportive care and those receiving standard routine care services from the hospital.

A study involved 50 women in the intervention group and 50 women in the control group, where the intervention group received educational support interventions. The results of this study show that the welfare of the mother and fetus is more optimal in the intervention group (Khalili et al., 2020). Supportive care plays a vital role for women both in pregnancy, childbirth and postpartum. This support can be obtained from the closest people, such as spouses, parents, friends, and health workers. These support interventions can also be carried out by promoting and maintaining women's health and welfare, such as conducting screening, assessing risk factors, planning support for families, immunization, health counselling, and education to improve health (Office of the Surgeon General (OSG), 2020).

The third program is ACLS training Green et al. (2015) research. Research shows that this training effectively increases nurses' confidence in their readiness to provide nursing care to patients. This training was carried out over two days; where on the first day, the nurses received training on basic life support, and the second day was in the form of case simulation exercises with mannequins.
The fourth program is multidisciplinary management from research by Yukihiro et al. (2014). Studies say that in implementing

interdisciplinary management, teams communicating and working together in treatment can produce good patient results—however, the analysis needed to explain the form of control implemented.
Another study was conducted on 96 nurses who attended ACLS. The results were compared with the previous year's ACLS score. The results of his research reflect the satisfaction and confidence of nurses in completing the algorithm set by the American Heart Association (AHA), as well as nurses attending traditional ACLS versus obstetric-based ACLS (ACLS-OB) classes. Nurses who completed the ACLS-OB obtained greater scores when performing the ACLS MegaCode algorithm (Roth et al., 2015). ACLS training for health workers is essential for maternal life-saving in emergency cases. Faster action from trained health providers can improve health outcomes and reduce mortality.

Tools

The results of the literature get an article that discusses the effectiveness of tools in the maternity sphere, namely coloured bands, for detecting preterm pregnancies. Studies show these coloured bands effectively measure gestational age from 20.0 to 35.6 weeks. The band is divided into three sections, the yellow section corresponding to <24.0 weeks of gestation, the red area to 24 to 36 weeks, and the green team to >36 weeks. This tape is made of tear-resistant, non-stretchable paper material, manufactured centrally by the Global Network Data Coordination Center (DCC), Research Triangle Institute (RTI).
The second intervention in the form of tools is in sub-Saharan Africa, based on research by Tura et al. (2018). Studies demonstrate the effectiveness of the WHO-adapted MNM identification tool. This research develops maternal near-miss tools from WHO by adding several variables. The forged instrument detects more cases of MNM compared to devices from WHO.
Based on research conducted by Papoutsis et al. (2017), who developed a Shrewsbury and Telford Hospital (SaTH) risk assessment tool for women who will give birth by the caesarean section method, where the results show that the tool can help provide predictions on the condition of women who will have a caesarean section delivery. The tool used to detect emergency cases in pregnant, maternity or postpartum women needs to be developed because this tool is expected to help health workers carry out screening quickly and accurately so that intervention can be given immediately.

Actions

Based on the case study by Taylor and Taylor (2018), the administration of CPR, defibrillation, ETT installation, and administration of 1 mg of epinephrine could not treat the condition of a postpartum woman who had a cardiac arrest. CPR is given when the patient's level of consciousness is unresponsive and waiting for the team to arrive. When help arrived, the patient was given defibrillation, CPR resumed, ETT insertion and 1 mg IV epinephrine. The intervention restored the patient's pulse, but he again experienced cardiac arrest when he was about to be moved to the room. The potential cause of this cardiac arrest was considered, and a pulmonary embolism was strongly suspected.
There is convincing evidence that there is an association between the administration of epinephrine and the return of spontaneous circulation in patients with cardiac arrest. However, there are conflicting results regarding the long-term survival of cardiac arrest patients on neurological function after cardiopulmonary resuscitation (Shao & Li, 2017).

Conclusion

Various interventions can be performed to handle emergency obstetric cases. In this systematic review, it can be concluded that the most effective intervention is using the Color-Coded Tape for Uterine Height tool because it can detect the possibility of a premature baby being born, which can interfere with the welfare of the mother and fetus. In addition to providing nursing care, nurses can develop the latest interventions, such as making assessment tools and adapting existing instruments to make them more effective

according to the character of society, creating algorithms for handling emergency patients, or combining existing programs to produce better results for patient health. However, other interventions still need to be developed for cases more frequently experienced by pregnant, maternity or postpartum women to improve patient welfare.

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