Literature Review: Analysis to Reduce Maternal Mortality

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Article Information	Abstract
	The maternal mortality rate in Indonesia is still high. Hard efforts are needed so that the Sustainable Development Goals target of 70 per 100,000 live births in 2030 can be achieved. The purpose of the study was to identify aspects related to the trend issue of maternal mortality, the determinants of causes, strategic efforts and the role of family planning in reducing maternal mortality. This literature review described sixteen peer-reviewed journals based on inclusion criteria. The results of the analysis of the literature review found that aspects of findings related to maternal mortality were as follows: trends issue maternal mortality (Maternal mortality is more common in developing countries), causative factors (Status health (nutrition, comorbidities and maternal complications), reproductive status (age, parity, gestational distance), access to health services and policies/regulations, health behavior (contraception use, socioeconomic)), strategic efforts (maternal and neonatal health management, Quality antenatal services, safe delivery and family planning) and family plans (Support system (women's status, family and community status)). The review analysis provides directions and patterns of strategic work steps, collaboration of various support systems ranging from the role of individuals, families, communities, health services and the government in ensuring maternal and child health.

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INTRODUCTION

The maternal mortality rate is an indicator of women's welfare, an indicator of the welfare of a nation as well as describing the results of a country's development achievements. Information on maternal mortality is useful for the development of maternal health improvement programs, especially safe pregnancy and delivery services, increasing the number of deliveries assisted by health workers, management of the referral system in handling pregnancy complications (Hasanbasri, Lazuardi, Gadjah, Yogyakarta, & Anak, 2013).

Based on the results of estimates of maternal mortality from the WHO, the maternal mortality rate is 210 per 100,000 live births. The maternal mortality rate in developed countries ranges from 16 per 100,000 live births, while in developing countries this rate is almost 15 times higher at around 240 per 100,000 live births. Indonesia is one of the countries experiencing an increase in maternal mortality, far from the target of 102 per 100,000 live births. It takes a strong effort from the government to overcome the problem of maternal mortality so that the Sustainable Development Goals (SDGs) target of 70 per 100,000 live births in 2030 can be achieved (Callister & Edwards, 2017a).

Many factors have contributed to the increase in maternal mortality in Indonesia. In addition to direct causal factors, such as bleeding, hypertension, infection, prolonged labor, and abortion, the main causes of maternal death are also influenced by indirect or intermediate causes. The government has implemented various intervention strategies to reduce maternal mortality, but many factors need to be analyzed further. It is the interest of researchers to obtain a framework for various aspects that affect maternal mortality (King, 2015).

The focus of this literature review discusses trends in maternal mortality globally and in Indonesia, the determinants of maternal mortality, efforts to reduce maternal mortality and the role of family planning in reducing maternal mortality.

METHOD

Study design

Literature review on Analysis to Reduce Maternal Mortality, in the literature search using the PICOS format as below. The dimensions analyzed as key variables in this study are Trends issue, determinant factors, strategic grands and family planning.

Table 1: Format PICOS in literature review

Criteria	Inklusi	Eksklusi
Population	Group of reproductive mothers who experienced maternal mortality	Groups of reproductive mothers who are not included in the category of maternal mortality
Intervention	-	-
Comparation	No comparator	
Outcomes	Analyze the aspects of Trends issue, determinant factors, strategic grands and family planning	There is no discussion of the analysis outside the specified dimensions
Study Design and Publication Type	Quasi-experimental studies, randomized control and trial, systematic review, qualitative research and cross- sectional studies.	No exclusion
Publication Years	Post 2015	Pre 2015
Language	Indonesia, English	Languages other than Indonesian, English

Search strategy

Alternative term for population (P) used "pregnant women of reproductive age" OR "post partum mothers of reproductive age" OR "mothers using contraception". Researchess did not use alternative terms for intervention (I). Alternative terms for the outcome (O), researchers used the aspects of Trends issue, determinant factors, strategic grands and family planning.

Selection Criteria

The inclusion criteria of this study included 2015-2021 journal collection, quantitative and qualitative researches, using original research and systematic review. Although research methods varied, researchers have paid attention to the depth of content aspect, to explore problems from various aspects, so that research problems can be clearly described. The area of journal about the aspects of trends issue, determinant factors, strategic grands and family planning. The exclusion criteria included conference papers, symposia, and discussion papers. Database scopus, proquest, pubmed, scient direct. Literature Review Algorithm using PRISMA flow. The results of the inclusion criteria screening obtained 16 journals.

Table 2: Summary of studies

	Title	Method (Design, sample, Variable)	Results
1.	Risk factors for maternal death and trends in maternal mortality in low- and middle-income countries: a rospective longitudinal cohort analysis (Bauserman et al., 2015)	**Design**: prospective longitudinal cohort analysis **Sample**: all pregnancies from 2010 to 2013 among women enrolled in the MNHR **Variable**: pregnancy and the maternal mortality ratio	The MNHR identified preventable causes of maternal mortality in diverse settings in low- and middleincome countries. The MNHR can be used to monitor public health strategies and determine their association with reducing maternal mortality.
2.	The etiology of maternal mortality in developed countries: a systematic review of literature (Rossi & Mullin, 2012)	**Design**: systematic review of literature **Sample**: Twelve articles provided data from 1980 to 2007, in PubMed, EMBASE, Medline and reference lists **Variable**: maternal death/mortality, pregnancy death and obstetric/maternity care	Conditions leading to hemorrhage warrant strict management. The risk of an apparently healthy woman to die during motherhood is 0.22 out of 100,000 livebirths.
3.	Correlates of maternal mortality in developing countries: an ecological study in 82 countries (Girum & Wasie, 2017)	**Design**: ecological study **Sample**: international data bases of health metrics from 2008 to 2016 using aggregates of health indicator data from WHO, World Bank, UNDP and UNICEF data bases for 82 developing countries. **Variable**: The dependent variable was the maternal mortality ratio, while the independent variable was socio-economic, health care related and morbidity ariables.	Maternal mortality is correlated with multiples of socio-economic factors, health care system associated factors, disease burden and their complex interactions. Therefore, Policy and programs targeted to improve maternal health and reduce maternal deaths should consider population dynamics, socio-economic influence and health system factors that impose a major risk on mothers.
4.	Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group (Alkema et al., 2016)	**Design**: systematic analysis **Sample**: international data bases of health metrics from 2008 to 2016 using aggregates of health indicator data from WHO, World Bank, UNDP and UNICEF data bases for 82 developing countries. **Variable**: The dependent variable was the maternal mortality ratio, while the independent variable was socio-economic, health care related and morbidity variables.	Although the rates of reduction that are needed to achieve country-specific SDG targets are ambitious for most high mortality countries, countries that made a concerted effort to reduce maternal mortality between 2000 and 2010 provide inspiration and guidance on how to accomplish the acceleration necessary to substantially reduce preventable maternal deaths.

5.	Trends in Texas maternal mortality by maternal age, race/ ethnicity, and cause of death, 2006- 2015 (Macdorman, Declercq, & Thoma, 2018)	**Design**: demographic analysis **Sample**: international data bases of health metrics from 2006 to 2015 using aggregates of health indicator data from WHO **Variable**: The variable was the maternal mortality ratio, into 5-years averages	The observed increase in maternal mortality in Texas from 2006- 2010 to 2011- 2015 is likely a result of both a true increase in rates and increased overreporting of maternal deaths, as indicated by implausibly high and increasing rates for women aged =40 years and among nonspecific causes of death. Efforts are needed to strengthen reporting of death certificate data, and to improve access to quality maternal health care services.
6	Trends in maternal mortality in the United States (Neggers, 2016)	**Design**: Analytical study **Sample**: secunder data **Variable**: Maternal mortality	Maternal mortality is higher in the U.S. as compared to many developed countries including Europe. This is true in spite of the fact that factors contributing to maternal mortality, such as overweight and obesity, hypertension, type 2 diabetes and increased maternal age at the birth of a child.
7	Maternal mortality: a cross-sectional study in global health (Sajedinejad, Majdzadeh, Vedadhir, Tabatabaei, & Mohammad, 2015)	**Design**: correlation analysis cross sectional approach **Sample**: secondary data from 2010 in 179 countries **Variable**: maternal mortality	Education, private sector and trade, and governance were found to be the most important macrostructural factors associated with maternal mortality. Employment and labor structure, economic policy and debt, agriculture and food production, private sector infrastructure investment, and health finance were also some other critical factors.
8	Strategies to reduce maternal mortality in developed countries (King, 2015)	**Design**: Review **Sample**: Literature **Variable**: maternal mortality data	To achieve a reduction within all developed countries there must be coordinated death review activities that investigate every case along with near-misses. Recommendations for changes within the medical system will continue to improve maternal health not only in developed countries but also worldwide.
9	Sustainable Development Goals and the Ongoing Process of Reducing Maternal Mortality (Callister & Edwards, 2017b)	**Design**: Review **Sample**: Literature **Variable**: maternal mortality data	To reduce maternal mortality: improvement of maternal nutrition during pregnancy; emergency obstetric care and postpartum hemorrhage prevention; expanded prenatal care, including prevention of stillbirth and preterm birth; emergency neonatal resuscitation and immediate newborn care; and detection/management of maternal/newborn infections.
10	Governance commitment to reduce maternal mortality. A political determinant beyond the wealth of the countries (Ruiz-cantero, Guijarro-garvi, Rose, Martínez-riera, & Fernández-sáez, 2019)	**Design**: Review literature **Sample**: secunder data in 174 countries **Variable**: maternal mortality	The six dimensions of governance: Government effectiveness, regulatory quality, rule of law, control of corruption, voice and accountability, and political stability and absence of violence. Findings were encouraging as maternal mortality in low-income countries with higher government effectiveness and regulatory quality was similar to that of medium-income countries with lower government effectiveness and regulatory quality. To achieve the post-2015 sustainable development goal on preventable maternal mortality—which

			persists despite economic development.
11	The Indonesian approach to reduce maternal mortality (Soedarmono, 2017)	**Design**: Review **Sample**: Literature **Variable**: maternal mortality data	Indonesia has high maternal mortality that mostly due to haemorrhage. The unavailability of blood contributes to maternal mortality. Increasing people's awareness and willingness to donating blood voluntarily is expected to increase blood supply and improve management of postnatal haemorrhage.
12	The impact of family planning on maternal mortality in Indonesia: what future contribution can be expected? (Utomo et al., 2021)	**Design**: decomposition methode **Sample**: data from long series of population censuses and large-scale surveys that are available in few other low- and middle-income countries. **Variable**: family planning and maternal mortality	CPR growth rate would have to nearly double the 2000–2017 rate to reach 70% CPR by 2030 and more than triple to reach 75%. Achieving the most ambitious target would still leave the maternal mortality ratio at 125 in 2030 without corresponding improvements in maternal health services. Although substantial reductions in maternal mortality between 1970 and 2017 can be attributed to contraceptive use and further contributions to the year 2030 are probable, smaller contributions are likely due to the already relatively high CPR and the challenges that must be overcome to move the CPR significantly higher. The ability of Indonesia to reach the 2030 SDG maternal mortality target of 70 maternal deaths per 100,000 live births will depend primarily upon health system effectiveness in addressing health risks to women once they are pregnant.
13	The role of birth spacing, family planning services, safe abortion services and post abortion care in reducing deaths in reducing maternal deaths (Ganatra, Faundes, & Coordinator, 2016)	**Design**: Review **Sample**: Literature **Variable**: maternal mortality data	Access to contraception and the provision of family planning is an essential reproductive health intervention that helps reduce maternal deaths by preventing or delaying pregnancy in women not intending to be pregnant or those at higher risk of morbidity and mortality. The provision of safe abortion is essential to prevent the complications arising from unsafe abortion and the provision of emergency care for complications is essential to avert deaths from those complications. Equally important, the provision of contraception and safe abortion go beyond preventing deaths –it is a telling indicator of our ability to respect women's decisions and ensure that they have access to timely, evidence-based care that protects their health and human rights.
14	Scaling Up Family Planning to Reduce Maternal and Child Mortality: The Potential Costs and Benefits of Modern Contraceptive Use in South Africa (Chola, Mcgee, Tugendhaft, & Buchmann, 2015)	**Design**: Review **Sample**: Literature **Variable**: maternal mortality data	If CPR increased by 0.68% annually, the number of pregnancies would reduce from 1.3 million in 2014 to one million in 2030. Unintended pregnancies, abortions and births decrease by approximately 20%. Family planning can avert approximately 7,000 newborn and child and 600 maternal deaths. The total annual costs of providing modern contraception

			in 2030 are estimated to be US$33 million and the cost per user of modern contraception is US$7 per year. The incremental cost per life year gained is US$40 for children and US$1,000 for mothers.
15	Understanding the determinants of maternal mortality: An observational study using the Indonesian Population Census (Id, Contreras, Id, & Cornwell, 2019)	**Design**: observational study **Sample**: The 2010 Indonesian Population Census identifies 8075 pregnancy-related deaths and 5,866,791 live births. **Variable**: determinan of maternal mortality	Distance to health clinics and the number of midwives at community health centres and village health posts are not significant contributors, nor is socio-economic status. If the same level of access to doctors and hospitals in lower maternal mortality Java-Bali was provided to the higher maternal mortality Outer Islands of Indonesia, our model predicts 44 deaths would be averted per 100,000 pregnancies.

RESULT

The results of the analysis of the literature review found that aspects of findings related to maternal mortality were as follows: trends issue maternal mortality (Maternal mortality is more common in developing countries, trends in maternal mortality in developed countries are more related to obesity and complications of hypertension and diabetes), causative factors (Status health (nutrition, comorbidities and maternal complications), reproductive status (age, parity, gestational distance), access to health services and policies/regulations, health behavior (contraception use, socioeconomic)), strategic efforts (maternal and neonatal health management, Quality antenatal services, safe delivery and family planning) and family plans (Support system (women's status, family and community status)). The framework of the review results is described in Figure 1 below.
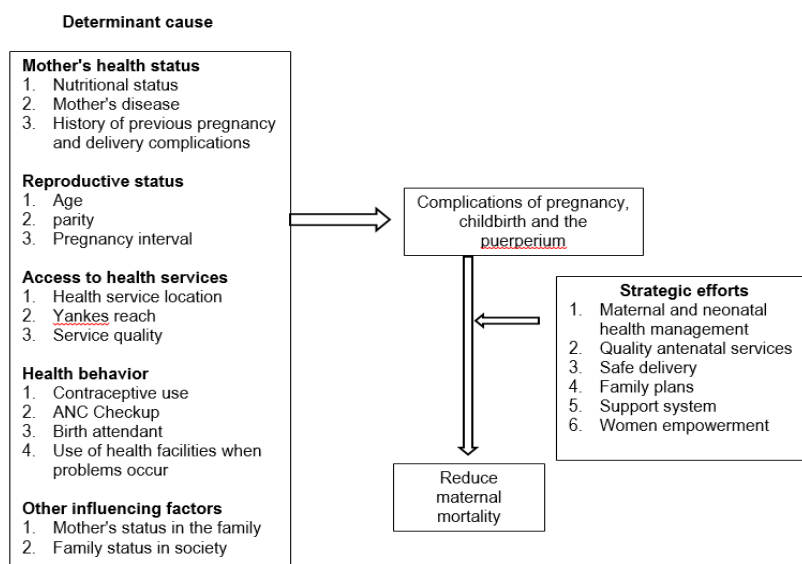

Figure 1. The framework of the analysis to reduce maternal mortality

DISCUSSION

Maternal mortality is more common in low and middle income countries. Maternal mortality is correlated with multiples of socio-economic factors, health care system associated factors disease burden and their complex interactions. While in developed countries, factors contributing to maternal mortality, such as overweight and obesity, hypertension, type 2 diabetes and increased maternal age at the birth of a child.

According to Mcarthy and Maine (1992) maternal mortality is influenced by three determinants, namely close determinants, intermediate determinants and far determinants. Close determinants are the cause of maternal death, namely pregnancy itself and obstetric disorders in the form of bleeding, infection, eclampsia/preeclampsia, and others. The close

determinants are directly influenced by the determinants, namely health status, reproductive status, access to health services, and behavior in using health services. Distant determinants are determinants related to demographic and sociocultural factors, namely the status of women in the family and society, the status of the family in society, and the status of society.

From close determinants, there are complications that can occur, including bleeding, infection, pre-eclampsia and eclampsia, obstructed labor or prolonged labor and uterine rupture. All of which have an impact not only on pregnancy, childbirth and postpartum, but also the risk of death for the mother and baby. The condition of the three determinants previously described, either directly or indirectly, integratedly must be anticipated in a planned manner since early pregnancy (*No Title*, 2015).

Most obstetric complications occur at the time of delivery. For this reason, we need professionals who can quickly recognize complications that can threaten the mother's life and at the same time carry out timely treatment to save the mother's life. The maternal mortality rate will be reduced adequately if 15% of births are handled by doctors and 85% are handled by midwives. This ratio is most effective when midwives can manage normal deliveries, and can effectively refer 15% of deliveries with complications to a doctor. Indonesia has launched Making Pregnancy Safer (MPS) as a public health development strategy towards a healthy Indonesia 2010 on October 12, 2000, as part of the Safe Motherhood program. The purpose of Safe Motherhood and Making Pregnancy Safer is the same, namely protecting reproductive rights by reducing the burden of illness, disability, and death associated with pregnancy and childbirth that should not have occurred (Akanbi & Mordi, 2017).

Safe Motherhood is an effort to save women so that pregnancy and childbirth are healthy and safe, as well as giving birth to healthy babies. The goal of Safe Motherhood efforts is to reduce morbidity and mortality rates for pregnant, maternity and postpartum women, and reduce morbidity and mortality rates for newborns. This effort is mainly aimed at developing countries because 99% of maternal deaths in the world occur in these countries.

Strategic interventions in Safe Motherhood efforts are stated as the four pillars of Safe Motherhood, namely: 1). Family Planning, which ensures that every person/couple has access to family planning information and services in order to plan the right time for pregnancy, the interval between pregnancies and the number of children; 2). Antenatal care, to prevent obstetric complications where possible, and to ensure that complications are detected as early as possible and adequately treated; 3). Safe delivery, ensuring that all birth attendants have the knowledge, skills and tools to provide safe and clean assistance, and provide postpartum services to mothers and babies; 4). Essential obstetric services, ensuring that obstetric services for high risk and complications are available to pregnant women who need them (Soedarmono, 2017).

Another intervention that also has a contribution is the empowerment of women and communities. Empowerment can be interpreted as an effort to increase the community's ability to participate and negotiate. Intensive Community influences and controls its people for the betterment of life. Empowerment can also be interpreted as an effort to provide power or strength to the community. The author tries to provide a solution through an idea, namely Intensive Community Empowerment, which is an intensive effort to make the community more empowered and independent in maintaining their health, where the outcome is expected to be an alternative to reduce maternal mortality (King, 2015).

CONCLUSION

Referring to the results of the review, various aspects of principles related to the reduction of maternal mortality were obtained, both in terms of trends issues, causative factors and risks, existing treatment strategies and the role of family planning. All of them give meaning, the need for collaboration with various support systems in building grand strategies to reduce maternal mortality. The review analysis of how to reduce maternal mortality provides directions and patterns of strategic work steps that can be taken by the role of individuals, families, communities, health services and the government in ensuring maternal and child health.

SUGGESTION

In reducing maternal mortality, it is very important to empower women and the role of health workers in collaboration with families in a comprehensive manner.

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CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest with the topic or any associated objects upon the publication of this study.

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