REVIEW ARTICLE:

Kartu Skor Poedji Rochyati in the Indonesian Maternal Referral System

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ABSTRACT

Maternal Mortality Rate (MMR) represents fatalities during pregnancy, childbirth, and the postpartum period due to complications, not external factors. Timely detection is crucial for preventing maternal deaths, necessitating integrated planning. The "*Kartu Skor Poedji Rochjati*" (KSPR) emerges as a vital tool for identifying high-risk pregnancies, facilitating urgent referrals to mitigate complications and enhance healthcare. A literature review on maternal mortality, risk assessment tools, and KSPR effectiveness was conducted to address the issues. The findings are expected to highlight KSPR's pivotal role in identifying at-risk pregnant women, enabling prompt referrals, and reducing maternal mortality rates. The case studies and data analysis will enrich our understanding of the tool's impact on maternal healthcare. The apex of public health involves embracing health-conscious lifestyles, reflected in indicators like mortality and morbidity. Proactively identifying high-risk pregnancies using KSPR is a strategic step in averting maternal mortality. Leveraging KSPR allows early intervention, reducing complications and contributing to enhanced maternal health, aligning with the goal of minimizing mortality risks.

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Highlights:

1. This review focuses on maximizing the effectiveness of "*Kartu Skor Poedji Rochyati*" (KSPR) in Indonesia's maternal referral system.
2. It addresses the lack of information about Indonesia's maternal referral system, offering valuable insights.
3. Underlining the high rates of maternal and fetal deaths due to referral errors, the article stresses the urgency of understanding KSPR's function for high-risk pregnant women.

INTRODUCTION

The Maternal Mortality Rate (MMR) refers to the tally of maternal fatalities transpiring during pregnancy, childbirth, and the postpartum phase due to complications arising from these processes or their management, excluding factors like accidents or falls. This figure is typically measured per 100,000 births.[1] Maternal mortality persists as a significant global public health challenge, particularly in regions with limited resources, encompassing approximately 85% of all maternal fatalities. Nevertheless, according to various sources, an

estimated 40% to 50% of these maternal deaths are deemed avoidable through appropriate interventions and healthcare measures.[2,3] As per the World Health Organization (WHO), maternal mortality encompasses the concept of maternal death, indicating a demise transpiring during pregnancy or within 42 days following the conclusion of pregnancy, but not resulting from accidental causes. In Indonesia, the central focus continues to revolve around maternal and child health concerns, constituting a primary agenda aimed at ameliorating healthcare service standards and curbing the prevalence of maternal and child mortality. Despite these efforts, maternal and child mortality rates within Indonesia persist at elevated levels in comparison to fellow ASEAN member nations.[4,5]

Preventing maternal mortality hinges on effective detection and proactive planning, facilitating a comprehensive approach to safeguarding maternal well-being. The integration of these strategies is pivotal in preserving the lives of expectant mothers. To identify high-risk pregnant women, the utilization of tools like the *Kartu Skor Poedji Rochyati* (KSPR) emerges as a valuable resource. This tool assists in pinpointing potential risks, enabling healthcare professionals to take timely and informed actions, thereby contributing to the prevention of maternal deaths.[6,7] the KSPR serves as a versatile tool utilized for the early identification of risk factors during pregnancy that have the potential to negatively impact both expectant mothers and the developing fetus. Its application is broad, encompassing the goal of promptly recognizing these risk factors to enable timely interventions and ensure the well-being of pregnant women and their unborn children. Delivery referral is needed to avoid risks that can occur to the mother or baby. Referrals to higher health facilities are carried out because of obstetric complications such as bleeding, obstructed labor, hypertension or factors that can cause a risky delivery.[8] Referrals are urgently needed so that complications related to pregnancy can be reduced and better health care can be obtained.[7]

Delays from referrals and transportation difficulties are the main barriers to getting quick access to health services. One of the factors that influence delays in obstetric care is when making referrals.[9] The referral factor for the high maternal mortality rate is a cause of health problems in Indonesia. Safe and well-prepared referrals can reduce the maternal mortality rate from 1.89% per 1000 live births to 1.09%. Based on research conducted in South India, 90% of 104 maternal deaths were admitted with an emergency and 59% of them were due to late referral decisions.[8] So referrals can affect the maternal mortality rate.

This article review aims to assess the role of KSPR in the maternal referral system in Indonesia and its impact on maternal morbidity and mortality rates.

The aim of this study

This study has been undertaken with the goal of tackling the identified issues in the article review. The focus is on a set of inquiries concerning maternal referrals in Indonesia and their repercussions on maternal morbidity and mortality rates. Firstly, the study delves into the definition of a high-risk pregnancy. Subsequently, it explores the connection between the *Kartu Skor Poedji Rochyati* (KSPR) and high-risk pregnancies. Additionally, the research investigates whether KSPR plays a role in influencing the number of maternal mortalities and morbidities in Indonesia. Lastly, the study examines whether there exists a significant correlation between KSPR and the overall efficiency of maternal referrals in the Indonesian context.

HIGH RISK PREGNANCY

The reproductive age range for women spans from 20 to 35 years, and within this timeframe lies the safest period for conceiving and giving birth. This age bracket is associated with a reduced risk of pregnancy complications. However, individuals below the age of 20 and those exceeding 35 years are considered to be at higher risk for encountering complications during pregnancy. For those under 20 years old, the uterus might not have attained its full size necessary for a healthy pregnancy, thereby elevating the likelihood of disorders like preeclampsia. On the other hand, individuals over 35 years old experience a degenerative process causing structural and functional alterations in peripheral blood vessels. These changes render them more susceptible to fluctuations in blood pressure, thus increasing the vulnerability to conditions like preeclampsia during pregnancy.[6,9,10]

A high-risk pregnancy refers to a situation during pregnancy wherein there exists either an existing or potential risk to the health and well-being of either the mother or the fetus. Such pregnancies involve circumstances where the life and health of either the mother or the baby could potentially be compromised.[11] Indeed, any unexpected or pregnancy-related medical or obstetric condition that possesses the capacity to jeopardize the health or overall well-being of either the mother or the fetus qualifies as a high-risk pregnancy. These conditions warrant increased medical attention and monitoring to ensure the best possible outcome for both the mother and the baby.[12,13]

Very high-risk pregnancies are the risk group for pregnant women with the highest number of maternal deaths followed by high risk pregnancies and low risk pregnancies. This condition is normal, because death is a condition that is always preceded by a very severe disease with very high-risk factors. However, if deaths are still found in pregnant women with low risk, then this proves that there is no riskless pregnancy. In accordance with the scoring system at KSPR, that a total score of 2 is the minimum score for each pregnancy.[6]

Women with high-risk pregnancies are confronted with a heightened likelihood of encountering complications, with a one in four chance, in contrast to women with low-risk pregnancies whose chance of experiencing complications stands at nearly one in ten. Various risk factors during pregnancy contribute to this disparity. These factors encompass the mother's height being below 145 cm, her age being either below 20 years or exceeding 35 years, having given birth to more than four children, maintaining a gap of less than two years between pregnancies, possessing a history of problematic deliveries, grappling with concurrent pregnancy-related ailments (like anemia, hypertension, or heart conditions), and undergoing symptoms such as bleeding, severe headaches, and limb swelling. Additionally, anomalies within the fetus (such as a larger size, malposition, or malpresentation) and aberrations in the mother's pelvic structure can also contribute to the classification of a pregnancy as high-risk. These multifaceted risk factors necessitate attentive medical care and monitoring to ensure the safety and well-being of both the mother and the baby.[6]

Based on when they were found, how they were recognized, and the characteristic of the risk, risk factors are grouped into 3 groups:[14] 1. Risk Factor Group I: There is potential for Obstetric Emergency with 7 Too and 3 Ever. Seven too were young primi, old primi, secondary old primi, age >35 years, grand multi, youngest child aged <2 years, low height <145 cm) and 3 had bad obstetric history, gave birth and experienced postpartum hemorrhage with infusion, transfusion, placental manual, vaginal surgery, former cesarean section. 2. Risk Factor Group II: There is an Obstetric Emergency, women with mild preeclampsia, twin pregnancies, hydramnios, serotinous pregnancies, IUFD, breech position, and transverse position. 3. Risk Factor Group III: Present-Emergency-Obstetrics: antepartum hemorrhage and preeclampsia severe eclampsia. AGDO mothers in conditions that can directly threaten the life of the mother/fetus, must be immediately referred on time (RTW) to the hospital to save the mother/newborn.

KARTU SKOR POEDJI ROCHYATI (KSPR)

In modern obstetrics, a fundamental recognition exists regarding the presence of potential risks inherent to both pregnancy and childbirth. This acknowledgment encompasses the understanding that these processes inherently carry a level of risk, introducing the potential for hazards or complications to arise. The range of possible complications spans from mild to severe, encompassing outcomes that can encompass mortality, morbidity, and even disabilities for either the mother or the infant. The extent and severity of these complications are intricately tied to various levels of risk factors. Essentially, the greater the number of risk factors a pregnant woman possesses, the higher the likelihood that she might encounter complications. This relationship underscores the significance of considering an individual's unique risk profile, with the understanding that tailored medical interventions and vigilance are crucial to mitigating potential complications and ensuring the health and safety of both the mother and the baby.[7] The primary emphasis of maternal and child care programs centers on identifying pregnancies that are at a higher risk of complications, aiming to avert obstetric challenges during childbirth. Within this framework, risk assessment plays a pivotal role in the realm of antenatal care (ANC) and has demonstrated its value in enhancing outcomes for both mothers and infants. By meticulously assessing the potential risks associated with a pregnancy, healthcare professionals can proactively address and manage those factors that might otherwise lead to complications during childbirth. This strategic approach not only contributes to the well-being of expectant mothers but also leads to improved perinatal outcomes, ultimately creating a positive impact on the health of both mothers and babies.[2]

In Indonesia, various risk factor approaches have been developed to address and mitigate the risk of maternal mortality. Among these approaches, the concepts of "Four Too" and "Three Delays" have been recognized for a considerable period. Additionally, the Poedji Rochjati Score Card (KSPR) is widely utilized to identify early risk factors during pregnancy that have the potential to negatively impact both pregnant women and their developing fetuses. The "Four Too" concept refers to identifying four specific factors that contribute to maternal deaths: Too late to seek care, Too far to reach care, Too little care, and Too late to receive adequate care. These factors emphasize the significance of timely and accessible healthcare in preventing maternal mortality. The "Three Delays" concept involves recognizing three types of delays that can lead to adverse maternal outcomes: Delay in decision-making to seek care, delay in reaching appropriate

medical facilities, and delay in receiving adequate and appropriate care once at the facility. This approach underscores the importance of swift decision-making, accessibility, and effective care provision in averting maternal deaths.[8]

The KSPR, or Poedji Rochjati Score Card, is utilized for early detection of risk factors in pregnancy. It aids in identifying potential complications that could impact both pregnant women and their fetuses. This tool helps healthcare professionals take timely interventions and actions to ensure the health and safety of both mother and baby. Within the KSPR framework, the concept of "Factor Four" is included, further emphasizing the importance of addressing risks and complications early in pregnancy.[8] The purpose of screening with KSPR is to classify pregnant women with Low Risk Pregnancy (LRP), High Risk Pregnancy (HRP), Very High Risk Pregnancy (VHRP), so that the behavior of the need for a place and delivery assistance is developed according to the conditions of the pregnant woman and empowering the mother. pregnant women, husbands, families, and communities to care and provide support and assistance with mental readiness, costs, and transportation to carry out planned referrals.[6]

KSPR has 6 functions as follows:[15] 1. Antenatal screening/early detection of risk factors in high-risk pregnant women. 2. Monitoring and control of pregnant women during pregnancy. 3. Recording and reporting of the condition of the mother during pregnancy, child-birth, postpartum, regarding mothers and newborns. 4. Guidelines for giving counseling and education. 5. Data validation of pregnancy, postpartum and family planning. 6. MPA (Maternal Perinatal Audit). The higher the score of pregnant women can increase the risk of the mother during pregnancy and childbirth can even be at risk to the baby. Assistance during pregnancy and comprehensive treatment is needed so that maternal risk factors can be minimized and handled properly.[7]

EFFECTIVENESS OF KSPR FOR DETECTION OF HIGH RISK IN PREGNANT WOMEN

The application of the Poedji Rochjati Score Card (KSPR) serves a dual purpose: detecting pregnancy and categorizing pregnancies as high-risk or low-risk. This facilitates the early formulation of comprehensive midwifery care plans. Within the KSPR framework, pregnant women with a score of 2, indicating a low-risk pregnancy, generally experience minimal complications throughout pregnancy and childbirth. However, instances have arisen where women consistently scored 2 throughout their pregnancy yet encountered complications during delivery. This highlights a vital consideration: the need for comprehensive care planning extends beyond just high or very high-risk pregnancies. Even women initially deemed low risk can face unexpected complications during both pregnancy and childbirth, necessitating diligent care and attention to ensure optimal outcomes.[7,16]

INDONESIAN MATERNAL REFERRAL SYSTEM

The significant maternal mortality rate in Indonesia underscores the inadequacies in health services, particularly concerning maternal health. As a pivotal step toward mitigating this issue, the establishment of an efficient referral system becomes imperative, particularly for cases involving complications. An integral facet of robust primary healthcare lies in maintaining a seamless connection with higher levels of care. This connection is manifested as an effective referral system, facilitating swift and coordinated response to maternal health challenges and ultimately contributing to the reduction of maternal mortality.[4,17,18]

The Ministry of Health of the Republic of Indonesia through the Director of Maternal Health Development has established a National Action Plan to Accelerate the Reduction of Maternal Mortality Rate for 2013–2015, in which the fourth main program is the implementation of effective referrals for cases of maternal complications. This is based on the fact that one of the main obstacles to the slow decline in MMR in Indonesia is barriers to providing and accessing emergency obstetric services. The ability to handle complicated cases at this time still relies on advanced health care facilities in hospitals, while the handling of complicated cases at the health center level has not gone well. Therefore, it is necessary to have a level division of tasks among various health service units through a referral system arrangement.[17]

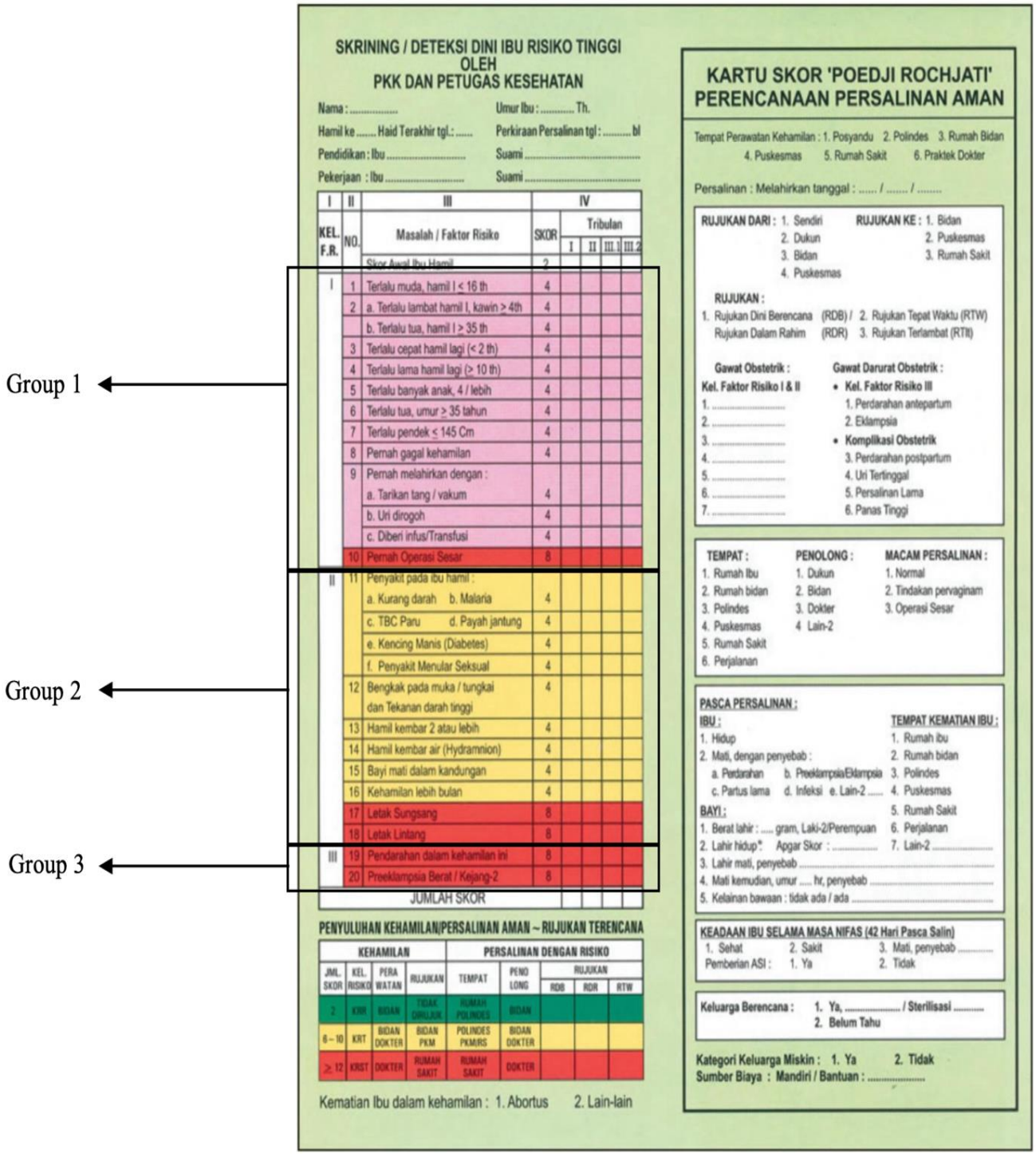

Figure 1. *Kartu Skor Poedji Rochyati* (KSPR)[15]

KSPR is divided into 3 groups: Group 1 (1-10): there is a potential obstetric emergency, with 7 being too much and 3 having occurred previously; Group 2 (11-18): there is an obstetric emergency; Group 3: there is an obstetric emergency.

In 2014, the Decree of the Minister of Health of the Republic of Indonesia No.HK.02.02/MENKES/390/ 2014 regarding Guidelines for Designating National Referral Hospitals. This guideline discusses the existence of national referral hospitals, provincial referrals, and regional referrals. The strategy for implementing referral hospitals in 2017 is by mapping national, provincial, and regional referral hospitals by strengthening the telematics system. In 2019 it appears that the development of the referral system still needs strengthening. Various obstacles occurred including the unclear relationship with BPJS Health in terms of setting up the referral system, the occurrence of differences of opinion on tiered referrals or competency-based referrals, as well as attention to the development of a referral system in areas where there is still a lack of strength. Regarding the current Referral System, in 2020 the Indonesian Ministry of Health issued Permenkes No. 3/2020 which regulates Hospital Classification and Licensing. The existence of Permenkes/PMK 3/2020 certainly affects the referral system. Conceptually, PMK No. 3/2020 strengthens the mapping of competency-based referral ladders. Competency-based tiered referral systems are determined based on the medical needs of a disease and the competence of health service facilities (hospitals), not hospital grade levels. This system requires the ability of the Provincial Health Office to prepare competency maps and a referral system to be built. Each province will have a different map.[18,19]

Referral is the transfer of responsibility from one health service to another. The referral system is a network of health services that allows for reciprocal delegation of responsibility for the emergence of problems from a case or public health problems both vertically and horizontally to those who are more competent, affordable, and carried out rationally. Referral system for quality health services, so that service objectives are achieved without having to use high costs. Referral is a system where coordination is the main element that is multi-sectoral and there must be support from various professions that are multi-disciplinary and multi-professional to carry out and organize a form of integrated service for emergency patients both in daily situations and in disasters and incidents. Extraordinary. Effective referrals require communication between facilities, the goal is that the referred facility knows the patient's condition and can prepare early the treatment needed by the patient as soon as the patient arrives at the hospital.[18,20]

The aim of referral is to produce equal distribution of health efforts in the context of solving health problems in an efficient and effective manner. The aim of the referral system is to improve the quality, coverage, and efficiency of health services in an integrated manner. Strengthening the referral system is one of the ways to accelerate the reduction of the Maternal Mortality Rate (MMR) as well as problems and challenges facing the health center in supporting the maternal referral system to the Regional General Hospital can be overcome. The referral must obtain the consent of the patient and/or family, as well as the authorized health worker must provide an explanation to the patient regarding the diagnosis and therapy or medical action required by the patient, the reason and purpose for the referral, the risks that may arise if the referral is not made, referral transportation, and the risks or complications that may arise during referral mobilitation.[18]

A safety referral system is a network system for health care facilities that allows for reciprocal delegation of responsibility for problems that arise both vertically (communication between equal units) and horizontally (higher core communication to lower units) to service facilities. more competent, rationally affordable, and not limited by administrative area. The referral system according to the 2009 Indonesian Ministry of Health National Health System is a health service delivery system that carries out reciprocal delegation of responsibility for one/more cases of disease or health problems vertically from units with less ability to units that are more capable or horizontally between units that are level of ability in the field of maternal and perinatal health.[18]

As outlined in Article 7 of the Minister of Health Regulation No. 001 of 2012 regarding the Referral System for Individual Health Services, the referral process can occur both vertically and horizontally. Vertical referrals encompass transfers between varying levels of healthcare services, primarily undertaken when a patient necessitates specialized or sub-specialized medical attention. These referrals also occur if the referring facility lacks the resources, equipment, or personnel required to cater to the patient's needs adequately. On the other hand, horizontal referrals pertain to transfers between healthcare services at the same level. Such referrals are made when the referring facility confronts limitations, be they temporary or permanent, in terms of facilities, equipment, or staff, and therefore cannot fulfill the patient's healthcare requirements effectively.[17]

The referral system is divided into:[14] 1. Planned referrals, which are referrals to the hospital from the start of pregnancy for women with high-risk pregnancies. Referral types are categorized into 2: a) Intrauterine early referral planning: Mothers at high risk who have not experienced maternal complications and have not yet been in partum. Mother was escorted by

the family independently to the hospital; b) Intrauterine referrals: Fetuses with special conditions or problems with healthy fetuses, or high-risk fetuses, such as fetuses with mothers with poor obstetric history. 2. Timely referral, is a referral to the hospital when obstetric problems occur for women with risk factor III or mothers with early complications.

RELATIONSHIP BETWEEN KSPR AND REFERRAL SYSTEM IN INDONESIA

Timely identification of high-risk pregnancies holds paramount importance in averting delays in intervention and referral processes. Among the factors contributing to elevated maternal and infant mortality, the occurrence of the four delays—namely, late detection of danger signs, delayed decision-making for referral, tardiness in reaching the designated referral facility, and being unable to access assistance promptly at the referral site—stands out. To counter the delay in detecting issues, education is a vital tool for pregnant women and their families, enabling them to recognize signs of potential danger. Addressing delays in decision-making involves transforming decision-making practices. Furthermore, enhancements to the transportation system are pivotal, facilitating swifter and easier access to healthcare centers and eliminating hindrances that could lead to delays in reaching referral points.[6]

Figure 2 shows how the risk factor screening pattern is implemented in referral health facilities. With the existence of a referral system, it is hoped that it can improve health services with a higher quality. One of the weaknesses of health services is the inaccurate and fast referral implementation. Deaths of mothers and babies are caused because services at health facilities are not optimal or there is a delay in referral services for mothers and babies which results in very late arrival of patients at referral service facilities.[18,19]

In Indonesia, the concept of the "3 delays" is widely recognized as a prominent contributor to maternal and infant mortality. These delays encompass delayed decision-making within families, delayed access to healthcare facilities, and delays in receiving adequate assistance at the healthcare facility level. Decision-making delays often arise due to preferences for home births, financial constraints, transportation limitations, and challenges in accessing remote healthcare facilities. Delays in reaching healthcare facilities result from transportation difficulties, the lack of a well-established referral network between village midwives and hospitals, and the absence of a standardized referral protocol. Delays in obtaining appropriate assistance at healthcare facilities are linked to suboptimal quality of obstetric and neonatal care across different facilities, limited recognition of services for social insurance beneficiaries such as BPJS, and unconventional return referrals.[21] An exploration of the underlying factors within these three delays reveals issues within the referral system. Consequently, there arises a critical need to enhance the existing referral system to establish an effective and efficient framework. Such improvements are vital for addressing the challenges posed by the "3 delays" and ultimately improving maternal and infant health outcomes in Indonesia.[18,19]

According to the study conducted by Widarta and colleagues, KSPR remains applicable for the early identification of risk factors in expectant mothers. Effectively addressing the four delayed factors is pivotal in reducing maternal mortality rates. The research revealed that all instances of maternal mortality exhibited elements of risk factors as outlined in KSPR and the four delayed factors. KRST emerged as the most prevalent risk factor group, accounting for 55.2%, followed by KRT at 39.7%, and KRR at 5.2%. Late factors, including delayed detection of warning signs (82.8%), delayed decision-making for referrals (56.9%), and delayed arrival at the referral facility (15.5%), were identified. Notably, the delayed factor of receiving assistance at the final referral facility was not observed in this study.[8]

As per the investigation by Susanti and colleagues, the objective of employing the KSPR for screening is to categorize expectant mothers into groups based on the level of pregnancy risk. This categorization facilitates the development of tailored behaviors related to the choice of delivery location and birth attendants, aligning with the specific conditions of pregnant women. Moreover, the goal is to empower pregnant women, their spouses, families, and the community to exhibit concern and extend support, encompassing assistance in mental preparedness, financial considerations, and transportation for planned referrals.[6]

In another study conducted by Nur Jannah at dr. Soebandi Hospital, Jember, Indonesia, the research results suggest a correlation between the pregnancy risk approach as indicated by KSPR and referral patterns. This correlation strengthens the significance of KSPR in the maternal referral system in Indonesia, consequently contributing to the decline in maternal morbidity and mortality rates in the country.[22]

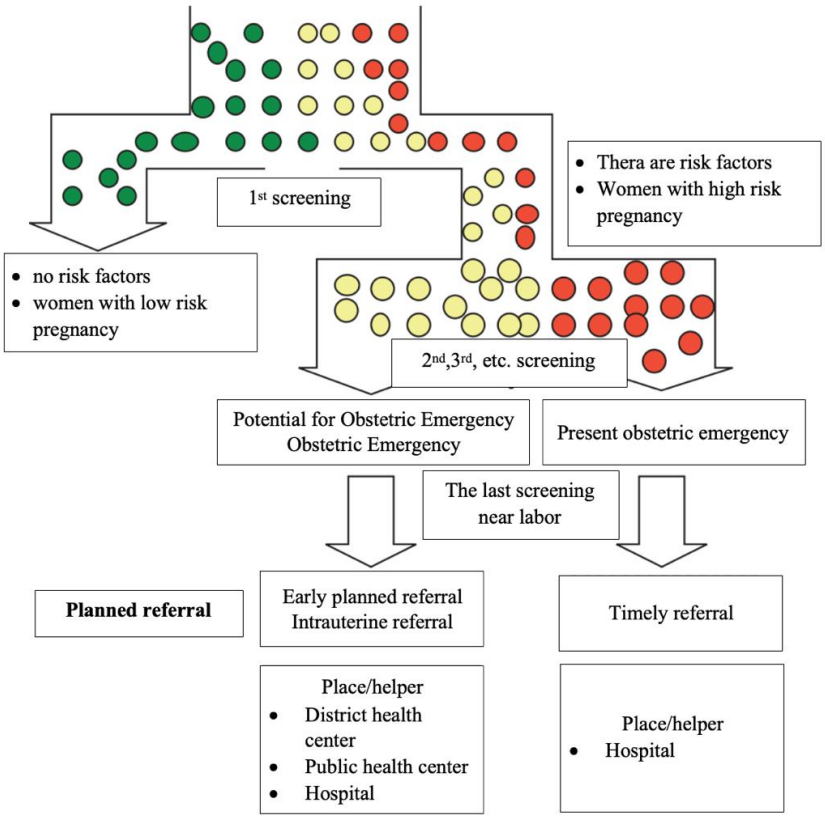

Figure 2. Screening implementation diagram

The primary drawback associated with crafting this review article lies in the less of original research studies centered around KSPR (*Kartu Skor Poedji Rochyati*) as the central research subject. This absence hinders the feasibility of conducting a comprehensive systematic review. However, as research efforts related to the article's title gain momentum, the potential for a more robust systematic review in the future becomes increasingly promising.

CONCLUSION

At the apex of public health achievement lies the trajectory of health development characterized by heightened awareness, willingness, and capacity to embrace a health-conscious lifestyle. The yardsticks defining the status of public health encompass crucial indicators such as mortality, morbidity, and nutritional well-being. A pivotal strategy in the pursuit of averting maternal and infant mortality involves the proactive identification of high-risk pregnancies through the application of the KSPR. Leveraging the KSPR for the early recognition of risk factors among pregnant women stands as a preventive measure aimed at curtailing maternal mortality rates. By harnessing the power of KSPR, the aim is to intervene proactively, minimizing potential complications and thereby contributing to the overarching goal of enhancing maternal health and reducing mortality risks.

DISCLOSURES

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Conflict of interest

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Author contribution

Initiated by the first author, the concept of crafting an article review took shape. The collaborative efforts of

the two authors converged as they jointly scoured for relevant articles, subsequently melding them into a seamless, continuous review.

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