

Commentary



Impact of maternal health on child development: why early intervention is crucial? (a commentary)

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Impact of maternal health on child development: why early intervention is crucial? (a commentary)

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Abstract

Early approach in the first trimester of pregnancy is very important to prevent complications and support optimal fetal growth. Optimal nutritional intake, as well as attention to mental health are crucial steps that can reduce the risk of premature birth and low birth weight, which have a significant impact on the child's long-term health. Maternal health, both physical and mental, is closely linked to a child's development and can affect their quality of life in the future. Challenges such as limited access and resources affect the effectiveness of these interventions both nationally and globally. In Indonesia, although programs such

as the Childbirth Guarantee Program (Jampersal) and Village-Based Maternal and Child Health (VBMCH) have been successful in improving access to maternal and child health services, there are still barriers related to accessibility and economics. Globally, health policies should focus on providing universal access to prenatal care, appropriate nutritional interventions, and mental health support. These efforts need to be supported by adequate financing and a community-based approach to ensure that all pregnant women, especially in remote areas, can access the health services they need, thereby reducing the risk of complications and improving maternal and child health outcomes. Recommendations are provided for improving maternal and child health policies, along with suggestions for further research to address existing gaps.

Commentary

Timely intervention during the first trimester of pregnancy is essential for reducing the risk of complications and promoting healthy fetal growth. Measures like proper nutrition, supplementation with folate and iron, and mental health care help minimize the likelihood of issues such as preterm delivery and low birth weight [1]. Maternal health is a critical factor influencing not only pregnancy outcomes but also the long-term physical, cognitive, and emotional development of children [2]. Emerging evidence underscores the relationship between maternal well-being during pregnancy and child development, raising the question of how early interventions can mitigate potential adverse outcomes [2,3]. In this commentary, we explore the impact of maternal health on child development and advocate for timely interventions to improve both maternal and child outcomes. Early intervention in pregnant women is very important to prevent various health problems that affect mothers and babies [2]. This fact is both globally and in Indonesia, such as the high maternal mortality rate which reached 295,000 cases worldwide in 2020 and 305 per 100,000 live births in Indonesia, as well as the

prevalence of stunting affecting 149.2 million toddlers in the world and 21.6% in Indonesia due to malnutrition since pregnancy, while anemia experienced by 40% of pregnant women in the world and 48.9% in Indonesia has the potential to cause serious complications such as premature birth and low birth weight, where in Indonesia there are 675,700 cases of premature birth each year [4].

Maternal health conditions, such as poor nutrition, anemia, psychological stress, and chronic diseases, greatly affect fetal development. These problems contribute to premature birth, low birth weight, and other complications that can have long-term effects on the child's physical and mental development. For example, maternal iron deficiency in pregnancy has been associated with impaired cognitive development in children, while maternal stress can increase the risk of behavioral and emotional problems in children. Research also shows that good maternal health is closely related to increased cognitive and emotional capacity in children. Therefore, monitoring maternal health during pregnancy is not only about maternal health, but also important for the child's long-term development [2,3]. Health policies that focus on early intervention for pregnant women are essential to ensure optimal child development. Effective maternal health programs should include broad access to prenatal care, regular mental health screenings, and targeted nutritional interventions [4]. In many developing countries, including Indonesia, access to prenatal health care is still uneven, and many pregnant women do not receive the services they need. Therefore, it is important to develop policies that support universal access to prenatal services and early intervention to reduce health disparities and improve children's quality of life in the future [5].

The importance of maternal health

During pregnancy, a mother's physical and mental health plays a pivotal role in shaping the future of her child. Conditions such as malnutrition, anemia, gestational diabetes, and mental health issues

have been associated with adverse birth outcomes like low birth weight, preterm delivery, and developmental delays in children [6]. These complications can lead to long-term health and developmental challenges, underscoring the need for comprehensive maternal care [1,4]. Recent studies indicate that maternal nutritional deficiencies, especially iron and folic acid, directly correlate with cognitive impairments and developmental delays in children. Additionally, maternal mental health issues, such as depression and anxiety, during pregnancy can negatively affect the bonding process and lead to emotional and behavioral difficulties in children [2]. Important substances that need to get attention to the importance of maternal health for the welfare of mothers, babies, and society as a whole include; The physical and mental health of mothers during pregnancy, childbirth, and the postpartum period are key factors in ensuring the survival and well-being of mothers. Physical conditions such as anemia, hypertension, and gestational diabetes, as well as mental problems such as postpartum depression, must be managed properly to prevent further complications. Maternal health also has a direct impact on the fetus and baby, where nutritional problems or medical complications can cause premature birth, low birth weight, stunting, and impaired physical and mental development of children. Routine pregnancy checks (antenatal care) are crucial in detecting early complications such as infectious diseases, anemia, hypertension, and diabetes, all of which can affect the mother and fetus [3]. On the other hand, fulfilling proper nutrition and providing supplements such as folic acid, iron, and calcium during pregnancy are important to prevent problems such as anemia, preeclampsia, and impaired fetal development [2,4].

Access to quality health care, especially for mothers in remote areas, is one way to reduce the risk of maternal and infant mortality, with medical facilities equipped with trained health workers to handle childbirth complications and provide necessary postnatal care [5]. In addition,

education on reproductive health and access to family planning services help mothers plan healthy pregnancies and ensure safe spacing between pregnancies. Social and economic factors, such as education, economic status, and access to health information, also influence maternal health, with women's empowerment in decision-making being an important part of improving maternal and infant health outcomes [5]. The still high maternal mortality rate in many countries, including Indonesia, highlights the need for stronger prevention efforts, especially in increasing awareness of danger signs during pregnancy and improving access to health facilities. In addition to physical health, maternal mental health also requires attention, because postpartum depression and stress during pregnancy can have a negative impact on both mother and child, so social support from family and community is essential [7]. Furthermore, maternal health during pregnancy has a long-term influence on the risk of chronic diseases in children in the future, such as obesity, diabetes, and heart disease, so it is important to maintain maternal health holistically during pregnancy and beyond [6].

Why early intervention matters

Early intervention during pregnancy, particularly in addressing maternal health issues, is crucial for several reasons. First, it allows for the prevention or mitigation of risks that could lead to adverse pregnancy outcomes. Early interventions also ensure that both mother and child receive the necessary support, including access to adequate nutrition, healthcare, and psychological support [3,4]. For example, prenatal nutrition programs have shown promising results in reducing rates of low birth weight and improving cognitive development. Additionally, mental health interventions, such as counseling and therapy for pregnant women, have demonstrated positive impacts on both maternal well-being and child development [6]. Table 1, illustrates several maternal and child health intervention programs that are considered successful in Indonesia and globally. Table 1 describes several maternal and

child health programs that have been successful in Indonesia and globally, including the Childbirth Guarantee Program (Jampersal) which provides free access for pregnant women to health services, and the Village-Based Maternal and Child Health Program (VBMCH) which increases antenatal care visits through a community-based approach. At the global level, programs such as Every Woman Every Child (EWEC) launched by the UN focus on increasing access to reproductive health services, while the World Bank's Global Financing Facility (GFF) provides funds to strengthen maternal and child health services in developing countries [7]. These programs have shown significant impacts in reducing maternal and infant mortality rates and expanding access to health services for mothers and children in various regions [6,7].

Policy implications

Given the clear connection between maternal health and child development, policymakers must prioritize maternal health interventions as a public health strategy. This includes expanding access to prenatal care, improving nutritional programs, and integrating mental health support into routine maternity care. Governments and healthcare providers should work collaboratively to ensure that all pregnant women, especially those in low-resource settings, have access to these essential services [8]. The policy implications of Indonesia and the World Health Organization (WHO) regarding early intervention in maternal health, especially for pregnant women, are explained in Table 2. The maternal health intervention policies between Indonesia and WHO show differences in focus on the number of Antenatal Care (ANC) visits, where Indonesia requires a minimum of 4 visits while WHO recommends 8 for better pregnancy outcomes. Both emphasize the importance of nutritional supplementation to prevent anemia in pregnant women, but WHO places more emphasis on universal service provision. Indonesia emphasizes increasing referrals for high-risk pregnancies and the role of trained health workers in reducing maternal mortality, while WHO encourages universal access

to quality care. In addition, although WHO further emphasizes maternal mental health, Indonesia is still in the early stages of integrating mental health services into maternal care [7,8].

Obstacles and challenges

In Indonesia, obstacles to the implementation of early interventions for maternal health often revolve around accessibility and resource constraints. Many remote or less developed areas face challenges in terms of adequate health infrastructure, such as a lack of health facilities and trained medical personnel. In addition, economic and cultural factors are also barriers, where communities may face difficulties in meeting the costs of health checks or have difficulty adopting recommended health practices due to cultural barriers or inadequate information [6,7]. Globally, one of the main obstacles to the implementation of early interventions is the limitation in funding and resource allocation. Many developing countries face challenges in providing sufficient funds for maternal and child health programs, as well as in ensuring equitable and efficient distribution of resources. In addition, political instability and conflict often complicate efforts to deliver effective health services, hinder access to essential prenatal and postnatal care, and cause gaps in achieving global health goals [9].

In Indonesia, accessibility issues are often a major obstacle to the implementation of early interventions for maternal health. Many remote areas and small islands face challenges in terms of adequate health infrastructure, such as a lack of medical facilities and trained health personnel. Transportation and communication limitations also make it difficult for pregnant women to access the necessary prenatal care, increasing the risk of complications and health problems during pregnancy [8]. Economic problems also play a significant role in inhibiting access to health services. Many families in Indonesia, especially in low-income areas, have difficulty in meeting the costs of health checks, medicines, and nutrition

needed during pregnancy [10]. Although there is a National Health Insurance program such as the Social Security Administering Body (BPJS), additional costs or the lack of facilities near their homes are still barriers for pregnant women to get the care they need [7,8]. Cultural factors also influence the implementation of early interventions in maternal health. Some communities in Indonesia may have traditions or beliefs that conflict with modern health practices, such as regular antenatal visits or the use of nutritional supplements [6,9]. Lack of appropriate information or limited communication between health workers and the community can also exacerbate these problems, reducing the effectiveness of interventions and increasing health risks for mothers and babies [8,9].

Conclusion

This commentary concludes that early intervention during the first trimester of pregnancy is essential to prevent complications and ensure optimal fetal development. Adequate nutrition, folate and iron supplementation, and mental health support can reduce risks such as preterm birth and low birth weight, which have a direct impact on the child's long-term health. Maternal health, both physical and mental, has a major impact on the child's physical and emotional development, so appropriate monitoring and intervention are essential to prevent serious health problems that can affect the child's quality of life in the future. Given the challenges faced both at the national and global levels, such as limited access and resources, health policies must focus on providing universal access to prenatal care, appropriate nutritional interventions, and mental health support. In Indonesia, although there are programs such as Childbirth Guarantee Program (Jampersal) and Village-Based Maternal and Child Health Program (KIBD) that have shown positive results, many challenges remain to be overcome, including accessibility and economic factors. At the global level, efforts to improve the implementation of early intervention need to be

supported by adequate financing and a community-based approach to ensure that all pregnant women, especially in remote areas, can access the health services they need.

Competing interests

The authors declare no competing interests.

Authors' contributions

Suparji Suparji conceptualized and wrote the original draft; Heru Santoso Wahito Nugroho, Teta Puji Rahayu, Astuti Setiyani and Nuryani Nuryani revised and edited the paper. All the authors have read and approved the manuscript.

Tables

Table 1: some successful maternal and child health programs in Indonesia and globally

Table 2: policy implications from both Indonesia and the World Health Organization (WHO) regarding early interventions in maternal health, specifically for pregnant women

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Table 1: some successful maternal and child health programs in Indonesia and globally

Program	Description	Impact
Indonesia		
Childbirth Guarantee Program (Jampersal)	This program gives free access to health service to pregnant mothers during pregnancy, childbirth and postpartum, including for societies non register as BPJS participants.	Expanding access to health service for pregnant mothers, reduce the mortality among mothers and babies, especially to lower the circles of intermediate economy.
Village-Based Maternal and Child Health (VBMCH) Program	Launched by the Ministry of Health in 2021, this program involves cadre health village to give education about prenatal and postnatal care, as well as increase access to health facility.	Increase antenatal care (ANC) visits and reduce mortality in mothers and babies in target areas through community approach.
Global		
Every Woman Every Child (EWEC)	Programs launched by the UN and various international organization in 2010 focusing on improving access to reproduction health services, preventing babies' death and promoting well-being women and children.	Increase investment in mother and child health services, take advantage of technology innovation such as telemedicine and strengthen global health systems, as well as lower mortality in mothers and babies.
Global Financing Facility (GFF)	Launched by the World Bank and its partners, the GFF focuses on providing funding to increase basic health services, including maintenance of pregnant women and children' vaccination and nutrition.	Help developing countries strengthen health systems, reduce mortality in mothers and babies, and ensure access to better health services for mothers and children.

Table 2: policy implications from both Indonesia and the World Health Organization (WHO) regarding early interventions in maternal health, specifically for pregnant women

Policy aspect	Indonesia (updated)	WHO (Global Policy)
Antenatal Care (ANC)	Indonesia's Ministry of Health emphasizes routine ANC visits at least 4 times during pregnancy. This is part of the National Health Insurance program to ensure access to maternal services.	WHO recommends a minimum of 8 ANC contacts for positive pregnancy outcomes, focusing on screening and preventive measures.
Nutritional Interventions	The government prioritizes nutritional supplementation (e.g., iron, folic acid) for pregnant women to combat high rates of anemia (48.9% as of 2018). Stunting prevention programs are integrated through community health centers (Posyandu).	WHO encourages micronutrient supplementation, especially iron and folic acid, as key to preventing maternal anemia and its consequences.
Maternal Mortality Reduction	Indonesia's National Strategy for Reducing Maternal Mortality focuses on improving the referral systems for high-risk pregnancies and increasing skilled birth attendants.	WHO's Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) focuses on ensuring universal access to quality care to reduce maternal mortality by 2030.
Family Planning	Government programs support family planning through accessible contraceptive services, aiming to reduce high-risk pregnancies and promote healthy birth spacing.	WHO promotes universal access to family planning and reproductive health services to reduce unintended pregnancies and support maternal health.
Mental Health Support	Indonesia's policies on maternal mental health are gradually incorporating postpartum depression screening as part of maternal care, though coverage is still limited.	WHO emphasizes mental health care as part of maternal care, particularly focusing on postpartum depression and psychological support during pregnancy and postnatal periods.
High-risk Pregnancy Management	Policies stress the early detection of high-risk pregnancies through village midwives and community health programs (Posyandu), supported by telemedicine for remote areas.	WHO recommends early detection and management of complications like gestational diabetes, hypertension, and other pregnancy-related risks through routine ANC.
Vaccination and Preventive Care	Integrated maternal programs include Tetanus Toxoid (TT) vaccination and HIV screening to prevent maternal and neonatal infections.	WHO supports universal vaccination programs during pregnancy and promotes preventive care, including screening for HIV, syphilis and other infections.
COVID-19 Response	The Ministry of Health adjusted policies to ensure safe maternal care during the COVID-19 pandemic, promoting telehealth services and maintaining essential health services.	WHO issued specific COVID-19 maternal health guidelines to protect pregnant women from the virus while ensuring continuous access to maternal services.
Community Empowerment	Indonesia continues to focus on community-based interventions (Posyandu), enabling local cadres to assist in maternal and child health monitoring, particularly in rural areas.	WHO advocates for community-based interventions as part of the Primary Health Care (PHC) approach, empowering local communities to support maternal health.