Integrating Reproductive Health and Nutrition: A Breakthrough Solution to Combat Stunting

Rahmah Juliani Siregar[1], Chatarina Suryaningsih[2], Yeti Trisnawati[3], Bernadetha Nadeak[4], Bincar Nasution[5]

[1]*STIKes Darmais Padangsidimpuan, Indonesia, rahmahjulianisiregar@gmail.com*
[2]*Universitas Jenderal Achmad Yani, Indonesia, chatarina.surya@yahoo.com*
[3]*Akademi Kebidanan Anugerah Bintan, Indonesia, yetitrisna2014@gmail.com*
[4]*Universitas Kristen Indonesia, bernadetha.nadeak@uki.ac.id*
[5]*Universitas Graha Nusantara, bin@ipi-limited.com*

KEYWORDS
Innovative Solutions; Nutrition and Stunting; Reproductive Health Integration.

ABSTRACT
Objective: This study aims to explore the importance of integrating reproductive health and nutrition as a strategic approach in addressing stunting in Indonesia. Materials & Methods: Using a qualitative study, this research analyzed findings from observation and from various scientific journals, reports of international and national health organizations, and policies related to stunting, reproductive health, and nutrition. The study emphasizes the importance of comprehensive perinatal interventions and supports the strengthening of maternal and child health systems. Findings: The analysis shows that a comprehensive approach that integrates nutrition interventions and reproductive health initiatives can significantly reduce the prevalence of stunting. This approach highlights the importance of adequate nutritional supplementation, quality perinatal health care, and health education programs for expectant mothers. Conclusion: The findings of this study are expected to contribute to the development of health policies that aim to sustainably reduce stunting rates with a holistic approach that focuses on maternal and child health.

1. Introduction

Stunting, defined as a condition in which the linear growth of children under five is stunted, is a highly complex and multidimensional public health problem. The term "stunting" is defined as a height that is below the growth standards set by the World Health Organization (WHO) based on the age of the child. Children who are stunted typically exhibit sustained chronic undernutrition, particularly during the first thousand days of life, from conception to two years of age. This results in visible impairments in physical development, but the impact is not limited to the physical.

The impact of stunting extends to cognitive development and the long-term productivity of an individual. Research indicates that stunted children tend to demonstrate lower learning capacity, poorer academic performance, and diminished earning potential in adulthood relative to children who are nourished with adequate nutrition. Furthermore, the long-term consequences of stunting are linked to an elevated risk of chronic health issues in adulthood, including diabetes, hypertension, and heart disease (Fleary, 2024).

As indicated in a recent WHO report, the number of children under the age of five who were stunted globally in 2020 exceeded 149 million. Stunting is a particularly prevalent issue in low- and middle-income countries, where access to adequate nutrition and quality health services is often constrained. Despite the implementation of a series of prevention strategies by the Indonesian government, the prevalence of stunting in the country remains a significant concern. In 2021, the prevalence of stunting in Indonesia reached 24.4%, representing a decline from the 30.8% recorded in 2018. However, this figure still falls short of the targeted reduction below 20% as outlined in the National Medium-Term Development Plan (RPJMN). (Indonesia., 2021)

The primary contributing factors to stunting are inadequate nutrient intake during the critical period of the first thousand days of life, which encompasses the prenatal period through a child's second year. This is a period of rapid growth and development of the brain and body, and thus any nutritional deficiencies during this phase will have a lasting impact. A lack of knowledge about good nutrition, incorrect feeding practices, recurrent infections, and lack of access to adequate health services are factors that contribute to high rates of stunting. Additionally, maternal health conditions during pregnancy can exacerbate the effects of stunting. Reproductive health problems, such as anemia in pregnant women, early pregnancy, or infections during pregnancy, can affect fetal growth and increase the risk of children becoming stunted after birth.

This indicates the necessity for the integration of reproductive health and nutrition interventions as a more efficacious preventive measure. A considerable body of research has underscored the necessity of a comprehensive approach that not only focuses on the well-being of children after birth but also considers the health and nutritional status of mothers before, during, and after pregnancy. Maternal reproductive health status is of paramount importance in creating an intrauterine environment that supports optimal fetal development. Adequate nutrition during pregnancy not only prevents premature birth or low birth weight but also plays a pivotal role in reducing the risk of stunting later in life. (Ferdous et al., 2023)

2. Materials and Methods

Research Design

This research employs the method of qualitative research to achieve an extensive and thorough examination of pertinent scientific literature concerning stunting, reproductive health, and nutrition, particularly with respect to strategies for prevention and management. This study employs a comprehensive literature analysis, encompassing both academic and non-academic sources. These include internationally recognized scientific journals, reports from renowned organizations such as the World Health Organization (WHO) and UNICEF, as well as governmental and institutional policies and programs pertaining to stunting prevention. (Bhutta et al., 2013)

The data collection involved observation and an in-depth search across reputable academic databases. This search was systematically reviewed to identify the most relevant and up-to-date data, which included interview, observation and recent journal articles, field research reports also comprehensive meta-analyses. The data was then analyzed critically to build a thorough understanding of the relationship between reproductive health, maternal nutrition, and their impact on stunting prevalence in children, especially within the context of developing countries. This qualitative analysis also examines how interventions in the fields of reproductive health and maternal nutrition might reinforce each other, enhancing efforts to prevent stunting (Jiang et al., 2022).

Figure 1. Qualitative Research

3. Findings

The Relationship Between Reproductive Health and Stunting

Stunting, characterized by height below the growth standard of children of the same age, is one of the most important indicators of chronic malnutrition in children. The causes are diverse, ranging from nutritional factors to socio-economic aspects, but maternal reproductive health plays a very important role in increasing or reducing the risk of stunting in children. Many studies show that a mother's reproductive health status before and during pregnancy has a major impact on fetal growth and child health after birth. (Saputri & Risnawati, 2024)

Influence of Reproductive Health Before Pregnancy

Maternal reproductive health before pregnancy is an important factor in determining pregnancy success and infant health. Studies show that a woman's optimal nutritional status and reproductive health before conception can reduce the risk of various pregnancy complications and impaired fetal growth. (Konwisser & Korytko, 2022)

For example:

1. Malnutrition: Women who are undernourished or malnourished before pregnancy have low energy and nutrient reserves, which affects fetal development. Maternal malnutrition is often associated with low birth weight, which is one of the main risk factors for child stunting.

2. Poor Reproductive Health: Diseases such as polycystic ovary syndrome (PCOS), menstrual disorders and untreated sexually transmitted diseases can affect a woman's fertility and reproductive health, negatively impacting pregnancy outcomes. For example, PCOS is often associated with a higher risk for gestational diabetes and preeclampsia, which affect fetal growth and increase the risk of stunting.

3. Pregnancy Planning and Preconception Health: Recent studies emphasize the importance of pregnancy planning programs and preconception care in preventing complications that can lead to stunting. Good pregnancy planning ensures that the mother is in optimal physical and mental condition before becoming pregnant, which will reduce the risk of stunting in the child.

Anemia in Pregnant Women and its Impact on Stunting

One of the most common reproductive health problems in developing countries is anemia in pregnant women. Anemia is defined as low hemoglobin levels in the blood, often due to iron deficiency. According to WHO, about 40% of pregnant women worldwide are anemic. Anemia during pregnancy has serious consequences for fetal growth, including increasing the risk of premature birth and low birth weight, which are important risk factors for stunting.

Studies published by The Lancet Global Health (2023) show that babies born to mothers with anemia during pregnancy are more likely to experience physical and cognitive growth delays, often leading to stunting in toddlerhood. Prolonged iron deficiency during pregnancy not only affects the oxygenation of fetal tissues, but also affects the development of its brain and nervous system. (Fitriyah & Fitriani, 2023)

Infections During Pregnancy and the Consequences for Stunting

Infections suffered by the mother during pregnancy can impair fetal development and increase the risk of stunting after birth. Infections such as malaria, HIV and urinary tract infections (UTIs) are often a serious problem in the context of maternal health in developing countries, and have a strong association with stunting.

1. Malaria: Malaria infection in pregnant women increases the risk of babies being born prematurely and with low birth weight. A study published in the Journal of Global Health (2021) found that pregnant women infected with malaria were more likely to give birth to stunted children compared to uninfected mothers.

2. HIV: Mothers with HIV are at higher risk of giving birth to babies with growth problems, especially if HIV infection is not treated during pregnancy. Lack of access to antiretroviral (ARV) treatment can lead to impaired fetal development, increasing the likelihood of stunting in the child later in life.

In addition to direct infections, chronic infections that pregnant women often experience such as UTIs can also trigger inflammation that affects fetal growth, increasing the risk of premature birth and growth disorders. (Maulina et al., 2024)

Lack of Prenatal Care and its Effect on Stunting

Inadequate prenatal care during pregnancy is a significant factor affecting the risk of stunting. In many developing countries, access to quality prenatal healthcare is often limited, and many mothers do not receive the routine check-ups needed to detect health problems at an early stage. This results in late treatment of problems such as anemia, high blood pressure and infections, all of which can affect fetal development and increase the risk of stunting.

Prenatal care includes regular monitoring of maternal and fetal health, provision of supplements such as iron and folic acid, and vaccinations to protect the mother and fetus from infectious diseases. Studies show that regular

prenatal care can reduce the risk of pregnancy complications leading to stunted fetal growth. (Maulina et al., 2022)

Influence of Maternal Age on Stunting Risk

Maternal age is also an important factor affecting reproductive health and the risk of stunting in children. Mothers who become pregnant too young (under 20 years old) or too old (over 35 years old) tend to have a higher risk of giving birth to stunted children. In teenage mothers, their bodies are often not fully developed to support a healthy pregnancy, which can result in a lack of nutrients for the fetus.

Conversely, in older mothers, the risk of complications such as preeclampsia, gestational diabetes, and chromosomal abnormalities in the fetus increases. These factors can affect fetal development and increase the risk of stunting after birth. (Garina et al., 2024)

Social and Economic Factors Affecting Reproductive Health

Socio-economic conditions also affect reproductive health and stunting. Women living in poverty, with limited access to health services, are more likely to experience malnutrition, anemia, and lack of prenatal care. In addition, they may have more children too closely spaced, which affects the mother's health and the body's ability to recover after pregnancy, increasing the risk of stunting in subsequent children. (Enjezab et al., 2023)

This study is consistent with the findings of Konwisser and Korytko (2022), who emphasized the pivotal role of maternal reproductive health prior to pregnancy in the success of pregnancy and the health of the infant. They posited that pre-conception reproductive health conditions, including nutritional status, hormonal health, and metabolic balance, exert an influence on early fetal development. Optimal reproductive health conditions, including balanced weight status, good reproductive system health, and a diet that meets the needs of micronutrients and macronutrients, have been linked to a higher probability of a healthy pregnancy and a normal birth weight. The latter is an early indicator that can help minimize the risk of stunting and other developmental problems in children.

Moreover, Konwisser and Korytko's research underscores the substantial impact of obesity on women's reproductive health. Obesity, which is often accompanied by metabolic disorders such as insulin resistance, systemic inflammation, and hormonal imbalances, has been demonstrated to impact various aspects of reproductive health, including the menstrual cycle, ovulation, and fertilization success. Women with obesity are at an elevated risk of developing pregnancy complications, including gestational diabetes and hypertension. These complications not only threaten maternal health but can also affect fetal development. They can result in premature birth, low birth weight, and impaired fetal growth, all of which are risk factors associated with stunting.

The Significance of Nutritional Interventions for Pregnant Women: A Comprehensive Strategy to Address Stunting

Adequate nutrition during pregnancy is a key factor in ensuring optimal fetal development and preventing stunting in children after birth. Pregnant women need adequate intake of micro and macronutrients to support their own body needs as well as the development of the fetus in the womb. Nutritional imbalances, especially micronutrient deficiencies such as iron, folic acid, and iodine, risk causing fetal growth disorders, which have a direct impact on increasing the risk of stunting later in life. In this context, targeted and planned nutrition interventions for pregnant women play a crucial role in reducing stunting. (Yanti et al., 2023)

Impact of Micronutrient Deficiencies on Pregnant Women and Fetal Development

Micronutrients, although required in small amounts, play an important role in supporting fetal growth and development. Three micronutrients that are often deficient during pregnancy and have a significant impact on fetal growth are iron, folic acid and iodine.

1. Iron: Iron is required for the production of hemoglobin, a protein in red blood cells that carries oxygen throughout the body, including the fetus. Iron deficiency in pregnant women can lead to iron deficiency anemia, which is associated with low birth weight, premature birth, as well as an increased risk of neonatal death. In addition, iron deficiency can affect a child's future cognitive and motor growth.

2. Folic Acid: Folic acid is essential in the process of DNA and RNA formation, which are instrumental in fetal development, especially in the first trimester. Folic acid deficiency in pregnant women risks causing neural

tube defects, which can affect the development of the baby's brain and spine. Adequate folic acid consumption, especially in the early stages of pregnancy, has been shown to reduce the risk of birth defects and also contribute to the healthy development of the fetus.

3. Iodine: Iodine plays a role in the production of thyroid hormones, which are essential for fetal brain growth and development. Iodine deficiency during pregnancy can lead to cretinism, which is characterized by mental retardation and stunted growth in infants. Intervention with iodine supplementation has been shown to be effective in preventing such disorders.

Micronutrient deficiencies mentioned above result in serious impairments in fetal development, including stunting. Therefore, nutritional interventions that include supplementation and increased micronutrient intake are vital in preventing stunting from early pregnancy. (Mayasari et al., 2023)

Targeted Nutrition Interventions for Pregnant Women

Targeted nutrition interventions for pregnant women are strategic efforts that aim to ensure the nutritional needs of the mother and fetus are met. Some interventions that have been proven effective in reducing stunting rates are:

1. Iron and Folic Acid Supplementation: WHO recommends routine iron and folic acid supplementation for pregnant women to prevent anemia and micronutrient deficiencies. Meta-analysis studies show that this supplementation not only prevents maternal anemia, but also increases infant birth weight and decreases the risk of preterm birth.

2. Increased Intake of Nutritious Foods: In addition to supplementation, pregnant women need to eat foods that are rich in nutrients. Protein source foods such as fish, lean meat, beans, as well as green vegetables and fruits rich in vitamins and minerals, should be part of the daily diet. These foods are important to support the development of the baby's brain, bones and body tissues.

3. Nutrition Monitoring and Counseling: Regular monitoring of the nutritional status of pregnant women is also important in detecting nutritional problems early. Nutrition counseling provided by health workers helps mothers understand the importance of a balanced diet and appropriate supplements during pregnancy. The program provides education on nutritious food sources, how to optimize nutrition intake despite economic limitations, and the importance of maintaining personal and fetal health.(Abdulsalam & Hasni, 2024)

The Importance of Nutrition Interventions from Preconception to Breastfeeding

An effective nutrition intervention approach should start before pregnancy (preconception) and continue through the breastfeeding period, with the aim of creating an environment that supports optimal child growth.

1. Preconception Period: The preconception period, the time before a woman becomes pregnant, is an important stage in preparing for reproductive health. The nutritional status of the mother during this period affects the quality of ovulation, fertilization and early embryo development. Research shows that women with good nutritional status before pregnancy tend to have healthy pregnancies and babies born with normal weight.

2. Pregnancy Period: During pregnancy, an increase in energy and nutritional needs becomes very important. In addition to increasing calorie intake, pregnant women should ensure consumption of foods rich in protein, healthy fats, complex carbohydrates, and essential vitamins and minerals. If the nutritional status of the mother is good, the risk of complications during pregnancy and childbirth can be minimized, and the fetus can grow and develop optimally.

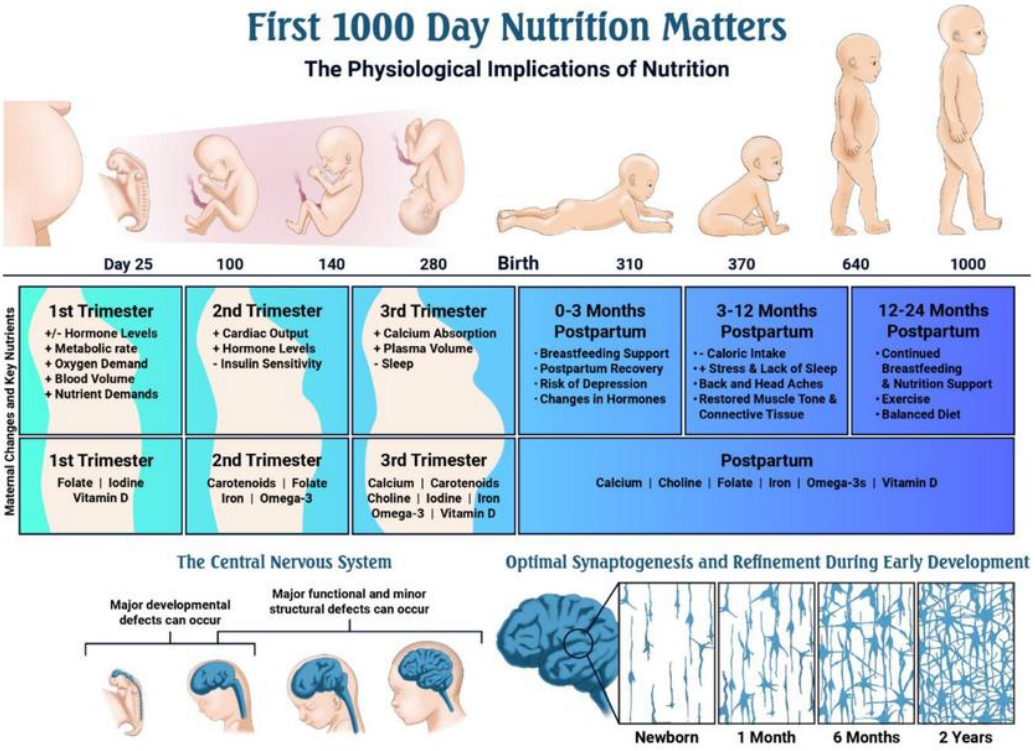

Figure 2. First 1000 day Nutrition. (Source: WHO)

3. Breastfeeding Period: Breastfeeding is one of the most effective ways to prevent stunting, especially in the first six months of life. Exclusive breastfeeding provides all the nutrients a baby needs for healthy growth and boosts immunity. Nutritional interventions for breastfeeding mothers should continue to maintain the quality of breast milk and ensure that the nutritional needs of both mother and baby are met. (Cinelli et al., 2023)

Recent Studies on Nutrition Interventions for Pregnant Women and Stunting Prevention

A recent study published in the journal The Lancet Global Health (2023) emphasized the importance of multiple micronutrient supplementation in pregnant women as an important step in reducing the prevalence of stunting. The study found that providing multimicronutrient supplements to pregnant women significantly increased infant birth weight and reduced stunting rates by 22% in countries with a high prevalence of stunting.

Another study published in Maternal & Child Nutrition (2022) highlighted the importance of community-based nutrition interventions, where empowering mothers through education programs and continuous nutrition monitoring can increase awareness and good nutrition practices during pregnancy. This has been shown to be effective in reducing the risk of stunting in rural areas with limited access. (Katmawanti et al., 2024)

This research is consistent with the findings of Yanti et al. (2023), which indicate that adequate nutrition during pregnancy is a crucial factor in ensuring optimal fetal development and preventing stunting in children after birth. The provision of nutrition education for pregnant women has been shown to significantly influence the level of knowledge and attitudes of respondents. Following the implementation of nutrition education, there was a notable enhancement in the knowledge, attitudes, and nutritional status of the respondents. It is anticipated that pregnant women, upon completion of the nutrition education program, will demonstrate a more comprehensive understanding of the principles of balanced nutrition and the prevention of stunting during both the prenatal and postnatal periods. They will also be better equipped to plan their daily dietary intake with a focus on incorporating healthy and nutritious food items to prevent the onset of chronic energy deficiency and anemia during pregnancy.

The Role of Reproductive Health and Nutrition Education in the Prevention of Stunting

Stunting, or the condition of stunted growth in children, is one of the most serious global health problems, especially in developing countries. According to WHO data, stunted children not only face barriers to physical

growth, but also have a higher risk of delayed cognitive development and poor health throughout life. One of the important efforts in preventing stunting is providing education on reproductive health and nutrition to mothers, both during preconception, pregnancy, and postpartum. (Ratna Wulandari & Ahmad Syafiq, 2023)

Significance of Reproductive Health and Nutrition Education

Reproductive health and nutrition education plays a key role in changing behavior and increasing mothers' understanding of the importance of adequate nutrition during pregnancy and after childbirth. Many mothers, especially in less developed regions, do not have access to adequate information on proper nutrition during this period. This can lead to various problems, such as micronutrient deficiencies (e.g. iron, folic acid, iodine), which have a direct impact on fetal and infant health.

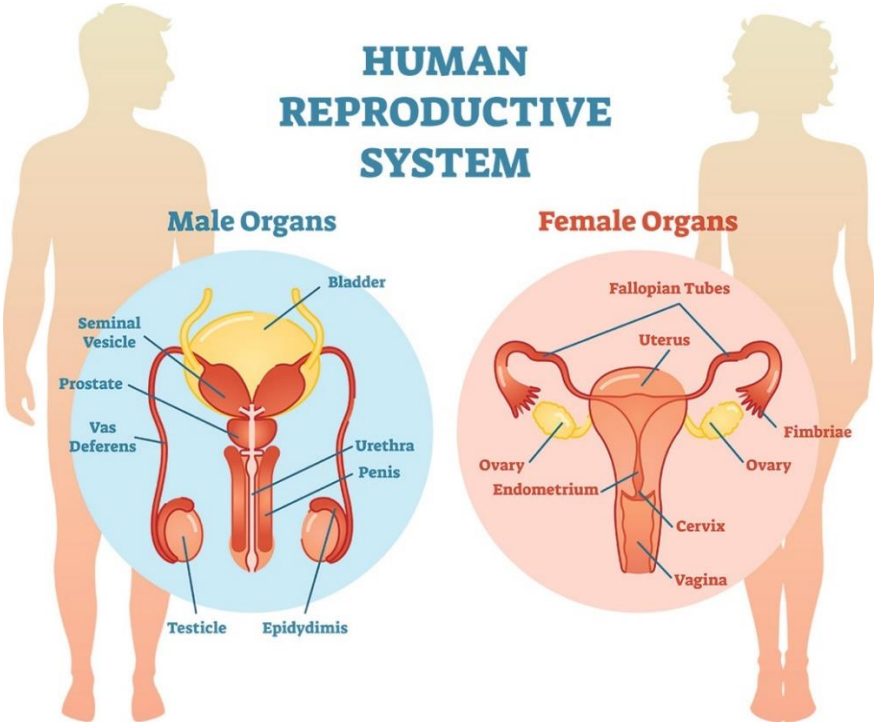

Figure 3. Reproductive Health (Source: niehs)

Poor nutrition during pregnancy can result in low birth weight and increase the risk of stunting in children. Education that focuses on reproductive health is also important, as various maternal health factors such as infections during pregnancy, anemia, maternal age that is too young or too old, and pregnancy spacing that is too close together can increase the risk of stunted babies. Thus, an effective and comprehensive education program is needed. (Mustafa, 2024)

Effect of Nutrition Education on Behavior Change

One important aspect of nutrition health education is the ability to change maternal behavior related to diet and healthy living habits. Research shows that health education programs and campaigns targeting mothers during pregnancy are successful in increasing mothers' knowledge of appropriate nutritional requirements and improving appropriate feeding practices, including exclusive breastfeeding and nutritious complementary foods.

For example, research published in Maternal & Child Nutrition in 2020 highlighted the importance of nutrition education for pregnant women in Sub-Saharan Africa, which resulted in increased maternal nutrition intake and decreased prevalence of anemia among pregnant women. The study showed that mothers who were educated about the importance of nutrition were more likely to follow health recommendations, such as taking iron and folic acid supplements, which contributed to healthier fetal growth. (Sitty Fadhilla Fitrianty Lahay et al., 2024)

Education in the Prevention of Malnutrition during Pregnancy

Pregnancy is a critical phase that determines the future health of the baby. Reproductive health education integrated with nutrition education not only focuses on the prevention of reproductive diseases, but it is also

important to improve mothers' understanding of the relationship between reproductive health and nutritional intake. For example, anemia during pregnancy, which often occurs due to iron deficiency, can affect blood flow and oxygen reaching the fetus, hindering fetal growth and development, ultimately leading to stunting after birth. (Madden et al., 2023)

An effective education program involves providing easy-to-understand information on the foods pregnant women should consume to prevent nutritional deficiencies. According to a study in The Lancet Global Health, educational interventions that provide appropriate information on pregnant women's diets, such as increased consumption of green vegetables, fatty fish, and iron-containing supplements, can significantly reduce the prevalence of low birth weight babies and improve fetal health.

The research presented here is in alignment with the findings of Fleary (2024), which indicate that the role of adults, particularly parents, is of significant importance in the prevention of stunting. An effective educational program should provide accessible information regarding the dietary recommendations for pregnant women to ensure the prevention of nutritional deficiencies.

Role of Health Campaigns in the Community

Reproductive health and nutrition education is not only provided through clinical interventions, but also through health campaigns and counseling at the community level. Extension programs involving health workers, midwives, and social workers in various regions allow important information on reproductive health and nutrition to reach a wider group of people, especially in rural or remote areas. In Indonesia, programs such as “Posyandu” and “Pregnant Women's Classes” have been implemented as strategies to educate pregnant women about nutrition and reproductive health.

Research shows that community-based approaches that focus on direct counseling, group discussions, and social support can help overcome logistical and cultural challenges in promoting maternal health. For example, a study in Public Health Nutrition in 2021 found that a community-based education intervention in India successfully increased pregnant women's nutritional intake and improved pregnancy outcomes, including reducing stunting in children. (Odongo, 2024)

Challenges in Implementing Reproductive Health and Nutrition Education

Although the benefits of reproductive health and nutrition education have been widely recognized, there are still challenges in its implementation, especially in developing countries. Some of the challenges include limited access to health services, low education levels, cultural norms and traditional beliefs that are still dominant in some communities. These factors may prevent mothers from following nutrition and health recommendations during pregnancy.

In this context, a multi-sectoral approach is needed to overcome these barriers. Programmes that involve collaboration between the government, health organizations and local communities can provide better support to pregnant women. In addition, training for health workers on how to provide effective education is also needed to ensure that messages are well understood and received by pregnant women. (Lahope & Fathurrahman, 2024)

Integrative Policies and Programs to Combat Stunting: A Multinational Investigation of Case Studies

Stunting is a complex health challenge, resulting not only from a lack of access to nutritious food, but also related to various other factors, such as maternal health status, sanitation, education, and health care. Therefore, an effective approach to reducing stunting requires comprehensive policies that integrate various sectors, especially between reproductive health and nutrition. (Yusnita et al., 2024)

Incorporation of Reproductive Health and Nutrition in Stunting Prevention Programs

Integrative approaches that combine reproductive health and nutrition have gained global attention as a way to accelerate stunting reduction. These programs aim to ensure that women of reproductive age, especially those planning to become pregnant or currently pregnant, receive quality health care as well as access to appropriate nutrition interventions.

Reproductive Health focuses on maternal health before, during, and after pregnancy, covering prenatal care, provision of information on sexual and reproductive health, and postpartum care. Optimal care during pregnancy can help reduce complications such as maternal anemia, preterm birth, and low birth weight, all of which are linked to child stunting.

Nutrition interventions include supplementation with micronutrients such as iron, folic acid and vitamins, and encouragement to eat nutrient-rich foods during pregnancy and lactation. Good nutrition during pregnancy is an important factor in supporting healthy fetal development, reducing the risk of stunting in children. (Anggraini & Fatkhuri, 2024)

Principles of Successful Integrative Policies

From some of the case studies above, there are several principles that can be identified as key to success in integrative policies and programs in combating stunting:

1. Multisector Collaboration: An integrative approach requires collaboration between the health, education, sanitation and social sectors. This ensures that the problem of stunting is addressed from all aspects that affect maternal and child health.

2. Focus on Maternal and Child Health: Successful programs put mothers and children at the center. Improving maternal health during preconception and pregnancy is one effective strategy in preventing stunting.

3. Education and Counseling: Educating pregnant women and communities about the importance of nutrition and reproductive health is an important pillar in the fight against stunting.

4. Monitoring and Evaluation: Effective policies also involve a good monitoring system to evaluate the progress of the program and adjust interventions as needed. (Yuliani & Sadad, 2024)

5. Conclusion

The integration of reproductive health and nutrition as a solution to combat stunting represents a strategic step that is increasingly recognized for its effectiveness in a variety of contexts. Stunting, or failure to thrive due to chronic malnutrition, is not only caused by a lack of access to nutritious food; it is also closely related to maternal health before, during, and after pregnancy. Maternal reproductive health is a significant determinant of fetal growth. The maternal health status prior to pregnancy, the care provided during pregnancy, and the maternal nutritional patterns during and after breastfeeding are significant factors that influence the risk of stunting in children. One of the primary objectives in the fight against stunting is to guarantee that mothers receive timely and effective reproductive health interventions. Health issues such as anemia, infections during pregnancy, and hormonal imbalances can impede fetal growth and increase the probability of low birth weight (LBW), which is a substantial risk factor for stunting. It is therefore imperative that reproductive health interventions, including comprehensive antenatal check-ups, early treatment of reproductive health problems, and timely immunizations, are made available. However, it is insufficient to consider reproductive health in isolation, without also addressing adequate nutrition. The quality of nutrition received by the fetus is contingent upon the maternal diet during pregnancy. Deficiencies in micronutrients, such as iron, folic acid, and iodine, or even macronutrients, such as protein and calories, can result in impaired fetal growth, which subsequently affects the growth of the child after birth. Supplementation programs, such as the administration of iron and folic acid tablets during pregnancy, have been demonstrated to enhance maternal nutritional status and mitigate the risk of stunting. This approach of integrating reproductive health and nutrition not only targets short-term interventions but also aims to have a long-term impact, thereby addressing the underlying causes of maternal and child health problems. By ensuring that mothers are in optimal health prior to and throughout pregnancy, and by providing adequate nutritional support during and after pregnancy, the risk of stunting can be significantly reduced. This enables children to flourish and develop to their full potential, both physically and cognitively, thereby increasing their likelihood of becoming productive members of society in the future. From a policy perspective, the integration of reproductive health and nutrition necessitates robust support from the government and other key stakeholders. National initiatives that prioritize the improvement of maternal and infant well-being should encompass a comprehensive approach to nutrition and reproductive health. It is imperative that policies be enacted to ensure universal access to reproductive health services, including antenatal check-ups, safe delivery services, and adequate food for mothers and children, in order to reduce the prevalence of stunting. The practical implications entail the implementation of comprehensive national policies that guarantee universal access to reproductive health services, antenatal check-ups, safe delivery services, and adequate nutrition for mothers and children. This study is constrained by a literature analysis that necessitates further corroboration through empirical research to ascertain the efficacy of implementing this integration in diverse local contexts. Future research could devise integrated intervention models that align with local, regional, and cultural characteristics, and evaluate policy implementation to facilitate strategic implementation at the national level.

Acknowledgments: Thank you to all people and institution for supporting this research until its completion.

Ethical Permissions: After reviewing the process, the Institutional Review Board (IRB) gave the procedure ethical clearance.

Conflicts of Interests: There were no conflicts of interest.

Authors' Contribution:

Funding/Support: There were no funding

Reference

[1] Abdulsalam, R., & Hasni, Y. (2024). Assessing Pregnant Women's Readiness for Pregnancy-Healthy Nutrition: A Trans-theoretical Model Approach. Mosul Journal of Nursing, 12(1), 56–63. https://doi.org/10.33899/mjn.2024.182191

[2] Anggraini, R. P., & Fatkhuri, F. (2024). Budget Politics in the Implementation of Social Assistance Programs (Case Study of Stunting Programs in Depok City). Jurnal Ilmiah Ilmu Administrasi Publik, 14(1), 141. https://doi.org/10.26858/jiap.v14i1.63143

[3] Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., & Black, R. E. (2013). Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? The Lancet, 382(9890), 452–477. https://doi.org/10.1016/S0140-6736(13)60996-4

[4] Cinelli, G., Croci, I., Gesualdo, F., Pandolfi, E., Miller, K. P., & Tozzi, A. E. (2023). Public Engagement in Digital Recommendations for Promoting Healthy Parental Behaviours from Preconception through the First 1000 Days. International Journal of Environmental Research and Public Health, 20(2), 1329. https://doi.org/10.3390/ijerph20021329

[5] Enjezab, B., Bokaei, M., & Salmanabad, F. (2023). Attitude and Factors Affecting Intention of Childbearing in COVID 19 Pandemic in Married Women of Reproductive Age Referred to Comprehensive Health Centers in Yazd City in Year 2022. Journal of Shahid Sadoughi University of Medical Sciences. https://doi.org/10.18502/ssu.v31i7.13696

[6] Ferdous, F., Jahan, S., Sharmin, S., & Afroz, S. (2023). Intrauterine fetal death and associated maternal conditions. BIRDEM Medical Journal, 13(2), 88–91. https://doi.org/10.3329/birdem.v13i2.66009

[7] Fitriyah, N., & Fitriani, N. (2023). THE RELATIONSHIP BETWEEN ANEMIA IN PREGNANT WOMEN AND THE RISK OF STUNTING. Jurnal SMART Kebidanan, 10(2), 83. https://doi.org/10.34310/sjkb.v10i2.420

[8] Fleary, S. A. (2024). Linking Childhood Cultural Health Capital Factors with Adult Health Literacy. HLRP: Health Literacy Research and Practice, 8(2). https://doi.org/10.3928/24748307-20240422-01

[9] Garina, L. A., Dewi, M. K., Trusda, S. A. D., Purbaningsih, W., Muflihah, H., Tursina, A., Respati, T., & Rahimah, S. B. (2024). Maternal, Child, and Household Risk Factors for Children with Stunting. The Open Public Health Journal, 17(1). https://doi.org/10.2174/0118749445321448240823112908

[10] Jiang, Y., Zhao, Y., Milne, G., Dai, Q., Chen, Q., Zhang, X., Lan, Q., Rothman, N., Gao, Y.-T., Cai, Q., Shu, X.-O., Zheng, W., & Yang, G. (2022). Quality of dietary carbohydrate is more important than its quantity in lipid peroxidation. The American Journal of Clinical Nutrition, 116(1), 189–196. https://doi.org/10.1093/ajcn/nqac047

[11] Katmawanti, S., Wahyuni, O. S., Paramita, F., Kurniawan, A., & Khuzaimah, S. (2024). Implementation of Specific Nutrition Interventions to Prevent Stunting in Pregnant Women in the Oesapa Community Health Center Area East Nusa Tenggara. Preventia : The Indonesian Journal of Public Health, 9(1), 29. https://doi.org/10.17977/um044v9i12024p29-47

[12] Kementrian Kesehatan. (n.d.). Laporan Tahunan Kesehatan Ibu dan Anak 2021.," J. Akarta Kementeri. Kesehat. RI., 2021.

[13] Konwisser, A., & Korytko, O. (2022). Influence of obesity on reproductive health before andduring pregnancy. INTERNATIONAL JOURNAL OF ENDOCRINOLOGY (Ukraine), 18(8), 446–450. https://doi.org/10.22141/2224-0721.18.8.2022.1224

[14] Lahope, G., & Fathurrahman, R. (2024). Current State, Challenges, and Opportunities of the School-Based Sexual and Reproductive Health Education in Indonesia: A Systematic Literature Review. Preventia : The Indonesian Journal of Public Health, 9(1), 81. https://doi.org/10.17977/um044v9i12024p81-94

[15] Madden, C., Ferber, M., Cantwell, S., Xaverius, P., & Christopher, K. M. (2023). Maternal Malnutrition During Pregnancy Among Women with Metabolic and Bariatric Surgery. Obesity Surgery, 33(8), 2276–2281. https://doi.org/10.1007/s11695-023-06678-0

[16] Maulina, R., Qomaruddin, M. B., Prasetyo, B., & Indawati, R. (2024). Maternal Complications during Pregnancy and Risk Factors for Stunting. Iranian Journal of Nursing and Midwifery Research, 29(3), 309–313. https://doi.org/10.4103/ijnmr.ijnmr_358_22

[17] Maulina, R., Qomaruddin, M. B., Sumarmi, S., Fahrul, A., & Haryuni, S. (2022). Antenatal Depression as a Stunting Risk Factor: A Systematic Review. Open Access Macedonian Journal of Medical Sciences, 10(F), 234–240. https://doi.org/10.3889/oamjms.2022.8501

[18] Mayasari, N. R., Bai, C.-H., Chao, J. C.-J., Chen, Y.-C., Huang, Y.-L., Wang, F.-F., Wiratama, B. S., & Chang, J.-S. (2023). Relationships between Dietary Patterns and Erythropoiesis-Associated Micronutrient Deficiencies (Iron, Folate, and Vitamin B12) among Pregnant Women in Taiwan. Nutrients, 15(10), 2311. https://doi.org/10.3390/nu15102311

[19] Mustafa, N. (2024). Clinical Nutrition and Health. Albus Scientia, 2024(1), 1–2. https://doi.org/10.56512/AS.2024.1.e240628

[20] Odongo, M. (2024). Health Communication Campaigns and Their Impact on Public Health Behaviors. Journal of Communication, 5(2), 55–69. https://doi.org/10.47941/jcomm.1980

[21] Ratna Wulandari, & Ahmad Syafiq. (2023). THE EFFECT OF NUTRITION EDUCATION TO PROSPECTIVE BRIDE IN PREGNANCY NUTRITION PREPARATION TO PREVENT THE RISK OF STUNTING: STUDY LITERATURE REVIEW. Muhammadiyah International Public Health and Medicine Proceeding, 3(1), 79–93. https://doi.org/10.61811/miphmp.v3i1.386

[22] Saputri, W. H., & Risnawati, E. (2024). Preparing for the School Readiness of Early Childhood by Enhancing the Well-Being and Family Support. JPUD - Jurnal Pendidikan Usia Dini, 18(1), 270–286. https://doi.org/10.21009/JPUD.181.19

[23] Sitty Fadhilla Fitrianty Lahay, Sunarto Kadir, Sri Manovita Pateda, Lintje Boekoesoe, & Irwan. (2024). The effect of nutrition education on anemia using lecture method, leaflet media, and Tiktok on behavior change among adolescent girls. World Journal of Advanced Research and Reviews, 22(2), 2035–2040. https://doi.org/10.30574/wjarr.2024.22.2.1514

[24] Yanti, S., Nazarena, Y., & Meilina, A. (2023). The Effectiveness Of A Nutritional Education-Based Module For Pregnant Women In Preventing Stunting. Journal of Applied Nursing and Health, 5(2). https://doi.org/10.55018/janh.v5i2.165

[25] Yuliani, F., & Sadad, A. (2024). Factors Inhibiting Implementation of Disaster Management Policies (Case Study of Stunting Management in Rokan Hilir Regency). KnE Social Sciences. https://doi.org/10.18502/kss.v9i7.15512

[26] Yusnita, M., Kurniawan, I., & Hakim, A. (2024). Public Policy Analysis in Stunting Reduction: A Review of National Programs and Strategies. Jurnal Indonesia Sosial Sains, 5(05), 1182–1188. https://doi.org/10.59141/jiss.v5i05.1109