

Analysis of the Implementation of Preconception Services for Women of Productive Age in Supporting Toddler Nutrition Intervention Policies in Barru Regency

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ABSTRACT

Introduction: Malnutrition in women of productive age, especially in mothers preparing for pregnancy, is a major cause of morbidity, mortality, and adverse birth outcomes. The purpose of this study was to understand the influence of preconception in women of productive age in supporting toddler nutrition intervention policies. **Method:** The research method used was a quantitative study with a sample of 95 people using purposive sampling techniques. The analysis test was carried out using linear regression analysis. **Results:** The results showed a significant and simultaneous influence on the variables of health and nutrition screening, access to essential micronutrients, special care for at-risk women, and diet and lifestyle counseling, where the Fcount was 3.445 with a significance value of 0.011. **Conclusion:** It is necessary to increase awareness for women to plan pregnancy from adolescence and productive age, not only when they are married. This study can serve as a foundation for future research focused on developing and testing policy-based interventions. Such research is expected to provide insights into the preconception nutritional status, knowledge, attitudes, behaviors, and access to healthcare services—as well as the factors influencing the readiness of women of reproductive age to prepare for a healthy pregnancy—thereby strengthening policies to accelerate the reduction of stunting and nutritional issues through a life-cycle approach, while also supporting the reinforcement of integrated and sustainable primary healthcare services.

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INTRODUCTION

Stunting, wasting, overweight, and underweight in children are problems experienced in several countries. More than half of low- and middle-income countries experience various forms of malnutrition, and the most common scenarios occur in sub-Saharan Africa, South Asia, East Asia, and the Pacific (Dey et al. 2024; Victora et al. 2021). Indonesia is one of the countries experiencing malnutrition problems (Baharuddin et al. 2023; Muchlis et al. 2023). Malnutrition in women of reproductive age, especially mothers preparing for pregnancy, is a major cause of morbidity, mortality, and adverse birth outcomes. The risk of pregnancy and childbirth complications in women before pregnancy can occur, such as anemia, hypertension, and Chronic Energy Deficiency (CED). Approximately 50% of pregnant women in Indonesia are in an unhealthy physical condition from the beginning of pregnancy, with the prevalence of anemia in women of reproductive age reaching 24%, hypertension 21%, and CED 14.5%. In addition to impacting the Maternal Mortality Rate (MMR), it also increases the risk of Low Birth Weight (LBW) and stunting (Kementerian Kesehatan RI 2018; South Sulawesi 2024; Ulfah, Ferina, and Sriyanti 2025).

The national stunting prevalence in Indonesia in 2023 was 21.5% (Kementerian Kesehatan Republik Indonesia. 2022). South Sulawesi recorded approximately 27.4%, a 0.2% increase from the previous year. Barru Regency recorded the lowest stunting prevalence in South Sulawesi in 2022-2023, at 14.1%, compared to other regions with averages above 20-30%. However, in 2023-2024, the stunting prevalence rate increased by 22.1%, and the latest data shows that in 2024-2025, the stunting prevalence rate in Barru Regency increased to 24.2%, an increase of almost 10% since 2022. The increasing stunting rate requires serious attention in addressing nutritional issues. Based on the results of measurements of toddlers with stunting status, Mallusetasi District is one of the districts in Barru Regency with the largest number of stunting cases, with 176 cases.

Malnutrition is more likely to affect women and children due to inadequate nutritional intake and unequal food distribution within households. Women of childbearing age are at greater risk of malnutrition for social and biological reasons (Baharuddin et al. 2025; Miller et al. 2025; WHO 2023). Preconception care is an intervention provided to women and couples of childbearing age, regardless of pregnancy status, to improve health and ensure optimal nutritional status for expectant mothers before pregnancy, whether for their first or subsequent pregnancies (De-Regil, Harding, and Roche 2016; Zakaria et al. 2022). In Indonesia, preconception care is typically integrated into premarital care, aiming to ensure the health of prospective brides and grooms before marriage. This program includes screening for sexually transmitted infections or measuring the woman's hemoglobin status. Couples typically access this health care program to obtain the certificates required to register their marriage with the local religious affairs office. Considering national regulations on accelerating stunting reduction, women during the preconception period are one of the target groups for accelerated stunting reduction. Therefore, existing policies and programs should not only focus on the first 1,000 days of life (HPK), but also require interventions that focus on the preconception period (Hanifaah, Kandarina, and Padmawati 2022; Ratna Wulandari 2022). Providing health education through preconception counseling is part of preconception and a strategy to improve behaviors related to pregnancy (Edris et al. 2024; Griffiths, Marley, and Atkinson 2020; Okemo et al. 2021).

This study examines the implementation of preconception services through health and nutrition screening, diet and lifestyle counseling, followed by text message reminders, to improve maternal knowledge and behavior, increase adherence to iron

supplementation, and increase maternal hemoglobin levels before pregnancy. This study integrates health services into maternal support programs from preconception through pregnancy.

Several studies have been conducted to assess policies for improving nutrition programs for toddlers. Previous research demonstrates the state of the art in the proposed research. Research on women's nutritional status before pregnancy impacts maternal and child health, therefore, nutritional status needs to be improved to ensure optimal maternal and child health outcomes (De-Regil, Harding, and Roche 2016). Subsequent research has demonstrated the potential of combining specific interventions with community mobilization and the importance of addressing health, nutrition, psychosocial well-being, and WASH (Water, Sanitation, and Hygiene) simultaneously (Miller et al. 2025).

The purpose of this study is to understand the influence of preconception on women of reproductive age and to evaluate the implementation of preconception services within toddler nutrition intervention policies. The results are expected to provide contextual policy recommendations. Furthermore, this research supports the National Research Master Plan (RIRN) and the Sustainable Development Goals (SDGs), specifically Goal 2 (Zero Hunger) and Goal 3 (Good Health and Well-Being).

LITERATURE REVIEW

While some women in Saudi Arabia have positive knowledge and attitudes toward preconception services, significant challenges remain in terms of perception, social acceptance, and access to services that hinder optimal preconception care practices. Overall, this study emphasizes that preconception services have the potential to be an important strategy for improving maternal and child health by providing education and outreach, social support, adequate access to services, and a healthcare approach sensitive to cultural preferences and perceptions of medical procedures (Edris et al. 2024).

Stunting prevention needs to begin before pregnancy, including through premarital services for prospective brides and grooms. Premarital care programs already exist, but not all address stunting prevention through a preconception approach. The concept of integrated preconception services is considered realistic and relevant for community-based implementation. Furthermore, stakeholders emphasized the importance of coordination and communication between sectors (health, religious affairs, family planning, and village government). These stakeholders view integrated preconception services as an opportunity to bridge the gap in prenatal nutrition and health interventions, thus becoming a strategy for stunting prevention (Hanifaah, Kandarina, and Padmawati 2022).

Preconception services at the primary health care level (community health centers) have significant potential to help prevent pregnancy complications and support maternal-child health: midwives and stakeholders in Bandung generally recognize the importance of preconception to reduce risks such as anemia, hypertension, energy deficiency, low birth weight (LBW), and stunting. Although stakeholders (midwives and stakeholders) support the idea of preconception, services are not yet optimally implemented and have not been integrated into the routine health care system at community health centers. To realize preconception services effectively, strong policies from the local government are needed; adequate resource allocation; public awareness campaigns (families and communities) to raise awareness; and capacity building and training for health workers (Ulfah, Ferina, and Sriyanti 2025).

METHOD

This study employs a quantitative research method with a cross-sectional design. The research is conducted within the service area of the Pallanro Community Health Center (Puskesmas) in Mallusetasi District, Barru Regency, South Sulawesi Province. The study is structured over a 10-month period starting in January 2025, with data collection scheduled from August to October 2025. The study population consists of 1,770 women of reproductive age within the Mallusetasi Community Health Center's service area. The sample size was determined using Slovin's formula $n = N / (1 + (N \times e^2))$ – with a 10% margin of error, resulting in a sample of 95 women. Sampling was conducted using a purposive sampling method based on the following inclusion criteria: women of reproductive age (20–35 years old) who are married and planning a pregnancy; have accessed preconception screening services at a primary health facility; are willing to participate as respondents; possess good communication skills; and are literate (able to read and write).

The variables in this study are: (1) Health and Nutrition Screening—a process of examining and identifying the health conditions and nutritional status of women of reproductive age prior to pregnancy, including risk factors that could affect maternal health and the pregnancy itself; indicators for this variable include assessments of nutritional status, BMI, Mid-Upper Arm Circumference (MUAC), blood pressure, hemoglobin (Hb) levels/anemia status (if available), medical history, and nutritional risk factors. (2) Access to Essential Micronutrients—the ease with which women of reproductive age can obtain, receive, and consume micronutrient sources necessary to support pre-pregnancy health; indicators for this variable include access to blood-supplementing tablets (iron), folic acid, vitamins and minerals, as well as the consumption of foods rich in micronutrients. (3) Specialized Care for At-Risk Women—health and nutrition services provided more intensively to women of reproductive age identified as having pre-pregnancy health or nutritional risk factors; indicators for this variable include risk identification, individual counseling, periodic monitoring, provision of interventions based on needs, and referral when necessary. (4) Diet and Lifestyle Counseling involves the provision of information, education, and communication by health workers or community health volunteers to women of reproductive age regarding balanced nutrition and healthy lifestyle behaviors prior to pregnancy. The indicators for this variable include the receipt of counseling, counseling frequency, counseling content, message comprehension, and the application of recommendations.

Questionnaires were used for each variable in this study: Health and Nutrition Screening (6 items; response options: yes [1] and no [0]), Access to Essential Micronutrients (11 items; response options: yes [1] and no [0]), Specialized Care for At-Risk Women (7 items; response options: yes [1] and no [0]), and Diet and Lifestyle Counseling (6 items). The dependent variable—implementation of preconception care (7 items)—was measured using a Likert scale (scoring 1–4). Structured interviews utilizing closed-ended questions were conducted with respondents. Data collection adhered to ethical principles—including confidentiality, privacy, and autonomy—and received ethical approval (No. 622/A.1/KEP-UMI/VIII/2025). Respondents provided informed consent by signing a consent form prior to the study's commencement. Data analysis was performed using linear regression to determine the relationships and contributions of the independent variables to the dependent variable; the influence of each variable is presented as a regression coefficient (β), along with the 95% Confidence Interval (CI) and p-value. The analysis aimed to identify the factors within the independent variables—health and nutrition screening, access to essential micronutrients, specialized care for at-

risk women, and diet and lifestyle counseling—that influence the dependent variable (implementation of preconception care). Data were analyzed using IBM SPSS version 27.

RESULTS AND DISCUSSION

This research was conducted in the Mallusetasi Community Health Center (Puskesmas) working area, Mallusetasi District, Barru Regency. The sample consisted of 95 respondents, mothers of toddlers residing in the Mallusetasi Community Health Center's working area. The data were then entered and analyzed using linear regression using SPSS. The results are as follows:

Table 1. Respondent Characteristics in Mallusetasi District, Barru Regency

Characteristics	Categories	Frequency (n)	Percentage (%)
Respondent Age	≤ 25 years	10	10,5
	26-35 years	31	32,6
	> 35 years	54	56,8
Respondents' Last Education	No Schooling	3	3,2
	Elementary School Graduate	10	10,5
	Junior High School Graduate	18	18,9
	High School Graduate	24	25,3
Employment Status	University Graduate	40	42,1
	Employed	24	25,3
	Not Employed	71	74,7

Table 1 shows the distribution of respondents by age in Mallusetasi District, Barru Regency. The majority of respondents were aged >35 years, with 54 respondents (56.8%). Based on the distribution of respondents' last educational level, the majority of respondents (40%) had completed higher education, with 42.1% having completed higher education. And the distribution of respondents based on employment status, the majority of 71 (74.7%) respondents were unemployed and 24 (25.3%) respondents were employed.

The coefficient of determination (R^2) from the multiple regression results shows how much the dependent variable (Implementation of Preconception Services) is influenced by the independent variables (Health and Nutrition Screening, Access to Essential Micronutrients, Special Care for Women at Risk, Dietary and Lifestyle Counseling). The results of the coefficient of determination (R^2) test can be seen in the following table:

Table 2. Determination Test Results Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,364 ^a	,133	,094	3,013

The data above yields a coefficient of determination (R^2) of 13.3% (0.133). This indicates that 13.3% of the implementation of preconception services for women of childbearing age is influenced by Health and Nutrition Screening, Access to Essential Micronutrients, Special Care for Women at Risk, and Dietary and Lifestyle Counseling. In other words, the independent variable contributed 13.3% to the implementation of preconception services among respondents. Meanwhile, 86.7% was influenced by other variables.

The F-test was conducted to determine whether the independent variables (Health and Nutrition Screening, Access to Essential Micronutrients, Special Care for Women at Risk, Diet and Lifestyle Counseling) jointly influenced the dependent variable

(implementation of preconception services). The table below shows the results of the F test.

Table 3. F Test Results

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	125,128	4	31,282 9,081	3,445	0,011 ^b
	Residual	817,293	90			
	Total	942,421	94			

From the ANOVA test, based on the table above, the calculated F is 3.445 with a significance value <0.011 (0.05). Therefore, H_a is accepted and H₀ is rejected. Therefore, it can be concluded that there is a joint and significant influence of the variables of health and nutrition screening, access to essential micronutrients, special care for women at risk, and diet and lifestyle counseling on the implementation of preconception services.

Table 4. t-Test Results

Table 1.1 Test Results						
		Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig
		B	Std. Error	Beta		
1	(Constant)	12,065	4,332		2,785	0,007
	Health and Nutrition Screening	0,360	0,235	0,159	1,536	0,128
	Access to Essential Micronutrients	0,092	0,109	0,086	0,844	0,401
	Special Care for Women at Risk	0,284	0,210	-0,134	-1,348	0,181
	Diet and Lifestyle Counseling	0,724	0,321	0,228	2,252	0,027

The statistical test results for the influence of the diet and lifestyle counseling variable on the implementation of preconception services showed a P-Value (0.027) <0.05. which means there is a positive influence, meaning the higher the score for diet and lifestyle counseling, the higher the score for implementation of preconception services.

Implementation of Preconception Services Programs

Preconception services programs are designed to help women prepare for a healthy pregnancy, starting in adolescence and continuing into pregnancy. The preconception period is often defined as the time before conception, which is the average time for conception for couples of childbearing age. This study assesses four dimensions or new perspectives that reflect interventions for women of childbearing age: health and nutrition screening; access to essential micronutrients; specialized care for women at risk; and diet and lifestyle counseling. From a public health perspective, the preconception period relates to the life course, beginning with adolescence, when women develop health behaviors that influence lifestyle patterns such as exercise, smoking, and diet.

In Indonesia, the policy regarding preconception services is regulated in the Minister of Health Regulation (Permenkes) Number 97 of 2014 concerning health services during pre-pregnancy, pregnancy, childbirth, and the postpartum period, as well as sexual health services. From a policy perspective, implementing preconception services without effective socialization will lead to public ignorance regarding the existence of preconception services in health care facilities. This situation occurs because preconception services are not viewed as an urgent program compared to other national priority programs. The impact of preconception services is generally long-term, such as

preventing pregnancy complications, reducing the risk of stunting, and improving maternal and child health. Meanwhile, policymakers often focus more on issues with directly visible and measurable impacts in the short term. This lack of understanding of the policy often results in suboptimal programs within the primary health care system. Consequently, policy support, budget allocation, and resources remain limited. This condition results in a low commitment and attention from policymakers to strengthening preconception services. (Khekade et al. 2023b; Ndou et al. 2023).

Health and Nutrition Screening

Health and nutrition screening did not have a significant impact on the successful implementation of preconception services (0.128). This finding indicates that screening implementation has not been followed by adequate follow-up, either in the form of nutritional interventions or counseling. This condition may occur because health and nutrition check-up services have not been optimally integrated with the program's preconceptions, so that the benefits have not been fully felt by the targets.

In line with this research, the implementation of preconception services is still limited to prospective brides and grooms and does not include couples of childbearing age, especially during the interconception period. Preconception services are primarily directed at high-risk groups, while women of childbearing age are still significantly under-involved, for example, in health and nutrition screenings (Ulfah, Ferina, and Sriyanti 2025).

Preconception health care for women of childbearing age encompasses biomedical, behavioral, and social prevention interventions to increase the chances of having healthy offspring. Preconception health can be achieved through preconception screening activities, which have been shown to have a positive impact on maternal and child health.

Access to Essential Micronutrients

Access to essential micronutrients did not significantly influence the implementation of preconception services (0.401). This finding indicates that availability or ease of access does not directly impact the implementation of preconception services at the individual or health facility level. Good access to micronutrients does not always translate into optimal utilization, as individual consumption behavior and compliance are often influenced by the level of knowledge, awareness, and perception of the importance of preconception nutritional interventions.

In the context of this study, high consumption willingness indicates good public acceptability, but the availability dimension of services remains low because health facilities do not routinely distribute supplements or vitamins to preconception groups. This phenomenon is explained from the perspective of the gap in the implementation of public nutrition policies, where micronutrient interventions are generally focused on pregnant women and toddlers, while women in the conception phase are not the primary target for supplement distribution in health facilities (Agusta and Astuti 2025; Kurniawati et al. 2021).

Consistent research supports that despite the availability of micronutrients, the overall implementation of preconception services remains suboptimal. Micronutrient provision during the preconception period is considered an intervention that significantly impacts a child's weight and intelligence. Low socioeconomic status and occupation are often contributing factors to low micronutrient compliance among women of reproductive age. Therefore, public awareness and a more active role for health workers in accessing and distributing micronutrient supplements are needed (Lanyumba et al. 2024; Ndou et al. 2023).

Specialized Care for Women at Risk

Specialized care for women at risk did not significantly impact the implementation of preconception services (0.181). This finding may be explained by the limited integration of specialized care programs into the primary health care system. Low utilization of preconception services reflects limited public knowledge and awareness. This leads many at-risk women to not actively seek or utilize available services. This is exacerbated by the perception that these services are only necessary during pregnancy and the lack of awareness of the concept of pregnancy planning before conception (Woldeyohannes et al. 2023; Righton et al. 2024).

Other studies supporting this research indicate that specialized care for preconception services does not have a significant impact. This finding indicates that the provision of specialized care components alone is not sufficient to drive comprehensive changes in preconception care practices at the primary health care level. Although specialized care is designed to provide more intensive interventions for women with specific health risks such as chronic diseases, anemia, obesity, or lifestyle factors, this study shows that its effectiveness is largely determined by system readiness, health worker capacity, and service integration (Castro et al. 2024; Khekade et al. 2023a).

Specifically, this study reinforces the finding that clinical interactions with women of childbearing age are often underutilized as opportunities for preconception counseling. This is despite the fact that various high-risk health issues are more effectively addressed before pregnancy.

Diet and Lifestyle Counseling

Diet and lifestyle counseling had a significant impact on the implementation of preconception services (0.027). This finding indicates that the counseling process is an effective service component in encouraging women of childbearing age to utilize and participate in preconception services. Diet and lifestyle counseling can facilitate behavioral changes such as increased consumption of nutritious foods, adherence to micronutrient intake, increased physical activity, and reduction of other risk factors. Therefore, the successful implementation of preconception services depends not only on the availability of the program but also on the quality of interpersonal interactions between health workers and service recipients through counseling.

The findings of this study align with previous studies confirming that more women change their risky behaviors after receiving in-person counseling compared to women who do not receive counseling, such as preconception counseling and care focused on overweight and obesity provided to women of reproductive age. Diet and lifestyle counseling have a positive impact on knowledge and risk-adjusted behaviors that support pregnancy. The role of education and lifestyle counseling is considered to be a stimulus or encouragement to engage women who lack the knowledge, mindset, or motivation to prepare for pregnancy (Cha et al. 2021; Smith et al. 2023).

CONCLUSION

The F-test results indicate a significant joint effect on the variables of health and nutrition screening, access to essential micronutrients, specialized care for at-risk women, and diet and lifestyle counseling. The F-test was 3.445, with a significance value of 0.011. The t-test results indicated that the only variable influencing the implementation of preconception services was diet and lifestyle counseling, with a P-value of 0.027. Optimizing health and nutrition screening through developing service channels accompanied by follow-up counseling and risk-based interventions is necessary, as well as increasing awareness among women about planning their pregnancies from

adolescence and into their productive years, not just after marriage, and also adopting healthy lifestyle behaviors as part of optimal pregnancy preparation.

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