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Improving Pregnancy Preparedness: Impact of Preconception Education on Folic Acid Awareness in Women of Childbearing Age

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Background: Preconception is an important early stage before pregnancy to determine the quality of the baby to be born. Approximately 24–60% of women, both in developing and developed countries, experience folic acid deficiency because the folic acid content in their daily diet is insufficient to meet the needs of pregnant women. Objectives: The purpose of this study was to analyze the effect of education about the importance of folic acid on healthy pregnancy preparation in women of childbearing age in Condong Village. Method: This study design was preeksperimen. The research variables were measured at a certain time to obtain a picture of the situation at that time. The population in this study were all women of childbearing age, totaling 67 people. The sampling technique used simple random sampling, resulting in a sample of 46 people. Data collection used a questionnaire, and analyzed using the Wilcoxon statistical test. The results of the study showed that preparation in planning a healthy pregnancy before being given education was sufficient for 26 respondents (56.5%), and preparation in planning a healthy pregnancy after being given education was good for 27 respondents (58.7%). The Wilcoxon test analysis showed a p-value of 0.000 < 0.005, indicating an effect of preconception education on the role of folic acid on healthy pregnancy planning among women of childbearing age. Conclusion: This study concludes that there is an effect of preconception education on the role of folic acid on healthy pregnancy planning among women of childbearing age in Condong Village.

Keywords : *Preconception, Education, Folic Acid, Pregnancy,Women of Childbearing Age*

INTRODUCTION

Preconception is the initial stage before pregnancy, crucial for determining the quality of the unborn baby. Prenatal nutritional preparation is crucial for optimizing the health of the unborn baby.(Ayudia & Arfianingsih, 2021; Fitraniar et al., 2022)The quality of a married couple's offspring is influenced by the mother's health before and during pregnancy. As expectant mothers, women of childbearing age are a vulnerable group, particularly in terms of their health, particularly their nutritional needs and nutritional status, which require close attention. Preconception health, including nutritional status, is crucial, especially in preparing for pregnancy, as it is closely related to pregnancy outcomes.(Marshall et al., 2022; Jahan-Mihan et al., 2024).

Preconception nutritional status plays a very crucial role in the success of pregnancy both in the short and long term.(Nurfatimah Nurfatimah et al., 2025)In the short term, adequate nutrition before pregnancy helps prepare the mother's body for optimal conception, implantation, and early embryo development.(Jahan-Mihan et al., 2024). Deficiencies in essential nutrients, such as folic acid, iron, and zinc, can lead to ovulation disorders, increased risk of miscarriage, and birth defects in the fetus.(Purnasari & Juliana, 2024; Soyupak et al., 2024)Meanwhile, in the long term, preconception nutritional status influences child growth and development, the risk of stunting, and the potential for metabolic diseases such as obesity and diabetes later in life.(Marshall et al., 2022)Therefore, nutritional interventions from the preconception period are a long-term health investment that impacts not only the mother and baby but also the quality of future human resources.

Women of Childbearing Age are adult women who will become mothers, namely women aged 15-49 years and are still of reproductive age, with any status (adolescent girls, pregnant/postpartum women, women of childbearing age who are not pregnant, female workers, prospective brides).(Sulaiman, 2021)In this phase, women play a crucial role in determining the quality of future generations through healthy and targeted pregnancy planning. Optimal pregnancy preparation, particularly during the preconception period, is a strategic step in preventing various pregnancy complications and improving maternal and child health.(Soyupak et al., 2024)One important aspect of this preparation is meeting micronutrient needs, particularly folic acid, which plays a major role in the formation of the fetus's nervous system and preventing neural tube defects.(Purnasari & Juliana, 2024)..

*World Health Organization*recorded that as many as 4 out of 10 women have unplanned pregnancies and in Indonesia 32,000 women do not plan their pregnancies, resulting in high complications.(UNFPA, 2022)The maternal mortality rate in 2022 was recorded at 4,005 and increased to 4,129 in 2023. The infant mortality rate in 2022 reached 20,882 and also increased to 29,945 in 2023.(East Java Health Office, 2024).The maternal mortality rate in 2023 in Probolinggo Regency was 23 people and infant mortality was 225

people.(East Java Health Office, 2024)A preliminary study conducted in Condong Village in October 2024 found that out of 10 women of childbearing age, 9 were not motivated to consume folic acid before becoming pregnant.

Pregnancy complications can be caused by inadequate pre-conception health preparation, such as not having a health checkup, blood tests, and urine tests. Approximately 24–60% of women, both in developing and developed countries, experience folic acid deficiency because the folic acid content in their daily diet is insufficient to meet the needs of pregnant women.(Barchitta et al., 2020; Tarigan et al., 2021)Folic acid is a vitamin, belonging to the B group of vitamins, and is an essential element in DNA synthesis. Folic acid intake can be achieved through foods such as beef, chicken liver, beef liver, mackerel, crab, spinach, broccoli, nuts, strawberries, oranges, and wheat. However, daily food intake generally does not meet all folic acid requirements. Folic acid consumption in pregnant women will be more optimal if it is done before pregnancy.(Kaldygulova et al., 2023). Folic acid can be fulfilled with tablets. Folic acid is a type of vitamin B that helps the body produce and maintain new cells.(Chen-Maynard, 2024; Husna et al., 2025; Retni, 2025)These new cells need to maintain their shape and number; therefore, theory and research suggest that folic acid can prevent DNA changes that could potentially trigger cancer.(Saras, 2023).

Prenatal folic acid supplementation is associated with a reduced incidence of birth defects.(Kaldygulova et al., 2023)The results of the study showed that giving folate supplements periconceptionally (before and immediately after conception) can reduce the risk of NTDs by 70%.(Mutare et al., 2025)Therefore, education is needed to increase mothers' knowledge and motivation, resulting in behavioral changes regarding the consumption of foods containing folic acid to achieve nutritional fulfillment for pregnant women. The three most important factors influencing eating habits are food availability, social patterns, culture, and personal factors.(Wijaya et al., 2024; Kadariya et al., 2025; Oudat et al., 2025).

Regardless of whether a woman plans to have children or not, the implementation of preventive, curative, and promotive activities is very effective in improving maternal and child health through screening and education that can benefit women of childbearing age during their reproductive years, both physically, psychologically, and socially.(Crombag et al., 2025; Dewi & Raswati Teja, 2022; Yudianti et al., 2024)One promotional activity involves providing preconception education. A woman's decisions and preparedness in early pregnancy determine her health and the well-being of her baby. Based on the above background, researchers are interested in conducting research on the effect of preconception education on the role of folic acid on healthy pregnancy planning among women of childbearing age in Condong Village.

METHODOLOGY

The type of research is quantitative correlational The research design used is pre eksperimental. The research was conducted in Condong Village, Probolinggo Regency The population in this study were all

women in Condong Village, Probolinggo, totaling 67 people. The sampling technique used was simple random sampling. The sample in this study was 46 women in Condong Village, Probolinggo.

Data collection in this study used a pre-experimental approach, namely using one sample group and conducting measurements before and after treatment was given to the sample. The data collection technique used was primary data collected directly by the researcher through a questionnaire. This questionnaire consisted of 10 closed-ended questions that had been tested for validity and reliability and were given to research respondents related to the topic being studied. The data obtained were analyzed using the Wilcoxon Match Paired Test to examine the effect of preconception education on the role of folic acid on preparing for healthy pregnancy planning among women of childbearing age in Condong Village. This study has undergone a health research ethics review at Hafshawaty Zainul Hasan University No. 220/KEPK-UNHASA/V/2025.

RESULT AND DISCUSSION

1. Univariate Analysis

a) Respondent Characteristics by Age

Table 1. Respondent Characteristics According to Age of Women of Childbearing Age

Age (years)	Frequency	Percentage (%)
26-35	29	63
36-45	15	32.6
46-55	2	4.4
Total	46	100

Based on table 1, it is known that the majority of respondents were aged 36-45 years, namely 29 people (63%).

b) Respondent Characteristics According to Education

Table 2. Characteristics of Respondents According to Last Education of Women of Childbearing Age

Education	Frequency	Percentage (%)
No school	10	21.7
Elementary School/Islamic Elementary School	3	6.5
Junior High School/Islamic Junior High School	15	32.6
Senior High School	17	37.0
Bachelor	1	2.2
Total	46	100

Based on table 5.2, it is known that the last education of mothers of stunted toddlers was high school/Islamic high school for 17 people (37.0%).

c) Respondent Characteristics by Occupation

Table 3. Respondent Characteristics According to Occupation: Women of Childbearing Age

Education	Frequency	Percentage (%)
Housewife	27	59
Laborer	6	13
Self-employed	12	26
civil servant	1	2
Total	46	100

Based on table 3, it is known that the last education of mothers of stunted toddlers was housewife, as many as 27 people (59.0%).

2. Bivariate Analysis

Table 4. The Effect of Balanced Nutrition Education on Nutritional Fulfillment Behavior in Efforts to Prevent Stunting in Preconceptional Women in Gading Village

Behavior	Balanced Nutrition Education			
	Before		After	
	Amount	%	Amount	%
Good	6	13.0	27	58.7
Enough	26	56.5	16	34.8
Not enough	14	30.5	3	6.5
Amount	46	100.0	46	100.0
P Value = 0.00 a = 0.05				

Table 4 above shows that before education, the majority of respondents had poor knowledge (30.5%), a total of 14 respondents. After education, good knowledge increased to 58.7% (27

respondents), and sufficient knowledge to 16 respondents (34.8%). The results of the analysis using the Wilcoxon test showed a significance value of 0.000.

Results Based on table 5.4 above, it shows that before being given education, the majority of respondents had poor behavior (56.5%), amounting to 26 respondents.

Prospective brides are part of the group of women of childbearing age (WUS) who need to ensure adequate nutrition. Optimal nutrition for expectant mothers will impact fetal growth and development, the health of their newborns, and their safety during delivery. Preconceptional nutritional status is one factor that can influence pregnancy outcomes and the well-being of the infant.(Mutare et al., 2025; Soyupak et al., 2024).The health and nutritional status of pregnant women are determined long before, namely during adolescence and adulthood before pregnancy or during their time as a woman of childbearing age.(Lestari et al., 2023; Jahan-Mihan et al., 2024; Hidayati & Iis Hanifah, 2025)The nutritional status of the expectant mother during the three to six months pre-conception period will determine the condition of the baby born.

Nutritional improvement efforts are often undertaken after a woman becomes pregnant. Therefore, it would be more beneficial if nutrition education, particularly in preventing stunting, were implemented before pregnancy and during pregnancy planning.(Lestari et al., 2023). Expectant mothers who suffer from anemia, malnutrition, or drastic weight loss during pregnancy will increase the risk of their unborn baby experiencing growth disorders.(Gomes et al., 2025)Comprehensive maternal nutritional interventions initiated preconceptionally or early in pregnancy will result in greater newborn length and weight and can reduce the incidence of stunting to a lower level compared with mothers who receive standard care.(Ayudia & Arfianingsih, 2021; Barchitta et al., 2020)This improved growth pattern impacts the infant's postnatal growth, even without any postnatal interventions for either the mother or the infant. In addition to prenatal nutrition, the growth period during the first 1,000 days of life is also crucial in preventing stunting. Therefore, multimicronutrient supplementation interventions as part of a stunting prevention program targeting prospective brides and pregnant women are crucial.(Argaw et al., 2023; Gomes et al., 2025; Lestari et al., 2023).

The finding that good knowledge increased to 58.7% (27 respondents) after education indicated that the preconception education intervention was significantly effective in improving women of childbearing age's understanding of the role of folic acid in preparing for a healthy pregnancy. This evidence adds to other evidence that providing targeted, evidence-based information can positively influence the level of knowledge of the target population. This increase also confirms that health education remains an important and relevant strategy in preventing pregnancy problems, particularly those related to micronutrient deficiencies such as

folic acid.

Based on table 5.4 above, it shows that after being given education, good knowledge increased to 58.7% for 27 respondents.

Providing nutritional interventions is apparently not enough to prevent stunting because it must be accompanied by changes in community behavior, which can be achieved through educational interventions. Information in health education can change mindsets for the better, leading to changes in attitudes (Lewa, 2021). This aligns with Azwar's theory that personal experiences, culture, other people, mass media, religious institutions, and individual emotional factors can all influence attitude formation. Attitude formation begins with knowledge perceived as positive or negative, which is then internalized within an individual.(Sina et al., 2023; Anggela et al., 2024). Furthermore, this increase in positive or positive attitudes stems from information provided during health education sessions, which suggests that adequate nutrition is crucial for preventing stunting. Efforts to increase knowledge can be carried out through nutrition education or counseling, which can encourage individuals to change their attitudes and behaviors. Maternal education can be a predictor and can be modified to improve growth and reduce the incidence of stunting.(Azizah et al., 2022; Prasetyo et al., 2023; UNICEF & Ministry of Health of the Republic of Indonesia, 2023)Other research shows that there is a change in knowledge and attitudes of prospective brides and grooms after being given nutrition education, where the average respondent has started to improve their eating patterns to prepare for pregnancy from the nutrition education that was previously provided.(Ratmalia et al., 2024; Hidayati & Iis Hanifah, 2025)Health education aims to increase knowledge so that behavior can be changed towards a healthier lifestyle.

Findings regarding changes in nutritional behavior in stunting prevention efforts following balanced nutrition education demonstrate significant results from a promotive and preventive perspective in public health. The increase in positive behavior following the educational intervention indicates that appropriate knowledge can be translated into concrete actions in daily life, particularly in selecting and preparing nutritious food for the family. From a research perspective, this reinforces the theory that health education has a direct influence on behavioral change, particularly when delivered through participatory and contextualized methods tailored to the target population. From a health service perspective, these results emphasize that stunting prevention efforts depend not only on medical interventions but also on community empowerment through increased nutritional literacy.

Based on the results of the analysis test using the Wilcoxon test, a sig value of 0.000 was shown, which can be assumed that the education provided during the research resulted in behavioral changes in the research subjects.

An unplanned pregnancy carries the risk of complications that can affect the unborn baby. An unintended pregnancy can lead to complications that can harm the unborn baby. On the other hand, a well-planned pregnancy can be beneficial for both mother and fetus. ResearchDewi & Raswati Teja (2022) and Hidayati & Iis Hanifah (2025)This study showed that there was a change in knowledge and attitudes among prospective brides and grooms after receiving nutrition education. Most respondents began improving their diets to prepare for pregnancy, following the nutrition education provided previously. Health education aims to increase knowledge and lead to healthier behavior changes. Prospective brides and grooms with good knowledge will have an impact on their attitudes and behaviors in preventing stunting.(Fitriani et al., 2021). As research showsLestari et al., (2023) which states that multimicronutrient supplements given preconceptionally can reduce the incidence of stunting compared to iron and folate supplements given only during pregnancy. Providing multimicronutrients preconceptionally can prevent stunting from birth.

Preconception health is part of the overall health of women and men during their reproductive years. Preconception health care is useful for reducing risks and promoting healthy lifestyles to prepare for a healthy pregnancy. Comprehensive preconception health includes life planning related to postponing pregnancy, obstetric history, nutrition, vaccinations, sexual health, chronic medical conditions, current medications, psychosocial health, and contraception.

This research can be applied to pre-conception health posts (Posyandu) with nutritional improvements starting pre-conception (from the time of marriage) for women of reproductive age/pre-pregnancy. This is done to ensure that maternal conditions and behaviors during pregnancy that could pose risks to both mother and baby can be identified and managed so that they can be detected early in pregnancy.

CONCLUSION

Based on the results of the analysis,There is an influence of pre-conception education about the role of folic acid on the preparation for planning a healthy pregnancy in women of childbearing age in Condong Village. It is hoped that the Maron Community Health Center can implement a pre-conception Posyandu program as a breakthrough in health services to improve nutrition starting from pre-conception (since becoming a bride) for women of reproductive age/pre-pregnant women by involving stakeholders from various sectors.

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