

The Influence of Nutritional Education and Reproductive Health of Pregnant Women on the Knowledge and Attitudes of Pregnant Women in Talun District Using a Quasi Experimental Study

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ABSTRACT

The prevalence of *SEZs* in Indonesia was 35.5% in 2018. Data from West Java Province in 2020 reported 55,629 cases of pregnant women experiencing *SEZs* across 27 districts and cities in the province. Specifically, based on data from West Java Province, there were 4,696 cases of pregnant women experiencing *SEZs* in Cirebon Regency. The factor of knowledge about nutrition and reproductive health is related to the incidence of *SEZs*, which are a cause of fetal growth and development disorders. For this reason, this research was carried out. The research aims to determine the influence of nutrition education and reproductive health of pregnant women on the knowledge and attitudes of pregnant women in Talun District. This study is Quasi Experimental research with a Separate Sample Pretest-Posttest design. The population consisted of pregnant women undergoing antenatal care at the Talun Health Center, Cirebon Regency, West Java, totaling 32 respondents who met the inclusion criteria. Quota sampling was used as the sampling method. A T-test analysis was conducted to determine the influence of nutrition education and reproductive health of pregnant women on their knowledge and attitudes in Talun District. The T-test analysis found a significant influence of nutrition education and reproductive health of pregnant women on their knowledge and attitudes in Talun District ($P < 0.05$). The provision of nutrition and reproductive health education has a positive effect on improving the knowledge and attitudes of pregnant women.

Keywords: nutrition education, maternal reproductive health, knowledge and, attitude of pregnant women.

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INTRODUCTION

Balanced nutrition is the daily arrangement of foods that contain nutrients in the type and amount that suits the body's needs, paying attention to the principles of food diversity, physical activity, clean living behaviors and regular weight monitoring in order to maintain a normal body weight to prevent nutritional problems (Baroroh & Maslikhah, 2021). Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 41 of 2014 concerning Balanced Nutrition Guidelines Article 1 of the Balanced Nutrition Guidelines aims to provide guidelines for daily food consumption and healthy behavior based on the principles of consumption of a variety of foods, clean living behavior, physical activity, and regular weight monitoring in order to maintain normal weight. That the application of balanced nutrition in the community is not optimal, there are still various problems related to eating behaviors, clean and healthy living behaviors, and diseases related to nutrition (Peraturan Menteri Kesehatan Republik Indonesia, 2014).

Adequate supply of nutrients is a very important factor that affects pregnancy. Women with pregnancies of young age or too close are at a factor of entering into a lack of nutritional reserves. Maternal nutritional depletion can contribute to an increased incidence of premature birth and fetal growth retardation as well as an increased risk of maternal mortality and morbidity (Mamuroh et al., 2019). The nutritional status of pregnant women at the time of growth and during pregnancy can affect the growth and development of the fetus. The weight of pregnant women must be adequate, increase according to the age of pregnancy. This is

because normal weight gain will produce a normal baby as well. In developed countries, the average weight gain during pregnancy is about 12-14 kilograms (Baroroh & Maslikhah, 2021). Lack of nutritional intake in pregnant women mostly causes pregnant women to experience chronic energy deficiency (KEK) and anemia.

In the first trimester of pregnancy, it can cause hyperemesis gravidarum, premature birth, fetal death, miscarriage and abnormalities of the central nervous system. While in the second and third trimester it can cause the growth and development of the fetus to be disrupted, the weight of the baby is born low. In addition, it will also result in disturbances of uterine strength during childbirth and postpartum bleeding (Baroroh & Maslikhah, 2021). The prevalence rate of anemia in pregnant women based on the 2018 riskesdas in Indonesia is 48.9% (Kementrian Kesehatan Republik Indonesia, 2019). In the West Java Health Office, the number of pregnant women who experience anemia based on Regency or City in West Java Province in 2020 was 63,246 cases or 30.93%. Meanwhile, in Cirebon Regency in 2022, there were 1,930 cases of pregnant women with anemia or 36.5% of 5,284 pregnant women in Cirebon Regency, West Java.

Meanwhile, the prevalence of KEK among pregnant women in Indonesia is in fourth place, at 35.5%. Based on data from the 2018 Basic Health Research (Riskesdas), the prevalence of chronic energy deficiency (SEZ) in women of childbearing age (WUS) in Indonesia in the age category of 15-19 years who are pregnant is 33.5%, while in the age group of 45-49 years who are pregnant is 11.1% (Devi Sri Lestari et al., 2023). Based on West Java Province data in 2020, it was found that there were 55,629 cases of pregnant women experiencing SEZ from 27 districts and cities of West Java Province. Then based on data from West Java Province, there are 4696 cases of pregnant women experiencing SEZs in Cirebon Regency. In addition to the nutrition of pregnant women, reproductive health is also important for pregnant women. Because reproductive health is a condition of overall prosperity, both in terms of physical and mental and social and also free from diseases or disability conditions in terms of reproductive systems and functions and processes (Mayasari Tyas et al., 2020).

Therefore, Antenatal Care Examination is highly recommended for pregnant women. Because Antenatal Care (ANC) Examination can optimize the mental and physical health of pregnant women. So that they are able to face childbirth, postpartum period, preparation for breastfeeding and the return of reproductive health normally. Antenatal care is prenatal care primarily aimed at the growth and development of the fetus in the womb. ANC services consist of: anamnesis, examination, follow-up handling, recording of examination results, communication, information and education (KIE) (Mayasari Tyas et al., 2020).

The government sets a policy of frequency of antenatal visits at least four times during pregnancy, with the provision that the time is at least once in the first trimester = K1, at least once in the second trimester = K2, and conducts antenatal visits at least twice in the third trimester = K3 and K4 (Mayasari Tyas et al., 2020). The proportion of K4 pregnancy checks showed an increase from 70% in 2013 (Riskesdas 2013) to 74.1% in 2018 (Riskesdas 2018). Based on routine data reporting, the coverage of antenatal visits in 2021 was 88.13% of the target of 85%. The coverage of antenatal visits in 2021 in West Java Province was 98.8% (Kementrian Kesehatan Republik Indonesia, 2021). Then the number of Antenatal Care visits in Cirebon Regency, Talun District in 2021 for K1 amounted to 1036 pregnant women and K2 amounted to 1027 pregnant women.

The lack of knowledge and attitudes of pregnant women about nutrition and reproductive health is still high, this is marked by the prevalence of Chronic Energy Deficiency (SEZ) in women of childbearing age (WUS) in Indonesia in the age category of 15-19 years who are pregnant as much as 33.5%. The results of Wahyuni's (2008) research show that there is a meaningful relationship between knowledge and the nutritional status of pregnant women. Basically, providing knowledge about the nutritional status of pregnant women is part of an effort to optimize the mother's ability, so that with good nutritional knowledge, it is hoped that pregnant women will have a good nutritional status as well. It is the result of tofu, and this happens after people do (Mamuroh et al., 2019).

The results of the research conducted by Hanifiya et al in (2023) is an increase in knowledge about pregnancy and reproductive health of pregnant women where results are obtained in the form of 13 respondents (86.7%) with an increase in good knowledge and 2 respondents (13.3%) with insufficient knowledge. The importance of nutrition and reproductive health education in pregnant women has a great influence on fetal development and nutrition of toddlers, while not all pregnant women and their families receive adequate health education and counseling, especially about pregnancy and efforts to keep the pregnancy healthy and of quality (Baroroh & Maslikhah, 2021).

The prevalence of Chronic Energy Deficiency (CED) among pregnant women in Indonesia remains a significant public health concern, with national data indicating a rate of 35.5% in 2018. Regional disparities exacerbate the issue, as evidenced by West Java Province reporting 55,629 cases in 2020, including 4,696 in Cirebon Regency. Research by Mamuroh et al. (2019) highlights the critical link between maternal nutritional knowledge and pregnancy outcomes, emphasizing that inadequate knowledge contributes to poor nutritional status and adverse fetal development. Similarly, Devi Sri Lestari et al. (2023) identified socioeconomic and educational factors as key determinants of CED, underscoring the need for targeted interventions. Despite these findings, gaps persist in understanding the effectiveness of educational programs tailored to rural populations, where access to healthcare information is often limited.

Reproductive health education is equally vital, as poor maternal health literacy correlates with complications such as preterm birth and low birth weight. Studies by Mayasari Tyas et al. (2020) demonstrate that comprehensive reproductive health education improves antenatal care utilization, yet implementation remains inconsistent across regions. The Indonesian Ministry of Health (2021) reports high antenatal visit coverage (98.8% in West Java), but this does not necessarily translate to improved knowledge or attitudes, as noted by Jourdan (2022). This discrepancy suggests a gap between service delivery and educational impact, particularly in rural areas like Talun District, where cultural and logistical barriers may hinder effective communication.

Knowing the influence of nutrition education and reproductive health of pregnant women on the knowledge and attitudes of pregnant women in Talun District. Knowing the overview of the level of knowledge before and after providing nutrition and reproductive health education for pregnant women in Talun District. Knowing the overview of attitudes before and after providing nutrition and reproductive health education for pregnant women in Talun District. Analyzing the influence of nutrition and reproductive health education on the knowledge of pregnant women in Talun District. Analyzing the influence of nutrition and

reproductive health education on the attitudes of pregnant women in Talun District. This research can be used as a science for researchers and learning as well as experience in writing scientific papers on the influence of nutrition education and reproductive health of pregnant women on the knowledge and attitudes of pregnant women in Talun District.

The urgency of addressing these gaps is amplified by the long-term consequences of maternal malnutrition and poor reproductive health, including intergenerational cycles of stunting and morbidity. The World Health Organization (WHO) identifies maternal education as a cornerstone of sustainable development, yet local studies, such as those by Hanifiya Wardhani et al. (2023), reveal that even educated women often lack practical knowledge about nutrition and reproductive health. This paradox highlights the need for innovative, context-specific educational strategies that bridge theoretical knowledge and actionable behaviors. Without such interventions, the national targets for reducing stunting and maternal mortality, as outlined in Presidential Regulation No. 72 of 2021, may remain unattainable.

Previous research has explored standalone interventions for nutrition or reproductive health, but few have integrated both into a cohesive program. For instance, Tria Astika Endah Permatasari (2021) demonstrated the efficacy of nutrition education in Bogor Regency, while Nico Krisna Prio Utomo (2024) focused on reproductive health in Jember. However, neither study addressed the synergistic potential of combined education, leaving a critical research gap. This study fills that void by examining the dual impact of nutrition and reproductive health education, offering a holistic approach to improving maternal outcomes. The quasi-experimental design further strengthens the evidence base by providing measurable pre- and post-intervention data.

The novelty of this research lies in its localized, integrated approach, which tailors content to the cultural and socioeconomic context of Talun District. Unlike generic national campaigns, this study employs participatory methods, such as interactive sessions and community-based delivery, to enhance engagement and retention. Additionally, it measures both knowledge and attitudes, recognizing that behavioral change requires more than information dissemination. By focusing on a high-risk population with documented disparities in healthcare access, the study contributes unique insights into scalable models for rural maternal education.

The primary objective of this research is to evaluate the influence of combined nutrition and reproductive health education on the knowledge and attitudes of pregnant women in Talun District. Specifically, it aims to assess baseline knowledge levels, measure post-intervention improvements, and identify barriers to behavioral change. The study also seeks to compare its findings with existing literature, such as the works of Ika Putri Melati (2021) and Arsita Sari (2019), to contextualize its contributions. By doing so, it provides an evidence-based framework for policymakers and healthcare providers to refine maternal education programs.

The benefits of this research extend beyond academic circles, offering practical tools for healthcare workers at Talun Health Center to enhance their outreach efforts. By demonstrating the effectiveness of integrated education, the study advocates for its inclusion in routine antenatal care protocols. Furthermore, it empowers pregnant women with actionable knowledge, potentially reducing CED and improving neonatal outcomes. The findings could also inform national strategies, aligning with the Ministry of Health's goals under the Balanced

Nutrition Guidelines (Regulation No. 41 of 2014) and the Sustainable Development Goals (SDGs).

METHOD

This study was a *Quasi Experimental* research using a Separate Sample Pretest-Posttest design. The first measurement (pretest) was conducted on a randomly selected sample from a population. Following this, interventions were applied to the entire population. A second measurement (posttest) was then performed on a different sample, also randomly selected from the same population. The study was carried out in Talun District during June–July 2024.

The target population comprised pregnant women in Cirebon Regency, while the accessible population included pregnant women in Talun District. The sample consisted of pregnant women in Talun District who met the inclusion criteria: willingness to participate, and the ability to read and communicate effectively. Exclusion criteria included illness and incomplete questionnaire responses. Sampling was performed using a non-probability quota sampling technique, selecting participants based on specific characteristics until the sample size was met.

Sample size was determined using Federer's formula to ensure valid data. Based on Hanifiya et al.'s previous research, where 86.7% of pregnant women showed increased knowledge about balanced nutrition and reproductive health, a population proportion of 20% (0.20) was applied. Federer's formula $((t - 1)(n - 1) \geq 15$, where t is the number of groups and n the number of subjects per group) resulted in a required sample size of 16 per group.

RESULTS AND DISCUSSION

This research was carried out in Talun District, Cirebon Regency in two villages, namely Cempaka village and Cirebon Girang village to meet the number of 32 pregnant women samples. This research was conducted from June 6, 2024, to July 31, 2024, regarding "The Effect of Nutrition and Reproductive Health Education of Pregnant Women on the Knowledge and Attitudes of Pregnant Women in Talun District using a Quasi Experimental Study". In this study, 16 pregnant women in Cirebon Girang village were 16 pregnant women as a control group or as a group that was given a pretest, while 16 pregnant women in Cempaka village were used as an intervention group or posttest group the results of the research analysis obtained the following data:

1. Univariate Analysis

Table 1. Distribution of Frequency of Nutritional Knowledge of Pregnant Women Before Education

Nutritional Knowledge Before Education	Frequency	Percent	Valid Percent	Cumulative Percent
Less	5	31,3	31,3	31,3
Enough	7	43,8	43,8	75,0
Good	4	25,0	25,0	100,0
Total	16	100,0	100,0	

Based on Table 1 of the distribution of the frequency of nutritional knowledge of pregnant women before being given balanced nutrition education above, it can be seen that of the 16 respondents, most of them were in the category of sufficient knowledge as many as 7 (43.8%), while lack of knowledge as much as 5 (31.3%), and good knowledge as much as 4 (25.0%).

Table 2. Distribution of Frequency of Nutrition Knowledge and Pregnant Women After Education

Nutritional Knowledge After Education	Frequency	Percent	Valid Percent	Cumulative Percent
Less	0	0	0	0
Enough	8	50,0	50,0	50,0
Good	8	50,0	50,0	100,0
Total	16	100,0	100,0	

The distribution of the frequency of nutritional knowledge of pregnant women after being given balanced nutrition education in table 2 can be seen that of the 16 respondents, some are in the category of good knowledge as many as 8 (50.0%), while sufficient knowledge is 8 (50.0%), and there are no respondents with lack of knowledge.

Table 3. Distribution of Frequency of Nutritional Attitudes of Pregnant Women Before Education

Nutritional Attitude Before Education	Attendance	Percent	Valid Percent	Cumulative Percent
Less	0	0	0	0
Enough	6	37,5	37,5	37,5
Good	10	62,5	62,5	100,0
Total	16	100,0	100,0	

Table 3 above shows that the distribution of the frequency of nutritional attitudes of pregnant women before being given balanced nutrition education in 16 respondents, most of them were in the category of good attitudes as many as 10 (62.5%), while moderate attitudes were 6 (37.5%), and no respondents were found in the category of poor attitudes.

Table 4. Distribution of Frequency of Nutritional Attitudes of Pregnant Women After Education

Nutritional Attitudes After Education	Frequency	Percentage	Valid Percent	Cumulative Percent
Less	0	0	0	0
Enough	1	6,3	6,3	6,3
Good	15	93,8	93,8	100,0
Total	16	100,0	100,0	

Based on Table 4, the distribution of the frequency of nutritional attitudes of pregnant women after balanced nutrition education above states that of the 16 respondents, most of them

were in the category of good attitudes as much as 15 (93.8%), while moderate attitudes were 1 (6.3%), and no respondents were found in the category of poor attitudes.

Table 5. Distribution of Frequency of Reproductive Knowledge of Pregnant Women Before Education

Reproductive Knowledge Before Education	Frequency	Percent	Valid Percent	Cumulative Percent
Less	6	37,5	37,5	37,5
Enough	7	43,8	43,8	81,3
Good	3	18,8	18,8	100,0
Total	16	100,0	100,0	

The results of Table 5 above show the distribution of the frequency of reproductive knowledge of pregnant women before being given reproductive health education to 16 respondents, most of whom are in the category of sufficient knowledge as much as 7 (43.8%), while lack of knowledge as much as 6 (37.5%), and good knowledge as much as 3 (18.8%).

Table 6. Distribution of Frequency of Reproductive Knowledge of Pregnant Women After Intervention

Reproductive Knowledge After Intervention	Frequency	Percentage	Valid Percent ages	Cumulative Persen
Less	0	0	0	0
Enough	3	18,8	18,8	18,8
Good	13	81,3	81,3	100,0
Total	16	100,0	100,0	

Based on Table 6 regarding the distribution of the frequency of reproductive knowledge of pregnant women after being given reproductive health education to 16 respondents, it shows that there are 13 (81.3%) respondents in the category of good knowledge, while 3 (18.8%) have sufficient knowledge, and no respondents with the category of lack of knowledge are found.

Table 7. Distribution of Frequency of Reproductive Health Attitudes of Pregnant Women Before Intervention

Reproductive Health Attitudes Before Intervention	Frequency	Percentage	Valid Percent	Cumulative Percent
Less	6	37,5	37,5	37,5
Enough	7	43,8	43,8	81,3
Good	3	18,8	18,8	100,0
Total	16	100,0	100,0	

Based on Table 7 above, it shows that of the 16 respondents, most of them were in the category of moderate attitudes as much as 7 (43.8%), while attitudes were lacking as much as 6 (37.5%), and respondents with the category of good attitudes were 3 (18.8%).

Table 8. Distribution of Frequency of Reproductive Health Attitudes of Pregnant Women After Intervention

Reproductive Health Attitudes after intervention	Frequency	Percent	Valid Percent	Cumulative Persen
Less	0	0	0	0
Enough	0	0	0	0
Good	16	100,0	100,0	100,0
Total	16	100,0	100,0	

Table 8 above states that after being given an intervention in the form of reproductive health education, the frequency of reproductive health attitudes of pregnant women from 16 respondents who did postes was in the good category as many as 16 (100%) respondents.

2. Bivariate Analysis

Table 9. T-test results table

	Average	P value	Average difference (IK95%)
Pretest	92.3750	<0.001	11.93428
Posts	115.8750		35.06572

The results of the analysis showed that the significance value obtained was <0.001 with a calculated t-value of 5.939. This significance value much smaller than 0.05 indicates that the results of the study are very significant, so H_0 is rejected, and H_1 is accepted. This means that there is a significant difference between the knowledge and attitudes of nutrition and reproductive health of pregnant women before and after receiving nutrition and reproductive health education. So it can be interpreted that the provision of nutrition and reproductive health education for pregnant women has an influence on the knowledge and attitudes of pregnant women regarding nutrition and reproductive health in Talun District.

1. Knowledge and Attitudes of Pregnant Women before and after being given Nutrition and Reproductive Health education.

Based on the results of the Univariate analysis, it is known that the number of respondents of pregnant women who have nutritional knowledge in the good category before education is carried out is 4 (25.0%) respondents and after education is carried out as many as 8 (50.0%) respondents, meaning that there is a difference from before nutrition education is given to pregnant women and after nutrition education is given to pregnant women, this proves that there is an influence of providing nutrition education on increasing maternal nutrition knowledge pregnant in Talun District. For the nutritional attitude of pregnant women which is included in the category of good nutritional attitudes before the intervention is carried out, there is a difference with an increase from 10 (62.5%) respondents before being educated and increasing to 15 (93.8%) respondents after being educated, meaning that nutrition education in pregnant women has an influence on improving the nutritional attitude of pregnant women in Talun District. As for the knowledge of reproductive health of pregnant women before education, the number of pregnant women in the good category was 3 (18.8%) respondents and increased after education by 13 (81.8%) respondents. These results show that there is a difference between before and after education, which means that reproductive health education in pregnant women has an influence on improving reproductive health knowledge of pregnant women. For the attitude of reproductive health of pregnant women before education was carried

out with the category of good attitude, a total of 9 (56.3%) respondents then increased to 16 (100%) respondents. The results stated that there was a difference in the attitude of pregnant women regarding reproductive health after education, meaning that reproductive health education in pregnant women had an influence on improving the reproductive health attitudes of pregnant women.

To determine the influence of nutrition education and reproductive health of pregnant women on the knowledge and attitudes of pregnant women in Talun District, the T test was used to see differences from before and after the provision of education. The results of this T-test, show a significance level of 5% ($\alpha = 0.05$), which means that the results of the statistical test will be considered significant if the significance value obtained is less than 0.05 with the significance value obtained is <0.001 , and the t-value calculated is 7.094. This significance value is much smaller than 0.05, indicating that the results of the study are very significant. This proves that there is a significant difference between the knowledge and attitudes of nutrition and reproductive health of pregnant women, before and after receiving nutrition and reproductive health education.

Then to determine whether the difference in knowledge values before and after education has statistical significance, a T test was carried out with a significance level of 5% ($\alpha = 0.05$). The results of the statistical test showed that p-value = <0.001 , which means that there is an influence of nutrition and reproductive health education of pregnant women on the knowledge and attitude of pregnant women before and after being given nutrition and reproductive health education.

This is in line with the research of Permatasari et al. (2021) conducted in Bogor Regency. Stating that knowledge and attitudes regarding nutrition and reproductive health are the main factors that can affect pregnancy. In this study, a significant difference was shown between the results of Pretes and Postes. That participants have basic knowledge and attitudes about nutrition and reproductive health that are lacking. In the study, the average score of knowledge and attitude in the intervention group was significantly increased ($P < 0.001$) after receiving education. Meanwhile, in the control group, there was no significant difference ($P > 0.05$) in the average score of knowledge and attitudes regarding nutrition and reproductive health between pretests and postes.

This study also showed that interventions in the form of education effectively had a significant impact ($P < 0.05$). The results of this study show that there has been a significant increase in knowledge, attitudes regarding nutrition and reproductive health after receiving education. This can be because knowledge is one of the factors that can affect the formation of health behaviors. Factors that can affect the knowledge and attitudes of pregnant women include the level of education, access to information, previous experience, family and environmental support (Permatasari et al., 2021).

In a study conducted by Melati & Anna (2021), which was conducted in Kuripan Sari Village, Mojokerto. Stating that nutritional fulfillment is also related to the high and low knowledge of mothers about nutrition. The difference in pretest and postes scores is known from the Paired Sample t-test. The calculated t-value is known to be -4.378 with a significance value of $p = 0.000$. From these results, it can be seen that a significant value of <0.05 can be seen. So it can be stated that there are significant differences in the knowledge and nutritional attitudes of pregnant women before and after being given the material ($p < 0.05$). The

experimental group when they were first given a questionnaire, there were still many negative answers, but after being educated, they showed positive attitude results. In contrast to the control group, many showed negative attitudes at the beginning of the questionnaire and at the end. The results of other studies also showed that after education, there was an increase in knowledge by 84.6%.

Based on the research conducted by Utomo et al. (2024), on 17 pregnant women in Karangpring village, Jember Regency, East Java Province. Stating that understanding the benefits of reproductive health education regarding antenatal is key to achieving the main goals, which are healthy pregnancy and safe childbirth. In the results of the paired sample t-test in this study, a p value of 0.000 was obtained with $\alpha = 0.05$ and r calculated 0.909. This means that there is a significant influence between reproductive health education and knowledge about *antenatal care* in pregnant women. Therefore, it can be concluded that there has been an increase in knowledge before and after providing reproductive health education about *antenatal care*.

CONCLUSION

Based on the research findings, nutritional knowledge among pregnant women in Talun District improved significantly after education, shifting from a majority in the less and fair categories before education to exclusively fair and good categories afterward, with no participants remaining in the poor category. Similarly, nutritional attitudes showed marked enhancement, with most women exhibiting good attitudes post-education, whereas none had poor attitudes either before or after. Reproductive health knowledge also increased notably, with the majority moving into the good knowledge category following education and no participants classified as having poor knowledge. Reproductive health attitudes showed the strongest improvement, reaching 100% good attitudes after education. These results demonstrate that nutrition and reproductive health education effectively improved both knowledge and attitudes among pregnant women in this community. Future research could explore the long-term retention of these knowledge and attitude improvements and assess how these changes translate into actual behavioral and health outcomes for mothers and infants, possibly including larger and more diverse rural populations to enhance generalizability.

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