THE EFFECT OF GLYCINE MAX (L.) MERRILL CONSUMPTION ON BREAST MILK PRODUCTION IN BREASTFEEDING MOTHERS AT PUSKESMAS CANGKUANG, BANDUNG REGENCY, 2025

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ABSTRACT

Exclusive breastfeeding is breastfeeding to babies without accompanying foods and drinks (including orange water, honey, sugar water), starting from newborn to 6 months of age. the achievement of Exclusive Breastfeeding in Bandung Regency in 2024 is 77.7% and in the Cangkuang Health Center Working Area in 2024 is 58%. This study aims to analyze "The Effect of Glycin max (L) Merril Administration on Breast Milk Production in Breastfeeding Mothers in the Working Area of the Cangkuang Health Center, Bandung Regency in 2025". This type of research is Experiment with one group pretest posttest design.. The number of research samples was 30 respondents who were selected using the total sampling technique. Data were collected using primary data from observations and secondary data from the book Kesehatan Ibu Anak. Data analysis was carried out using the paired t-dependent test with a significance level of $p<0.05$. The results of the study showed that there was an Effect of Glycin Max (L) Merril Administration on Breast Milk Production in Breastfeeding Mothers in the Working Area of the Cangkuang Health Center, Bandung Regency in 2025 with the results of a statistical test of p-value = 0.001. Breastfeeding mothers can improve their knowledge and practice of breastfeeding by utilizing nutritious food sources, one of which is Merrill Glycin max (L) to help facilitate breast milk production and Health Institutions continue to provide more optimal support for breastfeeding programs with education on the use of local food.

Keywords: Exclusive Breastfeeding, Glycine max (L.) Merrill, Breast Milk Production, Breastfeeding Mothers

INTRODUCTION

Exclusive breastfeeding is widely recognized as one of the most effective and cost-effective public health interventions for improving maternal and child health outcomes. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life, followed by continued breastfeeding with appropriate complementary foods until two years of age or beyond. Breast milk provides complete nutrition and contains bioactive compounds, immunoglobulins, enzymes, hormones, and growth factors that are essential for infant growth, immune system maturation, neurodevelopment, and protection against infectious diseases. Beyond its benefits for infants, breastfeeding contributes substantially to maternal health by reducing postpartum hemorrhage, accelerating uterine involution, and lowering the long-term risks of breast cancer, ovarian cancer, hypertension, type 2 diabetes, and cardiovascular diseases (Meek & Noble, 2022; World Health Organization [WHO], 2025).

The health benefits of breastfeeding extend beyond infancy and have significant implications for population health and sustainable development. Accumulating evidence demonstrates that exclusive breastfeeding is associated with a lower incidence of respiratory

tract infections, gastrointestinal infections, otitis media, obesity, type 1 diabetes, childhood leukemia, and infant mortality, while simultaneously improving cognitive development and lifelong health outcomes. Because of these extensive benefits, breastfeeding has been recognized as a global public health priority and an essential strategy for achieving the Sustainable Development Goals (SDGs), particularly those related to reducing child mortality, improving maternal health, enhancing nutrition, and decreasing health inequalities. Consequently, international organizations and professional societies continue to recommend strengthening breastfeeding promotion through evidence-based clinical practice and community-based interventions (Meek & Noble, 2022; Patnode et al., 2025).

Despite the overwhelming scientific evidence supporting breastfeeding, achieving optimal exclusive breastfeeding coverage remains a major challenge worldwide. Multiple biological, psychological, socioeconomic, and healthcare-related factors influence breastfeeding success, including delayed lactogenesis, maternal nutritional status, maternal confidence, family support, workplace barriers, breastfeeding counseling, and access to appropriate postpartum care. These factors often contribute to early breastfeeding cessation or premature introduction of infant formula and complementary foods before the recommended age. The American Academy of Pediatrics emphasizes that breastfeeding should not merely be considered an individual maternal responsibility but rather a public health priority requiring integrated support from healthcare providers, families, communities, and policymakers to ensure successful breastfeeding practices throughout the first six months of life and beyond (Meek & Noble, 2022; American College of Obstetricians and Gynecologists [ACOG], 2023).

One of the primary factors contributing to the low success rate of exclusive breastfeeding is suboptimal breast milk production among breastfeeding mothers. Insufficient milk supply often leads mothers to introduce supplementary foods to their babies earlier than recommended. Physiologically, breast milk production is regulated by the hormones prolactin and oxytocin, which are stimulated through the baby's suckling and are also influenced by the mother's nutritional status. Several studies have shown that maternal nutritional intake plays an important role in supporting the lactation process. Breastfeeding mothers with inadequate nutritional intake may experience reduced stimulation of the mammary glands, resulting in poor milk production. As such, nutrition-based interventions using local food ingredients with lactogogic effects have become an important area of focus in maternal and child health research.

Recent research developments have shown growing interest in the use of plant-based food ingredients as natural lactogogues to enhance breast milk production. One promising local food source is Glycine max (L.) Merrill, commonly known as edamame soybean. Soybeans are known to contain phytoestrogens, isoflavones, flavonoids, alkaloids, and polyphenols, which are believed to stimulate the hormones prolactin and oxytocin, thereby helping to increase breast milk production. In addition, soybeans are also rich in protein, iron, calcium, magnesium, folic acid, vitamin A, and various other essential nutrients needed by breastfeeding mothers.

A study conducted by Aida Fitria in 2022 found that soybean consumption had a significant effect on increasing breast milk production in postpartum mothers in Medan. Another study by Dita Lestiya in 2024 also found that Glycine max (L.) Merrill consumption had a positive effect on increasing breast milk production in postpartum mothers in Malang Regency.

Although several studies have addressed the benefits of soybeans on breast milk production, a research gap remains regarding the application of Glycine max (L.) Merrill among breastfeeding mothers in the working area of the Cangkuang Primary Health Center, Bandung Regency. Previous studies were conducted in different regions and with different

respondent characteristics, meaning their findings cannot fully reflect the conditions of the community in this particular area.

Furthermore, research on the use of Glycine max (L.) Merrill as a locally accessible nutritional intervention remains limited, particularly at the primary health center level. This gap highlights the need for research that can provide contextually grounded scientific evidence on the effectiveness of Glycine max (L.) Merrill in increasing breast milk production among breastfeeding mothers.

Based on this gap, the present study was conducted to analyze the effect of Glycine max (L.) Merrill consumption on breast milk production in breastfeeding mothers in the working area of the Puskesmas (Primary Health Center) Cangkuang, Bandung Regency, in 2025. This study is expected to contribute to the development of locally accessible and cost-effective food-based nutritional interventions for breastfeeding mothers. Furthermore, the findings of this study are hoped to serve as a reference for healthcare workers and health service institutions in strengthening exclusive breastfeeding education and promotion programs.

Based on the theoretical framework and findings of previous studies, the hypothesis of this study is that there is a significant effect of Glycine max (L.) Merrill consumption on increasing breast milk production in breastfeeding mothers in the working area of the Puskesmas Cangkuang, Bandung Regency, in 2025.

METHOD

This study used a quantitative method with a pre-experimental design using a one-group pretest-posttest approach. This research design was used to determine the effect of Glycine max (L.) Merrill consumption on breast milk production in breastfeeding mothers by measuring outcomes before the intervention (pretest) and after the intervention (posttest). The study was conducted in the working area of the Puskesmas Cangkuang, Bandung Regency, from June to August 2025.

Participant Characteristics and Research Design

The population of this study consisted of all breastfeeding mothers in the working area of the Puskesmas Cangkuang, Bandung Regency, in 2025. The study participants were postpartum and breastfeeding mothers who met the study criteria.The inclusion criteria were as follows: Breastfeeding mothers in the postpartum period from day 1 to day 14, Breastfeeding mothers who were willing to participate as research respondents, Mothers who were in good health and able to communicate well, Mothers who were directly breastfeeding their babies, Mothers who were willing to complete the entire intervention process until the study was finished. The exclusion criteria were as follows: Breastfeeding mothers experiencing postpartum complications, such as severe postpartum hemorrhage or infection, Mothers with a history of allergy to soybeans or soy-based products, Mothers who were consuming other medications or supplements to boost milk production during the study period, Mothers who were absent or did not complete the stages of the study.

The demographic characteristics of the respondents examined in this study included age, educational level, occupation, and parity. In addition, the specific characteristic observed was the condition of breast milk production before and after Glycine max (L.) Merrill consumption.

The one-group pretest-posttest design was carried out by taking an initial measurement of each respondent's breast milk production before the intervention was administered. Respondents were then given the intervention in the form of Glycine max (L.) Merrill consumption according to the study procedure, followed by a repeat measurement of breast milk production after the intervention was completed.

Sampling Procedure

The sampling technique used in this study was total sampling, in which the entire population meeting the inclusion criteria was included as the study sample. Based on data collected in the working area of the Puskesmas Cangkuang, a total of 30 breastfeeding mothers met the criteria and all of them agreed to participate, resulting in a participation rate of 100%.

Data collection was carried out directly in the working area of the Puskesmas through home visits and observation by the researcher, assisted by local healthcare workers. Prior to the study, the researcher provided explanations regarding the study's objectives, benefits, intervention procedures, as well as the rights and responsibilities of the respondents throughout the research process. Respondents who agreed to participate were asked to sign an informed consent form.

This study obtained research approval from the educational institution and the Puskesmas Cangkuang. All research procedures were carried out in accordance with the ethical principles of health research, encompassing respect for persons, confidentiality of respondents' identities, beneficence, and justice. Throughout the study, respondents were not provided with any financial compensation; however, they received education on the importance of exclusive breastfeeding and maternal nutrition for breastfeeding mothers.

Sample Size, Power, and Precision

The planned sample size for this study was 30 respondents, all of whom successfully completed the study through to the final stage, resulting in no sample loss (dropout). Sample size determination was based on the total number of breastfeeding mothers who met the inclusion criteria at the time the study was conducted.

Penelitian ini tidak menggunakan analisis *power* statistik secara khusus karena seluruh populasi yang memenuhi syarat dijadikan sampel penelitian. Namun demikian, jumlah sampel dianggap telah memenuhi syarat minimal penelitian eksperimen sederhana dengan desain satu kelompok. The research instruments used in data collection consisted of: A respondent characteristic sheet, A Breast milk production observation sheet, The Maternal and Child Book (Buku Kesehatan Ibu dan Anak/KIA) as a supplementary data resource.

The breast milk production observation instrument was developed based on indicators of milk flow adequacy according to lactation theory and previous research. The indicators used included: Frequency of infant breastfeeding, Breast condition before and after breastfeeding., Frequency of infant urination, Frequency of infant bowel movements, Infant response after breastfeeding, Infant sleep patterns after breastfeeding.

The research material used was Glycine max (L.) Merrill, or edamame, which was given to respondents throughout the intervention period. The research tools used included observation sheets, writing instruments, and research documentation equipment.

Measurements and Covariates

The independent variable in this study was Glycine max (L.) Merrill consumption, while the dependent variable was breast milk production in breastfeeding mothers.The operational definition of the independent variable was the administration of Glycine max (L.) Merrill to breastfeeding mothers during the study period in accordance with the dosage and procedures established by the researcher. The operational definition of the dependent variable was the quantity and adequacy of breast milk production, observed through physiological indicators and infant response after breastfeeding.

Breast milk production was measured using an observation sheet completed based on the results of direct observation and interviews with respondents. Observations were conducted twice, once before the intervention (*pretest*) and once after the intervention (*posttest*). To

improve the quality of data measurement, the researcher carried out several steps, including: Training enumerators on data collection procedures and the completion of observation sheets, Using observation instruments that had been adapted from established theory and previous research, Conducting repeated observations throughout the study to maintain consistency in measurement results, Ensuring that all respondents received the same treatment throughout the study. The covariates considered in this study included maternal age, educational level, occupation, parity, and maternal health status during the breastfeeding period.

Data Analysis

The data obtained were analyzed using univariate and bivariate analysis. Univariate analysis was used to describe the frequency distribution of respondent characteristics as well as the mean breast milk production before and after Glycine max (L.) Merrill consumption. The results of the univariate analysis are presented in the form of frequency distribution tables, percentages, means, and standard deviations.

Prior to bivariate analysis, the data were first tested for normality using the Shapiro-Wilk test to determine the distribution of the data. The normality test results indicated that the data were normally distributed, and the analysis was therefore proceeded with using the paired t-test**.**

Bivariate analysis was conducted to determine the effect of Glycine max (L.) Merrill consumption on breast milk production in breastfeeding mothers by comparing values before and after the intervention. The level of statistical significance used in this study was $p<0.05$ with a 95% confidence interval. The entire data analysis process was carried out using computerized statistical software in accordance with quantitative research standards.

RESULTS AND DISCUSSION

This study was conducted on 30 breastfeeding mothers in the working area of the Puskesmas Cangkuang, Bandung Regency, in 2025. The findings are presented in the form of univariate and bivariate analyses to determine the effect of Glycine max (L.) Merrill consumption on breast milk production in breastfeeding mothers..

Respondent Characeristic

Tabel 1
Frequency Distribution of Respondent Characteristics Based on Age, Educational Level, Occupation, and Parity

Characteristics	Frequency (f)	Percentage (%)
Age		
3		10,0
20–35 years	22	73,3
> 35 years	5	16,7
Education		
Primary Education	8	26,7
Secondary Education	17	56,7
Higher Education	5	16,7
Occupation		
Homemaker	21	
Employed	9	
Parity		
Primiparous	12	
Multiparous	18	

Based on Table 1, the majority of respondents were in the 20–35 age group, accounting for 22 respondents (73.3%). In terms of educational level, most respondents had a secondary education background, totaling 17 respondents (56.7%). The majority of respondents were homemakers, accounting for 21 respondents (70.0%), and most respondents had multiparous status, totaling 18 respondents (60.0%).Analysis of Breast Milk Production Before and After Intervention

Tabel 2
Distribution of Mean Breast Milk Production Before and After Glycine max (L.) Merrill Consumption

Variabel	Mean	SD	Min	Max
Breast Milk Production Before Intervention	6,13	1,224	4	8
Breast Milk Production After Intervention	9,27	1,081	7	11

Based on Table 2, the mean breast milk production before Glycine max (L.) Merrill consumption was 6.13 with a standard deviation of 1.224. Following the intervention, the mean breast milk production increased to 9.27 with a standard deviation of 1.081. These results indicate an improvement in breast milk production after Glycine max (L.) Merrill consumption.

Hypothesis Test Results

Tabel 4
The Effect of Glycine max (L.) Merrill Consumption on Breast Milk Production

Variabel	Mean Difference	t	p-value
Breast Milk Production Before and After Intervention	3,14	9,873	0,001

Based on the paired t-test results in Table 4, a p-value of 0.001 ($p<0.05$) was obtained, leading to the acceptance of Ha and the rejection of H0. These results indicate that there is a significant effect of Glycine max (L.) Merrill consumption on increasing breast milk production in breastfeeding mothers in the working area of the Puskesmas Cangkuang, Bandung Regency, in 2025.

Discussion

The findings of this study indicate that Glycine max (L.) Merrill consumption had a significant effect on increasing breast milk production in breastfeeding mothers. The increase in mean breast milk production following the intervention suggests that the nutritional content of Glycine max (L.) Merrill is capable of supporting and enhancing the lactation process in breastfeeding mothers.

Glycine max (L.) Merrill soybeans are known to contain phytoestrogens, isoflavones, flavonoids, alkaloids, and polyphenols, which function as natural lactogogues. The phytoestrogen content in soybeans can help increase the secretion of prolactin and oxytocin hormones, which play a vital role in breast milk production and release. Physiologically, prolactin stimulates milk formation in the alveoli of the breast, while oxytocin facilitates milk ejection through the let-down reflex. In addition, the protein, iron, magnesium, and folic acid content in Glycine max (L.) Merrill also helps meet the nutritional needs of mothers during the breastfeeding period, allowing for more optimal bodily metabolism and breast milk production.

These findings are consistent with a study conducted by Aida Fitria in 2022, which reported that the consumption of soy-based products had a significant effect on increasing breast milk production in postpartum mothers. That study found an increase in breastfeeding

frequency and calmer infant behavior following regular soybean consumption by the mothers. Another study by Dita Lestiya in 2024 also found that Glycine max (L.) Merrill consumption could increase breast milk production due to its isoflavone content, which acts similarly to the hormone estrogen in the body

The difference between this study and previous research lies in the study location, respondent characteristics, and the intervention approach used. This study was conducted among breastfeeding mothers in the working area of a Puskesmas with distinct social conditions and community consumption patterns compared to earlier studies. Furthermore, this study emphasizes the use of Glycine max (L.) Merrill as a locally available and cost-effective food ingredient that can be directly applied in public health programs. As such, this study offers a new contribution to the development of local food-based nutritional interventions for improving the success of exclusive breastfeeding.

Although the findings indicate a significant effect, this study has several limitations. The research design did not include a control group, meaning that factors beyond the intervention may still have influenced breast milk production, such as maternal rest patterns, breastfeeding frequency, and maternal psychological well-being. In addition, the relatively small sample size means that the findings cannot be broadly generalized. Therefore, further research with a more rigorous experimental design and a larger sample size is needed to obtain more comprehensive results.

Overall, the findings of this study suggest that Glycine max (L.) Merrill consumption may serve as an effective non-pharmacological intervention alternative to help increase breast milk production in breastfeeding mothers. The use of local food ingredients as natural lactogogues also has the potential to support exclusive breastfeeding promotion programs and improve the health status of both mothers and infants in the community.

LIMITATION OF THE STUDY

This study has several limitations that should be taken into account when interpreting the findings. First, the research design used was a one-group pretest-posttest without a control group, meaning there remains a possibility that factors outside the intervention influenced the increase in breast milk production, such as maternal diet, breastfeeding frequency, psychological condition, and family support. Second, the sample size in this study was relatively limited and was conducted in only one Puskesmas working area, meaning the findings cannot be generalized to a broader population. Third, breast milk production was measured through observational indicators and infant response, and therefore did not employ an objective measurement of milk volume. Furthermore, the relatively short duration of the study means that the long-term effects of Glycine max (L.) Merrill consumption on the sustainability of breast milk production could not be fully determined.

CONCLUSIONS AND SUGGESTIONS

Glycine max (L.) Merrill consumption has been proven to have a significant effect on increasing breast milk production in breastfeeding mothers in the working area of the Puskesmas Cangkuang, Bandung Regency, in 2025. The phytoestrogen, isoflavone, protein, and various essential nutrient content in Glycine max (L.) Merrill play a role in supporting the lactation process through the enhancement of prolactin and oxytocin hormones. This study demonstrates that the use of soybean-based local food can serve as an effective, safe, accessible, and cost-effective non-pharmacological intervention alternative to help increase breast milk production in breastfeeding mothers.

The findings of this study contribute to the advancement of health sciences, particularly in the field of maternal and child health, through a local food-based nutritional approach to support the success of exclusive breastfeeding programs.

Based on the study's limitations, it is recommended that future research adopt a more rigorous experimental design by incorporating a control group and a larger sample size to improve the generalizability of the findings. Future studies are also encouraged to use more objective methods of measuring breast milk production and to take into account other factors that may influence milk supply, such as maternal nutritional status, rest patterns, stress levels, and family support. In addition, healthcare workers are encouraged to develop educational programs on the use of Glycine max (L.) Merrill as a nutritional alternative for breastfeeding mothers in an effort to improve the success of exclusive breastfeeding in the community.

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