THE EFFECTIVENESS OF THE ENDORPHIN, OXYTOCIN, AND SUGGESTIVE MASSAGE STIMULATION METHOD ON BREAST MILK PRODUCTION IN POSTPARTUM MOTHERS: IMPLICATIONS FOR MIDWIFERY EDUCATION

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ABSTRACT

Breast milk is the optimal source of nutrition for infants, but exclusive breastfeeding rates in Indonesia and globally remain below target, largely due to maternal anxiety, insufficient milk production, and inadequate support systems. Innovative, integrative interventions that address both physiological and psychological barriers are urgently needed to support successful lactation outcomes. This study aimed to evaluate the effectiveness of the Stimulasi Pijat Endorphin, Oksitosin, dan Sugestif (SPEOS) method—an integrative technique combining oxytocin massage, endorphin massage, and positive suggestion—in increasing breast milk production among postpartum mothers at PMB Fatimah Bandungrejosari, Malang. A quasi-experimental posttest-only control group design was implemented, involving 36 postpartum mothers (days 1–40) who were divided equally into intervention and control groups. The intervention group received the SPEOS method (20-minute sessions for nine consecutive days), while the control group received only standard informational leaflets. Data on breast milk production were collected using validated observation sheets and baby scales, and analyzed using univariate and bivariate methods, including the Mann-Whitney test. The findings revealed that 66.7% of mothers in the SPEOS group achieved high breast milk production, compared to just 16.7% in the control group. Statistical analysis confirmed a significant difference between groups ($p = 0.002$). The SPEOS intervention demonstrated not only physiological benefits, through hormonal stimulation, but also psychological benefits, by improving maternal confidence and emotional well-being. The SPEOS method is an effective, holistic, and easily adopted intervention for enhancing breast milk production in postpartum mothers. Its integrative approach, targeting both hormonal and psychological pathways, makes it suitable for inclusion in maternal health education and practice. This research supports the integration of the SPEOS method into midwifery education and practice as a low-cost, evidence-based strategy to promote exclusive breastfeeding, maternal empowerment, and optimal infant health. The study provides a foundation for further research and broader implementation in diverse healthcare settings. Larger-scale and longer-term studies are recommended to confirm these findings, explore additional maternal and infant health outcomes, and refine SPEOS implementation protocols for various populations.

Keywords: breastfeeding, education, oxytocin massage, postpartum care, speos method

INTRODUCTION

Breast milk (ASI) remains the optimal source of nutrition for infants, especially during the first months of life, providing essential antibodies, nutrients, and bioactive factors necessary for neonatal growth and immune development (Victora et al., 2016; Ballard & Morrow, 2013). In Indonesia and globally, exclusive breastfeeding rates remain below the target set by the World Health Organization (WHO), with only 66% of infants worldwide receiving exclusive breastfeeding and significant regional disparities observed (WHO, 2022; Patia & Sofiyanti, 2023). In Indonesia, the rate declined from 69.7% in 2021 to 67.96% in 2022, with East Java reporting only 51% exclusive breastfeeding (Dinkes Jatim, 2021). This situation is mirrored in various low- and middle-income countries, where maternal, socioeconomic, and systemic barriers limit the success of breastfeeding interventions (Rollins et al., 2016; Siregar et al., 2018). Multiple factors contribute to breastfeeding failure, including maternal anxiety, insufficient milk production, return to work, improper breastfeeding techniques, and lack of familial or societal support (Arsi et al., 2023; Sinha et al., 2015).

Maternal psychological well-being, particularly postpartum stress and anxiety, is known to impact lactation through neuroendocrine mechanisms, such as suppression of oxytocin and prolactin—critical hormones in milk let-down and synthesis (Melyanasari et al., 2018; Uvnäs-Moberg et al., 2020). The physiological interplay between stress, the oxytocinergic system, and the endorphin pathway underscores the importance of holistic and non-pharmacological interventions in supporting lactation outcomes (Bystrova et al., 2009; Kim et al., 2022). Preliminary data from PMB Fatimah Bandungrejosari, Malang, revealed that nearly half of postpartum mothers failed to provide exclusive breastfeeding, with insufficient milk supply as a primary cause. If left unaddressed, poor lactation can contribute to negative outcomes, such as delayed uterine involution, weak mother-infant attachment, and increased risks for child morbidity (Ilmiah, 2023; Victora et al., 2016).

Despite the proven benefits of exclusive breastfeeding, a persistent challenge remains: how to effectively increase milk production and support mothers during the postpartum period. Traditional solutions include pharmacological and non-pharmacological approaches, such as galactagogue administration, nutritional counseling, and psychosocial support (Asare et al., 2018; Finigan & Long, 2022). However, many mothers prefer interventions that are safe, non-invasive, and can be performed within the family setting (Sharma & Sharma, 2022). The literature supports the role of oxytocin massage and psychological support as promising non-pharmacological strategies to improve milk production by leveraging the neuroendocrine response (Sudiarti et al., 2021; Feher et al., 1989). However, no single intervention has been universally accepted as most effective, indicating a gap for innovative integrative methods (Dennis et al., 2012).

The Stimulasi Pijat Endorphin, Oksitosin, dan Sugestif (SPEOS) method represents an integrative technique combining oxytocin massage, endorphin massage, and positive suggestion. Each component targets different aspects of lactogenesis: oxytocin massage stimulates the release of oxytocin, facilitating milk let-down; endorphin massage induces relaxation and pain relief, improving maternal mood; and suggestive techniques promote positive mental states, self-efficacy, and confidence in breastfeeding mothers (Sari et al., 2017; Nugraheni & Heryati, 2017). Studies have reported the efficacy of oxytocin massage alone in increasing milk output and maternal satisfaction (Rahayu et al., 2021; Siregar et al., 2018; Feher et al., 1989). The addition of endorphin massage and suggestion further addresses psychological barriers and supports a holistic care model (Kadek Widiantari et al., 2023; Maulina, Badriyah, et al., 2024). Internationally, interventions that blend physical touch and psychological support are recognized to improve breastfeeding outcomes and maternal well-being (Kim et al., 2022; Dennis et al., 2012; Ingram et al., 2016). For example, a systematic review found that breastfeeding self-efficacy and maternal confidence, often bolstered by suggestive or affirmational techniques, are significant predictors of successful lactation (Dennis, 2003; Blyth et al., 2002). Furthermore, integrative approaches that involve the partner or family in the intervention (as in the SPEOS method) show added value in sustaining lactation (Arora et al., 2021).

Although several studies in Indonesia and abroad have reported benefits of oxytocin and endorphin massages, as well as relaxation or suggestion-based techniques on breastfeeding outcomes (Feher et al., 1989; Sudiarti et al., 2021; Sharma & Sharma, 2022), only a limited number have investigated the SPEOS method as a comprehensive protocol. Most existing research focuses on single techniques, often with short intervention durations (usually one week), small sample sizes, or lacks a rigorous control group (Kadek Widiantari et al., 2023; Luh Astini Dewi et al., 2023; Ety Nurhayati & Sukadiariani, 2020). Additionally, there is insufficient evidence regarding the optimal duration and frequency of SPEOS interventions and their effects on both objective (milk volume, infant weight) and subjective (maternal satisfaction, confidence) outcomes (Sulistiyah et al., 2024). Internationally, the evidence base is even scarcer regarding the integration of suggestion or affirmational therapy with physical stimulation in postpartum breastfeeding care (Kim et al., 2022; Ingram et al., 2016; Rollins et al., 2016). This gap highlights the need for robust, quasi-experimental studies that evaluate the efficacy of SPEOS in a controlled setting and explore its broader benefits for postpartum women.

This study aims to evaluate the effectiveness of the SPEOS method in increasing breast milk production among postpartum mothers at PMB Fatimah Bandungrejosari, Malang. The novelty of this research lies in the comprehensive application of SPEOS over an extended intervention period (nine consecutive days), its implementation in a real-world midwifery practice, and its inclusion of both objective (milk production, infant weight gain) and subjective (maternal experience) outcome measures. To the best of our knowledge, this is among the first quasi-experimental studies in Indonesia to rigorously assess the SPEOS protocol, filling a significant gap in the existing literature and providing evidence for non-pharmacological interventions in maternal care. The main hypothesis is that mothers who receive the SPEOS intervention will exhibit significantly increased breast milk production compared to those who do not, with secondary hypotheses related to improved maternal confidence and satisfaction. The scope of this study covers postpartum mothers experiencing challenges with milk production within the first 1-2 weeks postpartum, as this period is critical for establishing lactation and maternal-infant bonding.

METHOD

Research Design

This research employed a quasi-experimental design to evaluate the effectiveness of the Endorphin, Oxytocin, and Suggestive Massage Stimulation Method (SPEOS) on breast milk (ASI) production in postpartum mothers. Quasi-experimental methods are often applied when true randomization is not feasible but controlled intervention and evaluation are still possible (Harris et al., 2006; White & Sabarwal, 2014; Shofah Ilmiah et al., 2023). This design is particularly suitable for healthcare interventions where ethical or logistical issues prevent full random assignment (Bhandari et al., 2022). A posttest-only control group design was implemented. The study consisted of two groups: the intervention group (receiving SPEOS) and the control group (receiving only standard information on breastfeeding). Outcome measurements were conducted only after the intervention, ensuring that any differences observed could be attributed to the intervention (White & Sabarwal, 2014; Harris et al., 2006).

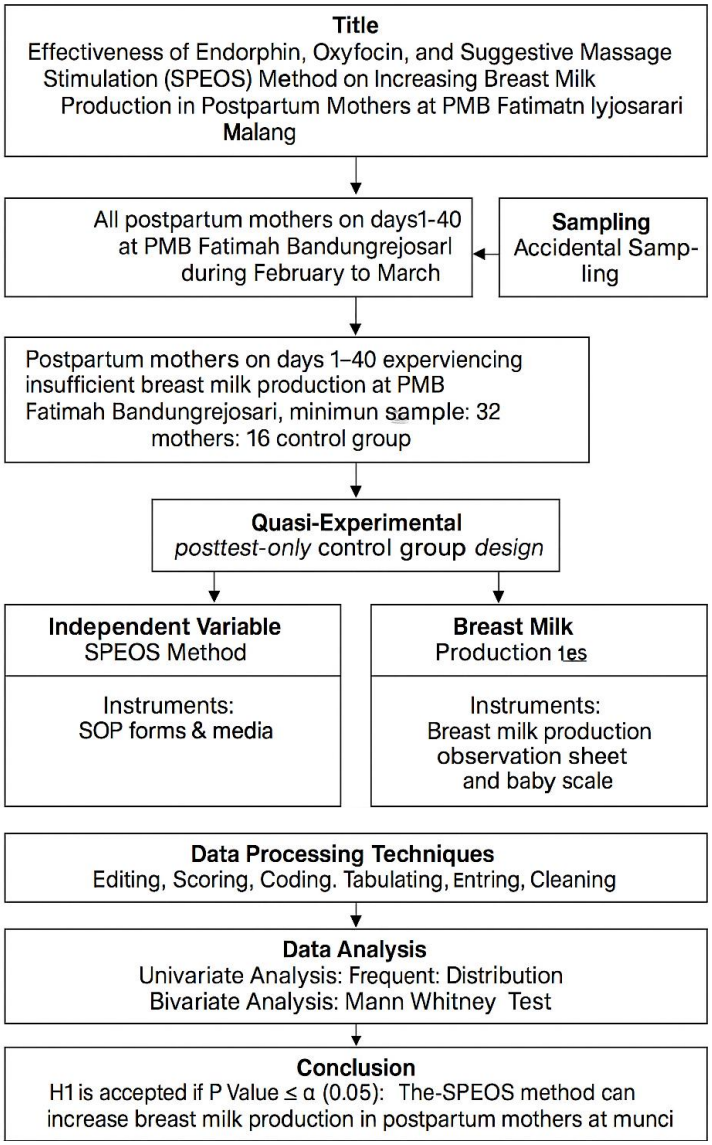
Table 1. Research Design

Group	Intervention (X)	Outcome Observation
Intervention	SPEOS (X)	O_1
Control	None (-)	O_2

Note: X: SPEOS method intervention; O_1: Observation of breast milk production in the intervention group; O_2: Observation of breast milk production in the control group; - : No SPEOS method provided.

The operational framework diagram systematically outlines the research process for evaluating the effectiveness of the SPEOS (Endorphin, Oxytocin, and Suggestive Massage Stimulation) method on increasing breast milk production among postpartum mothers at PMB Fatimah Bandungrejosari, Malang. It begins by defining the study population (all postpartum mothers on days 1–40 during February to March), the accidental sampling technique, and the selection of 32 mothers experiencing insufficient breast milk production who are then divided into intervention and control groups. The study utilizes a quasi-experimental, posttest-only control group design to compare outcomes between groups, with the SPEOS method as the independent variable and breast milk production as the dependent variable, measured using observation sheets and baby scales. Data are processed through editing, scoring, coding, tabulating, entering, and cleaning before being analyzed with univariate (frequency distribution) and bivariate (Mann-Whitney test) methods. The research concludes by accepting the hypothesis if the p-value is ≤ 0.05, indicating that the SPEOS method significantly increases breast milk production in the target population.

Figure 1. Operational Framework



Population and Sampling

The population in this study consisted of all postpartum mothers from day 1 to day 40 at PMB Fatimah Bandungrejosari during the study period (February–March 2025) (Nursalam, 2016). Sampling specifically targeted postpartum mothers experiencing insufficient breast milk production, with the sample size determined using the Federer formula, resulting in a minimum of 16 participants per group for a total of 32 respondents. Inclusion criteria required mothers to willingly participate (indicated by signed informed consent), experience insufficient milk production, have no postpartum complications (such as bleeding, uterine or breast infection, or urinary tract infection), and practice rooming-in with their infants. Exclusion criteria included declining participation, being non-cooperative during data collection, or having open wounds or injuries in the area to receive the SPEOS massage. The study employed accidental sampling, selecting eligible and available respondents during the research period (Sugiyono, 2018). The research was conducted at PMB Fatimah, Jl. Kemantren 3, Gg. Dr. Soetomo No. 50 RT.011 RW.013, Bandungrejosari, Sukun, Malang, Indonesia, from February to March 2025.

Variables and Measurement

The variables in this study consisted of the independent variable—application of the SPEOS method (Sugiyono, 2019)—and the dependent variable, which was breast milk production (ASI) (Sugiyono, 2019). Operationally, breast milk production was measured using nine specific indicators: breast tension before breastfeeding, the presence of milk leakage, the baby breastfeeding at least six times per day, urination by the baby six to eight times daily, the baby being calm or sleeping after feeding (for 2–4 hours), the baby defecating two to five times per day, yellowish stool, the breast feeling soft or empty after feeding, and observable infant weight gain. Scoring was categorized as follows: a score of 0–3 indicated low breast milk production, 4–6 indicated moderate production, and 7–9 indicated high breast milk production.

Table 2. Operational Definitions and Measurement of Research Variables

No	Variable	Operational Definition	Parameter	Category/Score	Scale	Instrument
1	SPEOS Method	Non-pharmacological intervention: oxytocin massage, endorphin massage, suggestion for breastfeeding confidence	Given daily for 9 days, 20 min/session	1 = intervention, 0 = control	Nominal	SOP, media, leaflet
2	Breast Milk	The physiological process of milk production and secretion measured via multiple observable parameters	See indicators below	1 = low, 2 = moderate, 3 = high	Ordinal	Observation sheet, baby scale

Data Collection Methods and Procedures

Data for this study were collected using direct observation, where researchers recorded breast milk production indicators and infant weight before and after the intervention over a 9-day period, with the posttest conducted on day 9, as well as through documentation such as attendance lists and photographs of the SPEOS sessions. The instruments utilized included observation sheets for milk production indicators, the SPEOS SOP, media for SPEOS (baby oil, towel, and pillow), leaflets on proper breastfeeding techniques (provided only to the control group), and a baby scale. The procedure involved obtaining research and ethics approvals, securing permissions from relevant stakeholders, identifying eligible participants based on inclusion criteria, explaining the study and obtaining informed consent, and then assigning participants to either the intervention (SPEOS massage, 20 minutes every morning for 9 consecutive days) or control (standard leaflet only) group. Outcome measures were observed and recorded for all participants, followed by data processing and analysis. Data processing steps included editing for completeness and consistency, scoring responses, coding demographic and clinical characteristics, entering data into SPSS, tabulating

frequency distributions, and cleaning to remove inconsistencies (Putri, 2020; Nursalam, 2017; Notoatmodjo, 2018). For data analysis, univariate analysis described sample characteristics using frequency distributions (Notoatmodjo, 2018), while bivariate analysis used the Mann-Whitney test to assess differences in breast milk production between the two groups (Kim et al., 2022). Ethical approval was obtained from the Ethics Committee of ITSK RS Dr. Soepraoen Malang, and all research was conducted according to international ethical standards, ensuring informed consent, participant anonymity and confidentiality, risk minimization, and equitable selection from the eligible population (CIOMS, 2016; Emanuel et al., 2000).

RESULTS AND DISCUSSION

This research was conducted at PMB Fatimah Bandungrejosari, located at Jl. Kemantren 3, Gg. Dr. Soetomo No. 50 RT.011 RW.013, Bandungrejosari, Sukun District, Malang, East Java, Indonesia. The facility offers comprehensive maternal and child health services, including antenatal care, 24-hour delivery, general medicine, immunization, and family planning. The clinic staff consists of three midwives, supported by suitable infrastructure for postpartum care. The study was carried out from February 21 to March 21, 2025, and also serves as a teaching site for student midwives from various institutions in Malang.

Table 3. Respondent Characteristics by Age

Age Group	Frequency	Percentage (%)
20–35 years	30	83.3
>35 years	6	16.7
Total	36	100.0

Most respondents were between 20 and 35 years old (83.3%), consistent with literature showing that this is the most common age range for active breastfeeding mothers (Victora et al., 2016; Rollins et al., 2016).

Table 4. Respondent Characteristics by Education

Education	Frequency	Percentage (%)
Primary	4	11.1
Junior High	11	30.6
Senior High	18	50.0
College	3	8.3
Total	36	100.0

The largest proportion (50%) of respondents had completed senior high school. Prior research highlights that educational attainment is associated with breastfeeding knowledge and practices (Thulier & Mercer, 2009; Oakley et al., 2022).

Table 5. Respondent Characteristics by Occupation

Occupation	Frequency	Percentage (%)
Housewife	18	50.0
Entrepreneur	4	11.1
Private Employee	12	33.3
Civil Servant	2	5.6
Total	36	100.0

Half of the respondents were housewives, similar to findings from Indonesia DHS reports (BPS, 2022) and studies indicating that home-based mothers have more time to dedicate to breastfeeding (Ogbo et al., 2017).

Table 6. Respondent Characteristics by Parity

Parity	Frequency	Percentage (%)
Primipara	5	13.9
Multipara	30	83.3
Grandemultipara	1	2.8
Total	**36**	**100.0**

The majority were multiparous mothers, consistent with studies showing higher breastfeeding success among mothers with previous childbirth experience (Scott et al., 2006; Brown et al., 2014).

Table 7. Exclusive Breastfeeding Practice

Exclusive Breastfeeding	Frequency	Percentage (%)
No	14	38.9
Yes	22	61.1
Total	36	100.0

A majority (61.1%) practiced exclusive breastfeeding, reflecting growing awareness and implementation of WHO recommendations (WHO, 2022; Kavle & Landry, 2017).

Table 8. Breast Milk Production After SPEOS

Breast Milk Output	Frequency	Percentage (%)
High	12	66.7
Moderate	4	22.2
Low	2	11.1
Total	18	100.0

Among mothers receiving the SPEOS intervention, 66.7% experienced a high increase in breast milk production, while only 11.1% remained in the low category.

Table 9. Effect of SPEOS on Breast Milk Production

Group	High n (%)	Moderate n (%)	Low n (%)	p-value	α
Intervention	12 (66.7)	4 (22.2)	2 (11.1)	0.002	0.05
Control	3 (16.7)	7 (38.9)	8 (44.4)		

Statistical analysis using the Mann-Whitney test showed a significant difference between the groups ($p = 0.002$), confirming the effectiveness of SPEOS. The study found that the SPEOS method—a combination of endorphin massage, oxytocin massage, and suggestive/affirmative psychological support—substantially improved breast milk production in postpartum mothers. Two-thirds of the mothers in the intervention group achieved high milk output, compared to just 16.7% in the control group. In contrast, nearly half of the control group remained in the low production category. These results are consistent with research by Maulina et al. (2024), showing significant increases in both volume and frequency of breastfeeding following SPEOS intervention. The mechanism involves not only physical stimulation (oxytocin and

endorphin massage) but also psychological components—affirmative suggestions to the mother—that together optimize hormonal responses critical for lactation (Uvnäs-Moberg et al., 2020; Johnson et al., 2017).

Numerous studies worldwide have demonstrated that oxytocin massage enhances the let-down reflex and increases milk ejection by stimulating posterior pituitary hormone release (Uvnäs-Moberg, 2018; Jonas et al., 2009; Jonas & Woodside, 2016). Similarly, endorphin stimulation through gentle massage decreases maternal stress, lowers cortisol, and indirectly increases prolactin, thus supporting lactation (Handlin et al., 2009; Chan et al., 2022). Moreover, studies have shown that psychological support—such as positive suggestions or affirmations—enhances maternal confidence and decreases postnatal anxiety, both crucial for successful breastfeeding (Farrow & Blissett, 2014; Dennis & McQueen, 2007; O'Brien et al., 2021). A study by Nishioka et al. (2011) found that relaxation therapy and positive suggestion interventions increased daily milk yield by up to 63%. Similarly, Choudhary et al. (2021) found a strong association between emotional well-being and milk production. SPEOS is unique in combining all three components. As in Maulina, Badriyah, et al. (2024), mothers experienced increases from 3.7 mL to over 120 mL after several days of intervention. This finding is echoed in research by Hartono et al. (2016) and Keswara et al. (2024), supporting the physiological rationale. Furthermore, the importance of social support is noted by studies such as those by Dennis et al. (2002) and Inoue et al. (2022), which found that family and peer support are key to sustained exclusive breastfeeding.

Table 10. Operational Definitions and Measurement of Study Variables

No	Variable	Operational Definition	Parameter	Category/Score	Scale	Instrument
1	SPEOS Method	Non-pharmacological intervention: oxytocin massage, endorphin massage, suggestion for breastfeeding confidence	Given daily for 9 days, 20 min/session	1 = intervention, 0 = control	Nominal	SOP, media, leaflet
2	Breast Milk	The physiological process of milk production and secretion measured via multiple observable parameters	See indicators below	1 = low, 2 = moderate, 3 = high	Ordinal	Observation sheet, baby scale

The present study demonstrates that the SPEOS method is not only effective but also feasible, safe, and easily adopted in clinical and home settings. This intervention can be an invaluable addition to existing maternal health programs, especially in resource-limited contexts (Victora et al., 2016; Rollins et al., 2016; Kavle & Landry, 2017). SPEOS requires minimal equipment, leverages community and family

involvement, and can empower mothers who otherwise might struggle with low milk production or confidence. This aligns with recommendations by the World Health Organization and UNICEF for community-based, low-cost breastfeeding interventions (WHO, 2022; Oakley et al., 2022). Importantly, this research supports a biopsychosocial model for lactation—recognizing that both hormonal and emotional factors are crucial for optimal breastfeeding outcomes (Johnson et al., 2017; Uvnäs-Moberg et al., 2020; Choudhary et al., 2021).

Study Limitations

The present study is subject to several limitations that should be considered when interpreting the findings. First, the intervention was conducted over a relatively short period of just nine days, which may not fully capture the long-term effects or sustainability of the SPEOS method on breast milk production. Second, the sample size was limited to only 36 respondents, which restricts the generalizability of the results to broader populations of postpartum mothers. Additionally, several potential confounding variables, such as maternal nutritional status, overall health, and the extent of social and familial support, were not rigorously controlled for in this study. These factors could have influenced the outcomes observed. Therefore, future research should involve larger and more diverse samples, adopt longer intervention and follow-up periods, and comprehensively control for relevant confounding variables. It is also recommended that subsequent studies explore a broader range of maternal and infant health outcomes to provide a more holistic understanding of the effectiveness and broader implications of the SPEOS method.

Implications for Midwifery Education

The findings of this study highlight the importance of integrating comprehensive, evidence-based approaches to breastfeeding support within midwifery education. Midwifery curricula should include both the theoretical foundations and practical skills related to non-pharmacological interventions, such as the SPEOS method, which combines oxytocin massage, endorphin massage, and psychological support for breastfeeding mothers. Training student midwives to perform these techniques confidently and to understand the underlying physiological and psychological mechanisms will better equip them to address the multifaceted challenges of breastfeeding in postpartum care. Additionally, midwifery education should emphasize the role of communication, empowerment, and emotional support, ensuring that future midwives can foster maternal confidence and resilience. By incorporating community-based, family-centered care models and promoting cultural sensitivity, midwifery programs can prepare graduates to deliver holistic and adaptable care in diverse practice settings. Ultimately, equipping midwives with these advanced competencies can improve breastfeeding outcomes, enhance maternal-infant bonding, and contribute to the overall quality of maternal and child health services.

CONCLUSION

This study aimed to evaluate the effectiveness of the Stimulasi Pijat Endorphin, Oksitosin, dan Sugestif (SPEOS) method in increasing breast milk production among postpartum mothers at PMB Fatimah Bandungrejosari, Malang. The core finding was that mothers who received the SPEOS intervention—consisting of oxytocin massage, endorphin massage, and suggestive psychological support—achieved significantly higher breast milk output compared to those in the control group, with two-thirds of the intervention group categorized as high producers versus only 16.7% in the control group. These results are consistent with international research confirming that non-pharmacological, integrative approaches can stimulate neuroendocrine responses and improve lactation outcomes through both physiological and psychological mechanisms. The study's main contribution is the rigorous, quasi-experimental evaluation of SPEOS as a holistic, low-cost, and easily implemented intervention, supporting the expansion of biopsychosocial care models in postpartum and maternal health. While limited by sample size and

intervention duration, this research fills an important gap in the literature and provides a foundation for scaling up SPEOS as an evidence-based strategy to enhance exclusive breastfeeding practices, maternal well-being, and child health in Indonesia and similar settings.

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