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Effect of combined *Moringa oleifera* juice and oxytocin massage on lactogenesis II onset

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Abstract

Background: Delayed onset of lactogenesis II often triggers early formula feeding, which hinders the success of exclusive breastfeeding. Nutritional fulfillment and mechanical stimulation are needed simultaneously to optimize prolactin and oxytocin hormones.
Purpose: To analyze the synergy between consuming fresh *Moringa oleifera* (moringa) juice and oxytocin massage on accelerating the onset of lactogenesis II in postpartum mothers.
Method: This study used a cross-sectional descriptive comparative-correlational design involving 70 postpartum mothers. This quantitative study used a quasi-experimental design with a posttest-only control group design, conducted in Bangun Rejo Village, North Sumatra, from February to April 2026. A sample of 36 normal postpartum mothers was selected using purposive sampling and divided equally into two groups (n=18 each). The intervention group was given juice from 20 grams of fresh Moringa leaves twice daily and oxytocin massage for 10–15 minutes daily, while the control group received only standard care. Data normality was tested using the Shapiro-Wilk test, and bivariate analysis was performed using the Independent T-Test.
Results: The baseline demographic characteristics (age, parity, education, and Body Mass Index) of both groups were homogeneous ($p > 0.05$). The mean onset time of lactogenesis II in the combination intervention group was significantly faster (34.50 ± 4.25 hours postpartum) than in the control group (56.60 ± 5.80 hours postpartum), with a difference of 22.10 hours. Independent T-Test results showed a highly significant statistical difference ($p < 0.001$).
Conclusion: The synergy between fresh *Moringa oleifera* juice consumption and oxytocin massage significantly accelerated the onset of lactogenesis II. This dual-action approach efficiently combines the natural galactagogue properties of *Moringa oleifera* to stimulate prolactin with the neuroendocrine reflex of massage to facilitate milk ejection.

Keywords: Lactogenesis II Onset; *Moringa Oleifera*; Oxytocin Massage; Postpartum Mothers.

INTRODUCTION

Moringa oleifera has long been recognized as a natural galactagogue because of its high nutritional content and bioactive compounds, including flavonoids, polyphenols, vitamins, minerals, and essential amino acids, which may support prolactin secretion and breast milk synthesis (Leone, Spada, Battezzati, Schiraldi, Aristil, & Bertoli, 2015). Breastfeeding success is strongly influenced by the timely onset of lactogenesis II, which generally occurs between 30 and 72 hours after childbirth. Delayed lactogenesis II has been associated with reduced exclusive breastfeeding rates and early breastfeeding cessation (Riordan & Wambach, 2022).

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Breast milk is the optimal nutrition for infants as it contains a comprehensive nutrient profile, immunological factors, enzymes, hormones, and various bioactive components that support ideal infant growth and development. Implementing exclusive breastfeeding during the first six months of life serves as a pivotal strategy to reduce infant morbidity and mortality rates, while simultaneously enhancing the quality of future human capital. The World Health Organization (WHO) recommends exclusive breastfeeding for the initial six months of life, followed by continued breastfeeding up to two years of age or beyond, integrated with the introduction of appropriate complementary foods (Fungtammasan & Phupong, 2021; Kayode, Oyedeji, & Alabi, 2023).

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) identify the expansion of exclusive breastfeeding coverage as a cornerstone indicator for global maternal and child health initiatives. Recent metrics reveal that in 2024, approximately 48% of infants under six months globally received exclusive breastfeeding, marking a substantial increase of over 10 percentage points from the prior decade. While this progress nears the global milestone of 50% by 2025, the WHO—via the 78th World Health Assembly—has instituted a revised target, mandating a minimum of 60% exclusive breastfeeding prevalence by 2030 (World Health Organization, 2025).

Enhancing exclusive breastfeeding prevalence is critical, given that optimal breastfeeding practices contribute substantially to the reduction of infant morbidity and mortality. According to the WHO and UNICEF, the optimization of breastfeeding practices holds the potential to avert hundreds of thousands of infant deaths annually, while concurrently conferring long-term health benefits upon both mothers and children (United Nations Children's Fund & World Health Organization, 2024).

On a global scale, research demonstrates that non-breastfed infants exhibit a 14-fold higher risk of mortality before their first birthday compared to infants who are exclusively breastfed for the initial six months. Substantial evidence also indicates that breastfed children achieve superior performance on intelligence tests—demonstrating a 3 to 4 point increase in IQ—are less predisposed to overweight or obesity, and manifest a lower risk of diabetes in later life. Consequently, optimizing breastfeeding practices has the potential to avert over 820,000 deaths among children under five years of age and prevent 20,000 annual cases of maternal breast cancer. In Indonesia, exclusive breastfeeding achievements have demonstrated a progressive upward trend over recent years. According to the 2023 Indonesian Health Survey (SKI), the exclusive breastfeeding rate reached approximately 68%, a substantial increase from the 52% recorded in 2017. Furthermore, complementary national reports indicate that the proportion of infants under six months of age exclusively breastfed reached roughly 73.97% in 2023, escalating to approximately 74.73% in 2024. Notwithstanding these advancements, implementation continues to encounter significant barriers, particularly during the critical initial phase of breastfeeding in the early postpartum period (World Health Organization & United Nations Children's Fund, 2024).

According to the 2024 Indonesian Health Profile, the national average for exclusive breastfeeding coverage in Indonesia stands at only 69.26%. While this national metric is nearing the established target, regional data reveals a stark disparity. North Sumatra Province emerges as a region exhibiting remarkably low exclusive breastfeeding rates, necessitating urgent intervention. The 2024 Indonesian Health Profile indicates that exclusive breastfeeding coverage in North Sumatra Province was a mere 50.38% in 2024. This figure falls substantially below the national average, representing a pronounced disparity of 18.88% (Ministry of Health of the Republic of Indonesia, 2025).

Despite the steady increase in national exclusive breastfeeding coverage, the Indonesian government aims for a more ambitious milestone. Under various maternal and child health optimization initiatives, the national target for exclusive breastfeeding prevalence is established at 80%; consequently, diverse innovative strategies remain imperative to foster successful breastfeeding during the early postpartum phase. A pivotal determinant of exclusive breastfeeding success is the timely onset of lactogenesis II, characterized by the initiation of copious milk secretion within 30–72 hours postpartum. Delays in this physiological transition

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often prompt mothers to introduce early formula supplementation and prematurely cease exclusive breastfeeding. Accordingly, interventions proficient in accelerating the onset of lactogenesis II are paramount to bolstering the attainment of both national and global exclusive breastfeeding mandates (Ammar, Russo, Altamimi, Altamimi, Sabbah, Al-Asmar, & Di Monaco, 2025; Anggraini, Budhiharto, Nurkholis, Fitri, & Herbawani, 2026).

Previous studies have demonstrated that combining oxytocin massage with *Moringa oleifera* supplementation significantly improves breast milk production compared with routine postpartum care (Umaroh, Hardjanti, & Rahfiludin, 2024). Delayed onset of lactogenesis II can be precipitated by various multifaceted factors, including stress, maternal exhaustion, suboptimal nutritional status, insufficient stimulation of prolactin and oxytocin, and inadequate breastfeeding support. These factors potentially impede the seamless initiation of milk production during the early postpartum period, consequently undermining the success of exclusive breastfeeding. Accordingly, to facilitate the successful implementation of early and exclusive breastfeeding, sustained support from families, healthcare professionals, communities, and policymakers is imperative from birth. The quality of maternal healthcare services plays a pivotal role in optimizing the outcomes of various maternal and child health initiatives, including breastfeeding success and comprehensive postpartum care (Sinaga, 2022). Healthcare provider support extends beyond clinical interventions to encompass effective and educational communication. Proper communication by midwives is positively correlated with maternal satisfaction regarding healthcare services, thereby fostering greater trust and compliance among mothers in adhering to clinical recommendations throughout the prenatal and postpartum continuum (Sinaga, Simbolon, Manurung, Bakara, Sianturi, & Niska, 2024). Beyond psychosocial support, targeted interventions aimed at optimizing the lactation process—through both nutritional fulfillment and hormonal stimulation—are essential to accelerate and maximize milk secretion (World Health Organization & United Nations Children's Fund, 2024).

One highly promising non-pharmacological innovation aligned with local wisdom to support the SDGs is the utilization of the Moringa (*Moringa oleifera*) plant, which is widely recognized as a potent natural galactagogue. In contrast to dry powder processing, which risks degrading active compounds through exposure to extreme thermal conditions, the administration of fresh Moringa juice is demonstrated to better preserve the integrity of its micronutrients and bioactive constituents. Moringa leaves are rich in protein, vitamin A, vitamin C, calcium, iron, and phytosterols, all of which contribute to stimulating prolactin secretion. Biomedically, *Moringa oleifera* leaves harbor a diverse array of bioactive compounds—specifically phytosterols, flavonoids, vitamins, and minerals—that function as natural galactagogues. These constituents are postulated to enhance the secretion of prolactin from the anterior pituitary gland, thereby optimizing breast milk synthesis and production during the postpartum period (Ammar et al., 2025; Simamora, Sembiring, Pasaribu, Mawardah, & Situmorang, 2023). However, addressing nutritional requirements to trigger the milk production hormone (prolactin) must be synergized with mechanical stimulation to activate the milk ejection hormone (the let-down reflex). Therein lies the pivotal role of Oxytocin Massage; this intervention is executed along the spinal column (vertebrae) down to the fifth or sixth intercostal space to stimulate the parasympathetic nervous system (Tambun, Damanik, Sari, Hutabarat, Nainggolan, Dewi, & Lusiatun, 2025; Pinem, Simamora, Manurung, Sinaga, & Sembiring, 2020).

Enhanced milk synthesis mediated by nutritional intake and prolactin must be complemented by an optimal milk ejection mechanism via the milk ejection reflex (let-down reflex). Among the widely implemented non-pharmacological interventions, oxytocin massage serves as a prominent strategy. This massage is applied along the vertebral column down to approximately the fifth or sixth intercostal space to deliver sensory stimulation that elicits a neuroendocrine response. The resulting impulse is transmitted via the neural pathway to the hypothalamus, subsequently stimulating the release of oxytocin from the posterior pituitary gland. Once released into the systemic circulation, oxytocin

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targets the mammary tissue and binds to specific oxytocin receptors (OXTR) located on the myoepithelial cells surrounding the mammary alveoli. This binding cascade triggers myoepithelial cell contraction, thereby propelling the stored milk from the alveoli into the ductal system to be ejected through the nipple. Consequently, oxytocin massage plays a pivotal role in optimizing the milk ejection reflex and fostering breastfeeding success (Wambach, & Spencer, 2021).

Bangun Rejo Village is situated within the Tanjung Morawa District, Deli Serdang Regency, North Sumatra Province. This locality exhibits substantial potential for the utilization of the Moringa plant, given its widespread availability and ease of cultivation by the local community. Additionally, maternal and child healthcare services in this region necessitate innovative, resource-localized strategies to optimize exclusive breastfeeding outcomes. Grounded in this rationale, a study investigating the synergistic effects of Moringa (*Moringa oleifera*) juice consumption combined with oxytocin massage on accelerating the onset of lactogenesis II in postpartum mothers is highly warranted.

RESEARCH METHOD

This quantitative research employed a quasi-experimental approach utilizing a posttest-only control group design. The study aimed to investigate the synergistic effects of Moringa (*Moringa oleifera*) juice consumption combined with oxytocin massage on accelerating the onset of lactogenesis II in postpartum mothers. The study was conducted in Bangun Rejo Village, Tanjung Morawa District, Deli Serdang Regency, North Sumatra Province. This site was selected via purposive sampling, driven by the abundance of indigenous Moringa vegetation and the regional lactation coverage metrics that necessitated targeted acceleration. The comprehensive research timeline, encompassing preliminary preparation through data analysis, spanned a three-month period from February to April 2026.

Participants who fulfilled the inclusion criteria were recruited consecutively using a consecutive sampling technique until the required sample size was achieved. In accordance with the quasi-experimental design, participants were not randomly allocated but were directly assigned by the researchers into either the intervention group or the control group based on the order of recruitment until each group consisted of 18 participants. Group allocation was completed before the intervention commenced, and each participant was enrolled only once throughout the study. Both groups were recruited from the same study setting and received postpartum care at the same healthcare facilities. All research procedures were implemented using standardized operating procedures, with the only difference being the administration of the intervention. The intervention group received Moringa (*Moringa oleifera*) juice consumption combined with oxytocin massage, whereas the control group received standard postpartum care only. Standard postpartum care included routine maternal and neonatal monitoring, breastfeeding counseling, and postpartum self-care education without additional administration of Moringa juice or oxytocin massage.

Before the intervention, all postpartum mothers and their husbands received standardized education regarding the preparation and consumption of *Moringa oleifera* juice as well as the standardized procedure for oxytocin massage according to the study protocol. The postpartum mothers consumed the Moringa juice, while oxytocin massage was performed by their husbands following the instructions provided by the researchers. Since participants were recruited consecutively and experienced childbirth at different times, continuous direct monitoring of intervention adherence was not feasible. Therefore, during data collection, the researchers confirmed with each participant whether the Moringa juice consumption and oxytocin massage had been performed according to the prescribed protocol.

The population in this study includes all postpartum mothers in Bangun Rejo Village during the study period, with samples selected using a purposive sampling technique. The inclusion criteria consist of normal postpartum mothers (0–24 hours post-delivery), vaginal births, live and healthy newborns, those who performed Early Breastfeeding Initiation (IMD), and those willing to participate as participants. The exclusion criteria include mothers with postpartum complications, newborns requiring intensive care, the presence of contraindications to

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breastfeeding, or mothers consuming other commercial breast milk boosters. Based on the Federer formula calculation for two experimental groups and after accounting for a 10% dropout rate, the sample size was determined to be 36 participants, divided equally into 18 participants for the combination intervention group and 18 participants for the control group. Since the sample size was determined using the Federer formula, it was not based on effect size estimation, significance level, or statistical power analysis. Therefore, future intervention studies are recommended to calculate sample size using a power analysis approach to meet current methodological standards for experimental research.

Primary data collection was structurally executed employing tailored instruments, including a participants characteristics questionnaire to capture baseline demographic data (age, parity, educational level, and Body Mass Index [BMI]) and a lactogenesis II onset observation chart to log the precise duration (in hours) from delivery to the manifestation of clinical indicators, such as breast fullness, engorgement, warmth, and copious milk secretion. The primary outcome of this study was the onset of lactogenesis II, defined as the time (in hours) from childbirth until the mother first perceived breast fullness. During data collection, participants were asked to report the first occurrence of breast fullness, and the time was recorded in hours postpartum. Clinical monitoring was conducted periodically at 6-hour intervals.

Participants in the combined intervention arm were administered a juice formulation consisting of 20 grams of fresh *Moringa oleifera* leaves blended with 200 mL of boiled water twice daily, supplemented by a 10–15 minute daily oxytocin massage. The dosage of 20 grams of fresh *Moringa oleifera* leaves administered twice daily was determined based on previous studies demonstrating that this dosage is safe for postpartum mothers and has the potential to enhance breast milk production as a natural galactagogue (Fungtammasan & Phupong, 2021; Ammar et al., 2025). Conversely, the control arm received only standard postpartum midwifery care without any adjunctive intervention.

The gathered data were statistically processed through consecutive stages of editing, coding, entering, cleaning, and analysis. Univariate analysis was employed to delineate the frequency distribution of baseline maternal characteristics, alongside the mean values and standard deviations of the duration to lactogenesis II onset. Normality of data distribution was evaluated utilizing the Shapiro-Wilk test, given that the sample size was under 50 participants. For normally distributed data, bivariate analysis was executed using the Independent T-Test to evaluate differences in mean onset duration between the two arms. In the event of a non-normal distribution, data analysis was shifted to the non-parametric Mann-Whitney U Test.

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RESEARCH RESULTS

Table 1. Characteristics of Participants (N=36)

Variavble	Intervention Group (n=18)	Control Group (n=18)	p-value
Age (Mean±SD)(Range)(Year)	28.08 ± 3.79 (20–36)	27.67 ± 4.73 (20–36)	
Age (n%)			
< 20	1/5.6	2/11.1	
20 – 35	15/83.3	14/77.8	0.632
> 35	2/11.1	2/11.1	
Parity (n%)			
Primipara (1st child)	8/44.4	9/50.0	0.738
Multipara (2 children)	10/55.6	9/50/0	
Education Level (n%)			
Basic Education (Elementary/Junior High)	3/16.7	4/22.2	
Secondary Education (Senior High School)	12/66.7	11/61.1	0.815
Higher Education (Diploma/Bachelor's Degree)	3/16.7	3/16.7	
Nutritional Status (BMI) (n%)			
Underweight (< 18.5)	2/11.1	1/5.6	
Normal (18.5 – 25.0)	13/72.2	14/77.8	0.547
Overweight/Obese (> 25.0)	3/16.7	3/16.7	

Based on Table 1, the majority of participants in both groups were within the healthy reproductive age range (20–35 years), accounting for 83.3% in the intervention group and 77.8% in the control group. The distribution of parity showed a balanced proportion between primiparous and multiparous participants. Furthermore, most participants had a secondary education background (Senior High School) and maintained a normal nutritional status based on BMI (72.2% in the intervention group and 77.8% in the control group). The homogeneity test results indicated that all characteristic variables had a *p*-value > 0.05, meaning there was no significant difference in the baseline characteristics of the participants between the two groups prior to the intervention (the data were homogeneous).

Table 2. Shapiro-Wilk Normality Test Results on the Onset of Lactogenesis II

Participant Group	Shapiro-Wilk Statistic	p-value	Conclusion
Combination Intervention	0.942	0.312	p > 0.05
Control	0.938	0.284	p > 0.05

The Shapiro-Wilk normality test results in Table 2 showed that the *p*-values for the onset time of lactogenesis II were 0.312 in the combination intervention group and 0.284 in the control group. Since the significance values for both groups were greater than 0.05 ($p > 0.05$), the distribution of the onset time data was declared to be normally distributed. Therefore, the bivariate statistical analysis was proceeded using a parametric test, specifically the Independent T-Test.

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Table 3. Analysis of Differences in Mean Onset Time of Lactogenesis II Using Independent T-Test

Variable	Combination Intervention Group (n = 18) Mean ± SD	Control Group (n = 18) Mean ± SD	Mean Difference (Hours) (Intervention−Control)	95% CI	*t* (df)	p-value	Cohen's *d*
Onset of Lactogenesis II (hours)	34.56 ± 4.20	56.60 ± 5.66	−22.04	−25.42 to −18.67	−13.27 (34)	< 0.001	−4.42

Based on Table 3, the Independent Samples t-test showed a statistically significant difference in the onset of lactogenesis II between the combination intervention group and the control group ($t(34) = -13.27$, $p < 0.001$). The mean onset time of lactogenesis II in the combination intervention group was 34.56 ± 4.20 hours postpartum, whereas the control group had a mean onset time of 56.60 ± 5.66 hours postpartum. The mean difference (combination intervention minus control) was −22.04 hours (95% CI: −25.42 to −18.67), indicating that the onset of lactogenesis II occurred approximately 22 hours earlier in the combination intervention group than in the control group. The effect size was very large (Cohen's d = −4.42), suggesting a substantial difference between the two groups. These findings indicate that the combination intervention of *Moringa oleifera* juice consumption and oxytocin massage was associated with an earlier onset of lactogenesis II compared with standard postpartum care.

DISCUSSION

Based on the presented findings, the univariate analysis indicated that the baseline demographic characteristics of the participants in both the combination intervention and control groups were homogeneous ($p > 0.05$). The majority of participants fell within the healthy reproductive age range of 20–35 years, accounting for 83.3% in the intervention group and 77.8% in the control group. Furthermore, the distribution of parity demonstrated a balanced proportion between primiparous and multiparous participants. In terms of education and nutritional status, most participants had a secondary education background (Senior High School) and maintained a normal nutritional status based on Body Mass Index (BMI), representing 72.2% in the intervention group and 77.8% in the control group. This baseline homogeneity indicates that the variation in the onset time of lactogenesis II between the two groups was not confounded by baseline demographic bias, but rather stemmed purely from the administered intervention.

The primary finding of this study showed that the combined intervention of *Moringa oleifera* juice consumption and oxytocin massage was associated with an earlier onset of lactogenesis II compared with standard postpartum care. The group receiving the combination intervention exhibited a significantly faster onset time, with a mean of 34,50±4,25 hours postpartum. Conversely, the mean onset in the control group, which only received standard postpartum care, was 56,60 ± 5,80 hours. A substantial mean difference of 22.10 hours in achieving lactogenesis II onset was observed between the two groups. The Independent T-Test yielded a *p*-value < 0.001, which sits well below the significance threshold of 0.05 ($p < 0.05$). The Independent Samples t-test showed a statistically significant difference between the two groups ($t(34) = -13.27$, $p < 0.001$), with a mean difference of −22.04 hours (95% CI: −25.42 to −18.67). The intervention group experienced an earlier onset of lactogenesis II than the control group.

The findings of this study are consistent with previous research that the non-pharmacological intervention of Marmet massage was effective in increasing breast milk production among postpartum mothers (Agustina, Pinem, Purnamasari, Simamora, & Sari, 2024). These findings further support the evidence that lactation stimulation through non-pharmacological approaches can serve as an effective strategy for promoting successful breastfeeding during the postpartum period

The earlier observed onset of lactogenesis II may reflect complementary effects of nutritional support from *Moringa oleifera* juice and sensory stimulation

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provided by oxytocin massage, although these biological mechanisms were not directly evaluated in the present study. A pivotal factor determining the success of exclusive breastfeeding is the seamless initiation of lactogenesis II, characterized by the onset of copious breast milk production within the first 30–72 hours post-delivery. Delays in this biological process frequently trigger maternal anxiety, often leading to premature formula feeding and the discontinuation of exclusive breastfeeding. Therefore, safe and accessible interventions capable of accelerating this onset are of paramount clinical importance (Ammar et al., 2025). Such delays can be influenced by maternal stress, fatigue, suboptimal nutritional status, low stimulation of prolactin and oxytocin hormones, and a lack of support for the breastfeeding process. Therefore, concerted efforts are required to optimize the lactation process, both through the fulfillment of nutritional requirements and hormonal stimulation.

The utilization of the Moringa plant (*Moringa oleifera*) represents a highly potential non-pharmacological innovation to support the Sustainable Development Goals (SDGs) based on local wisdom. Moringa is widely recognized as a natural galactagogue. Unlike processing into dry powder, which risks degrading active substances due to extreme heat exposure, administering it in the form of Moringa Juice has been proven more effective in maintaining the integrity of its micronutrients and bioactive compounds. Although the present study did not measure prolactin or oxytocin concentrations, previous studies have suggested several biological mechanisms that may explain the earlier onset of lactogenesis II observed following the combined intervention. *Moringa oleifera* has been widely reported as a natural galactagogue. Previous studies have suggested that its phytosterols, flavonoids, vitamins, and minerals may support lactation through neuroendocrine pathways involved in milk synthesis. However, because prolactin concentrations were not measured in the present study, these mechanisms cannot be confirmed and should be interpreted as biological explanations proposed in the literature rather than direct findings of this study. (Simamora, Pasaribu, Nainggolan, & Pinem, 2026; Hajar, Sinaga, Surbakti, Sinaga, & Ariyani, 2024).

However, the fulfillment of nutritional needs to trigger production hormones must be synergized with mechanical stimulation for the ejection hormone (ejection/let-down reflex). The increase in breast milk production stimulated by nutrition and the prolactin hormone needs to be supported by an optimal breast milk ejection mechanism via the milk ejection reflex or let-down reflex (Wambach & Spencer, 2021). Previous studies have suggested that oxytocin massage may stimulate sensory pathways involved in the milk ejection reflex. Nevertheless, because oxytocin concentrations were not assessed in the present study, the proposed mechanism remains hypothetical and cannot be confirmed by our findings. Sensory stimulation along this vertebral region elicits a neuroendocrine response. The stimuli are transmitted via the nervous system to the hypothalamus, which subsequently triggers the release of the oxytocin hormone from the posterior pituitary gland. Once released into the bloodstream, oxytocin reaches the breast tissue and binds to oxytocin receptors (OXTR) on the myoepithelial cells surrounding the mammary alveoli. This binding triggers the contraction of myoepithelial cells, thereby forcing the breast milk stored in the alveoli into the ductal system and out through the nipple, ultimately supporting the success of the breastfeeding process.

CONCLUSION

The combined intervention of *Moringa oleifera* juice consumption and oxytocin massage was associated with an earlier onset of lactogenesis II among postpartum mothers in Bangun Rejo Village compared with standard postpartum care. Mothers who received the combined intervention experienced the onset of lactogenesis II at a mean of 34.56 ± 4.20 hours postpartum, whereas those in the control group experienced the onset at 56.60 ± 5.66 hours postpartum. The mean difference was −22.04 hours (95% CI: −25.42 to −18.67), indicating that the onset of lactogenesis II occurred approximately 22 hours earlier in the combined intervention group. These findings suggest that the combined intervention may be an effective non-pharmacological approach to support an earlier onset of lactogenesis II in postpartum mothers.

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