Proceeding of The International Conference of Inovation, Science, Technology, Education, Children, and Health

E-ISSN: 2776-9062

Research Article

An Experimental Analysis of Kenikir for Optimal Lactation : The Effectiveness of Cosmos Caudatus Extract on Postpartum Maternal Prolactin Hormone Levels

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Abstract: Insufficient milk supply is one of the primary reasons for the discontinuation of exclusive breastfeeding, which poses a significant challenge to maternal and infant health. While kenikir (Cosmos caudatus) has long been used as a traditional remedy believed to help increase breast milk production, its direct effect on lactation has not been thoroughly studied. This research aimed to evaluate the impact of kenikir extract on prolactin hormone levels in postpartum mothers, which plays a key role in milk production. This was a true experimental study utilizing a pretest-posttest control group design. Kenikir extract served as the independent variable, and prolactin hormone levels were the dependent variable. A total of 40 postpartum mothers were included in the study, randomly divided into two groups: an intervention group that received 300 mg of kenikir extract daily for 14 days, and a control group with no treatment. The study analyzed within-group changes using the Paired T-Test and Wilcoxon test, and between-group differences were compared using the Mann-Whitney test. The results indicated that the intervention group experienced a significant increase in prolactin hormone levels, with an average of 44.70 ng/ml and a p-value of 0.0001. This shows that kenikir extract significantly enhances prolactin hormone secretion in postpartum mothers. These findings suggest that kenikir extract could be a promising natural remedy for increasing milk supply, offering an alternative or complementary approach to supporting lactating mothers. Further studies should be conducted to explore the long-term effects of kenikir extract on breastfeeding success and its potential role in promoting maternal and infant health.

Keywords: Kenikir; Postpartum Mothers; Prolactin Hormone

1. Introduction

Various efforts to enhance breast milk production can be undertaken, both pharmacologically and non-pharmacologically. Examples of non-pharmacological therapies include oxytocin massage, marmet massage, essential lavender oil, breast massage, and banana heart techniques (Jania et al., 2022).

Breast milk, secreted by a mother's mammary glands under the influence of prolactin and oxytocin, is the perfect nutrition for infants. It's not only safe and clean but also packed with essential nutrients and protective antibodies (Lawrence & Lawrence, 2021). The World Health Organization (WHO) recommends exclusive breastfeeding—meaning only breast milk, with no other food or drink except medication and vitamins—for a baby's first six months (Organization, 2017). Despite this, only 41% of infants under six months are exclusively breastfed, according to UNICEF data (Pujiastuti et al., 2022). The WHO aims to boost this rate to 50% by 2025 and 75% by 2030, also advocating for breastfeeding initiation within the first hour of birth and continuation up to two years alongside complementary foods after six months (Organization, 2017).

Received: 17, May 2025
Revised: 31, May 2025
Accepted: 16, June 2025
Published: 30, June 2025
Curr. Ver.: 30, June 2025

A preliminary study in Semarang in 2020 revealed challenges in breast milk production. Researchers found that among 10 new mothers, four produced only 0-30 cc of breast milk during the first three days postpartum. Additionally, four of these mothers who tried both pharmacological and non-pharmacological lactation aids experienced breast engorgement without an increase in milk volume. Consequently, these mothers, often with family support, turned to formula feeding for their babies.

To address insufficient milk production, non-pharmacological methods, particularly those from plants, offer a safe alternative. Plants like moringa, katuk, and papaya leaves contain flavonoids, notably stigmasterol, which can enhance milk production. For instance, a Semarang study by Pujiastuti et al. (2022) demonstrated that moringa leaf biscuits led to increased infant weight in the intervention group, suggesting improved milk production.

More recently, research has highlighted quercetin, another flavonoid, for its ability to boost breast milk production. Studies by Tušimová et al. (2017) on rabbits and Ikhlasiah et al. (2020) on mothers consuming papaya leaves (which contain quercetin) have shown promising results. Notably, kenikir (Cosmos caudatus Kunth) is rich in quercetin compared to other plants (Andarwulan et al., 2010). Given this background and the lack of specific research on kenikir's impact on lactation, this study aims to investigate the "Effectiveness of Kenikir Extract on Prolactin Hormone in Postpartum Mothers.

2. Research Methods

This research utilized a true experimental design with a quantitative approach. The study aimed to investigate the effectiveness of kenikir extract on prolactin hormone levels in postpartum mothers.

The study was carried out in Semarang between March and May 2025. The target population included all breastfeeding postpartum mothers. A sample of 40 postpartum mothers was chosen, and they were randomly assigned to either the control group (20 mothers) or the intervention group (20 mothers).

The assignment method used was simple random sampling (Jayadeepa, 2011). Researchers drew numbers from envelopes (1-40). Mothers who drew odd numbers were placed in the experimental group, while those with even numbers were assigned to the control group. The experimental group received standard therapy along with 300 mg of kenikir extract for 14 days, whereas the control group received standard therapy and a placebo.

3. Results and Discussion

Table 1. Responden karakteristik.

Variabel	f	%
Age		
< 20 year	7	57,1
20 – 30 year	13	73,4
< 30 year	20	13,3
Total	40	100
Education		
failed elementary school	2	5,0
failed elementary school	5	12.5
junior high school	8	20
Senior High school	19	47,5
Diploma-III	4	10
Bachelor S-1	2	5
Total	40	100
Paritas		
Haousewife	17	42,5
Swasta	23	57,5
Total	15	100
Nutrition		
<Rp. 1.000.000	6	40
Rp. 1.000.000-2.000.000	7	46,7
>Rp. 2.000.000	2	13,3
Total	40	100
IMT		
<18,49 (not enough)	18	55
18,5-24,9 (Normal)	22	45
Total	40	100

This data provides a snapshot of the 40 study participants based on several demographic and health-related characteristics.

Age Distribution: The majority of respondents fall within the 20-30 year age group, accounting for 73.4% (13 individuals). A smaller proportion, 57.1% (7 individuals), are under 20 years old. Interestingly, the category "< 30 year" shows 13.3% (20 individuals), which seems to be a cumulative or mislabeled category given the other age brackets. Assuming "20-30 year" refers to those strictly between 20 and 30, and "< 20 year" refers to those below 20, then the largest group of mothers is in their twenties.

Education Levels: Most respondents (47.5%, or 19 individuals) have a Senior High School education. Junior High School graduates make up 20% (8 individuals). There's a smaller representation of respondents with higher education, with Diploma-III at 10% (4 individuals) and Bachelor S-1 at 5% (2 individuals). A small percentage (5% and 12.5%, respectively, potentially a typo for "no elementary school completed" and "elementary school completed") indicates some respondents with lower educational attainment.

Parity (This section appears to be mislabeled as 'Parity' but contains 'Housewife' and 'Swasta' - likely referring to Occupation): Assuming "Paritas" here actually refers to Occupation, the data indicates that the majority of respondents (57.5%, or 23 individuals) are privately employed ('Swasta'), while 42.5% (17 individuals) are housewives. The total number

of respondents for this section is listed as 15, which seems inconsistent with the overall total of 40 respondents for other variables.

Nutrition (Income/Expenditure for Nutrition - assuming 'Nutrition' refers to income/expenditure brackets): The largest group of respondents (46.7%, or 7 individuals) falls into the income/expenditure bracket of Rp. 1,000,000-2,000,000. A significant portion (40%, or 6 individuals) has an income/expenditure below Rp. 1,000,000. Only a small fraction (13.3%, or 2 individuals) has an income/expenditure above Rp. 2,000,000.

Body Mass Index (BMI): The majority of respondents (55%, or 18 individuals) are categorized as underweight (<18.49 BMI), indicating insufficient weight. Conversely, 45% (22 individuals) fall within the normal BMI range (18.5-24.9).

Table 2. Characteristics of Respondents

Characteristics	Group		*p*
	Intervention	Control	
	Mean±SD	Mean±SD	
Age	29±4,702	29,85±4,614	0,567[a]
Paritas	2,28±0,960	1,50±0,506	0,462[b]
IMT	24,750±4,490	26,717±4,904	0,194[a]
Nutrition	112,70±11,499	104,60±11,376	0,778[a]

We used an Independent T-Test to compare age, BMI, and nutrition between the groups, yielding p-values of 0.567, 0.194, and 0.778, respectively. The Mann-Whitney test for parity resulted in a p-value of 0.462. Since all these p-values are greater than 0.05, we found no significant differences in respondent characteristics between the intervention and control groups.

Table 3. Prolactin Hormone Levels

Variable	**Group**		***p Value***	***Effect Size***
	Intervention	**Control**		
	Mean±SD ng/ml	**Mean±SD ng/ml**		
Hormone Prolactin Before	152,40±57,471	157,75±53,903	0,626[a]	1,152

Table 4. Details the changes in prolactin hormone levels observed before and after the treatment

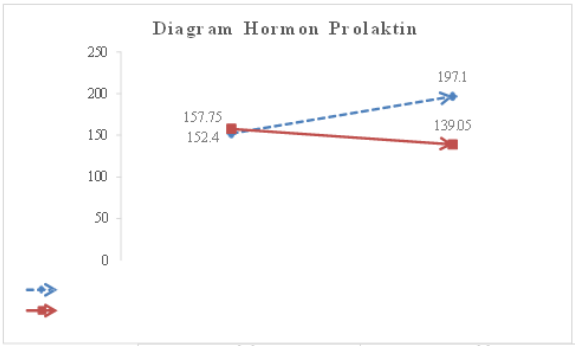
After	197,10±66,884	139,05±51,366	0,002[a]
Mean	44,70±46,429	-18,70±62,490	0,0001[a]
p value	0,0001[b]	0,094[c]	

In the intervention group, the average prolactin hormone level significantly increased from 152.40 ng/ml before treatment to 197.10 ng/ml afterward. A Paired T-Test confirmed this difference was statistically significant (p = 0.0001, which is less than 0.05).

Conversely, the control group saw a slight decrease in average prolactin levels, from 157.75 ng/ml before treatment to 139.05 ng/ml after. However, a Wilcoxon difference test revealed this change was not statistically significant (p = 0.094, which is greater than 0.05).

Comparing the two groups, a Mann-Whitney test showed a significant difference in prolactin hormone levels between the intervention and control groups before and after treatment (p = 0.0001, which is less than 0.05).

Furthermore, the effect size of kenikir extract on prolactin hormone was calculated at 1.152. This robust finding indicates that kenikir extract effectively boosts prolactin levels in postpartum mothers.



	sebelum	sesudah
intervensi	152.4	197.1
kontrol	157.75	139.05

Figure 1. Shifts in Average Prolactin Hormone Levels

Kenikir extract contains beneficial compounds like flavonoids, quercetin, saponins, and alkaloids, all of which are thought to help boost prolactin hormone levels. This finding aligns with a 2020 study by Prahesti and Sholihah, which showed that torbangun leaf tea, rich in polyphenols, tannins, alkaloids, and flavonoids, also increased prolactin. Their intervention group, given torbangun leaf tea, had an average prolactin level of 193 ng/ml, higher than the control group's 175 ng/ml (Prahesti et al., 2020).

Specifically, kenikir extract is notable for its high quercetin content. Quercetin is an active flavonoid known to act as a natural galactagogue and to raise prolactin levels (Jayadeepa, 2011). This is supported by Tusimova's 2017 research, where rabbits given quercetin (at 100 µg/kg and 1000 µg/kg, three times a week for 30 days) showed increased levels of FSH, LH, and prolactin.

In the control group, the average prolactin level actually decreased by 11.70 ng/ml from pre- to post-treatment. This decline can be attributed to several factors. While smoking mothers were excluded from the study, suboptimal breastfeeding practices are a likely culprit. For instance, babies might only consume about 67% of available milk and nurse based on preference rather than fully emptying the breast (Kent, 2007). It's also possible that some mothers didn't pump after breastfeeding, which can further reduce prolactin levels (Hill et al.,

1999). Additionally, insufficient sleep can lower prolactin, as it may decrease estradiol and increase progesterone, with higher progesterone leading to reduced prolactin (Pires et al., 2010). Stress and mood also play a role. Research indicates that working mothers who breastfeed often face higher stress and have lower prolactin levels compared to non-working breastfeeding mothers, as stress can disrupt endocrine profiles and is linked to negative moods (Bibi et al., 2021). While some respondents in this study reported household stress (e.g., from in-laws), researchers didn't confirm a direct link between this stress and their prolactin levels.

4. Conclusions

Administering 300 mg of kenikir extract daily for 14 days significantly increased prolactin hormone levels in the intervention group, showing an average rise of 44.70 ng/ml (p-value = 0.0001). In contrast, the control group experienced an average decrease of 18.70 ng/ml in prolactin. This demonstrates that kenikir extract effectively boosts prolactin levels in new mothers.

We recommend future research on kenikir's impact on prolactin explore its integration into the daily diet. Additionally, studies should consider other factors influencing prolactin, such as stress, sleep patterns, and breastfeeding practices.

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