Research Article

The Effect of Mannihot Esculenta on Prolactin Hormone Levels and Breast Milk Production in Breastfeeding Mothers

Efek Mannihot Esculenta pada Tingkat Hormon Prolaktin dan Produksi Susu Ibu pada Ibu Menyusui

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Abstract

Objective: To prove the effect of cassava leaves jerky (Mannihot Esculennta) on prolactin hormone levels and breast milk production in breastfeeding mothers in the Working Area of the Rejosari Health Center of Pekanbaru City.

Methods: This study used True Experiment Design with a pretest and posttest design with the control group, using a simple random sampling with a total of 28 breastfeeding mothers, 14 intervention group respondents, and 14 control group respondents. The intervention group was given cassava leaves jerky 60 gr/day, and the control group was given jerky without cassava leaves 20 gr/day for 2 weeks. Both groups were observed 3 times by weighing the baby's weight and checking the level of the hormone prolactin after administering the intervention using the ELISA method. Data analysis using Mann-Whitney, TIndependent, Repeated ANOVA test.

Results: There was a difference in the average difference of prolactin hormone levels in the intervention group and control group with a p-value of 0.000 (<0.05)

Conclusion: Giving jerky cassava leaves breast milk booster affects the hormone prolactin and breast milk production in breastfeeding mothers.

Keywords: breast milk production, cassava leaves, mannihot esculenta, prolactin.

Abstrak

Tujuan: *Untuk Membuktikan dendeng daun singkong (Mannihot Esculennta) terhadap kadar hormon prolaktin dan produksi ASI pada ibu menyusui di Wilayah Kerja Puskesmas Rejosari Kota Pekanbaru.*

Metode: *Penelitian ini menggunakan rancangan percobaan yang sebenarnya dengan desain pretest and posttest only with control group, sampling menggunakan sampel acak sederhana dengan jumlah 28 responden ibu menyusui, 14 responden kelompok intervensi, dan 14 responden kelompok kontrol. Kelompok intervensi diberi dendeng daun singkong 60 gr/hari, dan kelompok kontrol diberi dendeng tanpa daun singkong 20 gr/hari selama 2 minggu. Kedua kelompok diamati sebanyak 3 kali dengan menimbang berat badan bayi dan pemeriksaan kadar hormon prolaktin setelah pemberian intervensi dengan metode ELISA. Analisis data menggunakan uji Mann-Whitney, TIndependent, Repeated ANOVA.*

Hasil: *Terdapat perbedaan rata-rata selisih kadar hormon prolaktin pada kelompok intervensi 376,5 ng/ml, kelompok kontrol 103,5 ng/ml dengan p-value 0,000 (<0,05)*

Kesimpulan: *Pemberian dendeng penambah ASI daun singkong berpengaruh terhadap hormon prolaktin dan produksi ASI pada ibu menyusui.*

Kata kunci: *daun singkong, mannihot esculenta, produksi ASI, prolaktin.*

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INTRODUCTION

Breast milk is the best natural food, easily digested, and containing the energy and nutrients that babies need in the first six months of life.[1] Breast milk contains complex nutrients that are perfectly complemented by immune substances and most nutrients have an optimal composition according to the baby's needs.[2]

Not only does breast milk contain nutrients, antioxidants, hormones, and suitable antibodies a child needs, such as fat, carbohydrates, protein, minerals, and vitamins but also protective substances, namely IgA, IgE, IgM, lactobacillus biidus, lactoferi, lysozyme, cellular immunity that does not cause allergies so that it can neutralize bacteria, fungi, viruses, and parasites.[3,4] Breast milk provides all the essential components a baby needs, improves neurodevelopment, and protects babies from Sudden Infant Death Syndrome (SIDS).[5-6]

Data from the Indonesian Ministry of Health Performance Report in 2020, the achievement of exclusive breastfeeding during 0-6 months of life is 66.1% and this has not reached the Ministry of Health's Minimum Service Standard (SPM) target. Riau Province is one of the provinces that have relatively low exclusive breastfeeding coverage. Complete breastfeeding coverage in Riau Province based on Riau Province Health Profile Data in 2020 is 65.17%, and only 46.8% in Pekanbaru City which is still under the targe number.

The low coverage of exclusive breastfeeding may play a role in more than one million child deaths yearly. It affects growth and development of infants, hence the quality of life of the nation's next generation.[7] Babies who do not get exclusive breastfeeding will are at risk in developing nutritional problems that could inhibit their growth and development, such as stunting. Stunting can lower children's intelligence. Stunted children are more susceptible to disease and at risk in having lower productivity levels in the future.[8,9] A researcge stated that babies who are not exclusively breastfed are at 61 times greater risk of stunting compared to babies who are fully breastfed for 6 whole months.[10]

Many efforts have been made to facilitate breast milk production, both pharmacological and non-pharmacological. Pharmacological therapies such as administering domperidone and metoclopramide are considered optimal as laktagogums. However, they are expensive and have side effects such as headache, diarrhea, dry mouth, stomach cramps, and even skin redness.[11] Thus people prefer non-pharmacological efforts to increase milk production. Non-pharmacological approach may become an alternative for breastfeeding mothers and are relatively easy to do. This could be done by utilizing existing natural resources obtained from plants or plants. [12]

Food containing lactagogum increases breast milk production. Indonesia is rich in traditional plants that have a laktagogum effect. indonesian prefer to use plants to increase milk production, including katuk leaves, fenugreek seeds, gotu kola leaves, and torbangun leaves. Research revealed the benefits of consuming certain plants such as papaya leaves, moringa leaves, mulberry leaves, green beans, thorn spinach, cassava leaves, black cumin, jackfruit, temulawak and turi to increase breastmilk production. [13]

Indonesia is rich in natural resources thought to increase breast milk, one of it by consuming cassava leaves. The people of Pekanbaru City believe that consuming cassava leaves can increase breast milk and could also be used as a natural therapy. Cassava leaves, commonly called Manihot Esculenta Cranzt are daily food source for the people of Indonesia because they are easy to find and containing good nutrition for the body.

Cassava leaves contain lipid elements and hormonal structures with active compounds, namely flavonoids and saponins, which have an anti-inflammatory role and a laktagogum effect essential in increasing prolactin hormone levels and breast milk production[14]. Flavonoid compounds in cassava leaves can stimulate the release of prolactin hormone (PRL) and growth hormone (GH), up-regulated prolactin hormone (PRLR), and encourage breast development.[15]

The results of laboratory tests conducted at Unika Soegijapranata Semarang in 100 grams of cassava leaves contain high flavonoids, namely 3.502 grams. Cassava leaves also contain high levels of vitamin A and minerals; calcium, iron, protein, carbohydrates, phosphorus, vitamins B and C, which have many benefits for the body.[16] Cassava leaves are very easy to find and familiar to the people of Indonesia because they easily disseminated and suitable in environmental conditions in all regions in Indonesia, especially in Pekanbaru City. Researchers have received ethical approval or ethical clearance from Research Ethics Commission (KEPK) of the Health

Polytechnic of the Ministry of Health Semarang No. 0146/EA/KEPK/2022.

Jerky is one of the processed food products made from dried meat which is the result of a drying process and is in the form of a thin sheet then added with salt, and spices such as coriander and garlic.[17] The people of Pekanbaru City are no strangers and like to consume beef jerky, which usually made from beef, but not all can consume it every day because it has a relatively high price.

Processed cassava leaves jerky could be the better alternative and healthier choice from the beef jerky as it tastes almost like beef-based one and has good nutritional component for breastfeeding mothers. Laboratory finding of phytochemical compounds in 100 grams of cassava leaves jerky carried out independently in the Unika Semarang Laboratory found that flavonoid content of cassava leaves jerky is 1.988 grams higher than tin the katuk leaves which was proven to affect breast milk production, which was 0.8371 grams.18 So cassava leaves jerky can be an alternative choice for breastfeeding mothers.

In this study we intended to evaluate the effect ofcassava leaves jerky (Manihot Esculenta consumption in increasing prolactin hormone levels and breast milk production in Rejosari Health Center Pekanbaru City by measuring the baby's weight in breastfeeding mothers?

The difference in the existing research found in the dependent variable, namely the absence of research on cassava leaves on the hormone prolactin and breast milk production in breastfeeding mothers. This research used quantitative approach with a true experimental type, which is different from previous study with a qualitative research design that only dealt with interviews related to people's habits in increasing breast milk production.

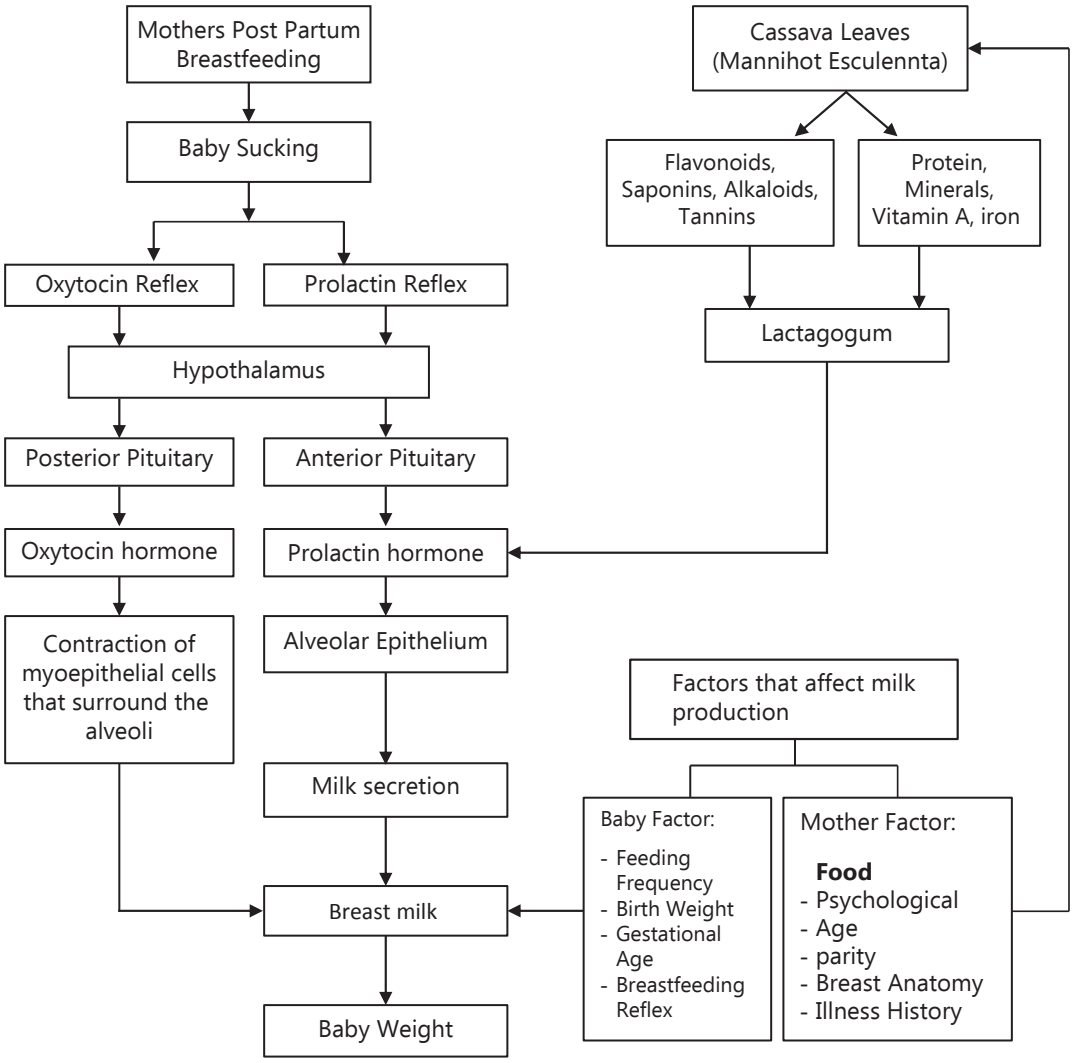

Figure 1. Theoretical Framework
(Pratiwi, et al., 2018; Bahekar, S., and Kale, R., 2013)

METHODS

This study used true experimental design withpre test and post test only with the control group, using sampling simple random sampling with a total of 28 breastfeeding mothers, 14 intervention group respondents and 14 control group respondents. Firstly, iIntervention group was given cassava leaves jerky 60 gr/day and the control group was given beef jerky without cassava leaves 20 gr/day for 2 weeks. Secondly, observations were done 3 times by weighing the baby's weight and to check prolactin hormone levels after the intervention using the ELISA method. Data was analyzed using Mann-Whitney test, T- Independent, repeated ANOVA.

The population in this study were all mothers in their 14th post partum day around the working area of the Pekanbaru City Rejosari Health Center, and the study sample is 28 respondents who had met the requirements. They were divided into 2 groups (14 respondents in the intervention group and 14 respondents in the control group). The sample were selected from 5 private midwives around Rejosari Health Center Pekanbaru City. Determination of the number of samples was based on the minimum number of samples in a simple experimental study that is 20 respondents, with the number of samples in each group being 10 respondents.19 The sample of this study was obtained by randomization with the draw lottery method from 9 private midwives' practices with the highest number of patients in the working area of the Rejosari Health Center. It was found that 5 private midwives' practices had enough respondents according to the inclusion and exclusion criteria. The total of 28 respondents consisted of 8, 6, 4, 4, 4 respondents from Y, M, D, TS and S private midwives's practice respectively.

The inclusion criteria were mothers with productive age of 20-35 years, normal maternal breast anatomy, not taking breast milk booster, healthy mother and baby, full breats-fed babies without any additional food, birth weight >2500 grams, baby's weight on day 14 remains the same as the birth weight (reagent), good baby sucking reflex. Exclusion criteria were mothers allergic to cassava leaves, abnormal nipple anatomy/diseases throughout the study, sick babies for 3 days, addition of nutrition to the babies other than breastmilk. The Operational Definition refers to measurement of the variables in questionniarre and measuring instruments/ instruments. The variables in this study were as follows:

Independent Variable : Cassava Leaves Jerky
Dependent Variable : Prolactin hormone and breast milk production
Confounding Variables : Frequency of breastfeeding, food intake and mother's psychological condition

RESULTS

Table 1. Frequency distribution of Respondents' Characteristics by Age, Education, Occupation and Parity of Breastfeeding Mothers

Variable	Intervention (n=14)		Control (n=14)	
	N	%	N	%
Age				
20-30	12	85.7	10	71.4
31-35	2	14.3	4	28.6
Total	14	100.0	14	100.0
Education				
Basic elementary/junior high)	6	42.9	2	14.3
SMA/SMK	6	42.9	7	50.0
College	2	14.2	5	35.7
Total	14	100.0	14	100.0
Occupation				
Unemployed	11	78.6	10	71.4
Employed	3	21.4	4	28.6
Total	14	100.0	14	100.0
Parity				
Primipara	6	28.6	3	21.4
Multipara	8	71.4	13	78.6
Total	14	100.0	14	100.0

Table 2. Homogeneity Test Results and Differences in Confounding Variables

Variable	Intervention (n=14)		Control (n=14)		*pa*	*pb*
	mean	SD	mean	SD		
Psychological Status	4,787	2,359	4,714	2,091	0.387	0.933
Breastfeeding Frequency	12.93	1,730	12.71	1.541	0.727	0.732
Nutritional status	7,599	9,355	7,126	12,329	0.097	0.265

[a] *Levene, s*[b]*Independent T-Test*

The study found that the psychological status, breastfeeding frequency, and nutritional status of the intervention and the control group were homogeneous (p = > 0.05).

Table 3. Normality of Data on Increased Breast Milk Production with Indicators of Baby Weight

Variable	Treatment	Group	*P-value*
Data on Increased Breast Milk Production with Baby Weight Indicators	BB Pre Day-1 (before intervention)	Cassava Leaves Jerky	0.991
		Jerky without cassava leaves	0.342
	BB Day 7	Cassava Leaves Jerky	0.196
		Jerky without cassava leaves	0.311
	BB Post Day-15	Cassava Leaves Jerky	0.936
		Jerky without cassava leaves	0.475

Table 3 shows that prolactine hormone have normal distribution on the Cassava leaves Jerky group, while the data in the jerky group without cassava leaves is not normally distributed. Therefore, non-parametric statistical analysis should be done.

Table 4. Differences in Infant Weight Gain by Group

Treatment	Group (Mean ± SD)						*Pa*
	Cassava Leaves Jerky			Jerky Without Cassava Leaves			
	Mean	SD	Min – Max	Mean	SD	Min – Max	
BB Day-1 Intervention	3310.7	403.9	2500- 4100	3357.1	425.6	2700 – 4200	0.770
BB Day 7 of intervention Post 1	3810.7	393.3	3000- 4700	3557.1	428.7	2900- 4200	0.115
BB Day-15 intervention (Post 2)	4092.9	365.2	3500- 4800	3725.0	456.0	2950 -4500	0.026
Pb	0.000			0.096			

[a]n *Independent T-Test*[b]*One Way ANOVA*

Table 4 shows that weight gain in infants in cassava leaves jerky group has normal distribution and the jerky without cassava leaves group has p values >0.05. Therefore, non-parametric statistical analysis should be done.

DISCUSSION

Breastfeeding mothers have different levels of the hormone prolactin from normal women. The normal prolactin hormone levels in breastfeeding mothers is around 100 ng/ml.[20] The average level of prolactin hormone in the intervention group was 376.5 ng/ml while in the control group was 103.5 ng/ml. This is in line with the theory regarding the value of prolactin hormone levels in breastfeeding mothers. The prolactin hormone levels in the first week after giving birth will increase compare to normal prolactin levels in women. The process of breastfeeding affects the level of the mother's prolactin hormone. This is due by several factors one of it being the mother's food intake.[21]

This study alters mother's food intake by adding cassava leaves which contain galactogogue, as an effort to increase breast milk, which is still rarely done, especially in Indonesia. Galactogogue is a substance found in herbal plants that are considered helpful in producing, maintaining, and increasing breast milk in breastfeeding mothers in African countries.[22] Galactogogue derived from various plants and have been widely studied and proven to increase milk production. Most of them are very safe for breastfeeding mothers.[23,9] The average increase in prolactin hormone levels in the group that was given cassava leaves jerky was higher than that in the control group that was only given flour jerky. It was proven that the flavonoid content in plants helped increase prolactin and breast milk production up to 10-20 times.[18] A study showed a significant difference in prolactin levels in breastfeeding Wistar rats after being given processed foods containing galactogogue with a p-value of 0.000.[24]

Flavonoids in 100 grams of processed cassava leaves jerky are somewhat higher, namely 1.988 grams compared to 0.8371 grams of katuk leaves. This was because flavonoids, components of phytochemical compounds in cassava leaves, are chemical messengers delivered by the bloodstream to the tissues to stimulate or inhibit a process. So, the presence of phytochemical compounds in cassava leaves was thought to have a relationship with stimulating the effect of increasing prolactin levels and milk production for breastfeeding mothers.[25]

Cassava leaves jerky affects prolactin hormone levels in breastfeeding mothers with a significant effect (effect size) 1.3 > 0.8, so it can be concluded that the of cassava jerky significantly affects the increase in prolactin hormone levels in breastfeeding mothers.

Based on the results of statistical analysis, it can be concluded that consumsing cassava leaves jerky affects infant weight, namely, in this study, breast milk production. Its consumption increased infant weight significantly on the 15th day after the intervention with p-value = 0.026 <0.05. In addition to that, the study showed that giving cassava leaves jerky had a very significant effect on the baby's weight starting from day 1 to day 15 (p-value = 0.000), meaning that there was an effect of giving cassava leaves jerky to breast milk production. At the same time, the consumption of beef jerky in the form of flour without cassava leaves did not affect the baby's weight from day 1 to day 15 (p-value = 0.096).

Consuming cassava leaves jerky was proven to increase milk production looking at the increase in weight gain. This was in line with a study by Riski, et al. (2020), and it was found that there was a significant difference in the provision of processed papaya leaves stir fry on the baby's weight (p = 0.000).[26]

The effect size of cassava leaves beef jerky compared to flour alone was 1.6 > 0.8. The difference in the average increase in breast milk production in the group given cassava leaves jerky was higher than that in the flour jerky group. Therefore, consumption of cassava leaves jerky to increase breast milk production has a significant effect compared to giving flour jerky without cassava leaves.

CONCLUSION

Based on the results of the study it can be concluded that jerky leaves Cassava has been shown to be effective in increasing prolactin hormone levels based on the baby's weight indicator. Consuming cassava leaves jerky for 14 days was proven to increase prolactin hormone levels in breastfeeding mothers with p value = 0.000 and milk production as seen from the increase in baby weight with value sig. p value = 0.026 (<0.05).

SUGGESTION

Further study is needed to examine the prolactin hormone levels before and after the intervention with different grams of cassava leaves. Not only does this research has proven the consumption of cassava leaves jerky as an alternative to increase breast milk production but also this could be developed further as an effort to improve the community's economy so that training can be held for the community, especially in Micro, Small and Medium Enterprises (MSMEs).

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