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Provision of cowpea leaves (Vigna Sinensis l) extract to increase the levels of prolactin hormone among postpartum women

Asri Daniyati[1], Runjati[2], Diyah Fatmasari[3]

[1]*Applied Midwifery Program, Ministry of Health Poltekkes Semarang, Indonesia*
[2]*Postgraduate Polytechnic Health, Ministry Program Semarang, Indonesia*
***Corresponding Author**: **Asri Daniyati**
Email id: dzakyzenna@gmail.com

ABSTRACT

Background

Insufficiency of breast milk production is the main reason for a mother to terminate breastfeeding early. Synthetic galactagogue is not widely known and the price is relatively expensive and it contains side effects. The content of sipinon & polyphenol compounds in cowpea leaves (Vigna Sinensis L) has a galactagogue effect that can increase breast milk production and smoothen lactation process.

Objective

To prove the effect of providing cowpea leaves extract on the increase in Prolactin Hormone Level among postpartum women.

Methods

This was a quasy experimental study with random cluster design pre test and post test control group design. The samples were 32 postpartum women who met the inclusion and exclusion criteria chosen with consecutive sampling technique. The samples were assigned into the intervention group (n=16) that was given 200 mg of cowpea leaves extract (in the form of capsule) and the control group (n=16) that was given vitamin supplements according to postpartum midwifery care standards. This study was conducted with univariate and bivariate analysis using dependent and independent t-tests and Wilcoxon test was performed for data that were not normally distributed.

Results

The prolactin level after the intervention obtained (p = 0.006), which means that there was a difference in prolactin levels after treatment between the intervention group and control group.

Conclusion

Cowpea leaves extract had an effect on increasing Prolactin Hormone Level.

Keywords: Cowpea Leaves Extract, Prolactin Hormone Level

BACKGROUND

Breast milk is the best natural nutrition for babies because it contains the energy and substance needed during the first six months of the baby's life. Related to problems in exclusive breastfeeding, one of the main obstacles is the unsmooth production of breast milk. This will be a

contributing factor to the low coverage of exclusive breastfeeding for newborns [1]

Inadequacy of breast milk production is the main reason for a mother to terminate breastfeeding early. Such mother feels that she does not have sufficient breast milk production to meet the needs of the baby and supports adequate baby weight gain, so that the problem makes breastfeeding a stressful thing for a post partum woman. [2]

Breast milk production is influenced by the prolactin hormone, in which the prolactin hormone will stimulate the milk excretion during postpartum periode. After childbirth estrogen and progesterone levels will decrease so that prolactin level will increase and stimulates the breast to excrete breast milk. [3]

According to WHO, the coverage of exclusive breastfeeding in various countries in the world in 2016 was 38%. This figure was still below the WHO target of 50%. Unlike the case in Indonesia, the coverage of exclusive breastfeeding in 2016 turned out to have exceeded the WHO target of 54%. Of course this coverage was still far from the Ministry of Health's target of 80%. The coverage of exclusive breastfeeding in Central Java Province also increased in 2016 of 59.9%.

[4] Although it has increased from the previous year, Central Java Province still has to make efforts to meet the target according to the Ministry of Health program in exclusive breastfeeding. [5]

A survey in Indonesia reported that 38% of mothers stopped breastfeeding because of a lack of breast milk production. This is also in line with the study conducted by Cox (2006) which showed that low breast milk production in the first days after childbirth became an obstacle to early breastfeeding; Exclusive breastfeeding which is still very low can cause nutritional problems in infants. Synthetic galactogogue is less known especially by the lower middle class and is relatively expensive. Therefore an innovation is necessary to alternative galactogogue drugs. Cowpea leaves consumption is felt as very impractical, the leaves have unpleasant odor, rough surface and the taste that cannot arise appetite and those become a constraint to cowpea leaves consumption. Thus, the change in the form of extract can be a good option. [8]

Cowpea leaves contain sipinon and polyphenols that play a role in the prolactin reflex. so that it stimulates the alveoli to produce milk as a food that can increase milk production. Cowpea leaves are also easier to find, easily planted, and easy to process [9]

SUBJECTS AND METHODS

Study Design

This was a quasy experimental study with random cluster design pre test and post test control group design. Data collection in this study was conducted for 14 days. The study was conducted at East Tlogosari Community Health Center and Ngesrep Community Health Center in Semarang City in April-June 2018.

Population and Samples

The population in this study were all postpartum women in the work area of East Tlogosari CHC and Ngesrep CHC. The study samples were postpartum women in the 14th day to the 26th day of postpartum period who met the inclusion criteria chosen with consecutive sampling technique.

Operational Definition of the Variables

Study Variables

The independent variable was pea leaves extract used as powder with a dose of 200 mg and then put into capsules and given to postpartum women 1 x 1 for 14 days. The dependent variable was the prolactin hormone produced by anterior pituitary measured before and after the intervention. Laboratory test was performed using blood samples of the patients.

Confounding Variables

Maternal Psychological State is a psychological condition experienced by a mother during breastfeeding; the measurement of stress levels is performed using DASS (Depression Anxiety Stress Scale)

Work is an activity carried out by the mother both during pregnancy and after childbirth outside the home with the aim of earning income divided in the working and unemployed categories.

Parity is the experience of pregnancy and childbirth before the current pregnancy divided in the primiparous, multiparous and grand-multiparity categories..

Research Ethics

Research ethics include informed consent, anonymity, confidentiality, and ethical clearance. Ethical clearance of this study was conducted at the Semarang Health Polytechnics and was declared feasible according to the decree number:312/KEKP/Poltekkes-Smg/EC/2018

RESULTS

Bivariate Analysis

Characteristics of Respondents

Characteristics of respondents were assessed based on maternal parity, employment status and psychological state. The number of respondents in this study was 32 normal postpartum women in the 14th day to the 26th day of postpartum period, assigned into 2 groups: 16 respondents in the intervention group, 16 respondents in the control group.

Table 4.1 Characteristics of Respondents in the Intervention Group and Control Group

Characteristics	Group						*P Value*
	Intervention			Control			
	n	(%)	Mean±SD	n	(%)	Mean±SD	
Age			25.50±2,033			26.13±2.363	0.250[a]
Min-Max							
Employment Status							0.452[b]
Working	5	31.2		5	31.2		
Unemployed	11	68.8		11	68.8		
Parity							1.000 [b]
Primiparous	11	68.8		11	68.8		
Multiparous	5	31.2		5	31.2		
Grand-multiparity		0			0		
Psychological State							0.076 [b]
Normal	12	75.0		14	87.5		
Mild	4	25.0		2	12.5		
Moderate							
Severe							
Very Severe							

[a] *Levene's Test* [b] *Chi-square Test*

Table 4.1 illustrated the mean of age of the study respondents which was included in healthy reproductive age, with the mean of 25 years in the intervention group and 26 years in the control group. The average respondent were unemployed, the dominant parity was primiparous, and the dominant psychological state was normal, in the homogeneity test there were no significant differences in the means of age, parity, and psychological state between the intervention group and the control group (p> 0.05).

Data Homogeneity Test

Table 4.2: Homogeneity test of the preliminary characteristics of prolactin hormone and breast milk production of the respondents before the treatment among postpartum women

Variable	Group		*P Value*
	Intervention	Control	
	Mean±SD	Mean±SD	
Prolactin Hormone Level	1.613±6.784	1.485±7.596	0.611

Table 4.2 show the results of data homogeneity test on the mean values of prolactin hormone, breast among postpartum women before being given intervention which obtained p>0.05, which meant that the variances of data between the intervention group and the control group were the same or homogeneous.

Data Normality Test

Table 4.3 Normality Test (Shapiro-Wilk) Results in the intervention group and control group before and after treatment

Variable		Group	
		Intervention	Control
Prolactin Hormone Level	Pre	0.020	0.031
	Post	0.706	0.031
	Δ	0.221	0.360

Table 4.3 above showed the normal results of data normality test in the prolactin hormone levels in the intervention group, the difference between the intervention group and the control group, whereas the other results showed that the data of prolactin hormone levels in the intervention group and control before and after treatment and the difference after treatment were not normally distributed (p<0.05)

Bivariate Analysis

Effectiveness of cowpea leaves extract in increasing hormone prolactin level among postpartum women in the work area of East Tlogosari Wetan Community Health Center and Ngesrep Community Health Center in Semarang City in 2018

Table 4.4 Differences in prolactin hormone levels before and after treatment in the intervention group and control group

Prolactin Hormone Level	Pre	Post	*p value*
	Mean±SD	Mean±SD	
Intervention	161.36±67.840	301.99±31.47	0.000[b]
Control	148.56±75.961	205.27±71.86	0.015[b]
	Intervention	**Control**	***p value***
Δ	140.63±81.972	56.64±77.195	0.006[a]

[a]*Independen T Test.* [b]*Wilcoxon*

Based on table 4.5, the analysis results using Wilcoxon Test on prolactin hormone levels before and after treatment in the intervention group obtained p value of 0.000, which meant that there was a significant difference in prolactin hormone levels after treatment so that there was an effect of cowpea leaves extract on prolactin hormone levels before and after treatment.

The analysis results using Wilcoxon Test on prolactin hormone levels before and after treatment in the control group obtained p value of 0.015 which meant that there was a significant difference in prolactin hormone levels after treatment so that there was an effect of iron (Fe) tablet supplementation on prolactin hormone levels before and after treatment.

The mean difference in prolactin levels in the intervention group was 140.63 ± 81.972 while in the control group was 56.64 ± 77.195. The results of the Independent t test obtained p value of 0.006 which meant that there was a significant increase in the mean difference in prolactin hormone levels between the intervention and control groups, there was more difference in the intervention group than in the control group.

The difference of the increase in prolactin hormone levels between the intervention group and the control group can be seen in the graph below:

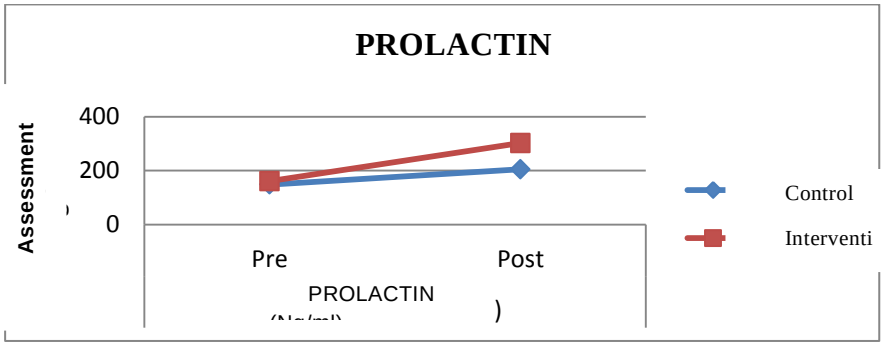

Figure 4.1 The mean increase in prolactin hormone levels

DISCUSSION

Effectiveness of cowpea leaves extract in increasing hormone prolactin level among postpartum women in the work area of East Tlogosari Wetan Community Health Center and Ngesrep Community Health Center in Semarang City in 2018

From the results of statistical calculations on prolactin hormone levels there was a difference in prolactin levels before and after treatment in the intervention and control groups. In the intervention group, the mean difference between prolactin hormone levels before and after consuming cowpea leaves extract was 140.63 ng/ml (87.15%), whereas in the control group the mean difference in prolactin hormone levels before and after the consuming cowpea leaves extract was 56.64 ng/ml (38.12%). Consuming cowpea extract had an effect on increasing the levels of prolactin hormone.

The normal value of prolactin hormone is 95-473 ng/m. The results of this study showed an increase in the mean of hormone prolactin levels in the intervention group of 301.99 ng/ml and an increase in the mean of prolactin hormone levels in the control group of 205.27 ng/ml, those results are still within the normal limits. The breast milk production in the initial postpartum period is correlated with the amount of prolactin excreted during breastfeeding after birth. The main stimulation that maintains prolactin secretion is suctioning. Breats milk production will continue as long as the baby continues to suck on the nipple. Every time a mother breastfeeds her baby, the nerve signal from the nipple brought to the hypothalamus will cause a surge of prolactin secretion of about 10 to 20 times that lasts about 1 hour, this prolactin acts on the mother's breast to maintain the mammary gland to secrete milk into the alveoli for the next breast milk production. [10]

This is supported by the study results that prolactin levels differed in each period. A study conducted on 16 breastfeeding mothers found different levels of serum prolactin between breastfeeding mothers in the 1st week of postpartum period, 4th week of postpartum period, 8th week of postpartum period, during the first menstruation after childbirth and after weaning, the prolactin level of breastfeeding mothers in the 4th week of postpartum period was the highest compared to other periods. [10]

The increase in the mean of prolactin hormone levels in the intervention group was greater than in the control group. It was due to cowpea leaves extract capsule contains chemical compounds namely polyphenols and sipinon which can affect the prolactin hormone and increase breast milk production by stimulating the alveoli which is active in the formation of breast milk. Meanwhile the increase in the mean of prolactin hormone levels in the control group was due to in the fourth week of postpartum period the prolactin hormone levels are increased and the vitamin supplement given to postpartum women namely iron, vitamin A and folic acid tables are useful for adding blood to the body and can help the anterior pituitary to stimulate the secretion of the prolactin hormone in the brain epithelium and activate the epithelial cells in the alveoli to hold milk in the breast. [11]

Galactagogue plays an important role in smoothening breast milk production. Furthermore, polyphenol content also plays a role in increasing the levels of the prolactin hormone. Polyphenols are a broad and naturally occurring group of compounds that have varying structures and have at least one phenolic group in their structure.

Polyphenols are a group of chemicals found in plants that play a role in giving color. [12]

Cowpea leaves also have high protein content, energy sources that are equivalent to carbohydrates, 4 calories per gram of protein, contain vitamin A and vitamin C. Vitamin A contained in cowpea leaves is very high. One function of these two vitamins is as an effective antioxidant in maintaining body and cells immunity. Vitamins contained in cowpea leaves are higher in dosage than other breast milk-promoting vegetables such as turi leaves, cassava leaves, Moringa leaves, sweet leaves, amaranth leaves. [13]

The content of cowpea leaves can facilitate the breast milk excretion because it can stimulate the prolactin hormone as one mechanism of a galactagogue compound (smoothing the release of breast milk), cowpea leaves contain protein and vitamins. Efficacious components stimulate an increase in milk secretion, while steroids and vitamin A play a role in stimulating the proliferation of new alveolar epithelium, thereby increasing alveoli. In lactation physiology, prolactin is a hormone secreted by the pituitary gland. This hormone has an important role to produce breast milk. The release of the prolactin hormone stimulates the cells in the alveoli to produce breast milk, and this hormone also emerges in the milk itself. [13]

Along with the formation of prolactin by adenohypophysis, stimulation derived from the baby's suction is followed by neurohypophysis which is then released by oxytocin. Oxytocin that reaches the alveoli will affect the myoepithelial cells. Contraction of cells will squeeze the milk that has been made and out of the alveoli and into the ductal system which then flows through the lactiferous duct into the baby's mouth.

Exposure to oxytocin is influenced by baby suction and it is also influenced by receptors located in the ductal system. If the duct dilates or softens, oxytocin is reflexively excreted by the pituitary, which acts to squeeze out milk from the alveoli. Thus, the role of prolactin and oxytocin is absolutely necessary in addition to other factors during the breastfeeding process.

There is an increase in maternal prolactin hormone in which prolactin is produced more at night to maintain breast milk production, thus affecting the volume of breast milk. Prolactin makes the mother feel comfortable and sometimes sleepy, because the usually rests well even though she is breastfeeding at night. Apart from hormonal factors, the increase in the volume of breast milk is also supported by a good maternal psychological factor. [14]

The regularity of baby sucking more than 10 times per day makes the production of breast milk increase every day and it is supported by nutrients from the extract of cowpea leaves consumed by the mother for 14 consecutive days which helps to increase the levels of maternal prolactin hormone. Thus, coordination between nutrients and baby suction frequency causes the breast milk volume increases. This theory is in accordance with the result of this study related to the increase in breast milk production. [13]

The confounding variables in this study were age, parity, employment status, and psychological state of postpartum women. Based on the study results the mean of respondents' age was similar between the intervention group and the control group. Thus, the age factor in this study could be controlled. The control of respondents' age was due to the inclusion criteria of respondents, namely 20-35 years. optimum age for safe pregnancy, childbirth and breastfeeding is 20-35 years according to the reproductive period which is very good and very supportive for exclusive breastfeeding practice. [17]

Related to the respondents' parity in this study, primiparous women showed less breast milk production than multiparous women on the 14^{th} day to 26^{th} day of post partum period, but after breastfeeding patterns could be built properly there was no significant difference between primiparous and multiparous women. The distribution of parity of postpartum women in the work area of East Tlogosari and Ngesrep CHCs between the intervention group and the control group showed the same distribution between multiparous and primiparous.

Characteristics of respondents showed that 5 respondents worked (31.2%) and 11 respondents (68.8%) were unemployed in the intervention group; meanwhile in the control group 5 respondents (31.2%) worked and 11 respondents (68.8%) were unemployed. It can be concluded that the two groups had equal or homogeneous employment status. Maternal employment status is a protective factor, meaning that mothers who do not work will be more supportive of exclusive

breastfeeding than mothers who work. This is because mothers who do not work outside the home will have a lot of time and opportunity to be able to breastfeed their infants on demand compared to mothers who work outside the home.

Pada variabel psikologis responden pada kelompok perlakuan dan kontrol The respondent's psychological state variable in the treatment and control groups showed the mean of maternal physiological factors were the same between both groups. Maternal psychological control was conducted by looking at the stress level of the mother using the DASS questionnaire applied on the respondents, so that the mother's psychological factor assessment showed the mental peace value between 0-7 which meant that the mothers did not experience stress or the mothers were within normal conditions both in the intervention group and the control group. Oxytocin hormone acts on uterus contraction, injecting breast milk and prolactin will stimulate breast milk excretion after childbirth. Another theory put forward by Richard in 2011 states that the actions of the oxytocin and prolactin hormones are influenced by the psychological state of the mother. Psychological distress, sadness and tension of the mother will reduce breast milk production. [18]

Based on previous theories related to the oxytocin hormone, the process of releasing breast milk involves the oxytocin hormone. Oxytocin is a hormone produced by the hypothalamus that is stored in posterior pituitary gland and is excreted in the blood by stimulation in the nerve fibres of the hypothalamus. [19] Another theory states that the action of the oxytocin hormone is influenced by psychological state. Psychological preparation of mothers before breastfeeding is an important factor that affects the success of breastfeeding. Stress and excessive worry, unhappiness felt by the mother is very instrumental in the success of exclusive breastfeeding. This is supported by previous study entitled maternal anxiety and breast feeding findings from the MAVAN (Maternal Adversity, Vulnerability and Neuro develovment) which showed that there was a relationship between maternal anxiety and reduced exclusivity and continuity of breastfeeding. [20]

CONCLUSION

Cowpea leaves extract given to postpartum women for 14 days hadd an effect on the increase in prolactin hormone level among postpartum women.

RECOMMENDATIONS

For other researchers

a. It is expected that further researchers conduct an examination to oxytocin hormone level in addition to prolactin hormone level, so as they can see the reflex mechanism of oxytocin and prolactin in women who are given cowpea leaves extract.
b. Food factors that influence breast milk production should be controlled more objectively and the culture of avoiding several kinds of food should be asked in more detail.

For Academic Environment

This study should be able to add references for the students about increasing breast milk production, so that students can improve their ability and skills in providing counselling about the importance of breastfeeding to the mothers and how to increase breast milk production so as to increase exclusive breastfeeding.

For the Study Site

Healthcare providers, especially midwives, to further improve their skills through the latest literature, training and counselling at every examination of pregnant women, so that they have sufficient knowledge of the benefits of giving cowpea leaves extract to increase prolactin hormone levels among postpartum women.

BIBLIOGRAPHY

[1]. Duijts L, Jaddoe Vw, Hofman A, Moll Ha. *Prolonged And Exclusive Breastfeeding Reduces The Risk Of Infectious Diseases In Infancy. Pediatrics*.Peds. 2010, 2008-3256.
[2]. Rattigan S, Ghisalberti Av, Hartmann P. *Breast-Milk Production In Australian Women. British Journal Of Nutrition*. 45(2), 1981, 243-9.

[3]. Cai X, Wardlaw T, Brown Dw. *Global Trends In Exclusive Breastfeeding. International Breastfeeding Journal*. 7(1), 2012, 12.
[4]. Dinkes Prov Jateng. Profil Kesehatan Provinsi Jawa Tengah Tahun 2016-2017. Semarang: Dinas Provinsi Jawa Tengah.
[5]. Kemenkes Ri. Profil Kesehatan Indonesia Tahun 2016-2017.Jakarta:Kementerian Kesehatan Ri; [139].
[6]. Cox S. Breasfeeding With Confidence.Panduan Belajar Menyusui Dengan Percaya Diri. Jakarta Pt.Elex Media Komputindo; 2006.
[7]. Tjing-Tjing. F. Penapisan Fitokimia Terhadap Tujuh Jenis Makanan Tanaman Yang Berkhasiat Sebagai Pelancar Air Susu Ibudengan Daun Katuk Sebagai Pembanding. Ff.Universitas Pancasila; 1996.
[8]. Edmond Km, Zandoh C, Quigley Ma, Amenga-Etego S, Owusu-Agyei S, Kirkwood Br. *Delayed Breastfeeding Initiation Increases Risk Of Neonatal Mortality. Pediatrics*. 2006;117(3):E380-E6.
[9]. Anonim.2007a. Vigna Sinensis L. Savi Ex Hassk. Http:// Bebas.Vlsm.Org/V12/Artikel/Ttg_Tanaman_Obat/Depkes/Buku3/3157.Pdf.Diakses Tanggal 17, 2007.
[10]. Tay C, Glasier A, Mcneilly A. *The 24 H Pattern Of Pulsatile Luteinizing Hormone, Follicle Stimulating Hormone And Prolactin Release During The First 8 Weeks Of Lactational Amenorrhoea In Breastfeeding Women. Human Reproduction*. 7(7), 1992, 951-8.
[11]. Nindiyaningrum Ra. Pengaruh Pemberian Ekstrak Daun Katuk Terhadap Produksi Asi Pada Ibu Post Partum. Jurnal Ilmu Keperawatan Dan Kebidanan. 1(6), 2014.
[12]. Hendriyani Is, Setiari N. Kandungan Klorofil Dan Pertumbuhan Kacang Panjang (Vigna Sinensis) Pada Tingkat Penyediaan Air Yang Berbeda. Jurnal Sains & Matematika. 17(3), 2009, 145-50.
[13]. Chahyanto Ba, Roosita K. Kaitan Asupan Vitamin A Dengan Produksi Air Susu Ibu (Asi) Pada Ibu Nifas. Jurnal Gizi Dan Pangan. 8(2), 2014, 83-8.
[14]. Lawrence Ra, Lawrence Rm.Breasfeeding E-Book: A Guide For The Medical Professional: Elsevier Health Sciences; 2010
[15]. Anonim. Vigna Sinensis L. Savi Ex Hassk. Http:// Bebas.Vlsm.Org/V 12/Artikel/Ttg_Tanaman_Obat/Depkes/Buku3/3-157.Pdf.Diakses Tanggal 17, 2007. 2007a.
[16]. Andriana Se, Yuda R, Susanthi D. Ekstrak Etanol Daun Kacang Panjang (Vigna Sinensis L.) Sebagai Laktagogum Pada Tikus Putih (Rattus Norvegicus L.) Yang Menyusui.
[17]. Bobak I, Lowdermilk D, Jensen M, Perry S. Maternity Nursing . St. Louis: Mosby-Year Book. Inc; 2005.
[18]. Fahey Jw. Moringa Oleifera: *A Review Of The Medical Evidence For Its Nutritional, Therapeutic, And Prophylactic Properties. Part 1. Trees For Life Journal.* 1(5), 2005, 1-15.
[19]. Agustie Pr, Hadisaputro S, Runjati R, Soejoenoes A, Mashudi Id, Widyawati Mn. *Effect Of Oxytocin Massage Using Lavender Essential Oil On Prolactin Level And Breast Milk Production In Primiparous Mothers After Caesarean Delivery. Belitung Nursing Journal.* 3(4), 2017, 337-44.
[20]. Adedinsewo Da, Fleming As, Steiner M, Meaney Mj, Girard Aw, *Team M. Maternal Anxiety And Breastfeeding: Findings From The Mavan (Maternal Adversity, Vulnerability And Neurodevelopment) Study. Journal Of Human Lactation*. 30(1), 2014, 102-9.

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