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Effect of Virgin Coconut Oil on Prolactin Levels and Breast Milk Production in Postpartum Mothers

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ABSTRACT

Background and Aim: Breastfeeding is a natural process for a mother to support and prosper her child after giving birth. Lack of perception about breast milk production is one of the factors causing failure in exclusive breastfeeding. Nutritional and hormonal factors (prolactin and oxytocin) are the main factors that affect breast milk production. The purpose of this study was to determine the effect of giving virgin coconut oil to prolactin levels and milk production.
Material and Method: This type of research is experimental with Posttest Only Group Design. The sample was selected by purposive sampling technique so as to get a sample of 33 pregnant women in the group and 33 pregnant women in the control group. Examination of prolactin levels were measured using the ELISA method. Data were analyzed by Kolmogorov Smirnov and Independent T test.
Result: The results of the average prolactin level of each group, namely the control group was 50.69 ng/ml and the treatment group was 72.98 ng/ml. The average milk production obtained in the control group was 325.73 ml and the treatment group was 432.80 ml. The results of the analysis using the Independent T test concluded that there were significant differences, between VCO, prolactin levels (p = 0.00) and VCO on breast milk production (p = 0.00).
Conclusion: The conclusion of this study is that giving Virgin Coconut Oil has an effect on increasing prolactin and breast milk production in postpartum mothers.

Keywords: VCO, Prolactin, Breast Milk

INTRODUCTION

Not all babies get breast milk according to their needs. The release of breast milk that is little or not even comes out is an obstacle at this time. As for the efforts that need to be made to overcome the production of breast milk that is not smooth or breast milk cannot be produced, that is, apart from consuming nutritious food, we also consume medicinal plants that promote breast milk. Today, treatment by consuming herbal medicines is widespread. There are so many people who have switched from chemical drugs to consuming herbal medicines which are believed to be able to treat the disease they suffer[1].

Cases that often occur are new mothers who find it difficult when they first have to give breast milk, in addition to the difficulties of many mothers whose breast milk does not come out after giving birth. This will frustrate the mother and become impatient with hungry babies and make formula milk their choice[2].

One of the efforts to increase prolactin hormone levels as well as increase the volume of breast milk is by giving galactagogue[3]. Galactagogue itself is a drug or substance that is believed to help stimulate, maintain or increase milk production. According to the Edu Health Journal (2015), plants or foods that are

efficacious for increasing milk secretion may contain active ingredients that work such as Prolactin Releasing Hormone (PRH) and contain active ingredients of steroid compounds. In Indonesia, there are many proven food sources that are believed to help increase breast milk, one of which is Virgin Coconut Oil (VCO). From a study, it was found that there was an increase in the total volume of breast milk for 4 hours after giving VCO compared to the control group. This is due to the ability of VCO as an anti-analgesic which provides a relaxation sensation so that it can increase breast milk[4].

Virgin Coconut Oil (VCO) is coconut oil obtained from wet processes and without going through chemical refining, where VCO has many benefits for pregnant women, it is obtained an increase in several components of breast milk that are important for babies such as lauric acid. In addition to functioning as a nutrient, lauric acid also functions as an immunomodulator that can protect babies from pathogenic attacks. Pure coconut oil is safe for consumption by pregnant and lactating women[4]. Consumption of VCO or coconut products (such as milk, grated coconut and coconut oil) by pregnant and lactating women has positive effects on babies, such as speeding up the birth process in pregnant women and increasing breast milk in breastfeeding mothers. helps the absorption of nutrients, digestive function, regulates blood sugar levels and protects babies from micro-organisms[5].

Consumption of Virgin Coconut Oil by pregnant and lactating women has a positive effect on mothers and their babies, this is due to the various fatty acids contained in VCO, including lauric acid, capillary acid, and capric acid which are included in the MCFA (Medium chain fatty acid) group[3]. By consuming Virgin Coconut Oil, breast milk will be produced with a higher composition of medium chain fatty acids so that it can help absorb nutrients, digestive function, regulate blood sugar levels and protect babies from disturbing microorganisms. When a breastfeeding woman adds lauric acid-rich foods to her diet, the amount of lauric acid available in her breast milk increases. This is evidenced by a rodent study conducted where the percentage of medium chain fatty acids was found to be very high after the standard pellets were soaked in coconut oil, namely the increase in caprylic acid from 0.1 to 7.2%, capric acid from 0 to 5.9% and lauric from 0.5 to 43.5%[6].

Aim and objective of study

The purpose of this study was to determine the effect of giving virgin coconut oil to prolactin levels and breast milk production in postpartum mothers.

MATRIAL AND METHOD

Ethics committee approval was taken before starting the study and written informed consent were obtained from the patients involved in the study.

This type of research is experimental with a research design: post test only with control group design. This research was conducted by comparing the experimental group with the control group.

The population in this study were all 3rd trimester mothers who underwent labor and postpartum in the working area of the Lubuk Buaya Health Center, Padang City, with a total of 264 mothers. The sampling method in this study is a purposive sampling approach, which is sampling by determining subjects who meet the research criteria to be included in the study for a certain period of time, so that respondents can be met. From the results of the sample calculation, 67 women with the final third trimester of pregnancy were selected, of which 60 pregnant women were willing to participate and fill out informed consent.

Blood Sampling

During pregnancy in the third trimester for one month before giving birth, pregnant women in the treatment group were given VCO and assessed on the day of birth by assessing the amount of milk

produced by the mammary glands and on the day after that blood was drawn.

Position the respondent in a comfortable sitting position, attach a tourniquet to the upper arm and ask the respondent to make a fist. Disinfect with 70% alcohol cotton at the specified puncture site. Blood sampling in the median cubital vein as much as 3 cc using a syringe was carried out by health workers or health analysts. The puncture site is covered with plaster. The blood sample is put into a vaccutainer, then placed on a tube rack to avoid shock and stay in position. Blood samples can last for 2 hours at room temperature 25^{o} C, let the blood samples stand for 15-20 minutes. Blood samples were centrifuged at 3000 rpm for 10 minutes. Then the serum is separated using a micro pipette and put into a microtube that has been coded according to the respondent group.

The serum samples obtained were sent by researchers to the Biomedical Laboratory, Faculty of Medicine, Andalas University, Padang using a coolbox containing ice gel. After that the serum is stored in the refrigerator at a temperature of -20^{o} C (lasts for 3 months). After all samples were met, prolactin levels were checked using the Prolactin Enzyme Link Immunosorbent Assay (ELISA) Kit at the Biomedical Laboratory, Faculty of Medicine, Andalas University.

Analysis of Prolactin Levels

The test will be carried out at room temperature. Determine the number of strips required for the test. Insert the strips into the frame for use. Strips that are not used should be stored at 2-8^{o} C. Add 50 jul of standard to the appropriate standard with a note do not add antibody to a good standard because the standard reagent contains biotinylized antibody. Add 40 l of sample to the appropriate sample, then add 10 l of antiPHR, antibody for the compliant sample and the appropriate standard (not a blank control) and mix. Cover the plate with a sealer and incubate for 60 minutes at 37° C. Remove the sealer and wash the dishes 5 times with the wash buffer container, then soak at a depth of at least 0.35 ml. Use the wash buffer for 30 seconds to one minute for each wash. For automatic washing aspirate well and wash five times with wash buffer. Fill it up to overflow well with the wash buffer. Clean the plate with paper or other absorbent material. Add 50 jul of subtract A reagent for each subtract and then add 50 l of subtract B reagent for each as appropriate. Cover the plate and incubate the new sealer, for 10 minutes at 37^{o} C in the dark. Add 50 jul of stop reagent for each until the blue changes to yellow. Release the optical density (On value) on each one immediately. Use a microscope set that reads up to 450 nm within 10 minutes of adding the stop reagent.

Analysis of the Amount of Breast Milk

Before starting to pump your breasts, wash your hands first with soap until clean. Compress the breast with a warm towel while massaging in a circular manner from the outside of the breast to the inside, but do not touch the nipple. Put the funnel on the breast, turn on the engine. You should choose a pump that has a comfortable and suitable pressure. Stop squeezing when your breasts feel empty. Breasts can not be squeezed out. Therefore, avoid squeezing for more than 20 minutes. If the breast feels sore at the nipple, stop the milking process

Statistical Analysis

The data were analyzed starting with the Kolmogorov Smirnov normality test. The data is normally distributed with p value >0.05. If the data is normally distributed, the parametric statistical test is continued with the Independent T test. In this study, the analysis used was the Independent T test. Independent or unpaired t-test where the test is used to assess differences in outcome changes in the control group and the intervention group. If the independent T test results in a significant difference, it can be concluded that Ho is rejected.

RESULT

Table 1. Normality Test of Data on Prolactin Levels and Breast Milk Production

Group	Statistic	Df	Sig.
Prolactin Level	0.089	60	0.200*
Breast Milk Production	0.087	60	0.200*

The results of the normality test using Kolmogorov Smirnov showed that both prolactin levels and breast milk production were normally distributed with p value of prolactin levels (0.2) and amount of breast milk (0.2) where the p value of both was > 0.05.

Differences in the Average of Virgin Coconut Oil on prolactin levels

Table 2 Average Differences of Virgin Coconut Oil on Prolactin Levels.

Group	Mean	SD	Sig
Control	50.69	5.47	0.00
Treatment	72.98	8.34	

Based on table 2, it is known that there are differences in the mean of giving Virgin Coconut Oil to prolactin levels, this can be seen where p value < 0.05 with a large p value of 0.00. From the table, it can be seen that there is a significant difference in prolactin levels of mothers who were given VCO when compared to pregnant women who were not given VCO where the average pregnant women with VCO were 72.98 ng/ml and the group of mothers who were not given VCO was 50.69 ng/ml.

Differences in the Average Effect of Giving Virgin Coconut Oil on Breast Milk Levels

Group	Mean	SD	Sig
Control	325.73	46.35	0.00
Treatment	432.80	48.11	

Based on table 3, it is known that there is a difference in the mean of giving Virgin Coconut Oil to breast milk production, this can be seen where p value < 0.05 with a large p value of 0.00. From the table, it can also be seen that there is a significant difference in prolactin levels of mothers who were given VCO when compared to pregnant women who were not given VCO where the average of pregnant women with VCO was 432.80 ml and the group of mothers who were not given VCO was 325.73 ml.

DISCUSSION

The results showed that the administration of Virgin Coconut Oil (VCO) was directed to pregnant women in the third trimester to see its effect on prolactin levels and the amount of breast milk. Pregnant women who consumed VCO for one month in the final third trimester experienced an increase in prolactin levels and milk production when compared to pregnant women who did not receive any treatment. This is in accordance with research conducted by Khrisna et al (2016) who found that VCO is an oil extracted from pure coconut milk, where the oil is different from other oil groups. VCO has high MCT (Medium Cain Triglyseride) levels. MCT is known to have the ability to improve the endocrine physiological system, especially steroid hormones such as testosterone, estrogen, LH, FSH and prolactin.

Astuti in 2014 has conducted a study in the form of giving VCO to mothers who breastfeed for one month, by assessing the volume of breast milk after 4 hours of giving where the breast milk is judged to come from the mother's right breast. From this study, it was found that after 4 hours of giving there was a difference in the amount of mother's breast milk given VCO when compared to the control group with a difference of 10.26% in the amount of breast milk. In this study, it was also known that the VCO given to breastfeeding mothers was only associated with the volume of breast milk, but did not correlate with other variables such as endocrine factors. The assessment of the amount of breast milk is carried out at the time after giving birth by assessing the volume of milk from both mother's breasts. Researchers also found that there was a significant effect between giving VCO to pregnant women in the late third trimester and the average difference in breast milk produced by mothers who received VCO treatment for one month as much as 107.07 ml or there was an increase of 1.07% when compared to mothers who did not get VCO intake. VCO

during the late third trimester. From the results of this study, the measurement is not only limited to the increase in the volume of breast milk produced by the mother, but also the researchers see how the relationship between VCO administration and maternal prolactin levels. The assessment of maternal prolactin was carried out as a form of proof to the physiological theory of lactation, which states that prolactin has an important role in the formation of breast milk and in maintaining the regulation of milk synthesis during lactation. One month of pregnancy was followed by an increase in prolactin levels in the mother's blood where there was an increase of 0.22% (22.23 mg/dl) in the average prolactin of mothers who received VCO more than mothers who did not.

In a study conducted by researchers, VCO was given for one month in the final third trimester with an assessment of the amount of breast milk carried out after delivery by assessing the volume of milk from both mother's breasts. Researchers also found that there was a significant effect between giving VCO to pregnant women in the final third trimester and the average difference in breast milk produced by mothers who received VCO treatment for one month as much as 107.07 ml when compared to mothers who did not get VCO intake during the final third trimester. From the results of this study, the measurement is not only limited to the increase in the volume of breast milk produced by the mother, but also the researchers see how the relationship between VCO administration and maternal prolactin levels. The assessment of maternal prolactin was carried out as a form of proof of the physiological theory of lactation, which states that prolactin has an important role in the formation of breast milk and in maintaining the regulation of milk synthesis during lactation. One month of pregnancy was followed by an increase in prolactin levels in the mother's blood where the mean prolactin of mothers who received VCO was higher (72.98 ng/ml) when compared to mothers who did not receive VCO (50.69 ng/ml).

Decreased prolactin levels in the lactogenesis phase can occur as a result of nutritional deficiencies (especially moderate fat and amino acids, unhealthy lifestyles, exposure to free radicals and stress experienced by the mother after [6]. Those who live aerobically will produce free radicals as a by-product of the body's metabolism, especially those from oxidative phosphorylation in the mitochondria[7].The body needs antioxidant intake to neutralize free radicals[8]. Antioxidants can be in the form of antioxidants. Endogenous antioxidants and exogenous antioxidants Endogenous antioxidants are antioxidants that are produced in the body such as glutathione peroxidase, superoxide dismutase, and catalase. Exogenous antioxidants come from food, such as vitamin E, vitamin C, beta carotene, zinc, and selenium[7].

Virgin Coconut Oil (VCO) contains high saturated fatty acids, which makes VCO resistant to rancidity due to oxidation. VCO also contains tocopherol. Tocopherol contains biologically active components as vitamin E activity which plays a role in maintaining human immunity[9]. Research conducted by Dosumu et al (2010) found that VCO is known to have biologically active components such as tocotrienols (which are reported to be antioxidants that have better activity when compared to alpha tocopherols), flavonoids, and several ploy phenol components which are responsible as antioxidants. The activity of polyphenol components contained in VCO is also reported to prevent cell damage such as membrane tissue damage caused by lipid perioxidation. Phenol components can interact with free radicals by donating a hydrogen atom group. Phenol in VCO can also interact with cascade enzymes that can inhibit the pathway of prolactin hormone synthesis[10].

Other studies have found that inhibition of the pituitary LH and FSH pathways during pregnancy is known to

result in inhibition of the prolactin synthesis pathway. Excessive stress during pregnancy and exposure to free radicals are factors that trigger the occurrence of pituitary resistance to stimuli given by the body. The increase in stress hormones (cortisol and ACTH) is a factor that can lead to disruption of the hypothalamic-pituitary synthesis pathway, in the end this disorder will have an impact on the high rate of acetylcholine secretion at the pituitary synapse, resulting in the absence of progesterone and inhibition of prolactin synthesis due to the presence of inhibin[11]. According to Muis (2014), VCO can act as antiphotooxidant and antioxidants. It was further explained that the antioxidant and antiphotooxidant activity of VCO was contributed by minor components (micronutrients) not only major components (macronutrients) in the form of fatty acids. VCO oil contains minor components such as: tocopherol, carotene and other phenolic compounds. These components are generally found in almost all types of vegetable oils, including VCO. It was reported that tocopherol and - carotene have the ability as antioxidants that are effective in counteracting free radicals in the blood.

Research conducted by Subroto (2016) found that by consuming Virgin Coconut Oil, breast milk with a higher composition of medium chain fatty acids will be produced so that it can help nutrient absorption, digestive function, regulate blood sugar levels and protect babies from disturbing microorganisms. Consumption of Virgin Coconut Oil by pregnant and lactating women has a positive effect on mothers and their babies, this is due to the various fatty acids contained in VCO, including lauric acid, capillary acid, and capric acid which are included in the MCFA (Medium Chain Fatty Acid) group. From various studies, the MCFA contained in VCO has similarities to milk fat found in breast milk. Another study by Rina Astuti in 2014 found that there was an increase in the total volume of breast milk for 4 hours after giving VCO compared to the control group. This is due to the ability of VCO as an anti-analgesic which provides a relaxation sensation so that it can increase breast milk. When a breastfeeding woman adds lauric acid-rich foods to her diet, the amount of lauric acid available in her breast milk increases. This is evidenced by the rodent studies conducted where the percentage of medium chain fatty acids was found to be very high after the standard pellets were soaked with VCO, namely the increase in caprylic acid from 0.1 to 7.2%, capric acid from 0 to 5.9% and lauric acid. from 0.5 to 43.5%[12].

Pure VCO can increase MCFA in breastfeeding mothers up to three times. Giving food intake containing MCFA to nursing mothers will produce milk that is rich in MCFA. In addition, pure VCO helps in the delivery process and is able to provide energy so that the mother has greater energy. Pure VCO is also able to quickly restore the mother's fitness after childbirth. VCO has a high lauric acid content. Lauric acid has been researched and proven to have antiviral, antibacterial and anti-fungal effects so that it can support the body's immune system. Therefore, consuming pure VCO is highly recommended for pregnant and lactating mothers. For pregnant women, consumption of VCO can be considered as "savings" of short and medium chain fatty acids and lauric acid in adipose tissue so that the milk that will be produced later will be better in quality and quantity. For breastfeeding mothers, consumption of pure VCO can increase the antibody levels contained in colostrum. The recommended amount of consumption is 3-4 tablespoons per day, especially for pregnant and lactating women[13]. As described above, it is known that VCO has the ability to increase the volume of breast milk and the physiological function of the hormone prolactin at various phases of administration.

However, there have also been many studies that have been conducted to find out what other than VCO can increase the volume of breast milk and the hormonal

activity of lactation during pregnancy or in the postpartum phase. As research conducted by Silva et al (2017) which found that the amount of tocopherol will decrease during lactation, and allow a decrease in the amount of colostrum and breast milk produced afterwards, so that a number of vitamins, especially vit. e is needed during pregnancy to maintain the regulation of lactogenesis. Another study conducted by Vieira et al (2017) reported that mothers with soy consumption during pregnancy are known to have different lipid characteristics where isoflavone levels in soybeans consumed by mothers during lactation are known to prevent children, especially from the incidence of metabolic diseases. related to sugar and fat metabolism. Several other studies have also reported that giving vitamins such as vitamins B6, B12, and Zinc at certain doses has the ability to increase the volume of breast milk produced by mothers[14]. In addition, various other metabolites such as obesity and dysregulation of the hormones leptin and ghrelin as well as a decrease in the amount of energy and nutrition in pregnant women can be a determining factor in decreasing the amount of breast milk[15.]

Limitation of the Study it is necessary to conduct further research on the factors that influence the increase in prolactin levels and milk production in postpartum mothers, especially regarding the relationship between these two variables in increasing the function of other lactating hormones.

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REFERENCES

1. Alam Syah, Andi Nur, 2005. Perpaduan Sang Penakluk Penyakit VCO + Minyak Buah Merah. AgroMedia
2. Astuti R, Sinaga SM, Putra EDL. Effect of taking virgin coconut oil to the breastmilk secretion and inspection of medium chain fatty acids contain. Int.J.PharmTechRes. 2015; 7(3):481-487.
3. Astutik, R. Y.2013. Payudara dan Laktasi. Jakarta: Salemba Medika
4. Asian and pacific Coconut Community (APCC) "Standard for Virgin coconut Oil", 2012 Backstrometal. 2010. Two Sides Of Breast feeding Support: Experience Of Women And Midwives
5. Biancuzzo, M.2013.Breast feeding the newborn: Clinical strategis fornurses. St.Louis: Mosby
6. Cadwell K&Cindy Turner - Maffei.2012. Buku Saku Manajemen Laktasi. Jakarta: EGC
7. Haryono dan Setianingsih. 2014. Manfaat ASI Esklusif untuk buah hati anda.Yogyakarta: Goysen Publishing
8. Iqbal, R, Ali, M, Amin, M, Saleem,M, Anwer, J,Ali, S. 2017.Factors involved infailure of exclusive breastfeeding practice among mothers, KSZMC,8(1),1113-1116.
9. Lester, Amy. 2014. Paternal Support For Breastfeeding: A Mixed Method Study To Indentify Positive And Negative Forms Of Paternal Social Support For Breastfeeding As Perceived By First Time Parent Couple
10. Madhavi,N, Manikyamba,D. 2016. Evaluation of factors responsible for failure of exclusive breastfeeding for first 6 months hospital based study. Int J Contemp Med Research, 3(6), 17011704.
11. Mohamad, Et. Al, 2015. Knowledge and Attitude towards Exclusive Breastfeeding Practices among fathers who attend Primary Health Care Facilities in Suburban, Malaysia
12. Rebecca Mc. Earleanand Valsaman Eaper. 2010. Perinatal Anxiety and Depressin: Associations with Oxytocyn and Mother Infant Interactions. Australia
13. Smedley et al.2013.Women's Reported Health Behavior Before and During Pregnancy: A Retrospective Study
14. Srivastava Y,Semwal AD,Sharma GK. Therapeutic, probiotic and unconventional food. Elsevier. 2018: 291-301.

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