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Correlation Of Percentage Of Body's Fat Of Breasfeeding Mother To Aterm Infant With Fat Content And Breast Milk Protein

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A B S T R A C T

Maternal nutritional status is very important to be prepared properly because it correlates with breast milk production, quality and quantity of breast milk component and it has an important role to succesfully achieve breastfeeding that its indicators can be measured based on the duration of exclusive breast milk, infant development. Various studies show that there were positive relations of maternal nutritional status to breastfeeding performance and infant development.

The method of this study applied cross sectional, with correlative study type to 48 postpartum mothers who breastfeed with exclusive breast milk to their infants aged 1-3 months. The study was conducted at work area of Belimbing Public Health Center and Central General Hospital of M Djamil from October to June 2016. The samples weere selected based on probality Sampling. The measurement of the percentage of body's fat of breastfeeding aterm infant applying Bioelectrical Impedance Analysis (BIA). The measurement of fat content and breast milk protein with Human Milk Analizer Data Analysis of regression linear and Spearman.

The results of the study show that there was a weak negative correlation and significant between the percentage

of body's fat of breastfeeding mother to aterm infant of breast milk fat content (r = - 0.33 ; p = 0.02). There was a very weak negative correlation and insignificant of breast milk protein content (r = - 0.33 ; p = 0.02).

In conclusion, the higher the percentage of body's fat of breastfeeding mother the lower of fat content and breast milk protein.

Keywords: Percentage of Body's Fat, Breast Milk Content, Breast Milk Protein Content.

I. INTRODUCTION

Nutritional status is a body condition due to food consumption and nutrient use followed by the balance between the amount of nutrient intake with the amount nutrient needs by the body for biological process. Good maternal nutritional status during breastfeeding period is very important because it has a positive correlation with quality and quantity of breast milk, moreover it has closely relation with breast milk production which contains various nutrient components which is badly needed for infant's grrowth and development (WHO, 2002; Alam, 2003).

In most developing countries, mothers have lactation period without sufficient fat reserve so that the mothers run the risks of not producing enough breast milk, unless the need of their energy are met by increasing food intake. Food intake and various kinds of food will produce of quality breast milk (Fikawati, 2015; Almatsier, 2001).

Maternal nutritional status during breastfeeding period has an important role because nutritional status of thin mothers of the first pregnancy by measuring with (IMT < 18.5) after 1 and 12 months of breastfeeding, the mothers are still thin with (IMT < 18.5) of 33.3% and 42%.. During breastfeeding, thin mothers run the risks of not successfully breastfeeding of 2,26-2,56 times compared to with the mothers who have normal nutritional status. The prevalence of thin mothers is increasing in line the length of breast feeding period. The prevalence of thin mothers with IMT < 18.5 of breastfeeding mothers for 1, 2, 3 and 4 months consecutively was 6.7%, 9.4%, 11.4% and 14.1% (Irawati, 2003).

Mothers with thin nutritional status during breastfeeding think they will surely be able to breastfeed the same as the mothers who have normal nutritional status. Breast milk production of mothers with thin nutritional status differs with mothers who have normal nutritional status not only quantity and quality, but also breat milk produced by the mothers who have normal nutritional status is more otimal compared to that of Mothers with thin nutritional status...mothers who have normal nutritional status have sufficient reserve so that they can produce breast milk well with sufficient nutrient content.

The reserve of fat in mother's body will influence fat content of breast milk because around 60% of breast milk fat produced from synthesis in adipose tissue (Blackburn, 2010). Mothers with good nutrition, so the growth of body's fat up to 4 kg in line with the store of 35,000 kkal, enough for lactation reserve for 6 months with the capacity of 330 kkal/day. During lactation process, the accumulated fat was changed into energy. In healthy breast milk can produce 85 ml/day, so the lost energy is 600 calorie/day. Energy from daily foods is changed into breast milk with efficiency of 90% (Laurence, 2011).

Nutritional status of breastfeeding mothers is very important to be prepared properly because it is related with breast milk production, quality and

quantity in breast milk component and it is important in successful breastfeeding which its indicators can be measured from exclusive breast milk duration, infant growth, and maternal nutritional status of post breastfeeding. Various studies show that there is a correlation or positive relation between maternal nutritional status with breastfeeding performance and infant growth, it can be observed from optimal duration in providing exclusive breastfeeding for 6 months it can be reached if nutritional status of breastfeeding mothers is normal (WHO, 2002; Alam, 2003).

Based on the data of Basic Health Research (Riskesdas) of 2010 show that low body mass index (BMI) has often been found in the age bracket of 18-24 years old around (24.8%), followed by the age bracket of 25-29 years old around (15.8%), while in 2013 the prevalence of pregnant mothers with chronic energy deficiency based on upper arm circumference of < 23.5 cm, of the age bracket of 15-49 years old around 24.2% nationally. The lowest prevalence of chronic energy deficiency risk was found in Bali (10,2%), while the highest was found in East Nusa Tenggara around (45.4%).

One of the factors that influence quantity and quality of breast milk is nutritional status of breast feeding mothers which reflects nutritional condition and mothers' health during breastfeeding period, which can be measured with anthropometry of mothers' body with body's fat percentage indicator. The percentage of body's fat is a comparison of fat mass and fat free mass in one's body. The percentage of body's fat can be obtained from measuring with *Bioelectrical Impedance Analysis* (BIA) (Hatsu, 2008 ; Morris, 2013).

Fat composition in breast milk depends on the source of fat in foods consumed by the mothers in line with sufficient calorie and other nutrients and also it can be influenced by the body composition of adipose tissue which is synthesized in breast milk fat. Therefore, there is a correlation between body's fat composition with fat content in breastmilk (Coad, 2011).

Fat in breast milk in the form of mass consisting of triglyceride, mixture of phospholipids, cholesterol, vitamin A and karotenoid. Triglyceride is produced from fat consumed and transported into the blood entering the breasts in the form trigliceride in kilo micron. Fat in breast milk is easier to digest because it has been in the form of emulsion. Therefore, fatty acid composition depends on the source of fat and various amount of fat in mothers' food. Fat content also depends on the availability or not fat reserve. Therefore, mothers with insufficient nutrition will produce breast milk of low fat content and breast milk fat is decreasing to 1% (Coad, 2011).

The quality of the potein mother's breast milk depends on the protein consumed by the mother. Therefore, mother with protein malnutrition can change protein composition in mother's breast milk, so protein supplement supply to the mothers is very important to produce good protein composition. Protein content in mother's breast milk is influenced by protein content in mother's blood flow which will be sintesized by mammary gland (Laurence 2011 ; Coad, 2011).

Protein quality and quantity in mother's breast milk depends on foods intake, types, and amount of protein consumed by the mother, in addition, body itself needs high protein intake to form body's tissue, so there is a correlation between fat percentage of breastfeeding mother's fat with protein content in mother's breast milk (Coad, 2011).

II. METHODS

This is a correlative study with cross sectional, the study was conducted at work area of Belimbing Public Health Center from October to June 2016. The

population of the study was al exclusive breastfeeding mothers at work area of Belimbing Public Health Center with the number of samples was 48 respondents. The samples were selected based on proportional random sampling. With inclusive criteria of the mothers of normal pregnancy age who had infants aged 1-3 months, the infants were in good health and normal, the mothers who breastfeed exclusively. While exclusive criteria in this study was the mothers who took medicine- the medicine such as rifamfisin, pirazinamid, and streptomycin,, the mothers drank alcohol, and they smoked. The variables that were studied were independent variables the percentage of body's fat of breastfeeding mother to aterm infants and dependent variables fat and protein content in breast milk. The tools and materials used in this study were Microtoie, Bioelectrical Impedance Analysis (BIA), Miris (Human Milk Analyzer), Water Bath with temperature of 40^0 c, Refrigerator with temperature of -40^0 c. The variables of body's fat was the comparison of weight of fat mass and fat free mass tissue in one's body and the measurement method used Bioelectrical Impedance Analysis (BIA) the measurement was carried out once by nutritional staff of Andalas University. The variable of fat content (breast milk) was the total fat content found in breast milk and the measurement method used Human Milk Analyzer (Miris) the measurement was carried out once by laboratory staff of Central General Hospital of M Djamil. The protein content of breast milk was the protein contained in breast milk the measurement method used Human Milk Analyzer carried out once by laboratory staff of Central General Hospital of M Djamil. Data analysis were carried out by data normality test with Shapiro Wilk. Percentage correlation test of body's fat with breast milk fat with regression linear test and breast milk protein content applied Spearman test.

III. RESULTS

Classification distribution of body's fat percentage can be seen from the table below:

Table 1. Classification distribution of body's fat percentage of breastfeeding mother to aterm infant

Classification	n	Breast Milk Fat Content	Unit
Underfat	1	2,40	g/dl
Normal	8	3,43 ± 1,08	g/dl
Low risk Obes	5	3,26 ± 1,14	g/dl
Overfat	13	2,81 ± 0,84	g/dl
Obesity	21	2,61 ± 1,07	g/gl

Table 2. Classification Distribution of Body's Fat Percentage of Breastfeeding Mother to Aterm Infant with Fat Content and Breast Milk Protein

Variable	Mean ± SD	Median (Min-Max)
Body's fat percentage (%)	31.61 ± 8,.16 %	
Breast Milk Fat Content (g/dl)	2.86 ± 1,03 g/dl	
Breastmilk Protein Content (g/dl)		1 (0.3-1.9) g/dl

Percentage Correlation of Body's Fat of Breastfeeding Mother to Aterm Infant with Breast Milk Fat Content

The results of Regression Linear correlation test are to know the correlation between fat content of breastfeeding mother with breast milk fat content can be seen from the table below:

Table 3. Correlation Distribution of Body's Fat Percentage of Breastfeeding Mother to Aterm Infant with Breast Milk Fat Content

Variable	r	R^2	P

Breast Milk Fat Content	-0,33	0,10	Breast Milk Fat Content = 4,18 + (-0,04) x Body's fat percentage	0,02

Percentage Correlation of Body's Fat of Breastfeeding Mother to Aterm Infant with Protein Content Breast Milk

Percentage Correlation of Body's Fat of Breastfeeding Mother to Aterm Infant with Protein Content Breast Milk used Spearman statistic test, because the data were not normally distributed and the data have been transformed but the data still were not distributed normally. The results of Spearman correlation can be seen from the table below:

Table 4. Correlation of Body's Fat of Breastfeeding Mother to Aterm Infant with Protein Content Breast Milk

Variable	r Value	p Value
Body's fat percentage Brastmilk Protein Content	-0,05	0,7

IV. DISCUSSION

Percentage Distribution of Body's Fat of Breastfeeding Mothers to Aterm Infant

Based no the study of 48 mothers who have infants aged 1-3 months aho were given exclusive breast milk, percentage of maternal body's fat was 31.61 ± 8.16 %, this describes there was an increase of percentage of body's fat with overweight classification. Kinnunen (2007) said that the mothers who gained overweight during postpartum period correlated with an increase of extreme body's weight during pregnancy can also be caused by other factors such as an increasing risk of postpartum body weight due to an increase of the percentage of body's fat before pregnancy, body weight, and shorter time for breastfeeding the infant.

The results of this study were based on body mass index (BMI) obtaining overweight classification so it is the same as percentage classification of body's fat. Mann (2000) said that body mass index had a positive correlation with percentage of body's fat. Body mass index during pregnancy had an important role in increasing body weight during pregnancy, in line with the recommendation from *World Health Organization* (WHO, 2000) based on IMT <18.5, an increase of body weight of 12.5-18 kg, IMT 18.5-22.9, an increase of body weight of 11.5-16 kg, IMT 23-24.9, an increase of body weight of 7-11.5 kg, IMT > 30, an increase of body weight of 5-9 kg, Most the mothers regained their body weight before pregnancy in 6 months after delivery, but there were some mothers who had excess body weight around 14-2 kg (Cuningham, 2012).

Percentage Correlation of Body's Fat of Breastfeeding Mothers to a Aterm Infant with Breast Milk Fat Content

Based on the results of regression linear correlation statistic test show that there was a weak and significant negative correlation between the percentage of body's fat and breast milk fat content was r = - 0.33 ; p = 0.02 (p < 0.5) ; R^2 = 0.10. The percentage of body's fat in this study tended to be higher was 31.61 ± 8.16 % with breast milk fat content was 2.8 ± 0.30 g/dl. The results of this study show that the higher the pecentage of body's fat the lower the breast milk fat content. This shows that the percentage of body's fat gave contribution of 10% to the decrease of breast milk fat content, with regression analysis shows that in every increase of 1% the percentage of body's fat will decrease breast milk fat content around 0.04 g/dl

The percentage of body's fat is influenced by several factors such as genetic, race, age, food intake and high fat consumption, and physical activities[15.] Physical activities play an important role in using energy in the body. The energy that has been used by

the body if it is not balanced with physical activities it can cause an increase of percentage of body's fat (Gayton & Hall, 2006).

The results of this study are in line with the study conducted by Nikniaz *et al.* (2009) in Iran to analyze the correlation body's fat percentage with breast milk fat content of breastfeeding mother with exclusive breast milk in rural and urban areas, it can be concluded that there was a weak and significant negative correlation between the percentage of body's fat with breast milk fat content p = 0.02 ; r = -0.28 ; R^2 = 03. This study shows that it was found percentage of body's fat either in rural or urban areas there were risks more than normal characterized by high overweight status on average of 34.56% and obesity on average of 23.8%, this study describes that fat intake which was consumed can keep or maintain mobilization of body's fat. The correlation of percentage of Body's Fat of breastfeeding mothers to Aterm Infant with Breast Milk Protein Content

Based on Spearman statistic test shows that there was an insignificant correlation between the percentage of body's fat and breast milk protein content of p < 0,9 and a very weak negative correlation (r = -0,05) which means that the higher the percentage of body's fat the lower protein content. In line with the theory of Irawati (2003) says that an increase of the percentage of boy's fat can be influenced by internal and external factors. Internal factors are among others heredity such as gene, thermal regulation, and metabolism which are responsible for body mass and metabolism to body mass, while external factors are among others physical activities and nutritional intake that can affect breast milk protein content.

According to Laurence (2011) protein content in maternal breast milk experienced a decrease in line with a decrease during breastfeeding duration. Colostrum contains 2 g/dl of protein, transitional breast milk of 1.55 g/dl while mature breast milk containing 0.9 g/dl of protein. The quality of protein in mother's breast milk depends on maternal protein consumption. The mother having chronic protein malnutrition can change protein composition in maternal breast milk, so providing protein supplement is very important for the mothers to produce good protein composition. The protein content in maternal breast milk is influenced by protein content in blood flow which will be synthesized by mammary gland.

The results of the study were in line ith the study conducted by Quinn *et al*. (2012) it shows that there was not a correlation between the percentage of body's fat with breast milk protein content p = 0.7 with fair correlation (r = 0.40). This is different with th study conducted by Soliman *et al.* (2014) it shows that there was an increase of the percentage of body's fat followed by an increase of breast milk protein content. The breast milk was increasing on average of 4,6 g/dl.. There was a positive correlation between percentage of body's fat with breast milk protein content of p = 0,01. Breast milk protein can be affected by food intake and various of types of protein consumed by the mothers. During breastfeeding, the mothers need additional protein above normal needs of 20 gr/day. Based on this condition, there must be every 100 cc of breast milk containing 12 gr protein. Similarly, breast milk is produced of 850 cc containing 10 gr (Arisman, 2009).

According to Coad (2011) the protein content of mature breast milk was relatively low compared to the colostrum of 2,3 g/dl, while in mature breast milk, the protein content was 0.9 g/dl. The protein content synthesized by the breasts can be different because the hormone ruling genetic expression and leading the protein synthesis can change from time to time.

The study conducted by Gidrewicz *et al.* (2014) shows that the protein content was highe in colostrum compared to mature breast milk with the

comparison of35 % (0,7 g/dl), however, after 3 days or in transition breast milk breast milk was different of 0,2 g/dl. And in mature breast milk, the content of breast milk fat was higher. The content of protein in breast milk can change and be different in order to be in line with balanced calorie need for infant growth.

Bachour *et al.* (2012) shows that body mass index can influence the protein content in breast milk, to the mothers experiencing an increase of body's fat or overweight IMT > 25 showing that 14.9% of the mothers had low protein content, similarly the mothers experiencing obesity with IMT > 30 showing 18.7% had low protein content. Statistically, there was no difference on average of breast milk protein content of the mothers with normal IMT and obesity, similarly the number of parities was increasing the lower the protein content in breast milk.

V. CONCLUSION

The distribution of body's fat percentage of the breastfeeding mothers to aterm infant is classified into overweight. The content of breast milk fat is lower compared to normal content, and breast milk protein is in normal range.

There is a significant negative correlation between body' fat content of breastfeeding mothers to aterm infant and the content of breast milk fat.

There is a insignificant negative correlation between body' fat content of breastfeeding mothers to aterm infant and the content of breast milk protein.

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BIOGRAPHY

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