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Fat Intake With Oleic Acid Levels In Breastfeeding Mother's Milk (6 Months - 24 Months) In The Work Area Of Sudiang And Sudiang Raya Public Health Centers Makassar City

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Abstract

Oleic acid (omega 9) is a monounsaturated fatty acid that plays a critical role in the early development of the central nervous system. Recent research has shown that oleic acid is an antioxidant that may protect against the development of numerous forms of cancer, including breast and colorectal cancer. The purpose of this research is to determine the association between fat consumption and oleic acid levels in nursing mothers' breast milk. This is a cross-sectional approach to analytic observation. Breast milk from nursing moms is the population. Breast milk from nursing moms aged 6-24 months as a sample. The sampling approach employed was purposive sampling, and the results were analyzed using the Sperman Correlation test on a large population of 178 nursing moms and a large sample of 59 nursing mothers. According to the study's findings, the average fat consumption of nursing women aged 6-12 months was 57.95gr, whereas breastfeeding moms aged >12-24 months consumed 56.25gr. Oleic acid levels in breast milk were on average 1.00 for nursing women aged 6-12 months and 0.99 for breastfeeding mothers aged >12-24 months. Statistical analysis revealed no significant Breast Milk, Exclusive Breastfeeding, Oleic Acid, Fat Intake, Breastfeeding Mothers association between maternal fat consumption and breast milk oleic acid levels in nursing women (p>0.05). The amount of oleic acid in nursing moms' breast milk is smaller than the recommended threshold (1.5 g/l). However, there are two instances of high oleic acid levels in nursing moms' breast milk. Additional qualitative study is needed on nursing moms whose oleic acid levels are within or surpass the recommended range. Additionally, we examined additional factors relating to baby intake and nutritional status.

Keywords: Breast Milk, Exclusive Breastfeeding, Oleic Acid, Fat Intake, Breastfeeding Mothers

Introduction

Based on data from the Sustainable Development Goals (SDGs) in the health and welfare sector (SDGs 3), by 2030 end preventable infant and under-five mortality by reducing the neonatal mortality rate to 12 per 1,000 live births and the under-five mortality rate by 25 per 1,000 live births. (Ministry of Health RI, 2015). Neonatal mortality is currently 15 per 1000 live births and under five is 24 per 1000 live births, and under-five mortality is from 40 per 1000 live births to 32 per 1000 live births (IDHS, 2017).

Globally 2.4 million children died in the first month of life in 2019. There are about 7,000 newborn deaths every day, which is 47% of all deaths of children under 5 years old, up from 40% in 1990. Infant mortality is highest According to WHO, the largest in the world are India and Nigeria. Meanwhile, Indonesia itself is among the 10 countries with the highest infant mortality rates in the world (WHO 2020).

Based on the World Health Organization (WHO) in 2016 the coverage of exclusive breastfeeding in the world was only 36%. This achievement is still below the exclusive breastfeeding coverage target set by WHO, which is 50%. According to Riskesdas data taken from 2013 - 2018 coverage of exclusive breastfeeding in Indonesia in 2013 was 37.3%, 2015 was 55.7%, 2016 was 54%, 2017 was 61.33%, and in 2018 experienced a significant decrease that is equal to 37.3%.

The results of the Central Statistics Agency survey in 2020 South Sulawesi exclusive breastfeeding data coverage in 2018 was 52.18%, in 2019 it was 70.52% and in 2020 there was an increase of 76.21%, but when compared with the target set by the Ministry of Health of the Republic of Indonesia, namely 80%, the achievement of exclusive breastfeeding at the Indonesian level has not yet met the target. (riskesdas 2018). Low breastfeeding is a threat to the growth and development of future children which will affect the growth and development as well as the quality of human resources in general.

Babies who are breastfed until the age of 2 years can reduce infant morbidity and mortality, reduce the risk of chronic diseases, and help infant development, which is closely related to the development of children's IQ. According to WHO, the shorter the duration of breastfeeding in infants is associated with a decrease in the child's IQ by about 2.6 points. Breast milk can increase a child's immune system, where the composition of breast milk is very complex, which includes all the nutrients that babies need. (Infodation Ministry of Health 2018).

The composition of breast milk contains carbohydrates (lactose), fat, protein in the form of oleic acid, vitamins and minerals, this is the key to baby's health. Breast milk provides all the nutrients for babies to live in the first 6 months (Cristine B et al, 2018). Fatty acids have benefits for fetal growth, as well as brain and retina development during pregnancy in the early years of life (Sanchez Hernandez, et al., 2019). Fatty acids are needed for the body to stay healthy and function well. The three most important types of fatty acids are omega-3, omega-6 and omega-9 (Oleic Acid).

Oleic acid (omega 9) has a protective effect on the development of several types of cancer such as breast and colorectal cancer (Arsic, 2017). In infants and children, the fatty acid content in breast milk is very important, especially oleic acid which functions for the formation, brain development, transportation, metabolism so that maternal food intake is very important so that breast milk in breastfeeding mothers increases (Arsic A et al, 2017). In addition, oleic acid is one type of unsaturated fatty acid where unsaturated fatty acids are neutral to LDL (does not decrease or increase), but can increase HDL lipoproteins (Mora et al, 2013).

The content of oleic acid in breastfeeding mothers varies. Research conducted by Butss et al (2018) in New Zealand found oleic acid levels for several different ethnicities, including Asian, European and New Zealand ethnicities. From the analysis of fatty acids, oleic acid levels were found in Asian ethnic breastfeeding mothers of 1.5 g/L, 1.2 g/L Maori and Pacific Island ethnicities and 1.2 European New Zealanders.

Apart from oleic acid, breast milk contains other proteins in the form of alpha-lactalbumin, alpha-lactalbumin and oleic acid in breast milk, which are components of human -lactalbumin made lethal to tumor cells (HAMLET). Previous research said Hamlet is a complex relationship consisting of -lactalbumin and Oleic Acid which has anti-tumor activity which was directly found in breast milk Mossberg et al, (2010). This research is in line with that conducted by Hallgren (2008), that in breast milk, protein and fat components are found which are very important (HAMLET). From in vitro studies, HAMLET has been proven to work as an anti-tumor and has a therapeutic effect, this effect has also been tested in vivo in humans.

Research by Melizah Kurniati et al, (2017), said that the fat content in breast milk is influenced by several factors, such as maternal fat intake, weight per mother's height, and the frequency of breastfeeding mothers, there is a correlation between breast milk fat content and maternal fat intake, although not significantly statistics. One of the factors that affect oleic acid levels is the intake of breastfeeding mothers. From the research report, Citrakesumasari et al (2020) said that the intake of macronutrient status in SEZ and normal breastfeeding mothers was different except for fat intake.

Based on the benefits of Oleic Acid described above, this research is important to do. This research is expected to provide information related to the benefits of other nutritional components of breast milk, namely Oleic Acid which is still rarely known, so the background for this research is to look at fat intake with levels of Oleic Acid in breast milk in breastfeeding mothers.

Material and Methods

Research Location and Design

The research was carried out in the working area of the Sudiang and Sudiang Raya Public Health Centers in Makassar City and in the Hasanuddin University Hospital Laboratory. The type of research used is analytical observation with a cross-sectional study approach.

Population and Sample

The population and sample in this study were breast milk of breastfeeding mothers in the working area of the Sudiang and Sudiang Raya health centers with a total sample of 367. Dahlan's 2019 sample formula.

Method of Collecting Data

Breast milk sampling was carried out during the COVID-19 pandemic with a health protocol provided that respondents were required to use masks and face shields and use hand sanitizer and plastic gloves. Meanwhile, researchers used N95 masks, medical masks and face shields as well as using hand sanitizer and gloves.

The respondent's characteristic data includes age, education, occupation, which were obtained by direct interview. Mother's food intake used a 2x24 hour recall on a working day. Maternal nutritional status (CED and Normal) was obtained by measuring the mother's upper arm circumference (LILA). Breast milk sampling was carried out at 09.00-11.00 WITA. Mother's milk is obtained by using an electric breast pump with the Real Bubbe brand with serial number RBX-8023S-2 then the ASI is put into the Gea Baby brand breast milk bag and tightly closed then stored in a cool box with the Gren Lay brand which has been filled with an ice bag. . The researcher took as many breast milk samples as the mother produced and then brought them to the laboratory for temporary storage in the Thermo brand breast milk refrigerator at a temperature of -20oC. Examination of breast milk by only taking 5-10 ml of breast milk samples, to see the oleic acid content of breast milk using the ELISA method.

Data Analysis

To see the relationship between fat intake and oleic acid levels in breast milk, nursing mothers were analyzed using the Mann Withney test, sperm test and processed using the Windows version of SPSS 24 program.

Results and Discussion

Table 1. Characteristics of breastfeeding mothers in the working area of the Sudiang and Sudiang Raya Public Health Centers, Makassar City

Characteristic Breastfeeding Mother	Frequency	% Frequency
Mother's Age		
≤ 19 years old	1	1,7
20-35 years	50	**84,7**
> 35 years	8	13,6
Mother's Education		
Elementary School	5	8,5
Junior School	19	32,2
High School	24	**40,7**
Diploma	4	6,8
Bachelor	7	11,9
Mother's Work		
IRT	59	**100**
PNS	0	0
Mother's Nutritional Status		
Normal	34	**57,6**
KEK	25	42,4

Table 1 shows that the age of breastfeeding mothers is more dominant at the age of 20-35 years with a percentage of (84.7%). Mother's education shows that at the high school level has a percentage (40.7%). Mother's occupation is dominated by housewives (100%). In the nutritional status of breastfeeding mothers, more mothers with normal nutritional status (57.6%).

Table 2. Characteristics of Babies in the Work Areas of the Sudiang and Sudiang Raya Health Centers, Makassar City 2021

Characteristic Baby	Frequency	% Frequency
Baby's Age		
6 - 12 months	17	28,8
>12 - 24 months	**42**	**71,2**
Gender		
Man	23	39,0
Woman	**36**	**61,0**
Birth Weight		
< 2500 kg	4	6,8
≥ 2500 kg	**55**	**93,2**
Length of Birth Body		
< 48 cm	12	20,3

≥ 48 cm	**47**	**79,7**

Table 2 shows that the baby's age is mostly 12-24 months (71.2%), female gender (61.0) and baby boy (39.0). In the baby's birth weight, there were babies under <2500 kg (6.8%) and most of the babies' birth length was 48 cm (79.70%).

Table 3. Average Fat Intake of Breastfeeding Mothers Based on Infant Age Groups in the Work Areas of Sudiang and Sudiang Raya Public Health Centers Makassar City

Age of the baby	Mean ± SD	Min	Max	Pvalue
6 - 12 months	57.95 ± 22.96	19.10	104,60	
> 12 - 24 months	56.25± 29.95	17.60	128,20	**0,503**

Source: Primary Data Processed

Mann-Whitney Test

This study showed that the average fat intake in the age group 6-12 months (57.95 ± 22.96) with a range of fat intake between 19.10-104.60 and the age group >12-24 months (56.25 ± 29.95) was in the range of 17.60-128.20. so that the fat intake at the age of >12-24 months was lower when compared to the age of 6-12 months, but no statistically significant difference was found for p>0.503. In general, the fat intake of breastfeeding mothers has low fat intake based on the RDA of breastfeeding mothers.

Table 4. Average Oleic Acid Levels of Breastfeeding Mothers Based on Infant Age Groups in the Working Area of Sudiang and Sudiang Raya Public Health Centers Makassar City

Baby's Age	Mean ± SD	Min	Max	P value
6-12 months	1,00 ± 0,18	0,8	1,4	**0,835**
>12-24 months	0,99 ± 0,22	0,8	1,8	

Source: Primary Data Processed

Mann-Whitney Test

This study showed that there was no significant difference in the levels of oleic acid in breast milk of breastfeeding mothers with the age group of infants. In the infant age group, the average value of oleic acid levels aged 6-12 months is 1.00 and the baby's age is >12-24 months 0.99. so that the oleic acid levels based on the age group > 12-24 months were slightly higher when compared to the age group 6-12 months. The level of oleic acid in breast milk of nursing mothers by age is in the low category (standard 1.5 g/L).

Table 5. Relationship between Fat Intake and Oleic Acid Levels in Breast Milk in Breastfeeding Mothers in the Work Areas of Sudiang and Sudiang Raya Public Health Centers, Makassar City

Variable	r	p
Fat Intake	**- 0194**	**0,132**

Spearman Test

Table 5 shows the results of the Spearman correlation test of fat intake on oleic acid levels in breast milk of nursing mothers, with p value > 0.132 which indicates that there is no significant correlation

between fat intake and oleic acid in breast milk of nursing mothers with a Spearman correlation value of -0.192 indicating a negative correlation (Dahlan, 2014).

Fat Intake of Nursing Mothers

The results of this study indicate that the fat intake of breastfeeding mothers by age group does not have a significant difference between the fat intake of breastfeeding mothers and the maternal age group where the average value of fat intake for 6-12 months is 57.95 ± 22.96 where the range of fat intake is between 19.10-104.60, while the average fat intake aged >12-24 months was 56.25 ± 29.95 with a range of 17.60-128.20. Fat intake by age was higher in fat intake in the age group 6-12 months when compared to the age group >12-24 months. However, when assessed based on the percentage of the RDA, the overall fat intake based on the infant's age group, breastfeeding mothers are in a sufficient percentage with a value of 84.2%, which is above 80% of the RDA standard. Research proposed by Nakul et al (2017) found that maternal food intake during breastfeeding did not affect the composition or content of breast milk in nursing mothers.

The determinant factors related to the adequacy of fat intake are influenced by the work and education of all mothers of infants who do not work (IRT) and most of the mothers have an average education of senior high school (40.7%), so this affects low purchasing power which makes access to and selection of food ingredients limited. consumed. This research is in line with what was done by Indrawati (2012) regarding mother's work and mother's education affecting the purchasing power of foodstuffs so that intake needs are not met. Low education and work will put children at risk of stunting. This study shows that children born < 48 cm (20.3%) will be at risk of stunting if their intake needs are not met in the future (Nurmalasari, 2020).

Oleic Acid Level

The results of this study indicate that oleic acid levels are relatively low as well as oleic acid levels in New Zealand and European ethnicities, but when compared with Asian ethnicities who have high oleic acid levels with a standard of 1.5 g/L. Previous research conducted by Buts al (2018) who looked at the breast milk content of breastfeeding mothers on all nutrients, one of which was oleic acid in Asian ethnicities in New Zealand, Maori islands, Pacific islands and European ethnicities it was found that the lowest oleic acid levels were European and ethnic groups. The Maori ethnic groups have oleic acid levels of 1.3 g/L and 1.2 g/L, while the Asian ethnic groups have the highest levels of 1.5 g/L.

This study also showed that there were 2 respondents who were breastfeeding mothers who had oleic acid levels higher than the standard average of 1.5 g/L, that is, each respondent had oleic acid levels of 1.8 g/L. The difference in the mean value of oleic acid content varies widely in different countries. The composition of breast milk varies greatly among mothers and even within a single breast milk. This multidimensional variation in composition is believed to be a reflection of the infant's needs, geographic area and food supply. Variations in breast milk composition between mothers are reported as a response to cultural differences such as diet and lifestyle factors as well as environmental factors such as soil mineral content which is then reflected in the mineral density of the food grown there and the presence of human genetic differences (Butts., 2018, 2018, Quinn et al., 2016, Jackson., 2004). This study showed that there was no difference in oleic acid levels according to the age group 6-12 months with p value > 0.404, as well as the age group > 12-24 months p > 0.167. This shows that the level of oleic acid in breast milk of nursing

mothers is not affected by the length of lactation so that this can explain the importance of breast milk as the main source of food even in conditions of poor maternal nutritional status (Quinn et al, 2012).

Relationship between fat intake of breastfeeding mothers and oleic acid levels in breast milk

The results of statistical tests showed that there was no relationship between maternal fat intake and oleic acid levels in breast milk of nursing mothers. This study is in line with previous studies which said that the composition of breast milk was not influenced by maternal food intake (Nakul K et al, 2017). And other studies that have been conducted on the composition of fatty acids in breast milk and fat intake of breastfeeding mothers in South Korea stated that the nutritional status of breastfeeding mothers did not significantly affect the fatty acid levels of breast milk (Kim Hyesook, et al, 2017). Previous research has also revealed that although determinants of breastfeeding mothers such as intake and good nutritional status can affect the composition of breast milk, most studies have found a weak or no relationship to the composition of breast milk (Quinn et al, 2012)

Conclusion

Fat intake of breastfeeding mothers based on groups of infants aged 6-12 in the range of 19.10 - 104.60gr with an average intake of 57.95 and age >12-24 in the range of 17.60-128.20gr with an average intake of 56.25. Below the Indonesian RDA adequacy standard for 2019 (62.2gram). The level of oleic acid in breast milk of breastfeeding mothers from infants aged 6-12 is in the range of 0.8-1.8 with an average of 1.00gr/L. age >12-24 months ranged from 0.8 to 1.8 an average of 0.9 g/L. Below the reference 1.5 g/L (buts et al). Fat intake of breastfeeding mothers was not significantly related to oleic acid levels of breast milk in breastfeeding mothers ($p>0.05$).

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