

The Relation Between Calcium Levels in Breast Milk on Exclusive Breast Milk History and Body Length of Infants Aged 12 Months in The Public Health Centre of Padang

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ABSTRACT

Breast milk is a natural food for babies and contains rare nutrients. The growth of the child, especially the length of the child body is influenced by the calcium contained in exclusively breast milk. Calcium intake can affect the mineralization of the new bone deposit matrix and osteoblast function. This study aimed to determine the relationship between calcium levels in breast milk on a history of exclusive breastfeeding with the body length of children aged 12 months in the Public Health Center, Padang. This research was carried out in the Public Health Center, Padang. The study started from June to October 2020. The research design used was "Cross-Sectional" with a sample of 102 people with a history of exclusive breastfeeding. Sampling was carried out by using simple random sampling. Data were analyzed univariately and bivariate by using the Spearman Correlation test. Assessment of calcium levels in breast milk was finished by utilizing AAS (Atomic Absorption Spectrophotometer) and body length by utilizing the Lengthboard. Based on the results of the study, it was found that the average calcium level in breast milk aged 12 months was 1,83 mg/L \pm 0,530. The average body length of children aged 12 months was 72.47 \pm 1.88. In the correlation test, there was a weak relationship between's calcium levels in breast milk and the body length of infants aged 12 months ($p > 0.05$). In this study, it can be concluded that there is no relation between calcium levels in breast milk with a history of selective breastfeeding and the body length of newborn children matured a year.

Keywords: Calcium levels, body length of infants aged 12 months, history of exclusive breastfeeding

1. INTRODUCTION

Breast milk (ASI) is an emulsion of fat in a solution of protein, lactose, and organic salts secreted by both sides of the mother's breast glands as the baby's main food. Optimal breastfeeding and early initiation of breastfeeding within one hour of life as well as breastfeeding until the age of two years or more will help increase the baby's immunity.[1] The World Health Organization (WHO), United Nations Children's Fund (UNICEF) and the Ministry of Health of the Republic of Indonesia state that breast milk is the best source of nutrition for newborns up to 6 months of age because it contains micronutrients and macronutrients which are very important for the growth and development of infants.[2]

Exclusive breastfeeding in the first 6 months is the golden period of life and

breastfeeding until the age of 2 years or more, is stated as a normative standard in infant feeding.[3] Exclusive breastfeeding is the foundation of infant endurance and youngster wellbeing since it gives irreplaceable essential nutrients for child growth and development.[4]

One indicator of nutritional problems in children is the failure to grow in length or height, children who suffer from malnutrition will be shorter with lower body weight than their peers. If the efficiency lasts a long time and is severe, the growth in height will fail and even the process of growth and development will be disrupted.[5] Normal newborn length parameters are 45-50 cm and based on the curve determined by the National Center for Health Statistics (NCHS), the baby will experience an increase in body length of about 2.5 cm every month.[6]

A cohort study conducted on children from birth to 24 months of age in a Bangladesh slum area

found that most of the short children had intakes of micronutrients such as vitamins A, E, B complex, calcium, iron, and zinc which were insufficient or less than the normal value. recommended internationally.[7] A similar study was also conducted by Arsenault JE et al in 2013 which reported that almost all children aged 24-48 months and women had an inadequate average daily intake of micronutrients.

The quantity and quality of macronutrient intake affect plasma insulin growth factor I (IGF-I) levels, as well as on bone matrix proteins and growth factors that play an important role in bone formation. In addition, in the Lancet Series in 2013 it was explained about several micronutrients that have a very important role in children's linear growth, namely vitamin A, zinc, iron, iodine, calcium and phosphorus so that they are very important needed in the body to prevent growth failure.[8]

During growth, the need for bone mineralization is very high, low calcium admission can bring about low mineralization of the grid of new bone stores and osteoblast brokenness. Calcium insufficiency will influence direct development if the calcium content in the bone is under half of the ordinary substance.[9]

Calcium is very important for the body, so calcium intake must be sufficient from birth to help the baby's bone growth.[1] Calcium that is consumed will be absorbed by the small intestine and transported in the blood which binds to albumin (protein) so that the level of calcium contained in the blood will also be affected by albumin, calcium will be stored in the bones in the form of crystals

that will bind to phosphorus, namely calcium phosphorus.

One of the provinces that has a high prevalence of stunting is the province of West Sumatra at 30.6%.[10] The results of the 2018 Basic Health Research stated that short and very short children aged 24-59 months in Indonesia were 30.8%. This figure is in the heavy category, while the prevalence of children aged 0-23 months is included in the moderate category, which is 29.9%. One of the provinces included in the heavy category is West Sumatra at 30.6%.[11] The city of Padang has a prevalence of 11.6% with the category of short children as much as 9.2% and very short by 2.4%.

Based on this background, the researchers conducted a study on the relationship between calcium levels in breast milk on a history of exclusive breastfeeding with the body length of kids matured a year at the Padang City Health Center.

2. RESEARCH METHODS

This type of research is an analytic observational study with a cross-sectional design. The study was conducted from June to October at the Padang City Health Center while the calcium level examination was carried out at the LLDIKTI Laboratory of Region X Padang City. The population in this study were breastfeeding mothers who had children aged 12 to 15 months. The sample is 102 children aged 12 months. The sampling technique in this study was simple random sampling. Data analysis was univariate and bivariate.

3. RESULT

This study obtained the following research results:

3.1 Univariate Analysis

3.1.1 Baby Characteristics

Table 1.Frequency Distribution of Characteristics of Babies by Sex

Characteristics	N	%
Gender		
Woman	51	50,0%
Man	51	50,0%
Total	102	100%

Table 2.Frequency Distribution of Characteristics of Babies based on Baby's Birth Body Length (cm)

Birth Body Length	Mean ± SD	Minimum	Maximum
Birth Body Length	48,70± 1,803	45	51

3.1.2 Calcium Levels in Breast Milk in 12 Months Old Babies

Table 3. Calcium Levels in Breast Milk in 12 Months Old Babies (mg/L)

Calcium Level	Mean ± SD	Minimum	Maximum
12 Months Age	1,83 ± 0,530	0,75	2,76

3.1.3 Body Length

Table 4. Body Length based on Z-score in 12 Months Old Babies

Body Length	N	%
12 months old		
Normal	47	46,7%
Short	55	53,3%
Total	102	100%

Table 5. Average Body Length Gain in 12 Months Old Babies (cm)

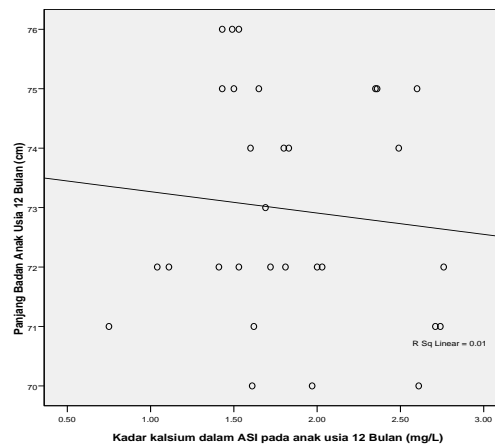
Characteristics	Mean ± SD	Minimum	Maximum
12 Months Old Baby Body Length	72,97±1,921	70	76

3.2 Bivariate Analysis

3.2.1 The Relationship of Calcium Levels in Breast Milk on History of Exclusive Breastfeeding on Body Length of 12 Months Old Babies

The Spearman correlation test in this study showed a negative correlation between the

calcium levels of infants with a history of exclusive breastfeeding at 12 years old months and the body length of newborn children matured a year. The strength of the correlation was weak ($r=-0.01$) and statistically showed that there was no huge connection between calcium levels in 12-month-old infants and 12-month-old baby's body length ($p>0.05$).



Graph 1. The relationship between calcium levels in exclusive breastfeeding and the body length of a 12-month-old baby

Graph 1 shows that high levels of calcium do not affect the length of the baby's body, from the value (r square = 0.01) it shows that calcium levels in exclusive breastfeeding contribute 0.1% to the body length of babies aged 12 months and 99.9% other factors which were not researched.

4. DISCUSSION

In view of table 1. it very well may be seen that the respondents engage in sexual relations with the same ratio, namely male and female (50.0%)

In view of table 2, it very well may be seen that the normal birth length is 48.70 ± 1.733 , In view of table 3, it very well may be

seen that the average level of calcium in breast milk for a 12-month-old baby is $1.83 \text{ mg/L} \pm 0.530$. In light of Table 4, it tends to be seen that the majority of the respondents (53.3%) at the age of 12 months have a short body. Based on table 5. it can be seen that the average increase in body length of a 12-month-old baby is $72.97 \text{ cm} \pm 1.921$.

The Relationship between Calcium Levels in Breast Milk and Body Length for 12 Months Old Babies

Breast milk is the main food for babies that contains very good nutrients for the growth and development of babies for this time and in the future, after the baby is more than 6 months old, the baby will get MP-ASI as additional food and there are differences in the calcium content in the baby. Breastfeeding and complementary foods but still have the same function to help the growth and development of children. Calcium is the most abundant mineral and is found in teeth and bones.[12]

The results of this study indicate that there is a weak correlation between calcium levels in breast milk in the history of selective breastfeeding and the body length of newborn children matured a year ($r=0.01$). The results obtained showed that there was no huge connection between calcium levels and the body length of infants aged 12 months ($p>0.05$).

This is possible because the relationship between calcium intake and growth is strongly influenced by the intake of breast milk and complementary foods, low calcium intake from breast milk and complementary foods results in low total calcium intake for bone mineral needs. Low total calcium can interfere with the baby's growth. In addition, in addition to many other factors that are not studied, body length is also multifactor. Body length is an indicator of growth which together can describe a person's growth. The dominant factors that also affect body length are parental height and intake.

Someone who has tall parents will be taller than those whose parents are short. Likewise with intake, not only does calcium affects body length, but other nutrients such as carbohydrates, proteins and fats as well as other vitamins and minerals if consumed adequately will be able to optimize a person's height.

Calcium and bone digestion are firmly related and incorporated. Calcium deficiency (eg in the elderly), caused by vitamin D deficiency and increased PTH, causes bones to release calcium (increased bone resorption) to be able to return serum calcium to normal.

Low calcium intake can hurt health, especially growth problems and other health problems related to the function of calcium in the body. Calcium is the largest component in bones, so calcium intake from food is important to increase bone strength and health.[13]

This is in accordance with the examination of Hardinsyah, which states that there is no real relationship between calcium from milk and height. This is because apart from calcium, other factors that affect height are growth hormone, IGF-I, genetic factors, daily activities and exercise. In this study, there was no genetic relationship (parental height) with the child's height.[14] Saptawati's research found that 15.7% of research subjects were stunted, more than 80% of research subjects had a low daily intake of calcium and no correlation was found between calcium intake and height indicators.[15]

Research conducted by Endika. That from the total sample studied as many as 30 people, 15 samples exclusively breastfed and 15 samples received milk from formula milk, the results of testing data for body length gain of infants aged 4-6 months between infants who were exclusively breastfed and formula-fed using an independent statistical test -test shows the value of $p=0.355$ ($p>0.05$). There is no difference in body length gain between infants who breastfeed exclusively and formula milk.[16]

The results of the Spearman correlation test that have been carried out show that there is a weak relationship between calcium levels in breast milk and body length at 12 months of age and there is no significant relationship between calcium levels in breast milk and body length of infants aged 12 months.

5. CONCLUSION

1. The average calcium level of 12-month-old infants is within normal limits at the Padang City Health Center
2. The average body length gain of 12-month-old babies is within normal limits at the Padang City Health Center
3. There is a weak and insignificant relationship between calcium and the body length of a 12-month-old baby.

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