

## RESEARCH STUDY

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# The Relationship between the Frequency of Formula Feeding and the Use of Milk Bottle Size with the Nutritional Status of Infants Aged 0-24 Months at Puskesmas Merdeka, Bogor City

## Hubungan Frekuensi Pemberian Susu Formula dan Penggunaan Ukuran Botol Susu dengan Status Gizi Bayi Usia 0-24 Bulan di Puskesmas Merdeka, Kota Bogor

Khoirul Anwar<sup>1\*</sup>, Alya Salsabilla<sup>1</sup>, Muh. Nur Hasan Syah<sup>2</sup><sup>1</sup>Nutrition Study Program, Faculty of Food Technology and Health, Sahid University, Jakarta, Indonesia<sup>2</sup>Ikatan Sarjana Gizi Indonesia (ISAGI), Jakarta, Indonesia**ARTICLE INFO**

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\*Correspondent:

Khoirul Anwar

[khoirul\\_anwar@usahid.ac.id](mailto:khoirul_anwar@usahid.ac.id) DOI:

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**ABSTRACT**

**Background:** An infant (aged 0-24 months) is in a growth phase prone to nutritional problems if the infant's food intake is improper. Based on the data in Bogor City, the number of babies exclusively breastfed in 2020 was only 54.7%. A 100 ml formula milk has energy and protein contents of 10-18% and 55-80%, respectively, higher than breast milk, causing infant obesity.

**Objectives:** Analyze the relationship between the frequency formula consumption and use bottle size with the nutritional status of infants aged 0-24 months.

**Methods:** The study was conducted quantitatively (descriptive) with a Cross-Sectional Study design with mothers of children aged 0-24 months as willing and active respondents coming to posyandu. Respondents amounted to 66 people who were divided into groups with different formula milk frequencies: 1-4 bottles and > four bottles per day and use ≤180 ml and >180 ml bottle sizes per day. Respondents were selected by purposive sampling. The statistical test uses Mann withney for the difference test and Spearman rank for the relationship test.

**Results:** There was a significant relationship between the frequency of formula feeding and the growth index of WHZ (P=0.005; R=0.338). There was a significant relationship between the use of formula bottle size and HAZ growth index (P=0.021; R=0.283), WHZ (P=0.023; R=0.280), and BAZ (P=0.004; R=0.353).

**Conclusions:** There are differences in nutritional status in using milk bottle sizes. Nutritional Status Infants with WHZ growth index showed significant results leading to obesity in infants given formula milk >4 bottles per day.

**INTRODUCTION**

One of the rapid growth and development phases is the infant phase (Age 0-24 months), which occurs until the child is 24 months old. This condition is a critical period for meeting his nutritional needs. At this Age, children are at a stage of growth and development, making them very vulnerable to various diseases, one of which is caused by a lack or excess intake of certain types of nutrients<sup>1</sup>. Poor nutritional conditions in the current period can lead to irreversible nutritional and health problems, so the nutritional status of children in the current Age must be seriously considered. Nutritional status is the ultimate determinant of a person's level of health<sup>2</sup>.

Coverage of exclusive breast milk (ASI) provision in Indonesia in 2020 was 66.06%. Data in Bogor City showed that the number of babies that received exclusive

breastfeeding in 2020 was 54.7%, while in Central Bogor Community Health Center's work area, it reached 50.4%. These data still illustrate that 1 in 2 babies in Indonesia do not receive exclusive breast milk. Exclusive breastfeeding has many benefits for babies. Breast milk is declared the best food for babies aged 0-6 months.

WHO (World Health Organization) and UNICEF (United Nations International Children's Emergency Fund) recommend four conditions to achieve optimal growth and development, namely providing Early Breastfeeding Initiation (IMD) immediately around 30 minutes after the baby is born, giving exclusive breast milk from birth until the baby is 6 months old, complementary foods with breast milk (MP-ASI) are given from the time the baby is 6 months old until the baby is 24 months old. Breastfeeding continues until the child is

24 months old<sup>4</sup>.

Unbalanced nutritional intake, whether consumed excessively or lacking nutritional intake in toddlers, can affect their health<sup>5</sup>. According to Mubarokah et al. (2019)<sup>6</sup>, factors contributing to nutritional problems are also becoming the first, namely direct factors, among which are food sources or food intake, which can influence the nutritional status of children. The second factor is indirect factors such as food availability and others. Kartini et al. (2017)<sup>7</sup> stated that an increase in nutritional risk can occur in babies who get their nutritional intake from breast milk compared to babies who get their nutritional intake from breast milk. This condition can happen because formula milk's protein and mineral content exceed the adequate level for human babies, so the baby gets excess food intake. Formula milk given to babies before the Age of 6 months will impact the baby's nutritional status. If a formula milk is given thin and low, it will result in less nutritional intake for the baby's body, and if formula milk is given thick and high doses, it can result in excess nutrition.

Formula milk is specifically formulated for babies and toddlers as a substitute for breast milk<sup>8</sup>. Early administration of formula milk, which has a high energy and protein content for babies in the early stages of life, can increase the risk of increased body weight and obesity; it is known that 100 ml of formula milk given to children has an energy content of 10-18% higher than that of breast milk and a protein content of 55-80% higher than that of breast milk<sup>9</sup>. Previous research conducted by Utami et al. (2017)<sup>10</sup> stated that toddlers who consume an average of >100 g/day of formula milk are at a 7 times greater risk of becoming obese, which will impact their health.

Providing nutritional intake obtained from complementary breast milk (MP-ASI), which is given correctly, can reduce the death rate in toddlers by 6%. Apart from that, exclusive breastfeeding for babies from birth to 6 months of Age also has a positive impact; it can reduce the death rate of 30,000 babies in Indonesia every year<sup>11</sup>. Based on the background above, the author is interested in conducting research with the title "The Relationship between the Frequency of Giving Formula Milk and the Use of Milk Bottle Size with the Nutritional Status of Babies Aged 0-24 Months at the Merdeka Community Health Center, Bogor City" as an effort to increase exclusive breastfeeding.

## METHODS

This research was carried out in April-June 2023 at Posyandu Kenanga, Posyandu Wijaya Kusuma 1, and Posyandu Rose in Ciwaringin, Kebon Kalapa and Panaragan sub-districts. The research location is in the working area of the Merdeka Community Health Center, Bogor City, which serves 3 sub-districts with a total of 35 posyandu. This research was carried out by distributing questionnaires and anthropometric measurements to babies and toddlers. This research design is a Cross-Sectional Study, which has passed ethical approval number 10.117.BLL/KEPK-FKMULMJ/IV/2023.

The research variables in this study consist of independent variables and dependent variables. The independent variables in this study are the frequency of

giving formula milk and the size of the milk bottle used. Meanwhile, the dependent variable in this study is the nutritional status of babies aged 0-24 months. The sample in this study, namely 66 respondents, was determined using a non-probability sampling technique, namely purposively, with the inclusion criteria being mothers who had babies aged 0-24 months who were willing and active in coming to the Posyandu at the Merdeka Community Health Center, Bogor City.

Primary data was collected using questionnaires and anthropometric measurements directly at the posyandu. Subjects will be asked to commit to participating in this research using informed consent. Primary data included the frequency of consumption of formula milk per day and the size of the milk bottles used. Data was analyzed using computer applications, namely Microsoft Excel 2016 and IBM SPSS Statistics 22. Data analysis was carried out using observational statistical methods to determine the proportion and average of respondents with categories for frequency, namely 1-4 bottles per day and more than 4 bottles per day, while the size of milk bottles used is categorized into two, namely  $\leq 180$  ml and  $>180$  ml and nutritional status is categorized based on the growth index Weight-for-age z-score (WAZ), Length/height-for-age z-score (HAZ), weight for height z-score (WHZ) and Body mass index-for-age (BMI-for-age or BAZ). The Z-score data for the baby's growth index was then tested for normality to determine whether the data was normally distributed. If the data is average the data is tested statistically, including using the independent sample t-test, and if the data is not expected the data is tested using Mann Withney to determine the differences between the two sample groups. Apart from that, the data was also tested using the Spearman rank test, which aims to test the relationship between two variables on an ordinal scale, namely between the frequency of formula milk consumption per day and the size of milk bottles used on the nutritional status of babies aged 0-24 months.

## RESULTS AND DISCUSSION

### Overview of Formula Milk Feeding on Infant Nutritional Status

Table 1 shows an overview of the baby's nutritional status obtained from measuring the z score of the baby's growth index using a computer application, WHO Anthro. Based on measurements carried out on nutritional status using the Weight-for-age z-score (WAZ), there are 2 babies in the nutritional status category with meager body weight, 3 babies in the underweight category, 46 babies with average weight, and 15 at risk of being overweight. When measuring nutritional status using the Length/height-for-age z-score (HAZ), it was found that there were 14 babies in the very short category, eight babies in the short category, 34 babies in the normal category, and 10 babies in the short category. Based on measuring nutritional status using the weight index according to weight for height z-score (WHZ), the results showed that 1 baby was malnourished, 4 babies were malnourished, 28 babies had normal nutritional status, 8 babies were at risk of being overweight, 8 babies were overweight, and 17 babies were obese. Measuring nutritional status using Body

mass index-for-age (BMI-for-age) showed that 4 babies were malnourished, 3 babies were undernourished, 25 babies were well nourished, 9 babies were at risk of

overnutrition, 7 babies were overnourished, and 18 babies are obese.

**Table 1.** Overview of Formula Milk Feeding on Infant Nutritional Status

Indicator	Giving Formula Milk			
	Not Given		Given	
	n (25)	%	n (41)	%
<b>Weight-for-age z-score (WAZ)</b>				
Severely Underweight	1	50.0	1	50.0
Underweight	0	0.0	3	100.0
Normal	17	36.9	29	63.1
Risk of being overweight	7	46.7	8	53.3
<b>Length/height-for-age z-score (HAZ)</b>				
Severely Stunted	5	35.7	9	64.3
Stunted	3	37.5	5	62.5
Normal	14	41.1	20	58.9
High	3	30.0	7	70.0
<b>Weight for Height Z-Score (WHZ)</b>				
Severely wasted	0	0.0	1	100.0
Wasted	2	50.0	2	50.0
Normal	13	46.4	15	53.6
Risk of being overweight	3	37.5	5	62.5
Overweight	0	0.0	0	0.0
Obesity	4	23.5	13	76.5
<b>Body mass index-for-age (BMI-for-age)</b>				
Severely Thinnes	1	25.0	3	75.0
Thinnes	2	66.7	1	33.3
Normal	11	44.0	14	56.0
Risk of being overweight	3	33.3	6	66.7
Overweight	3	42.8	4	57.2
Obesity	5	27.7	13	72.3

**Overview of the Frequency of Formula Milk Feeding on Infant Nutritional Status**

Based on Table 2, the results show that, in the Weight-for-age z-score (WAZ), the majority of babies who consume 1-4 bottles of formula milk per day have normal nutritional status, namely 13 babies (37.1%) while the majority of babies who consume >4 bottles of formula milk per day had normal nutritional status, namely 17 babies (41.5%). In the Length/height-for-age z-score (HAZ), most babies who consume 1-4 bottles of formula milk daily have normal nutritional status, namely 10 babies (24.4%). In comparison, most babies who consume > 4 bottles of formula milk daily had normal

nutritional status, namely 12 babies (29.3%). In the Weight for Height Z-Score (WHZ), most babies who consume 1-4 bottles of formula milk daily have good nutritional status, namely 8 babies (19.5%). In comparison, most babies who consume >4 bottles of formula milk daily had good nutritional status, namely 7 babies (17.1%). Regarding Body mass index-for-age (BMI-for-age), most babies who consume 1-4 bottles of formula milk/day have good nutritional status, namely 10 babies (24.4%). In comparison, the majority of babies who consume >4 bottles of formula milk/day have obese nutritional status, namely 7 babies (17.1%).

**Table 2.** Overview of the Frequency of Formula Milk Feeding in Infant Nutritional Status

Indicator	Formula Milk			
	1-4 bottles/day		>4 bottles/day	
	n (20)	%	n (21)	%
<b>Weight-for-age z-score (WAZ)</b>				
Severely Underweight	1	100.0	0	0.0
Underweight	2	66.7	1	33.3
Normal	13	43.3	17	56.7
Risk of being overweight	4	57.2	3	42.8
<b>Length/height-for-age z-score (HAZ)</b>				
Severely Stunted	4	57.2	3	42.8
Stunted	1	20.0	4	80.0
Normal	10	45.5	12	54.5
High	5	71.4	2	28.6

Indicator	Formula Milk			
	1-4 bottles/day		>4 bottles/day	
	n (20)	%	n (21)	%
<b>Weight for Height Z-Score (WHZ)</b>				
Severely wasted	2	66.7	1	33.3
Wasted	1	100.0	0	0.0
Normal	8	53.3	7	46.7
Risk of being overweight	2	33.3	4	66.7
Overweight	0	0.0	4	100.0
Obesity	7	58.3	5	41.7
<b>Body mass index-for-age (BMI-for-age)</b>				
Severely Thinnes	1	100.0	0	0.0
Thinnes	1	50.0	1	50.0
Normal	10	62.5	6	37.5
Risk of being overweight	1	16.7	5	83.3
Overweight	2	50.0	2	50.0
Obesity	5	41.7	7	58.3

**Overview of the Use of Formula Milk Bottle Size on Infant Nutritional Status**

Based on Table 3, the results obtained on the weight index according to Age, the majority of babies consuming formula milk with a bottle size of ≤180 ml per drink have normal nutritional status, namely 12 babies (30%) and the majority of babies consuming formula milk with a bottle size of >180 ml per drink. Each drinker had a normal nutritional status of 18 babies (42.5%). In the height or body length growth index according to Age, the majority of babies who consume formula milk with a bottle size of ≤180 ml per drink have normal nutritional status, namely 8 babies (20%) and the majority of babies who consume formula milk with a bottle size of >180 ml

per drink and each drink had normal nutritional status, namely 14 babies (32.5%). In the weight growth index, according to height or body length, the majority of babies who consume formula milk with a bottle size of ≤180 ml per drink have good nutritional status, namely 8 babies (20%) and the majority of babies who consume formula milk with a bottle size of >180 ml per drink, 9 babies (20%) have obese nutritional status. In Body Mass Index, according to Age, the majority of babies who consume formula milk with a bottle size of ≤180 ml per drink have good nutritional status, namely 8 babies (20%) and the majority of babies who consume formula milk with a bottle size of >180 ml per drink have good nutritional status and obesity, 8 babies (20%).

**Table 3.** Overview of the Use of Formula Milk Bottle Size on Infant Nutritional Status

Indicator	Formula Milk			
	≤180 ml		>180 ml	
	n (18)	%	n (23)	%
<b>Weight-for-age z-score (WAZ)</b>				
Severely Underweight	1	100.0	0	0.0
Underweight	1	25.0	2	75.0
Normal	12	40.0	18	60.0
Risk of being overweight	4	50.0	4	50.0
<b>Length/height-for-age z-score (HAZ)</b>				
Severely Stunted	3	42.8	4	57.2
Stunted	2	40.0	3	60.0
Normal	8	53.3	14	46.7
High	5	71.4	2	28.6
<b>Weight for Height Z-Score (WHZ)</b>				
Severely wasted	1	33.3	2	66.7
Wasted	0	0.0	1	100.0
Normal	8	53.4	7	46.7
Risk of being overweight	4	80.0	1	20.0
Overweight	1	25.0	3	75.0
Obesity	4	30.8	9	69.2
<b>Body mass index-for-age (BMI-for-age)</b>				
Severely Thinnes	0	0.0	1	100.0
Thinnes	0	0.0	2	100.0
Normal	8	50.0	8	50.0
Risk of being overweight	3	60.0	2	40.0
Overweight	3	75.0	1	25.0
Obesity	4	33.3	8	66.7

**Test Results of the Relationship between Formula Milk Feeding and Nutritional Status**

A relationship test was carried out between formula milk and nutritional status to determine whether or not there was a relationship between the decision to give formula milk and the baby's nutritional status as

seen from the z score of the baby's growth index. The relationship test was carried out using the Spearman correlation test to determine the relationship's significance and strength by determining the relationship's correlation coefficient.

**Table 4.** Test Results of the Relationship between Formula Milk Feeding and Nutritional Status

Indicators	Mean ± SD <sup>1</sup>				R <sup>2</sup>	Sig <sup>3</sup>
	Not Given		Given			
	Mean	SD	Mean	SD		
Weight-for-age z-score (WAZ)	3.76	1.268	4.22	1.475	-0.125	0.317
Z Length/height-for-age z-score (HAZ)	3.20	0.645	3.07	0.608	0.012	0.912
Weight for Height Z-Score (WHZ)	2.60	0.957	2.61	1.022	0.166	0.184
Body mass index-for-age (BMI-for-age)	3.80	1.443	4.12	1.548	0.119	0.342

<sup>1</sup>SD = Standard Deviation, <sup>2</sup>R = Correlation coefficient value from the Spearman correlation test, <sup>3</sup>The significance of the Spearman correlation results

Based on Table 4 above, the results of the analysis of the relationship between giving formula milk and the nutritional status of babies, such as BB/U, TB/U or PB/U, BB/PB or BB/TB, and BMI/U show that there is no relationship between these variables with the significance value of each nutritional status indicator (>0.05). This result contrasts those of Samiati et al. (2017)<sup>5</sup>, who states that there is a relationship between formula milk consumption and the nutritional status of toddlers with a value of p = 0.003. Ultami et al. (2016)<sup>12</sup> also stated that children who were given formula milk had a 4.26 times greater risk of becoming obese than children who were not given formula milk. This condition can happen because factors that influence nutritional

status in toddlers can be determined from food consumption and other factors such as physical activity and infectious diseases.

**Test Results of the Relationship between Frequency of Milk Giving and Infant Nutritional Status**

Testing the relationship between the frequency of giving formula milk based on nutritional status was carried out to determine whether or not there was a relationship between the frequency of giving formula milk and the baby's nutritional status. The results of the relationship test between the two variables can be seen in Table 5 below:

**Table 5.** Test Results of the Relationship between Frequency of Milk Giving and Infant Nutritional Status

Indicators	Mean ± SD <sup>1</sup>				R <sup>2</sup>	Sig <sup>3</sup>
	1-4 bottles/day		>4 bottles/day			
	Mean	SD	Mean	SD		
Weight-for-age z-score (WAZ)	3.90	1.744	4.19	1.401	0.034	0.789
Z Length/height-for-age z-score (HAZ)	3.00	0.725	3.10	0.436	-0.840	0.501
Weight for Height Z-Score (WHZ)	2.80	1.056	2.63	0.865	0.338*	0.005*
Body mass index-for-age (BMI-for-age)	3.85	1.531	4.38	1.359	0.143	0.252

<sup>1</sup>SD = Standard Deviation, <sup>2</sup>R = Correlation coefficient value from the Spearman correlation test, <sup>3</sup>The significance of the Spearman correlation results, \* = Significant results

Based on Table 5, the relationship between the frequency of giving formula milk and the baby's nutritional status, namely PB/U or TB/BB, shows a relationship with a significant p-value (<0.05). The correlation coefficient value was obtained at 0.338, indicating a sufficient relationship. Meanwhile, other nutritional status indicators such as BB/U, TB/U PB/U, and BMI/U show no relationship with the frequency of formula milk with a significance value (>0.05). This result is in line with research by Utami et al. (2017)<sup>10</sup>, who show a relationship between giving formula milk and the nutritional status of toddlers.

Toddlers who receive formula milk and consume it continuously, about 15-24 times per day and more than 100 grams per day, can cause obesity, especially in toddlers aged less than six months. This aspect is supported by research conducted by Kartini et al. (2014)<sup>7</sup>, which shows that the frequency of giving formula milk

more than 20 times at the Age of 0 to 6 months is associated with an increase in nutritional status. Research in Germany stated that children who were overweight at the Age of 7 years were associated with high levels of protein consumption, namely at the Age of 12 months<sup>13</sup>. Formula milk made from cow's milk has been processed and changed, making the composition as best as possible so that the content is the same as breast milk but not 100% the same. In making formula milk, cow's milk's carbohydrate, protein, and mineral content has been changed and added with vitamins and minerals to follow the required composition suitable for babies based on age<sup>14</sup>. The protein in formula milk is very high, and if given to babies, it can modulate the concentration of the Insulin-like Growth Factor (IGF-1). The IGF-1 hormone is a hormone that regulates the growth and development of adipose tissue through the endocrine pathway. Providing high protein intake such as branched-



chain amino acids (BCAA) can increase IGF-1 and insulin secretion, which increases the number of adipocytes and increased preadipocyte differentiation in the child's body<sup>10</sup>. Other research conducted by Suswan et al. (2014)<sup>15</sup> also stated that apart from the protein content in formula milk, there is also sugar content in formula milk, which ranges from 6.8 gr/100 ml to 9.8 gr/100 ml. If a formula milk is given to toddlers with high frequency, it can cause obesity and dental caries.

The nutritional content in formula milk should be the same as breast milk, but marketed formula milk has a higher energy content than breast milk. The energy content in 100 ml formula milk reaches 77.6 kcal/100 ml. If giving formula milk to toddlers occurs continuously with large amounts of consumption, it can cause energy intake to be much greater than needs and cause accelerated growth in children<sup>16</sup>. Toddlers who have a history of energy intake exceeding requirements have a greater risk of becoming obese through tissue accumulation<sup>17</sup>.

According to Sasmiati (2017)<sup>5</sup>, an increase in nutritional risk can occur more in babies given formula

milk than in babies given breast milk. This condition can happen because formula milk's protein and mineral content exceed the nutritional adequacy rate for babies, so babies receive excess food intake. Excess nutrition that occurs in babies will interfere with the growth and development of the baby's gross and fine motor movements, resulting in the baby not being able to make movements that he should be able to do at that Age. Protein intake provided during early life influences early weight gain.

#### Test Results of the Relationship between Formula Milk Bottle Size and Baby's Nutritional Status

Testing the relationship between the use of formula milk bottle size based on nutritional status aims to determine the existence of the relationship and the strength of the relationship between the size of the milk bottle and the baby's nutritional status as seen from the z score of the baby's growth index. The relationship test was carried out using the Spearman correlation test to determine the relationship's significance and strength by determining the relationship's correlation coefficient.

**Table 6.** Test Results of the Relationship between Formula Milk Bottle Size and Baby's Nutritional Status

Indicators	Mean ± SD <sup>1</sup>				R <sup>2</sup>	Sig <sup>3</sup>
	≤180 ml		>180 ml			
	Mean	SD	Mean	SD		
Weight-for-age z-score (WAZ)	2.95	0.653	3.36	0.492	0.130	0.300
Z Length/height-for-age z-score (HAZ)	3.00	0.690	2.59	0.959	0.283*	0.021*
Weight for Height Z-Score (WHZ)	3.55	1.184	4.59	1.436	0.280*	0.023*
Body mass index-for-age (BMI-for-age)	3.68	1.211	4.59	1.593	0.353*	0.004*

<sup>1</sup>SD = Standard Deviation, <sup>2</sup>R = Correlation coefficient value from the Spearman correlation test, <sup>3</sup>The significance of the Spearman correlation results, \* = Significant results

Based on Table 6, the analysis of the relationship between the size of milk bottle use and the baby's nutritional status, namely PB/U or TB/U, shows a relationship (p<0.05). The correlation coefficient value was obtained at 0.283, which indicates that there is a sufficient relationship. The results also showed that the size of milk bottle use and the nutritional status of BB/PB or BB/TB had a significant relationship (p<0.05). The correlation coefficient value was obtained at 0.280, which indicates that there is a sufficient relationship. Besides that, nutritional BMI/U has a significance value of 0.004 (<0.05). The correlation coefficient value was obtained at 0.353, indicating a sufficient relationship between the size of the milk bottle and the nutritional status indicator BMI/U. Meanwhile, the nutritional status indicator BW/U shows no relationship (p>0.05).

The results of this research are in line with the research of Retnowati et al. (2020)<sup>18</sup>, who examined the relationship between the use of milk bottle size and the baby's nutritional status (p=<0.001) stated that the size of the milk bottle also influences nutritional status. Children given high protein intake are likely to have an increase in Body Mass Index (BMI) 2 times compared to children with low protein intake. Bottle size >180 ml has a high risk of overnutrition. This result is supported by research from Siswatmo et al. (2019)<sup>9</sup>, who reported that giving formula milk in large bottles (>6 oz = >180 ml) was correlated with 0.21 times the increase in body weight.

In growth and development, toddlers are determined by what they eat daily. The nutritional needs of toddlers are determined by Age, gender, activities, and environmental temperature (cold and hot air) (MOH RI, 2016). Formula milk made from cow's milk has been processed, and its composition has been changed as best as possible so that the content is the same as breast milk but not 100% the same. In making formula milk, cow's milk's carbohydrate, protein, and mineral content are changed and then added with vitamins and minerals to follow the required composition suitable for babies based on age<sup>19</sup>. According to (2019)<sup>20</sup>, formula milk has several nutritional contents: fat is recommended between 2.7-4.1 g per 100 ml, protein ranges between 1.2-1.9 g per 100 ml, and carbohydrates range between 5.4-8.2 g every 100 ml.

#### CONCLUSIONS

There are differences in the nutritional status of HAZ, WHZ, and BAZ in the size of milk bottles. The nutritional status of babies with the growth index WHZ shows significant results leading to obesity nutritional status in babies given >4 bottles of formula milk per day. However, it is insignificant for other growth indices such as WAZ, HAZ, and BAZ. The use of milk bottle size shows significant results on the growth index HAZ, WHZ, and BAZ, with the majority using milk bottles with a size of >180 ml. Formula feeding is associated with an increase in the baby's weight. It tends to be at risk of overnutrition,

so it is recommended that mothers give exclusive breast milk as much as possible to their babies, especially babies aged 0-6 months.

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No conflict of interest exists for any of the authors regarding this article.

#### REFERENCES

1. Mufida, L., Widyaningsih, T. D. & Maligan, J. M. Prinsip Dasar Makanan Pendamping Air Susu Ibu (Mp-Asi) Untuk Bayi 6-24 Bulan: Kajian Pustaka [In Press September 2015]. *J. Pangan dan Agroindustri* **3**, (2015).
2. Sulfiati, S. et al. *Penentuan Status Gizi*. (Yayasan Kita Menulis, 2021).
3. Efniyanti, F., Dew, M., Khomsan, A. & Ekawidnyani, karina rahmadia. Riwayat pemberian ASI eksklusif, status gizi, dan status anemia balita di kabupaten cirebon. *J. Dep. gizi Masy.* **1**, 181–188 (2022).
4. Wahyuni, S. & Wahyuningsih, A. Pemberian Makan pada Bayi dan Anak dengan Kenaikan Berat Badan Bayi di Kabupaten Klaten. in *Prosiding Seminar Nasional & Internasional* vol. 1 (2016).
5. Sasmia. Hubungan Konsumsi Susu Formula Dengan Status Gizi Balita Di Puskesmas Piyungan Bantul Yogyakarta. *Southeast Asian J Trop Med Public Heal.* **8**, 322–328 (2017).
6. Mubarakah, A. Z. Pengaruh Faktor Psikologi Dan Sosio Budaya Gizi Terhadap Pemberian Asi Eksklusif Pada Bayi Di Puskesmas Bangkalan, Kabupaten Bangkalan, Madura. at (2019).
7. Kartini, A., Suyatno, S. & Lestari, P. Hubungan Praktik Pemberian Susu Formula Dengan Status Gizi Bayi Usia 0-6 Bulan Di Kecamatan Semarang Timur Kota Semarang. *J. Kesehat. Masy.* **2**, 339–348 (2014).
8. Sabati, M. R. & Nuryanto, N. Peran Petugas Kesehatan Terhadap Keberhasilan Pemberian ASI Eksklusif. *J. Nutr. Coll.* **4**, 526–533 (2015).
9. Rohsiswatmo, R. & Amandito, R. Optimalisasi Pertumbuhan Bayi Prematur dan Pasca Prematur di Indonesia; Mengacu pada Pedoman Nutrisi Bayi Prematur di Rumah Sakit Cipto Mangunkusumo. *Sari Pediater.* **21**, 9 (2019).
10. Utami, C. T. & Wijayanti, H. S. Konsumsi susu formula sebagai faktor risiko kegemukan pada balita di Kota Semarang. *J. Nutr. Coll.* **6**, 96–102 (2017).
11. Marlina. Faktor yang Berhubungan dengan pemberian makanan Pendamping ASI pada bayi Usia 0-6 Bulan di Wilayah Kerja Puskesmas Juli Kabupaten Bireuen. *J. Kesehat. dan Masy. (Jurnal KeFis)* **1**, 103–108 (2021).
12. Utami, C. T. Konsumsi susu formula sebagai faktor risiko kegemukan. *Propos. Penelit.* 96–102 (2016).
13. Laila, fita nur, Hardiansyah, A. & Susilowati, F. Pengetahuan Gizi Ibu, Pendapatan Orang Tua, Pemberian Susu Formula, Dan Kaitannya Dengan Status Gizi Balita Di Posyandu Desa Welahan Kabupaten Jepara. *J. Nutr. Culin.* **3**, 24–36 (2023).
14. Sulistyoningtyas, S. & Khusnul Dwihestie, L. Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal. *Peran Mikronutrisi Sebagai Upaya Pencegah. Covid-19* **12**, 75–82 (2022).
15. Suswan, W. Formula Enteral Buah Berdasarkan Formulasi Bahan Diajukan oleh : Wawang Suswan G2B216076 Program Studi S1 Gizi Universitas Muhammadiyah Semarang Tahun 2018. 1–14 (2018).
16. Rahmatin, F. D. Pengaruh Pemberian Susu Formula Pada Bayi Usia 0-12 Bulan. (2022).
17. Adhi, I. G. A. A. S. Pencegahan Obesitas Pada Anak. *I Gusti Ayu Amanda Sinta Adhi* **10**, 139–146 (2021).
18. Retnowati, N. A., Lestari, E. D. & Harsono, G. Pengaruh Kadar Protein Susu Formula terhadap Status Gizi Lebih Usia 3 hingga 5 bulan. *Sari Pediater.* **21**, 226 (2020).
19. Timporok, A. G. A., Wowor, P. M. & Rompas, S.

Hubungan status pekerjaan ibu dengan pemberian asi eksklusif di wilayah kerja Puskesmas Kawangkoan. *J. Keperawatan* **6**, (2018).

20. Damaris, Y. Hubungan Pemberian Susu Formula Dengan Berat Badan Bayi 1-6 Bulan Di Puskesmas Pancur Batu Kabupaten Deli Serdang Tahun 2018. (2019).