



# The Correlation Between Formula Milk Feeding and Nutritional Status of Toddlers at Sukoharjo Regency

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**Abstract.** Formula milk contains added sugar which causes faster weight gain in toddlers. Toddlers who consume formula milk have twice energy intake from added sugars and gain weight faster than toddlers who only consume breast milk. High amount of energy and protein intake can increase the release of the hormone insulin and insulin like growth factor-1 (IGF-1) which can increase adipogenic activity and encourage weight gain. The purpose of this study was to determine the relationship between formula feeding and nutritional status according to body weight for age in toddlers aged 24–59 months in Sukoharjo. This research used quantitative research with cross-sectional design. The sample was 98 toddlers aged 24–59 months who consumed formula milk taken from three health centers in Sukoharjo using Multistage Random Sampling method. Data on formula feeding was taken by filling out questionnaire and 24-h food recall form for 4x24 hours, while data on the nutritional status of toddlers was obtained by measuring the toddler's weight. The analysis test used Pearson Product Moment statistical test. The results showed that the p-value of the relationship between the frequency and the amount of formula milk consumption and nutritional status according to body weight for age in children under five in Sukoharjo was 0.000 and 0.000, respectively. From these results, it can be concluded that the frequency and the amount of formula milk consumption has a significant relationship with the nutritional status of children under five according to body weight for age.

**Keywords:** Formula milk · Nutritional status · Toddler

## 1 Introduction

Nutritional problems according to nutritional status indicators weight for age are divided into underweight, normal weight, and overweight or obesity. Based on the 2018 Indonesian Basic Health Research, 15.4% children aged 24–59 months are underweight. Based on data obtained from the Sukoharjo Regency Health Profile in 2020, the prevalence of underweight in Sukoharjo Regency was 4.4% [1].

Overweight in under-five children in Indonesia also become a problem in toddler aged 24–59 months which accounted for 3.4%. The prevalence of overweight in Central Java is 2,7% and this makes Central Java rank 19th out of 34 provinces for overweight

cases in Indonesia. This figure indicates that overweight needs to be addressed before it becomes a more serious nutritional problem in Indonesia [2].

Formula milk is one of the factors that affect toddler's weight. This is because giving formula milk with high energy and protein content in toddler can increase the weight gain. A high amount of energy and protein intake can increase the release of the hormone insulin and insulin like growth factor-1 (IGF-1) that can intensify adipogenic activity and encourage weight gain which triggers an increasing in the nutritional status of toddlers according to weight for age [3].

Based on Indonesia Basic Health Research data, in 2013 the percentage of mothers who give formula feeding in infants was 79.8%. While in 2018 the coverage of formula feeding in infants aged 0–5 months was 84.5%, ages 6–11 months was 81.4%, and ages 12–23 months was 79.9%. The percentage of giving formula milk in Central Java itself is quite high which was 81.2%. However, there is no definite data for the percentage of giving formula milk to toddlers in Sukoharjo Regency [1][4].

Nutritional intake is the main factor that is closely related to excess nutrition in toddlers. Excessive intake of nutrients without sufficient energy use can increase energy storage in fat cells causing an increase in the size and number of cells which can lead to obesity in toddlers [5].

Formula milk is one of the nutritional intakes for toddlers which is made from cow's milk that has been processed and changed the composition content as best as possible by imitating the content of breast milk even though it is not 100% the same. In the process of making formula milk, the carbohydrate, protein and mineral content of cow's milk has been changed and then added with vitamins and minerals to fulfil the nutrient requirement for infants and toddlers based on their age [6]. Toddlers who are given formula milk have energy intake 1.2 to 9.5 times higher and protein intake 1.2 to 4.8 times higher than toddlers who are not consume formula milk [7]. This is because the high energy and protein content in formula milk and the high volume of consumption that may result in greater weight gain in toddlers who consume formula milk.

The research states that consumption of formula milk of more than 100 g/day has a significant relationship with cases of overweight in toddlers. Toddlers with an average consumption of formula milk of more than 100 g/day (> 100 g/day) have 7 times greater risk of experiencing weight gain compared to toddlers who consume formula milk  $\leq$  100 g/day [8]. The results of other studies revealed that based on the results of a meta-analysis of the cohort study, it was shown that giving formula milk can increase the case of obesity in toddlers by 1.1 times greater than breastfeeding. Meanwhile, based on the results of a meta-analysis from the cross-sectional study, it shows that giving formula milk can increase the incidence of obesity in toddlers by 1.25 times compared to breastfeeding [9].

Toddlers with excessive consumption of formula milk or not according to serving recommendations can increase the risk of excess nutrition to the level of obesity. Overweight or obesity in children has a short-term health impact which has a detrimental effect on growth and development, while the long term includes a greater risk of developing diseases such as hypertension, diabetes, and cardiovascular disease during adulthood [10].

## 2 Materials and Methods

### 2.1 Study Design

This study was designed to assess the formula milk feeding and the nutritional status in toddlers according to weight for age. This study used quantitative research with the cross-sectional research approach. The data collected in this study were the frequency and the amount of formula milk feeding given to toddlers and the toddlers weight to obtain their nutritional status according to weight for age. This data was collected using a formula feeding questionnaire and a 24-h food recall form for 4 non-consecutive days. Frequency of formula milk feeding was obtained from respondent's answers in the questionnaire form of how many times toddlers consumes formula milk in one day and was proven by a 24-h food recall for 4x24 hours. While the amount of formula milk feeding was obtained from how many measuring spoons the toddler consumes formula milk in one serving then multiplied by the frequency in one day and the amount of giving formula milk for one day was obtained in grams. The nutritional status according to weight for age was obtained by measuring the toddler's weight using a digital scale, then calculating the nutritional status using the WHO Antro computer program. Measurement and data collection were conducted during 1 month period in September 2022.

### 2.2 Study Population

The study population was consisting of toddlers aged 24–59 months from 3 health centers in Sukoharjo Regency, namely Bendosari health center, Polokarto health center, and Sukoharjo health center. A total of 98 toddlers (52 boys and 46 girls) and their parents were recruited to participate in this study. The study sample was recruited using a Multistage Random Sampling. The sample are enrolled if they meet the inclusion criteria: (1) toddlers aged 24–59 months in the Sukoharjo Regency area and willing to be respondents, (2) toddlers in good health, (3) toddlers who consume formula milk and do not have allergies to formula milk. The informed consent was obtained from the parents or guardian of each toddler. This study was ethically approved by Health Research Ethics Committee Dr. Moewardi General Hospital with the ethical clearance number 1.070/VII/HREC/2022. All methods in this study were performed in accordance with the relevant guidelines and regulations.

### 2.3 Statistical Analysis

The data were checked for normality before the statistical analysis by using Kolmogorov-Smirnov Test. The normality test in this study uses the residual normality test because the data is consisting of three different variables so that it is combined using the residual regression function to obtain normality. The results of data normality test obtained a result of 0.815 which means that the value is more than 0.05 ( $>0.05$ ) so that the three variables simultaneously have normal distributed data. The statistical test used to determine the correlation between variables is the Pearson Product Moment test. A Correlation coefficient of  $< 0.20$  represented a very poor strength of correlation, 0.21 to 0.40 represented a poor strength of correlation, 0.41 to 0.60 represented a fair strength

of correlation, 0.61 to 0.80 represented a good strength of correlation, and 0.81 to 1.00 represented a very good strength of correlation. The relative risk test in this study was used to determine the risk opportunities for an event that occurs in formula feeding and obesity in toddlers. All data analysis were conducted by using SPSS statistical application (version 21) and the level of statistical significance for analysis was set at  $p < 0.05$ .

### 3 Result and Discussion

#### 3.1 Characteristics of Research Subjects

The subjects in this study were toddlers aged 24–59 months who met the inclusion and exclusion criteria with a total of 98 toddlers. The characteristics of the subjects can be seen in Table 1.

Based on Table 1 above, the number of research subjects was 98 toddlers consisting of 52 toddlers male (53.1%) and 46 toddlers female (46.9%). The distribution of research subjects according to age characteristics was most prevalent in the age range of 24–35 months with 38 toddlers (38.8%), it is followed by age range 36–47 months with 32.6% and age range 48–59 with 28.6%.

The frequency of formula milk feeding for toddlers aged 2–5 years is good which is around 3–4 times a day [11]. Based on Table 1, it is known that the most frequency of formula milk feeding is in the sufficient category, which is between 3–4 times a day. The number of toddlers who consume formula milk in the sufficient category is 42 toddlers (42.8%). This number is followed by toddlers who consume formula milk frequently or more than 4 times a day with 38 toddlers (38.8%).

Formula milk consumption of more than 100 g/day has a significant relationship with cases of overweight in toddlers. Toddlers with an average consumption of formula milk of more than 100 g/day ( $> 100$  g/day) have a 7 times greater risk of experiencing weight gain compared to toddlers who consume formula milk  $\leq 100$  g/day [8]. Based on Table 1 above, it is known that most of the research subjects consuming formula milk are in the sufficient category or less than 100 g in one day. This is evidenced by the results of the percentage of sufficient amount categories of 75.5% or as many as 74 toddlers. Meanwhile, there were 24 (24.5%) toddlers who consumed formula milk in excessive category or more than 100 g/day ( $> 100$  g/day). Excessive consumption of formula milk can increase the risk of toddlers experiencing overweight or obesity.

Regulation of the Minister of Health No. 2 of 2020 regulates the nutritional status of toddlers according to the weight for age indicators which are categorized into 4, it is severely underweight, underweight, normal, and possible risk of overweight [12]. From the results of the research, the characteristics of the subjects based on nutritional status according to the indicators of weight for age were obtained from measurements of body weight in toddlers aged 24–59 months in the Sukoharjo Regency area. Based on Table 1 above, most of the research subjects had normal nutritional status, it is 69 toddlers with a percentage of 70.4%. A total of 11 toddlers (11.2%) with nutritional status included in the possible risk of overweight category had a tendency to consume formula milk with frequent frequency and excessive dosages.

**Table 1.** Characteristics of Subjects

<b>Characteristics of Subjects</b>	<b>Amount (n)</b>	<b>Percentage (%)</b>
<b>Gender</b>		
Male	52	53.1
Female	46	46.9
<b>Total</b>	<b>98</b>	<b>100</b>
<b>Toddler's Age</b>		
24–35 months	38	38.8
36–47 months	32	32.6
48–59 months	28	28.6
<b>Total</b>	<b>98</b>	<b>100</b>
<b>Frequency of Formula Milk</b>		
Rarely	18	18.4
Sufficient	42	42.8
Frequently	38	38.8
<b>Total</b>	<b>98</b>	<b>100</b>
<b>The amount of Formula Milk</b>		
Excessive	24	24.5
Sufficient	74	75.5
<b>Total</b>	<b>98</b>	<b>100</b>
<b>Nutritional Status</b>		
Severely Underweight	7	7.2
Underweight	11	11.2
Normal	69	70.4
Possible Risk of Overweight	11	11.2
<b>Total</b>	<b>98</b>	<b>100</b>

The practice of giving formula milk excessively will result in overweight and obesity in childhood which will lead to an increased risk of obesity and non-communicable diseases such as type two diabetes mellitus and cardiovascular disease in the future. In addition, childhood obesity greatly affects the physical, social, and emotional well-being and academic performance of children [13].

### 3.2 The Correlation Between Formula Milk Feeding and Nutritional Status of Toddlers at Sukoharjo Regency

#### 3.2.1 Distribution of Formula Milk Feeding Frequency with Nutritional Status

Based on the results of research on the frequency distribution of formula feeding with the nutritional status of toddlers according to weight for age can be seen in Table 2.

Table 2 shows that 7.2% toddlers are at risk of overweight with frequent formula feeding frequency. Meanwhile, the highest percentage was in toddlers with normal nutritional status with sufficient and frequent frequency of giving formula milk, which was 29.6%.

#### 3.2.2 Distribution of Amount of Formula Milk Feeding with Nutritional Status

Based on the results of research on the distribution of formula feeding amount with the nutritional status of toddlers according to weight for age as shown in Table 3.

Based on Table 3, it shows that 6.1% toddlers are at risk of being overweight with an excessive amount of formula milk. While the highest percentage was in toddlers with normal nutritional status with a sufficient amount of formula milk, which was 54.1%.

**Table 2.** Distribution of Formula Milk Feeding Frequency with Nutritional Status

Toddlers Nutritional Status according to Weight for Age	Frequency of Formula Milk Feeding					
	Rarely		Sufficient		Frequently	
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)
Underweight	6	6.1%	10	10.2%	2	2.0%
Normal	11	11.2%	29	29.6%	29	29.6%
Overweight	1	1.0%	3	3.1%	7	7.2%
<b>Total</b>	<b>18</b>	<b>18.3%</b>	<b>42</b>	<b>42.9%</b>	<b>38</b>	<b>38.8%</b>

**Table 3.** Distribution of Amount of Formula Milk Feeding with Nutritional Status

Toddlers Nutritional Status according to Weight for Age	Amount of Formula Milk Feeding			
	Sufficient		Excessive	
	Amount (n)	Percentage (%)	Amount (n)	Percentage (%)
Underweight	16	16.3%	2	2.0%
Normal	53	54.2%	16	16.3%
Overweight	5	5.1%	6	6.1%
<b>Total</b>	<b>74</b>	<b>75.6%</b>	<b>24</b>	<b>24.4%</b>

**Table 4.** Analysis Result of The Correlation between Formula Milk Feeding with Nutritional Status by Weight for Age

	<i>p</i> Value	Correlation Coefficient	RR Value
Frequency of Formula Milk Feeding	0.000	0.478	0.362
Amount of Formula Milk Feeding	0.000	0.372	0.270

### 3.2.3 The Correlation Between Formula Milk Feeding and the Nutritional Status of Toddlers

The results of the analysis of the correlation between formula milk feeding and nutritional status according to weight for age in toddlers aged 24–59 months in Sukoharjo Regency, can be presented in Table 4.

Based on Table 4, the result of statistical tests using Pearson Product Moment shows that there is a significant value of the correlation between the frequency of formula feeding and the nutritional status of toddlers according to weight for age with *p*-value is 0.000, which means that the value is less than 0.05 ( $<0.05$ ). It can be said that there is a correlation between the frequency of giving formula milk and the nutritional status of toddlers according to weight for age. The value of the correlation coefficient (Pearson correlation) between the two variables is 0.478, which means that the level of correlation between the frequency of giving formula milk and the nutritional status according to weight for age is included in the category of a fairly strong relationship. These two variables have a positive Pearson correlation value, so it can be concluded that the higher the frequency of formula feeding, the higher the nutritional status according to weight for age for toddlers aged 24–59 months in Sukoharjo Regency with a fairly strong relationship.

The results of the Relative Risk (RR) analysis showed that the ratio of formula milk consumption with excess frequency in toddlers who had overweight nutritional status had a 0.362 times greater chance than the presence of formula milk consumption in toddlers with normal nutritional status. The lowest range of probability occurrence ratio values is 0.114 times and the highest range of occurrence rates is 1.154 times.

The other result show that there is a significant value of the correlation between the amount of formula feeding and the nutritional status of toddlers according to weight for age with *p*-value is 0.000, which means that the value is less than 0.05 ( $<0.05$ ) so it can be said that there is a correlation between the amount of giving formula milk and the nutritional status of toddlers according to weight for age. The value of the correlation coefficient (Pearson correlation) between the two variables is 0.372, meaning that the level of correlation between the amount of formula milk and the nutritional status of children according to weight for age is included in the category of weak closeness relationship. These variables also have a positive Pearson correlation value, so it can be concluded that the higher the value of the amount of formula milk, the nutritional status according to weight for age for toddlers aged 24–59 months in Sukoharjo Regency will increase with a weak close relationship.

While the results of the Relative Risk (RR) analysis show that the ratio of excess amount consumption of formula milk in toddlers who have overweight nutritional status

has a 0.270 times greater chance than the presence of formula milk consumption in toddlers with normal nutritional status. The lowest range of probability occurrence ratio values is 0.091 times and the highest range of occurrence rates is 0.807 times.

The results of this study are in line with the research which states that consumption of formula milk of more than 100 g/day has a significant relationship with cases of overweight in toddlers [8]. Other similar studies reveal that there is a relationship between giving formula milk which can increase the incidence of obesity in toddlers by 1.1 and 1.25 times greater than breastfeeding [9]. There is a relationship between giving formula milk and the incidence of obesity in children and having an OR value of 4.26 means that children who consume formula milk have a 4.26 times greater risk of developing obesity than children who do not consume formula milk [14]. In addition, other studies say that there is a strong relationship between the frequency of giving formula milk and the level of nutritional adequacy and has a positive relationship direction [15].

In theory, formula milk that contains high energy and protein can increase the risk of overweight in children. The side effect of high protein intake in childhood on the risk of obesity in adulthood is related to the effect on increasing plasma and tissue concentrations of insulinogenic amino acids, insulin, and insulin-like growth factor 1 (IGF-1), which can result in increased higher body weight in toddlers as well as increased adipogenic activity. The protein contained in formula milk is a major contributor to the nutritional regulation of the IGF-1 hormone which has a role in growth during toddlers. Milk protein increases serum IGF-1 more than animal protein, this explains that milk protein has more influence on the risk of obesity in toddlers compared to other proteins [16]. Apart from being a risk factor for obesity, formula milk can also cause diarrhea in toddlers. Toddlers who consume formula milk have a higher frequency of diarrhea than those who only consume breast milk [17]. In other research also revealed that carbohydrate sweetened drinks were the strongest risk factors for dental carries in children, the results of Odds Ratio value was between  $1.603 \pm 12.404$ , which meant that the consumption of sugary foods or drinks was a risk factor for dental caries [18].

However, the results of this study are not in line with research which states that there is no significant relationship between the level of knowledge of mothers about formula milk and the incidence of obesity in toddlers [19]. But in other research shows that there is a relationship between the level of knowledge of mothers about giving complementary feeding with the nutritional status of toddlers in Semanggi Village, Surakarta which the p-value is 0.014 [20]. The case of obesity in toddlers is not only caused by formula milk, but also excessive eating patterns that tend to contain high levels of fat. In addition, another factor in the incidence of obesity in toddlers can come from the mother's knowledge about giving formula milk in accordance with the procedures and serving sizes listed on the packaging. Rules for giving formula milk that are not implemented properly can affect the occurrence of obesity in toddlers.

Many factors can influence toddlers to be overweight or obese apart from consumption of formula milk. Sleep duration, food intake, and physical activity are associated with the incidence of obesity in toddlers. Toddlers with sleep duration of less than 10 h/day have a 2.49 times greater risk of developing obesity compared to toddlers who have sufficient sleep time ( $= 10$  h/day). Less sleep duration means more awake time thus providing more opportunities for toddlers to eat. Toddlers with more food intake ( $>$



110% RDA) have a 4.42 times greater risk of becoming obese compared to toddlers who have adequate food intake. Toddlers with very light physical activity have a 6.15 times greater risk of becoming obese than toddlers with mild or moderate physical activity [21]. External factors such as family income also affect the nutritional status of toddlers, there is a significant relationship between family income and the nutritional status of toddlers [22].

## 4 Conclusions

Based on data analysis and discussion, it can be concluded that the percentage of frequency of formula milk feeding to toddlers in Sukoharjo Regency with the frequent category is 38.8%, the sufficient category is 42.8%, and the rare category is 18.4%. The percentage of the amount of formula milk feeding to toddlers in Sukoharjo Regency with the excessive category is 24.5% while the sufficient category is 75.5%. The percentage of toddler nutritional status according to weigh for age in Sukoharjo Regency with the possible risk of overweight category is 11.2%, the normal category is 70.4%, underweight category is 11.2%, and severely underweight category is 7.2%. The data analysis showed that there is a correlation between the frequency of formula milk feeding and nutritional status according to weight for age in toddlers aged 24–59 months in Sukoharjo Regency. There is also a correlation between the amount of formula milk feeding and nutritional status according to weight for age in toddlers aged 24–59 months in Sukoharjo Regency.

Therefore, the mothers of toddlers are expected to increase awareness about the consumption of formula milk that is not in accordance with the serving recommendations and tends to be excessive so it can cause the increase of children's weight to the point of obesity. It needs to be more attention and education to the parents about giving the correct formula milk to prevent the risk of obesity in toddlers.

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## References

1. Dinkes Kab Sukoharjo. (2020). Profil Kesehatan Kabupaten Sukoharjo 2020. Sukoharjo: Dinas Kesehatan.
2. Kemenkes RI. (2018). Laporan Nasional Riset Kesehatan Dasar (Riskesmas) Tahun 2018. Jakarta: Kemenkes RI Badan Penelitian dan Pengembangan Kesehatan.

3. Arnberg, K., Cristian, M., Kim, F. M., Signe, M. J., Ellen, T., Anni, L. (2012). Skim Milk, Whey, and Casein Increase Body Weight and Whey and Casein Increase the Plasma C-Peptide Concentration in Overweight Adolescents. *Journal of Nutrition*, 142(12): (P. 2083–2090). DOI: <https://doi.org/10.3945/jn.112.161208>.
4. Kemenkes RI. (2013). Laporan Nasional Riset Kesehatan Dasar (Riskesdas) Tahun 2013. Jakarta: Kemenkes RI Badan Penelitian dan Pengembangan Kesehatan.
5. Misra A, Shrivastava U. (2013). Obesity and dyslipidemia in South Asians. *Nutrients*, 5(7): (p. 2708–2733). DOI: <https://doi.org/10.3390/nu5072708>
6. Suririnah. (2009). *Buku Pintar Merawat Bayi Umur 0–12 Bulan*. Jakarta: PT. Gramedia Pustaka Utama.
7. Hester, S. N., Hustead, D. S., MacKey, A. D., Singhal, A., & Marriage, B. J. (2012). Is The Macronutrient Intake of Formula-Fed Infants Greater Than Breastfed Infants in Early Infancy. *Journal of Nutrition and Metabolism*. DOI: <https://doi.org/10.1155/2012/891201>.
8. Utami, C. T., Wijayanti. (2017). Konsumsi Susu Formula Sebagai Faktor Risiko Kegemukan pada Balita di Kota Semarang. *Journal of Nutrition College*, 6(1): (p. 96 – 102).
9. Yopiana, E., Yulia, L. R., Bhisma, M. (2020). Relationship between Formula Milk and The Incidence Obesity in Children Under Five: Meta-Analysis. *Indonesian Journal of Medicine*, 05 (04): (p. 299–307). DOI: <https://doi.org/10.26911/theijmed.2020.05.04.05>.
10. Musadat, A. 2010. Analisis Faktor-Faktor yang Mempengaruhi Kegemukan pada Anak Usia 6–14 Tahun di Provinsi Sumatera Selatan. Bogor: Sekolah Pasca Sarjana IPB.
11. Hafizhah, S. Z., Niken, P., Berlian, P. (2022). Early Childhood Caries pada Balita Usia 2–5 Tahun yang Mengonsumsi Air Susu Ibu dan Susu Formula. *Padjadjaran Journal of Dental Researchers and Students*, 6(1): (p. 44–51).
12. Kemenkes RI. (2020). Peraturan Menteri Kesehatan Republik Indonesia Tentang Standar Antropometri Anak. Jakarta: Kemenkes RI Direktorat Jendral Bina Kesehatan Masyarakat.
13. Ismail, Leila Cheikh, et al. (2022). Nutritional Status and Adequacy of Feeding Practices in Infants and Toddlers 0–23,9 Months Living in the United Arab Emirates (UAE): Findings from The Feeding Infants and Toddler Study (FITS) 2020. *BMC Public Health*, 22(p. 319). DOI: <https://doi.org/10.1186/s12889-022-12616-z>.
14. Triastuti, F., Tri Anasari. (2013). Hubungan Pemberian Susu Formula dengan Obesitas pada Anak Usia 5–6 Tahun di Pendidikan Anak Usia Dini Kecamatan Mandiraja Kabupaten Banjarnegara. *Jurnal Kebidanan*, 5(01): (p. 54–59).
15. Lestari, P., Suyatno., Apoina K. (2014). Hubungan Praktik Pemberian Susu Formula dengan Status Gizi Bayi Usia 0–6 Bulan di Kecamatan Semarang Timur Kota Semarang. *Jurnal Kesehatan Masyarakat*, 2(06): (p. 339–348).
16. Veit, Grote, et al. (2021). Effect of Milk Protein Content in Toddler Formula on Later BMI and Obesity risk: protocol of the multicentre randomized controlled Toddler Milk Intervention (ToMI) Trial. *BMJ Open*, 11 (12). DOI: <https://doi.org/10.1136/bmjopen-2020-048290>.
17. Rahmitasari, P., Ichsan, B., Ermawati, S. (2012). Perbedaan Frekuensi Diare antara Bayi yang Diberi Asi Eksklusif dengan Bayi yang Diberi Susu Formula pada Rentang Usia 2- 4 Bulan di Wilayah Kerja Puskesmas Klaten Tengah. *Biomedika*, 4(2): (p.26–30). DOI: <https://doi.org/10.23917/biomedika.v4i2.255>.
18. Widiyaningsih, E. N., Nuraini, R., Indira, P. (2016). The Relation Between Consumption of Sugary Food and Toothbrushing Behavior with The Incidence of Dental Caries at Children Aged 24–59 Months in Mranggen Polokarto Sukoharjo. *ICHWB*, (p. 247–252).
19. Nisak, Raudhotun. (2018). Hubungan Tingkat Pengetahuan Ibu Tentang Susu Formula dengan Kejadian Obesitas pada Balita di Playgroup Modern Ngawi Kecamatan Ngawi Kabupaten Ngawi. *Media Publikasi Penelitian*, 5 (1).
20. Widyawati, W., Dwi Sarbini, Muwakhidah. (2016). Hubungan Tingkat Pengetahuan Ibu Balita mengenai Pemberian Makanan Pendamping Asi (MP-ASI) dengan Status Gizi pada Balita

Usia 6–24 Bulan di Kelurahan Semanggi Kecamatan Pasar Kliwon Kota Surakarta. Diploma Thesis, Universitas Muhammadiyah Surakarta.

21. Tristiyanti, Wara F., Didik Gunawan T., Yulia Lanti Retno D. (2018). Analisis Durasi Tidur, Asupan Makanan, dan Aktivitas Fisik sebagai Faktor Risiko Kejadian Obesitas pada Balita Usia 3–5 Tahun. *Sari Pediatri*, 20(3): (p. 178–184).
22. Andini, D., Ichsan, B., Nirlawati, D. (2013). Hubungan Tingkat Pendapatan Keluarga dengan Status Gizi Balita di Wilayah Kerja Puskesmas Kalijambe. *Biomedika*, 5(2): (p. 7–10). ISSN 2541–2582. DOI:<https://doi.org/10.23917/biomedika.v5i2.263>.

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