



Feeding Patterns and Food Waste Behavior on the Nutritional Status of Toddlers

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ABSTRACT: Food Waste is a growing problem. In household scale, Food Waste often considered as a normal thing. Food composition and less variant (quality) is one of factor who can affect to nutritional status of toddlers and Food Waste, if the more Food Waste produced by toddlers, the more nutrients are wasted in vain, so that the food intake eaten by children does not match the required needs. Toddlers who do not get the food intake that should be, able to affect the nutritional status and result in stunted growth and development of children. This research aims to determine the relationship between Food Waste Behavior and Feeding Patterns on the Nutritional Status of Toddlers in Tanah Sareal District, Bogor City. This type of research is cross sectional with purposive sampling data collection technique with 100 respondents. The statistical test used is Chi-Square. Based on the results of the research, it was found that in Tanah Sareal Subdistrict had a high Food Waste behavior of 69%. While the results of the feeding pattern in Tanah Sareal District have an inappropriate feeding pattern of 52%. There is a significant relationship between Food Waste behavior on the nutritional status of toddlers (p-value of 0.000) and there is a significant relationship between feeding patterns and nutritional status of toddlers (p-value of 0.000).

KEYWORDS: Food Waste, Feeding Patterns, Nutritional Status, Toddlers

INTRODUCTION

Since 2020, the world has been hit by turmoil due to the presence of a new virus called COVID-19 (coronavirus disease). The Indonesian government has implemented an independent isolation policy (Suryani, 2020). Reducing activities outside the home is expected to increase domestic waste generation and affect waste generation and composition. Before the pandemic, DKI Jakarta's waste generation was 0.69 kg/person/(Putri Lestari et al., 2020). Food loss and wastage is one of the biggest challenges we face today. Food waste can cause more than 925 million people to be malnourished worldwide (FAO, 2011, 2015) (Nahman, 2013). Indonesia is one of the developing countries where the level of hunger is still severe (Institute, 2017). However, it is very unfortunate that Indonesia's food waste reaches 300 kg per person per year, as evidenced by Indonesia being the second largest producer of food waste in the world (Ministry of Agriculture, 2019).

In 2013 in a not-for-profit organization in Australia, namely National Recycling Week, planet Ark stated that there are several types of categories that are included in Food Waste, including (Initiative & Reduction, n.d.; 2016): Avoidable Food Waste, Probably Food Waste, Unavoidable Food Waste. Based on the results of a preliminary study, most of the Food Waste generated came from the Avoidable Food Waste category. The Food Waste category can still be consumed but is wasted either due to damage or due to excessive processing so that it is not consumed until it runs out. This type of food waste often occurs in households due to the behavior of household members who often leave food behind due to overcooking, buying too much, and storing it improperly.

Based on data from the National Waste Management Information System, that the largest composition of waste in Indonesia comes from 39% food waste, and the second is plastic waste of 17%. As well as the source of the most waste-producing waste comes from household waste 37.3% (Sistem Informasi Pengelolaan Sampah Nasional, 2020). The report on the results of Basic Health Research of the Ministry of Health of the Republic of Indonesia in 2018 shows that 17.7% of infants under 5 years of age (toddlers) are still experiencing nutritional problems. This figure consists of children under five who experience malnutrition by 3.9% and those who suffer from malnutrition by 13.8%.

A child's development is influenced by several factors, including nutritional status. Nutritional status is closely related to growth and development. Is a series of processes of growth and development of the body that occur regularly and continuously in accordance with the development of both the structure and function of the organs of the body (Prakhasita, 2018). Bias in food composition and



lack of diversity (quality) is also an indirect factor that can affect the nutritional status of toddlers, if the more food waste a toddler produces, the more nutrients are also wasted so that the food intake that children eat not in accordance with the required requirements. Toddlers who do not get the intake should be able to affect nutritional status and result in stunted growth and development of children. Based on the problems above, the researchers want to know the relationship between Food Waste behavior and feeding patterns on the nutritional status of toddlers in Tanah Sareal District, Bogor.

RESEARCH METHOD

Design, Time, and Place

This research is a quantitative study with a cross-sectional design to determine the relationship between food waste behavior and feeding patterns on the nutritional status of toddlers in Tanah Sareal District, Bogor City. This research has received approval from the Esa Unggul University Research Ethics Commission with ethical review number 09 22 01 004 /DPKE-KEP/FINAL-EA/UEU/I/2022. The entire research activities starting from the preliminary survey to data collection were carried out in March-April 2022. This research was conducted in Tanah Sareal District, Bogor City. Analysis of the nutritional status of children under five uses three calculation indices, namely (weight/age, height/age, and weight/height). Then from the results of the analysis, the interpretation of nutritional status is carried out based on three anthropometric indices according to WHO. Interpretation results are then divided into two categories, namely normal nutritional status and at risk, nutritional status at risk means more or less risk. Interpretation can be done by referring to the interpretation table, such as an example of how to interpret the nutritional status of under five: Known under five nutritional status based on weight/height: -0.31 (high), weight/age: 1.39 (normal weight), height/age: -2.00 (Normal) so that it can be concluded based on the interpretation table of the nutritional status of toddlers who are more, but not obese.

Amount and Method of Sampling

The population of this study were mothers in Tanah Sareal District. Data collection was carried out during Posyandu activities in Tanah Sareal District. Data collection started with measuring height using a microtoise and weight using a digital scale. After carrying out anthropometric measurements, an interview was carried out with the mother of the toddler according to the inclusion and exclusion criteria. The questions given regarding the characteristics of mothers such as age, education, and characteristics of toddlers in the form of age, sex and history of disease. Respondents were also given questions regarding Food Waste behavior consisting of 23 questions with the choices very often, often, rarely and never then the answers would be categorized into Food Waste behavior (<60%) and No Food Waste ($\geq 60\%$) (Abdelradi, 2018), feeding patterns using a modified Child Feeding Questionnaire (CFQ) questionnaire consisting of 27 questions with the choices very often, often, rarely and never, then the results of the answers will be categorized into inappropriate eating patterns (<60%) and appropriate ($\geq 60\%$). The results of anthropometric measurements will then be processed using WHO Antro Plus with 3 categories, then interpreted into 2 categories, namely normal and at risk (more and less risk).

Processing and Analysis of Data

Anthropometric data for toddlers is taken using direct measurements. The interview technique for the characteristics of mothers and toddlers, Food Waste behavior and feeding patterns used a modified Child Feeding Questionnaire (CFQ). The data obtained from the results of the interviews then entered the stage of providing code or coding which was converting data in the form of letters into numbers to make it easier when processing data. Then it was analyzed using SPSS 25 to see the relationship between Food Waste behavior and feeding patterns on the nutritional status of toddlers. The test used is Chi-Square because the research data is ordinal scale and we want to see the data distribution in more detail.

RESULTS AND DISCUSSION

The data on the mother's characteristics (consisting of age range, last education, occupation), toddlers (consisting of age range, gender, history of illness in the last 3 months, and nutritional status), food waste behavior and feeding patterns obtained characteristic data results.



Table 1. Characteristics of The Mother

<i>Characteristics</i>		<i>n</i> <i>(100)</i>	<i>%</i> <i>(100%)</i>
<i>Mother's Age Range</i>			
Early Adult	Ages 17-25 Years	13	13%
	Ages 26-35 Years	57	57%
Dewasa Akhir	Ages 36-45 Years	29	29%
	Ages > 45 Years	1	1%
<i>Mother's last education</i>			
Low Education	Elementary School/Equivalent	7	7%
	Junior High School/Equivalent	20	20%
	Not going to school	2	2%
High Education	Senior High School/Equivalent	58	58%
	University/ College	13	13%
<i>Mother's Job</i>			
Unemployed		85	85%
Work		15	15%

Table 1. explains the age range of respondents for mothers was more in the early adult category, as many as 70 people (70%). Respondents with an age range of 26-35 years of 57 people (57%) are in line with the results from the City of Bogor in the 2022 figures that the population according to age group and sex in the city of Bogor is mostly in the productive age of 50% (BPS, 2022) . Meanwhile, based on the latest level of education, the results of the study found that the highest percentage was in the higher education category, with 71 people (71%). The results of the analysis also showed that most of the respondents had the highest educational background at the high school/equivalent level, as many as 58 people (58%). According to the results of the Bogor City BPS in 2018, that the population graduated from high school 55,755 people, and 27,934 tertiary institutions (Bogor City Health Office, 2018). So it can be concluded that the population with the most recent education is at the high school/equivalent level as many as 55,755 people.

Based on the results of the analysis, it was found that 85 people (85%) were mothers who did not work or were housewives. According to the results of the Survey Kerja Nasional (Sakernas), BPS City of Bogor that the female population is 18,770 people who are not working and 3,678 male residents (BPS, 2022). Meanwhile, according to research results, women who work are only 15% on average as employees and laborers.

Table 2. Toddler Characteristics

<i>Characteristics</i>		<i>n</i> <i>(100)</i>	<i>(100%)</i>
<i>Toddler Age Range</i>			
	24- 36 Month	64	64%
	37 – 59 Month	36	36%
<i>Gender</i>			
	Male	53	53%
	Female	47	47%
<i>History of Illness in The Last 3 Months</i>			
Tidak Sakit		69	69%
<i>Sick</i>		31	31%



Table 2. explains the age range for toddlers aged 24-36 months is 64 people (64%). According to the 2018 Health Office, Tanah Sareal District has the second most distribution toddlers population in Bogor City, namely 20,615 people after West Bogor District with 21,051 people. Based on the gender characteristics of toddlers, namely male toddlers, as many as 53 people (53%) get the highest percentage. The characteristics of illness in the last 3 months showed that a greater proportion of children under five had a history of not being sick (69%), but it was also found that the proportion of samples with a history of illness (31%) out of 31% of children under five who were sick had a history of diarrhea (3%), while the remaining 20% had a history of coughs, colds, and fever. The distribution of illness in toddlers is based on the Health Office Profile, 2020, namely the highest case finding was pneumonia in the Tanah Sareal District of 67%, for diarrheal diseases as many as 4,112 toddlers experienced diarrhea the second highest number of cases was in the Tanah Sareal District area (Bogor, 2021)

Table 3. Nutritional status, food waste behavior, and feeding patterns

<i>Characteristics</i>		<i>n</i> <i>(100)</i>	<i>%</i> <i>(100%)</i>
<i>Nutritional Status of Toddlers</i>			
<i>Weight/Age</i>			
Normal Nutritional Status	Normal Weight	76	76%
Risk Nutritional Status	Very Less Weight	10	10%
	Overweight	14	14%
<i>Nutritional Status of Toddlers</i>			
<i>Height/ Age</i>			
Normal Nutritional Status	Normal	80	80%
	Tall	4	4%
Risk Nutritional Status	Short	8	8%
	Very Short	8	8%
<i>Nutritional Status of Toddlers</i>			
<i>Weight/Height</i>			
Normal Nutritional Status	Good Nutrition	43	43%
	Malnutrition	15	15%
Risk Nutritional Status	Malnutrition	5	5%
	Risk of Overnutrition	23	23%
	Overnutrition	7	7%
	Obesity	7	7%
<i>Food Waste Behavior</i>	<60% (Food Waste)	64	64%
	≥ 60% (No Food Waste)	36	36%
<i>Feeding Patterns</i>	Less Precise (<60%)	52	52%
	Appropriate ≥ 60%	48	48%

1. Nutritional Status

Based on the results of the analysis in table 3.1, it shows that the characteristics of the nutritional status of children under five based on weight/age, more respondents were included in the category of normal nutritional status as much as 80%, but it was also found that the proportion of samples with nutritional status at risk (at risk of more or less) amounted to 24%, of the 24% of children under five who are at risk, 10% are at risk of very less weight and 14% are at risk of more weight.



According to the results of the prevalence of malnutrition under five in Bogor City in 20220 it was 3.84% and 0.68% with very poor nutritional status. Based on the results of the analysis, it showed that the characteristics of the nutritional status of children under five based on height/age, more respondents were included in the category of normal nutritional status as much as 84%, however, it was found that the proportion of samples with nutritional status at risk (at risk of more and or less) amounted to 16%, out of 16% children under five who are at risk of 8% short and 8% very short. According to the results, the prevalence of short toddlers in Bogor City in 2022 is 7.47%, while the stunting category is 10.66% and very short is 3.19%. (Bogor, 2021). Based on the results of the analysis, it showed that the characteristics of the nutritional status of children under five based on weight/height were more respondents included in the category of nutritional status at risk by 57%, but it was also found that the proportion of samples with normal nutritional status was 43%. According to the results of the prevalence of under five in Bogor City in 2022, the category of very thin is 0.24% and 2.96% is fat (Bogor, 2021).

2. Food Waste Behavior

Based on the results of the analysis, it shows that the behavioral factors of Food Waste in the majority of respondents, as many as 64 people (64%) are still in the Food Waste category <60% and as many as 36 people (36%) are in the good category ≥60%. According to Abdelradi, 2017 the level of Food Waste behavior is categorized as sufficient if it reaches a value of ≥60%, so it can be concluded that the level of Food Waste behavior in mothers and toddlers in Tanah Sareal District is still relatively high <60%. The composition of waste at the national level is dominated by food waste (organic) as much as 46% and in Bogor City itself as much as 40%, and the largest contributors to waste come from households as much as 50% (SIPSN, 2021).

3. Feeding Patterns

Based on the results of the analysis, it showed that 52 people (52%) were in the inappropriate category and 48 people (48%) were in the right category. According to Ridha, 2018 the feeding pattern is categorized as good if it reaches a value of ≥60%, so it can be concluded that the feeding pattern level in Tanah Sareal District has an inappropriate feeding pattern <60%.

4. The Relationship Between Food Waste Behavior and Feeding Pattern On Nutritional Status Under Children Bivariate Analysis using Chi-Square was carried out with the aim of knowing the relationship between the independent variables (Food Waste Behavior and Feeding Patterns) and the dependent variable (Nutritional Status) as follows:

Table 4. The Relationship Between Food Waste Behavior and Feeding Pattern On Nutritional Status Under Children

Factors	Nutritional Status				Total	p-Value	OR (95% CI)	
	Risky		Normal					
	n	%	n	%				
Food Waste Behavior	Food Waste <60%	58	90.6%	6	9.4%	64	100%	.046 (.061- .137)
	No Food Waste ≥ 60%	11	30,6%	25	69.4%	36	100%	
	Total	69	69%	31	31%	100	100%	
Feeding Patterns	Less presisce < 60%	50	96.2%	2	3.8%	52	100%	.026 (.006- .112)
	Appropriate ≥ 60%	19	39.6%	29	60.4%	48	100%	
	Total	69	69%	31	31%	100	100%	



Table 4. explains the Chi-square test shows that, in the Food Waste Behavior variable, a p-value of 0.000 is obtained where the result is a value ($p < 0.05$) so that it can be concluded that there is a relationship between Food Waste behavior and the nutritional status of toddlers. It can be seen that out of 100 respondents, 58 (90.6%) of children under five with nutritional status at risk include being at risk of over nutrition or under nutrition having a value of $< 60\%$, which means that there are still many toddlers with nutritional status at risk who still like to do Food Waste behavior, such as throwing away food that is still suitable consumed. The nutritional status at risk for toddlers is most at risk of malnutrition, this is indicated by phenomena in the field that cause toddlers to produce more Food Waste because toddlers are experiencing Shut Mouth Movement (GTM), and mothers don't pay attention to toddlers' food portions so they often eat too much and in the end thrown away. 25 toddlers with normal nutritional status (69.4%) have values $\geq 60\%$ who do not like to do food waste behavior. Analysis of the relationship between Food Waste behavior and the nutritional status of toddlers produces an odds ratio (OR) value of 0.046 with a 95% CI between the upper and lower limits of 0.061-0.137, which means that respondents with Food Waste behavior have a risk of .046 times to experience a nutritional status at risk include those at risk of under or over nutrition. The relationship between Food Waste behavior and nutritional status has a negative relationship or reduces the incidence of risky nutritional status (more or less risk) (OR value < 1).

According to Prita (2021), a high number of Food Waste behaviors can be influenced by age because it affects a person's appetite. Children, adolescents and young adults usually eat according to their wishes and do not think about the impact that will occur if they do Food Waste (Swamilaksita et al., 2021). According to Quested et al. (2018) someone over 65 years of age produces less Food Waste because they already have sufficient knowledge to manage leftovers and shop for groceries as needed (Quested, T.E., Marsh, E., Stunell, D., Parry, A.D., 2018). Meanwhile, according to Parizeau et al., (2019) households with children or toddlers produce more food waste. This is because mothers buy more healthy food, provide and prepare excessive food for their children even though the child does not intend to eat it (Graham-Rowe, E., Jessop, D.C., & Sparks, 2014). This is in line with research (Trisha, 2021) that there is a significant relationship between Food Waste and nutritional status. Food Waste for the toddler group occurs in abnormal nutritional status. Abnormal nutritional status is dominated by poor nutritional status.

Based on the results of the study, it was shown that the largest percentage of toddlers left food sources of carbohydrates, vegetables and fruit. This is indicated by the results of the average question score of mothers answering with a score of 3 which means "often". Just like the results of Azizah's research, (2021) that a lot of food wasted at the consumption stage occurs due to a lack of food planning, food storage, or food waste (Azizah et al., 2021). According to Spiker et al., 2017 the nutrient content wasted from food scraps in the United States in 2012, there were 1217 kcal, 13 protein and 5.9 grams of fiber per capita per day and the types of food wasted were sources of carbohydrates and fiber such as rice, potatoes, vegetables and fruit. Vegetables and fruit are types of food that are wasted in relatively high amounts, which contain many of the nutrients needed to improve health (Spiker, 2017).

The feeding pattern obtained a p-value of 0.000, the result of this value ($p < 0.05$) so that there is a relationship between the feeding pattern and the nutritional status of toddlers. It can be concluded that if the feeding pattern is right, it will reduce the risk of risky nutritional status. The results of this study are in accordance with research (Sodikin et al., 2018) explaining that toddler feeding patterns affect malnutrition due to a lack of quantity and quality in growth and development. The findings of this study are also supported by research (Husin et al., 2008), namely that there is an interaction between parenting and eating patterns of children on the nutritional status of children under five in terms of the practice of food gifts, environmental hygiene & sanitation. The results of interviews show that mothers under five are accustomed to giving large portions to their children directly, besides that mothers rarely vary the menu so that children often feel bored, meal breaks are also often not paid much attention to in feeding toddlers so that it can lead to inappropriate eating patterns. .

Mothers of toddlers often feed their toddlers at a time close to the time of giving milk, besides that mothers also don't limit their children to snacks or eating from outside which is high in calories. From the explanation above, it can be concluded that if the diet given is good, the nutritional status of the toddler will be good, and vice versa. Food intake affects a person's nutritional status. A state of good nutritional status is achieved when the body receives sufficient nutrients to be used efficiently, enabling physical growth, brain development, and work capacity to achieve optimal health levels (Ministry of Health RI, 2018). Mother's knowledge about good feeding patterns is also still lacking, marked by many mothers of toddlers who think that the most important thing is that the child has eaten without paying more attention to the food intake that is eaten by the child.

Based on UNICEF (Adriani & Kartika, 2013), there are two main factors that cause malnutrition in toddlers. 1) The direct cause, the main factor causing malnutrition in toddlers is the lack of intake of nutritious food both in quality and quantity in the toddler's



body. In addition, the presence of co-infection often has a significant impact on the health and nutrition of children under five years of age. 2) Indirect causes, food availability and environmental hygiene in health services. Mother's age is one of the factors that influence the nutritional status of toddlers. This may be due to other factors such as mother's knowledge, because the mothers in this study were relatively young (<35 years) and lacked adequate nutritional knowledge during pregnancy and after delivery. The mother's knowledge factor also influences the pattern of feeding provided. The level of mother's knowledge about toddler nutrition greatly influences the nutritional status of toddlers, because mothers have the strongest bond with their children. What toddlers eat is still very dependent on their caregivers, because toddlers still don't know what they want. So that what the caregiver gives to eat is what the toddler will eat. Mother's knowledge is the most important key in meeting the nutritional needs of toddlers. Well-understood knowledge can also generate new and positive behaviors. Mother's knowledge of well-understood nutritional needs requires action to provide nutritious food to toddlers.

CONCLUSION

Based on the results of the study, it can be concluded that there are 64 children (64%) in Tanah Sareal District aged 24-36 months, and there are still many toddlers who behave in Food Waste due to not paying attention to the pattern of feeding in portions, quantity and variety of menus given. The results of the analysis show that there is a relationship between Food Waste behavior and the nutritional status of toddlers and there is a relationship between feeding patterns and the nutritional status of toddlers in Tanah Sareal District, Bogor City.

SUGGESTION

Educate mothers of toddlers about knowledge of preventing Food Waste behavior in toddlers about good feeding patterns such as having to pay attention to variations in food for toddlers so they don't get bored every time they eat, pay attention to children's meal times so they don't get too close during distractions so children can still finish their food and pay attention to the type of food given to children to suit their needs.

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