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No correlation between picky eating and nutritional status of toddlers aged 24-59 months in Denpasar City, Bali Province

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ABSTRACT

Background and purpose: Picky eating behaviour in toddlers may lead to a lack of nutritional intake and affect their nutritional status. This study aims to determine the correlation of picky eating with the nutritional status of toddlers aged 24-59 months in Denpasar City.

Methods: This is a cross-sectional study of 100 toddlers and mothers in Denpasar City in 2020. The variables collected were mother's education, occupation, family income, children's age, gender, history of infectious diseases, eating behaviour, and nutritional status. The data were collected by interview using questionnaire for socio-demographic characteristics and the Children Eating Behaviour Questionnaire (CEBQ). Bodyweight and height were measured using Camry and Microtoise digital scales. The data were analyzed including descriptive analysis and chi-square test.

Results: We found almost two third (63%) of the toddlers had picky eating behaviour. Most toddlers had normal nutritional status (87%), while 9% of them were stunted. Most toddlers had a poor appetite (85%) and left food on their plates after eating (54%). The majority do not want to taste food that was never introduced (66%) and refuse the main meal after eating snacks (68%). We found no significant association between eating behaviours and nutritional status of the toddlers.

Conclusion: There was no correlation between picky eating behaviour and the nutritional status of toddlers. Picky eaters do not refuse food consistently, hence it can balance the nutritional needs. Therefore, providing information and practice regarding nutritious food is still important, as well as regular monitoring of children's nutritional status.

Keywords: Picky eating, toddler, nutritional status, stunting, CEBQ

INTRODUCTION

The World Health Organization (WHO) Report on Global Nutrition 2018 asserted that malnutrition in toddlers is still a concern because it has not reached the targets. WHO aims to significantly reduce nutritional problems by 2025 due to a huge number (150.8 million (22.2%)) of toddlers are stunted globally.¹ Acute malnutrition in toddlers manifests as growth retardation such as wasting, which is a strong predictor of mortality. At the same time, chronic malnutrition in the early stages of life causes failure to optimal growth and development (stunting).² Indonesia ranks third highest in Southeast Asia as for stunting with the prevalence of 36.4% in 2005-2017.³ The Basic Health Research (*Riset Kesehatan Dasar/Riskesdas*) in 2018 showed the proportion of stunting among toddlers at 30.8% was higher than underweight (17.7%) and wasting (10.2%). The rate is way above the 2019 National Medium Development Plan (*Rencana Pembangunan Jangka Menengah Nasional/RPJMN*) target, which was about 17%.

According to *Riskesdas* data, the proportion of stunting among toddlers in Bali Province in 2018 was 21.7%, underweight toddlers was 13.1%, and wasting toddlers was 6.3%. Denpasar City, the capital city of Bali Province, has the third highest proportion of underweight toddlers in Bali at 10.9%, which increased from 6.8% in 2013. Meanwhile, the proportion of wasting at 10.9% did not decrease between 2013 and 2018. Data also showed that the proportion of stunting (18.84%) was higher than wasting (10.9%) and underweight (10.9%).⁴

Multiple factors influence children's nutritional status, which can be divided into direct and indirect factors. Direct factors include lack of nutritional intake⁵⁻⁹ and infectious diseases.¹⁰⁻¹³ Meanwhile, indirect factors related to the nutritional status of toddlers are socioeconomic, namely family income,^{5,14-16} food availability,^{15,17-19} and environmental conditions.^{13,20,21} However, other studies show no correlation between environmental conditions and the nutritional status of toddlers.^{10,22,23} Another indirect factor is feeding behavior.^{20,24-26} Poor feeding behaviour in toddlers can cause eating problems, one of which is picky eating behavior.²⁷ Toddlers with picky eating behaviour tend to have underweight nutritional status,^{14,24,28,29} at higher risk of being underweight, inadequate weight gain and nutritional deficiencies. The age group experiencing the highest likelihood of being picky eaters is 1 to 5 years old, with the highest likelihood among sex groups is in the males.³⁰ However, other studies have shown no correlation between picky eating behaviour and nutritional status in toddlers.^{6,31-33}

Based on previous research, inconsistent results are shown related to the nutritional status of toddlers, including the variables of nutritional intake, infectious diseases, food availability, socioeconomic aspects of family income, and feeding behaviour. In addition, the variables of environmental conditions, socioeconomic conditions in other aspects such as education, parental occupation, and picky eating behaviour also show inconsistent results. Therefore, this study aims to determine picky eating behaviour as a factor related to the nutritional status of toddlers aged 24-59 months in Denpasar City.

METHODS

This study is a mixed methods research with a sequential explanatory design, starting with quantitative research followed by qualitative research.¹⁵⁻¹⁷ Quantitative research was conducted through cross-sectional surveys and qualitative research through in-depth interviews.

This study used a cross-sectional design conducted throughout the period of November 2019 to September 2020 in Denpasar City. The number of samples was 100 toddlers which calculated using a 95% confidence

level, 80% power, the proportion of underweight nutritional status in the category of picky eating behaviour was 27%,³³ and the proportion of underweight nutritional status in the category of not picky eating behaviour was 6.25%.³² Samples were selected using multistage random sampling. Firstly, one sub-district (West Denpasar) was randomly selected from 4 sub-districts in Denpasar City, then, 1 village (Tegal Harum Village) in West Denpasar was also randomly selected. Then we created the list of all hamlets and number of toddlers based on data obtained from the administration bureau of Tegal Harum Village. Then, the samples were selected using Probability Proportional to Size (PPS) sampling method. After obtaining a total sample of each hamlet, the selection of subjects was carried out by simple random sampling using MS Excel by taking subjects whose serial numbers were randomized from the top.

The data was collected by means of a household survey, specifically visiting the respondent's house one by one. The researcher first explained the research objectives, then the informed consent was signed by all respondents who agreed to participate. At the time of data collection, the researcher was assisted by one cadre of the integrated health service post (*posyandu*) in each hamlet in the selected village. The cadres facilitated the anthropometric measurements of toddlers. Researchers and cadres used Personal Protective Equipment (PPE) when collecting data and applied strict health protocols due to the COVID-19 outbreak situation. Researchers conducted structured interviews with questionnaires to respondents regarding mother's education, mother's occupation, family income, history of infectious diseases, and picky eating behavior in toddlers. The questionnaires used in this study were a questionnaire to collect characteristics data and Children Eating Behavior Questionnaire (CEBQ) which has been tested for validity and reliability in various countries and has been tested for validity in Indonesia.²⁴

The CEBQ was designed to assess a child's preference for food based on the child's eating behaviour. In the questionnaire, there were 8 subscales. Based on these 8 subscales, 5 subscales identified picky eating, including 2 categories, food avoidance and food approach.³⁴ The subscales were divided into 19 question items, according to a Likert scale from 1-5. The category of picky eating behaviour is derived if the mean value of the distribution of subscales scores on food avoidance (Slowness in Eating, Food Fussiness, Satiety Responsiveness) and the food approach (Food Responsiveness, Enjoyment of Food) was above 1 (>1).

The data collection of nutritional status was carried out by researchers using anthropometric measurements. Instruments to measure nutritional status were Camry brand scales and microtoise with an accuracy of 0.1 kg and 0.1 cm. Anthropometric measurements were carried out twice to reduce the potential for bias. The index used for nutritional status data was height/age. According to WHO standard, the standard deviation of the unit (Z-score) of -2 SD to 2 SD were categorized as normal nutritional status, Z-score values <-3 SD to <-2 SD were categorized as stunted, and Z-score values >2SD were categorized as tall. Stunted and Tall were categorized as abnormal nutritional status.

The data then analysed using univariate analysis to describe the characteristics of picky eating behaviour variables, sex, age, nutritional status, weight, height, mother's education, mother's occupation, family income, and history of infectious diseases by presenting data using percentage, frequency and mean. Bivariate analysis was carried out with chi-square test to measure the association between picky eating behaviour and other independent variables with nutritional status.

This research has been approved by the Ethics Commission of the Faculty of Medicine, Udayana University/Sanglah Hospital Denpasar Bali, on 27th August 2020, with number 1759/UN14.2.2.VII.14/LT/2020.

RESULT

Respondents' Characteristics

The characteristics of toddlers, including age, sex, weight, height, and history of infectious diseases, are displayed in Table 1. More than third of toddlers (37%) were aged 24-36 months old, with the same proportion of males and females (50%). Most toddlers (84%) were weighted about 9-17 kg and 48% of them have height between 99-109 cm. About 92% of toddlers did not have any infectious disease in the previous 3 months of the survey. The majority of the toddlers' mothers (91%) had obtained higher education, senior high school education, to university. About 56% of respondents had no job, with the majority (89%) reported their family income was less than Rp 2,500,000 with an average family income of Rp 4,177,000.

Table 1. Characteristics of toddlers and mothers

Characteristics (N=100)	n	Proportion (%)
Age (months)		
24-36	37	37
37-49	33	33
50-59	30	30
Sex		
Male	50	50
Female	50	50
Bodyweight (kg)		
9-17	84	84
18-25	16	16
Body height (cm)		
77-87	15	15
88-98	29	29
99-109	48	48
110-117	8	8
History of infectious disease		
Yes	8	8
No	92	92
Mother's education		
Low	9	9
High	91	91
Mother's occupation		
Working	44	44
Not working	56	56
Family income		
<Rp 2,500,000	11	11
≥Rp 2,500,000	89	89
Mean (SD)	IDR 4,177,000 (IDR1,708,378)	

Almost two third (63%) of the toddlers had picky eating behaviour, while the majority (87%) had normal nutritional status (Table 2). The distribution of responses on the eating behaviour of toddlers can be seen in Table 3. Most toddlers had a poor appetite (85%) and left food on their plates after eating (54%). The majority of toddlers did not want to taste food that was never introduced (66%) and refused the main meal after eating

snacks (68%). Besides, about 69% of toddlers felt full before eating and did not like a food ingredient even when they have not tried it (65%). In general, picky eater toddlers reached 60% (Table 3).

Table 2. Distribution of eating behaviour and nutritional status

Characteristics (N=100)	n	Proportion (%)
Eating behaviour		
Picky eating	63	63
Non-picky eating	37	37
Nutritional status		
Stunted	9	9
Normal	87	87
Tall	4	4

Table 3 Distribution of responses to questions on eating behavior in toddlers

Question items	Yes (%)	Answer items	Yes (%)
The toddlers like all kinds of food	70	The toddlers feel full before the meal is finished	69
The toddlers' lack of appetite	85	The toddlers enjoy food while eating	96
The toddlers refuse a new food menu the first time they try it	48	Even though the toddlers feel full, they can still eat their favourite food	79
The toddlers like to try new food	34	The toddlers cannot eat the main meal after eating snacks	68
The toddlers often ask for food outside of mealtimes	58	The toddlers tend to want to taste foods that have never been introduced before	34
The toddlers would eat more if they allowed to exceed their portions	47	The toddlers do not like a food ingredient even though they have not tried it	65
The toddlers leave food on his plate after eating	54	If left alone, the toddlers always have food in his mouth	64
The toddlers eat more than 30 minutes at a time	40	The toddlers eat with less appetite and hungry, then continue while eating the existing dishes	36
The toddlers want to eat when given several choices of dishes	72	In general, children are picky eaters	60
The toddlers always look forward to their meal	72		

Table 4 presents the cross-tabulation between the characteristics of mothers and toddlers, their eating behaviour and nutritional status based on the body height/age index. According to the mothers' occupation, 82.1% of toddlers from unemployed mothers had normal nutritional status, while 93.2% of those whose mothers were employed had normal nutritional status. There was no significant difference of toddlers' nutritional status based on their mother's level of education and history of infectious disease. Proportion of toddlers with normal nutritional status from a higher income family is higher (88.8%) than those from lower income (72.7%), although this difference was not statistically significant. Based on picky eating behaviour, there was a slight difference in the proportion of toddlers with normal nutritional status, but it was not significant.

Table 4. Distribution of nutritional status based on characteristics and picky eating behaviour

Variables	Nutritional Status		p*
	Normal n (%)	Not Normal n (%)	
Mother's occupation			
Not working	49 (82.1)	7 (17.9)	0.103
Working	38 (93.2)	6 (6.8)	
Mother's education			
Low	8 (88.9)	1 (11.1)	1.000
High	79 (86.8)	12 (13.2)	
Family income			
<Rp 2.500.000	10 (72.7)	1 (27.3)	0.309
≥Rp 2.500.000	77 (88.8)	12 (11.2)	
History of infectious disease			
No	80 (87)	12 (13)	1.000
Yes	7 (87.5)	1 (12.5)	
Picky eating			
No	32 (83.8)	5 (16.2)	0.671
Yes	55 (88.9)	8 (11.1)	

*) Chi-square Test

DISCUSSION

This study shows most toddlers are picky eaters. Toddlers with picky eating behaviour tend to have underweight nutritional status,^{14,24,28,29} and are more at risk of being underweight, inadequate weight gain, and nutritional deficiencies. The age group experiencing the pickiest eating behaviour is 1 to 5 years old, with the highest likelihood is in males.³⁰ Picky eating behaviour is on a broad spectrum that can develop into "pathological" picky eating behaviour, i.e. rejecting all types of food in certain food groups, for example, refusing all protein sources.²⁷ If it left, it could lead to loss of intake of one of the food groups, so the child is at risk of developing particular macronutrient or micronutrient deficiencies.

Based on a longitudinal study, it was found that picky eating behaviour is related to body weight. Picky eaters are twice as likely to be underweight as non-picky eaters in the future, especially when toddlers are 4.5 years old.¹⁴ In this study, it was found that most toddlers had picky eating behaviour with normal nutritional status, and mostly experienced it at the age of 2 to 3 years, and equally the same in both male and female. Toddlers were categorised as having a picky eating behaviour when consuming a limited amount of food, having a strong appetite for only one type of food, having a limited intake, and having difficulty consuming new types of food.³⁵ These characteristics are similar to the subjects in this study, specifically they have a poor appetite, leave food on their plates after eating, do not want to taste foods that have not been introduced before, cannot eat after eating snacks, feel full before their meal is finished, and do not like foodstuff even they have not tried it.

This study found that there was no correlation between mother's education and the nutritional status of toddlers. Although, the nutritional status of toddlers of mothers with higher education is better than mothers with low education, this is not statistically significant. These results are similar with previous studies,^{10,17,22} while it is different from other study that shows a significant correlation between mother's education and the nutritional status of toddlers.³⁶ Parental control of eating patterns contribute to children's eating behavior. Mothers who are more educated pay attention to their children's eating behavior and feed their children with

better food choices, resulting in much better eating habits.²⁹ Other characteristics which were also analyzed in this study, namely family income and mother's occupation, showed that these two factors were not correlated to nutritional status. These results are similar with previous studies,^{10,11,17,22,32} however, they are also different from other studies.^{5,14-16} Differences in the results of this study may occur due to differences in family characteristics, namely that most of the respondents in this study were household workers or did not work, differences in research locations, and differences in the research design.

Another determinant of nutritional status which was also analyzed in this study was the history of infectious diseases experienced by toddlers. The results of this study indicate that a history of infectious disease is not a factor correlated to the nutritional status of toddlers. These results are similar with previous study,²² while also different from other studies which show that infectious diseases had a significant relationship with the nutritional status of toddlers.¹⁰⁻¹² Infectious diseases are correlated with an increase in the odds ratio of underweight nutritional status.¹² The UNICEF's framework of determinants of nutritional status shows that two of the determinants are direct factors, namely the lack of nutritional intake and infectious diseases.² The difference in the results of this study could be caused by nutritional intake factors that was not explored, because both have a correlation with each other. If the body lacks nutrients, it causes the immune system to decrease so it is easy to get sick.²

In this study, it was found that there was no correlation between picky eating behaviour and the nutritional status of toddlers. Based on previous study, picky eating behaviour is not related to nutritional status. This is related to the absence of a relationship between picky eating behaviour with energy, protein and fat intake, and no macronutrient problems were found, so it is not related to nutritional status due to good nutritional intake.⁶ Picky eater toddlers tend to refuse to eat at once, but they will eat the food they refused yesterday on another day. This behaviour can balance the nutritional needs even though it is not consumed every day. In addition to the nutritional intake of toddlers, which is indeed fulfilled, parents behaviour in feeding can also be caused by their awareness regarding what foods their children like and do not like so that they can balance their nutritional status.²⁰

The implications of finding the relationship between picky eating behaviour and the nutritional status of toddlers can contribute to the literature that can guide nutrition counselling staff regarding the description of the characteristics of toddlers who have picky eating behaviour from the food avoidance category and food approach. The results of this study can also provide consideration for policymakers to be able to carry out monitoring and evaluation of toddler's nutrition as a preventive effort so that the nutritional status of toddlers remains good, such as programs to anticipate picky eating behaviour in toddlers so that they do not become sedentary behaviour, namely by a systematic introduction to new foods. Parents must remain neutral and calm in their attitude and thinking in dealing with children's food intake.²⁷

The limitation of this research was that it used a cross-sectional design, so it cannot state the temporal relationship between independent and dependent variables. Furthermore, this study only represents the characteristics of toddlers under five who live in urban areas (Denpasar City), so its generalisability may be limited.

CONCLUSION

Most toddlers in this study reported to have picky eating behaviour, indicated by having a lack of appetite and leaving food on their plates after eating. Other indications were that toddlers refused to taste foods that have not been introduced before, could not eat the main meal after eating snacks, and refused to eat certain type of

foods. However, there was no correlation between picky eating and the nutritional status of toddlers based on the body height/age index. Picky eaters do not refuse food consistently, hence it may balance the nutritional needs. Therefore, providing information and practice regarding nutritious food is still important. It is also necessary to monitor and evaluate toddlers nutritional status and their intake through *posyandu* activities every month.

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AUTHOR CONTRIBUTION

RDP, as the main author, designed the study, collected and analyzed the data. NKS and NWAU were second authors involved in the design and concept of the research, provided feedback and edited the manuscript.

CONFLICT OF INTEREST

No conflict of interest declared by the author

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