The Correlation between Characteristics, Knowledge of Nutrition and Nutritional Status (H/A) among Children Aged 6-59 Months in Medan City

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Abstract. Background: The growth and development of children under five years (toddlers) is an indicator of nutritional status in the community. North Sumatra Province is one of 27 provinces with the high prevalence of stunting (>=20%). Objective: This study aimed to identify a correlation between characteristics, knowledge of nutrition and nutritional status (H/A) among children aged 6-59 Months in Medan City. Methods: This observational study used a cross-sectional study design and was conducted from June to July 2022 at Titi Papan Primary Healthcare Center, Medan Deli District, Medan City. Sampling in this study was carried out using a random sampling technique, and the total samples were 153 toddlers. The independent variables in this study were characteristics and mother's knowledge. While the dependent variable in this study was the nutritional status (H/A). Results: There were significant relationships between age (ρ=0.000), birth weight (ρ=0.018), family income (ρ=0.025) with nutritional status (H/A) of children aged 6-59 months, while characteristics such as birth length, family size and mother's knowledge were not related with nutritional status. Conclusions: Nutritional status of children aged 6-59 months was influenced by birth weight. Babies with low birth weight (LBW) has a risk of stunting than those with normal weight.

1 Introduction

Stunting is the poor linear growth during a critical period among under-five-year-old children, and it is diagnosed as height for age less than two standard deviations from the median of child growth standards determined by the World Health Organization (WHO) [1]. The consequences of stunting are in both immediate and long-term periods and include increased morbidity and mortality, poor child development and learning capacity, increased risk of infections and noncommunicable diseases in adulthood, reduced productivity and poor economic capacity [2]. Reducing stunting among children under five years old is the first of six goals in the Global Nutrition Targets by 2025.

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Indonesia is one of the countries with a high burden of malnutrition, including stunting [3]. Child health outcomes are still poor; even though the Indonesian economy is the largest in Southeast Asia and the 17th largest in the world [4]. Data published by Indonesian Ministry of Health (2020) showed that the incidence of stunting among children aged five years and below remained high at 30.8% [5]. The World Bank, noted that Indonesia underperformed more in reducing the level of stunting compared to other upper-middle-income countries and other countries in Asia. Given the high prevalence of stunting and its impact on children's cognitive development, the productivity level of Indonesia's next generation is possibly reduced to be half of its potential [4]. Therefore, tackling stunting among children under five years old remains a major government commitment, as asserted in the Indonesia Medium Development Goals 2015–2019 and 2020–2024 [6].

A variety of literature on stunting reveals that various child, parental, household and community characteristics are associated with stunting [7–9]. At the parental and household levels, several dietary and socioeconomic factors are correlated with the risk of stunting. concerning risk factor, for example, the risk of stunting in Indonesia is higher in households that have no access to safe drinking water. Household wealth status is another significant predictor, and children coming from poor households are more likely to suffer from stunting. Meanwhile, at the community level, the prevalence of stunting is higher in communities that lack access to health care [7]. In terms of protective factors for stunting, the likelihood of stunting is lower in communities where antenatal care services and integrated health and nutrition services are available [10]. In addition, consumption of diverse food within a household has also been found to lower the likelihood of stunting [11]. Furthermore, parental education is significant for maintaining child education. Children raised by educated parents have a lower risk of stunting. Previous study in 2018 explored parental education impacts on stunting, and it argued that educated parents provided more care (.e., having their children immunized and providing them with vitamin A and iodized salt), which would in turn lower the risk of stunting [8].

According to the Indonesian Ministry of Health 2020 [5] as many as 51.2% of toddlers across five provinces in West Java with the highest number of stunted children were born in a state of stunting. North Sumatra is one of the provinces in Indonesia which has a higher prevalence, while the current prevalence of stunting among children under five years old in North Sumatra was still above 20% [12]. This means that North Sumatra still faces public health problems. Based on the data above, this study examines the relationship between characteristics, knowledge of nutrition and nutritional status (H/A) of children aged 6-59 months at the Titi Papan Primary Healthcare Center, because it is one of the special stunting locations in Medan City.

2 Materials and Methods

This study was observational research with a cross-sectional design, and it was conducted in the working area of the Titi Papan Primary Healthcare Center, Medan City from June to July 2022. Titi Papan Primary Healthcare Center, Medan Deli Subdistrict, Medan City was one of the special locations for stunting handling with the highest number of cases of 82 children under-five-years (stunting). Thus, the Titi Papan Primary Healthcare Center was used as the basis for the research location. The population was all children aged 6-59 months amounting 1,313 people at the Titi Papan Primary Healthcare Center which has 16 integrated health posts, Medan Deli District. Calculated based on sample size formula, 105 children aged 6-59 months were selected through randomly cluster sampling from 16 zone at Orchid Integrated Health Post I to Orchid XVI. Data collection was carried out by cadres and nutrition enumerators. Complete primary data were obtained from 153 children through interview and

measurements, and secondary data were collected from literature studies and children profile published by the health integrated posts.

The independent variables in the study were age, birth weight, birth length, family size, family income, and knowledge of nutrition, while the dependent variable was nutritional status (H/A). Respondents were mothers who had children aged 6-59 months in the working area of Titi Papan Primary Healthcare Center. The inclusion criteria of this study were mothers who had healthy children aged 6-59 months without disability and fever during the study and were willing to take part in the study. One child per mother was selected to avoid cluttering the influence of social and genetic demographic characteristics in the same households. The research team conducted subject screening by filling out a questionnaire on the child's medical history (.e., not under the care of a doctor, not taking growth drugs, and having scoliosis, cerebral palsy, and severe back, foot and hand injuries) to determine the health of the subjects. Then the measurement of the main variable, body length, was carried out after collecting the subjects from the first stage. Furthermore, interviews were conducted with the mothers to identify the characteristics of the subjects i.e., age, birth weight, birth length, family size, family income, and knowledge of nutrition. Univariate analysis was conducted to determine the frequency distribution of all variables. Bivariate analysis was adapted to the type of data for each variable and was carried out using the independent T-test, ANOVA test, and Spearmen correlation test at a confidence level 95% (ρ=0.05). The limitation of this study is that it does not measure the diet and health status of children under-five-year-old. The Research Ethics Commission of the Faculty of Medicine, Maranatha Christian University issued ethical clearance before research begins. This study's ethics was approved by the Ethical Committee of Maranatha Christian University (approval number: No:063/KEP/VI/2022).

3 Results and Discussion

Table 1. Difference in length and height (H), weight (BB), and height per age (H/A) Z-scores based on subject characteristics[1]

Characteristics	n (%)	Height (H)	Weight (W)	H/A (Z-score)
Total subject	153 (100)	79.74±11.78	9.64±2.53	-0.99±2.13
Gender				
Boys	80 (52.3)	79.30±11.06	9.63±2.70	-0.72±2.14
Girls	73 (47.7)	80.21±12.58	9.65±2.36	-1.29±2.10
ρ[2]		>0.05	>0.05	>0.05
Age (months)				
6-23	100 (65.4)	73.44±6.443	8.31±1.66	-0.57±1.89
24-36	18 (11.8)	86.27±5.52	10.98±1.62	-1.82±1.34
37-59	35 (22.9)	94.35±11.23	12.75±1.78	-1.74±2.73
ρ[3]		<0.05*	<0.05*	<0.05*
Birth length				
<48 cm	26 (17)	80.15±9.37	9.41±2.51	-1.31±1.67
≥48 cm	127 (83)	79.65±12.25	9.69±2.54	-0.92±2.21
ρ[2]		>0.05	>0.05	>0.05
Birth weight				
<2,500 g	10 (6.5)	76.15±10.99	8.48±2.70	-1.46±1.28
≥2,500 g	143 (93.5)	79.99±11.83	9.72±2.51	-0.95±2.18
ρ[2]		>0.05	>0.05	>0.05

[1]Mean± Standard Deviation.
[2]Independent T-test, ρ <0.05
[3]Anova, ρ <0.05

The number of subjects in this study was 153 children aged 6-59 months. The percentages of male and female subjects were 52.3% and 47.7%, which was not much different. The percentage of children aged 6-23 months was greater than that of other age groups, which was 65.4%. The distribution of characteristics can be seen in Table 1.

The results of this study indicated that there were differences in height, weight, and height z-scores per age in different age groups. Based on the survey data from the Indonesian Nutrition Status Study, the percentage of stunting under-five-year-old children with stunting was24.4% in 2021, which was still more than the WHO normal standard of 20% [13].

Table 2. Differences in length and height (H), Weight (BB), and Height per age (H/A) Z-score based on family characteristics[1]

Characteristics	n (%)	Height (H)	Weight (W)	H/A
Family size				
≤4 (small)	54 (35.3)	81.54±11.42	10.28±2.61	-1.00±1.94
>4 (big)	99 (64.7)	78.75±11.92	9.29±2.43	-0.98±1.94
ρ[2]		>0.05	<0.05	>0.05
Maternal education				
Below senior high school	57 (37.3)	78.97±10.83	9.45±2.53	-1.46±1.75
Higher education and/or senior high school	96 (62.7)	80.19±12.34	9.75±2.54	-0.71±2.29
ρ[2]		>0.05	>0.05	<0.05*
Paternal education				
<Senior high school	50 (32.7)	81.05±11.41	10.08±2.73	-1.50±1.19
≥Senior high school	103 (67.3)	79.10±11.96	9.43±2.42	-0.74±2.43
ρ[2]		>0.05	>0.05	<0.05*
Mother's job status				
Working	31 (20.3)	82.77±16.15	10.36±2.77	-0.57±3.62
Housewife	122 (79.7)	78.96±10.33	9.46±2.45	-1.09±1.54
ρ[2]		>0.05	>0.05	>0.05
Father's job status				
Worker/driver	99 (64.7)	79.98±10.34	9.76±2.53	-1.05±1.92
Entrepreneur/ merchant	7 (4.6)	77.85±12.34	8.91±2.09	-1.05±0.80
Employee	15 (9.8)	73.63±7.27	8.17±2.05	-1.05±1.32
Others	32 (21)	82.26±16.23	10.13±2.66	-0.85±3.11
ρ[3]		>0.05	>0.05	>0.05
Family income				
≥3,370,645	67 (43.8)	78.12±9.21	9.45±2.39	-0.78±2.15
<3,370,645	86 (56.2)	80.99±13.37	9.79±2.65	-1.15±2.11
ρ[2]		>0.05	>0.05	>0.05

[1]Mean± Standard Deviation.
[2]Independent T-test, ρ <0.05
[3] ANOVA Test, ρ <0.05

Table 2 shows family characteristics, family size and socio-economic descriptions i.e., mother's and father's education, mother and father's occupation, and family income. Most of the mothers were graduated from senior high school years, (37.3%), and most of them were housewives (79.7%). Parents' education and occupation were factors that indirectly affect the nutritional status of children under five. The results showed that there was a difference in z-scores in mother's and father's education, but this study did not see the relationship between

parents' education and nutritional status. In several studies related to education, the low level of parental education, both father and mother, likely increases the risk of stunting [19, 20].

Table 3. Correlation of subject characteristics and mother's knowledge with nutritional status (H/A)[1]

Variable	Nutritional Status (H/A)	
	r	ρ
Age (month)	-0.42	0.000*
Birth weight	0.19	0.018*
Birth length	0.10	0.21
Family size	-0.03	0.66
Family income	0.18	0.025*
Mother's knowledge	-0.02	0.78

[1]Spearman Test, $\rho < 0.05$

The results of the Spearman correlation test showed that several variables i.e., age, birth weight, and family income had relationships with nutritional status (H/A). The results showed a significant negative correlation between children's age and Z-scores ($\rho < 0.05$). As children get older, they have the possibility to become stunted. This is in line with research by Lukman et. al. (2021) which stated that the increasing prevalence of stunting correlated with age. Children under the age of five years are susceptible to malnutrition because this period is where a process of rapid growth and development takes place, and the children require attention from their parents and the environment [21, 22].

Moreover, this study showed the socio-economic status in two categories: low (Regional Minimum Wage of < Rp 3,370,645 per month) or high (Regional Minimum Wage ≥ Rp 3,370,645 per month). A small portion of family (43.8%) above the Regional Minimum Wage of (≥ Rp 3,370,645). A significant relationship was found between family income and the nutritional status of children under five years old in Medan City. The material living conditions of the family had an influence on children's health [23]. The purchasing power and understanding of household food was determined by income [24]. This study is in line with the research of Aryastami et al. stating that socio-economic status had a relationship with stunting incidence in Indonesia. This finding follows the general hypothesis that poverty causes low birth weight and stunting [17]. In addition to socioeconomic status, other risk factors for stunting must be considered to prevent stunting in children under five years old in Indonesia.

Based on the results of statistical tests, a relationship was found between mother's knowledge and nutritional status (H/A) with a correlation coefficient (r) of -0.02 and p-value of > 0.05. This showed no relationship between mother's knowledge about nutrition and nutritional status (H/A) in Medan City. This study is in line with research by Kawengian et. al. which demonstrated a similar finding. Knowledge is an indirect cause of nutritional disorders in toddlers, and there are direct factors such as consumption patterns, infectious diseases, social and economic factors that might contribute to malnutrition [25]. Food sufficiency at the family level does not necessarily guarantee improving the nutritional status of each member.

4 Conclusion

The results of the Spearman correlation test showed that several variables had a relationship with nutritional status (H/A). The variables include age ($\rho = 0.000$), birth weight ($\rho = 0.018$), and family income ($\rho = 0.025$), and nutritional status. It is important to establish a program that focuses on accelerating stunting reduction in a region. This study provides an overview

of some risk factors for nutritional status for the policy direction overcome nutritional problems in Medan city.

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