

Relationship of nutritional status with diarrhea among children in Sumenep Regency

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Abstract

Nutritional problems in children cause many diseases, especially diarrhea. This disease attacks all age groups, children under 5 years who are most susceptible to being affected. This study aims to determine the relationship between nutritional status and the incidence of diarrhea in children under five. This study used a cross sectional with an observational research design. Sampling using the Total Sampling technique, all toddlers in Pandian Village and registered at Pandian Health Center. Sampling was carried out for 3 months starting from June 06, 2016 to August 19, 2016 with 182 toddlers. The results that using the chi square test ($\alpha = 0.05$) showed that the p value was 0.001 which means that there is a significant relationship between nutritional status and the incidence of diarrhea. In addition, the data show 72,3% children under five have been infected diarrhea and also undernourished. The nutritional status of this toddler affects about the digestive process in the body. In toddlers with poor nutritional status suffer the small intestinal mucosa as a result of the atrophic process so that enzymes that play a role in killing disease have decreased which results in a high risk of infection in toddlers.

Keywords: diarrhea; nutritional status; toddler

INTRODUCTION

Nutritional are major problem that has not been solved in Indonesia to date. Nutritional problems occur in all age groups, one of which is toddlers. Nutritional problems in toddlers are stunting, wasting and overweight which are reported in the Global Nutrition Report (GNR) 2014 Nutrition Country Profile Indonesia. The prevalence of the three nutritional problems are 37.2% stunting, 12.1% wasting and 11.9% overweight (IFPRI, 2014). Malnutrition in toddlers, if not addressed immediately, will have a bad impact and cause death, so that the nutritional status is very important known to the public (Maflahah, 2019). Nutritional status is a condition of the body caused by a balance between nutrient intake and needs. This balance can be seen from the growth variables, which are body weight, height or body length, head circumference, arm circumference and leg length (Marmi, 2012). The impact of malnutrition in children under five causes other diseases to emerge, one of which is diarrhea.

Diarrhea is a condition of abnormal or unusual stool expenditure (Kemenkes, 2011). Diarrhea is still one of the main causes of morbidity and mortality in almost all geographic areas in the world. This disease attacks all age groups but is more susceptible to children under 5 years of age, based on data from WHO that the main



cause of death in children under five is diarrhea by 14% (Depkes RI, 2011). In Indonesia, the incidence of diarrhea is 6.7% and in East Java it is 11.7% (Risksedas, 2013). Diarrhea can be caused by infection by microorganisms, either bacteria or viruses, the food consumed and psychological factors (Radlovic et al, 2015). Diarrhea in toddlers is related to age, parental education level, clean living habits, knowledge of nutritious food, and water sources around the house.

Diarrhea that occurs in children under five in Sumenep Regency there are 1613 out of 7993 children under five, which is 20.1%, this figure is much higher than the incidence of diarrhea according to Riskesdas (2013) which is 10.2%. Meanwhile, in Sumenep Regency, the coverage of toddlers with body weight below the red line was 449 toddlers or 0.80% and poor nutrition was found to be 40 toddlers or 100 (BPS Kabupaten Sumenep, 2014).

In a previous study using the Spearman's rank showed a negative correlation with a very low correlation coefficient (-0.261) with the conclusion that there was no relationship between nutritional status and the incidence of diarrhea in toddlers (Primayani, 2016). The same study was conducted by Ananda, (2017) there was no relationship between nutritional status and the incidence of diarrhea in children aged 1-60 months.

With the high rate of diarrhea in Sumenep Regency and the absence of research on the relationship between the nutritional status of toddlers and the high incidence of diarrhea in Pandian Village, as well as previous studies suggesting that there is no relationship between nutritional status and the incidence of diarrhea in toddlers, the researchers conducted research on the relationship between nutritional status and diarrhea in toddlers in Pandian Village. Knowing the relationship between nutritional status and the incidence of diarrhea is expected to help reduce the incidence of diarrhea in Pandian Village, Sumenep District, Sumenep Regency.

RESEARCH METHODS

Research Design

This research is an observational analytic study with a cross sectional design observational.

Place and Time of Research

This research was conducted on 6 June to 19 August 2016 at the Community Health Center in Pandian Village, Sumenep Regency.

Population

Population The population in this study were all children under five in Pandian Village and registered at Pandian Health Center. The data obtained from the Pandian Health Center amounted to 286 toddlers.

Sampling Technique

The sample in this study were toddlers aged 1-5 years who resided in Pandian Village, Sumenep District. The sampling technique in this study was the Total Sampling with the sampling technique was the same as the population (Sastroasmoro, 2014).

Sample Size

The larger the sample that was close to the population, the smaller the chance of generalization error. Conversely, if the smaller the sample obtained, the greater the possibility of errors (Maman, Etta 2010). In this study, the sample size was determined using the formula:

$$n = \frac{Z^2 \cdot p \cdot q}{d^2}$$

It known that Z is the 95% confidence level (1.96), the proportion of children under five with diarrhea with $p = 0.201$ (20.1%), and d error limit or absolute precision is 0.1 (10 %). So that the results of the calculation of the minimum number of samples required (n) are 62 children under five. When the research took place, it was found that there were only 182 toddlers in Pandian Village. It is known that the distribution of the population in Pandian Village is that some toddlers have moved their residence or are only temporary residents in Pandian Village.

Inclusion and exclusion

Criteria inclusion in this study were toddlers aged 12 months-59 months who were in Pandian Village, toddlers who suffered from diarrhea about 1 week ago, toddlers whose parents were willing to be respondents with signed informed consent and communicated well. The exclusion criteria in this study were toddlers who did not live in Pandian Village, parents refused to participate in the study and toddlers who were seriously ill.

Data Collection

This study research instrument was an interview used a questionnaire to mothers of children under five who had been tested beforehand and had received ethical approval with the number 72/EC/KEPK/FKUA/2016 which contained multiple choices and a short description. The question is to measure the dependent variable first, the incidence of diarrhea with the condition of increasing the frequency of defecation more than 3 times / day accompanied changes in the consistency of the stool to become soft in the last 3 months in toddlers, then the independent variable nutritional status obtained by weight index according to age (BB/U) then compared with the WHO standard (2009).

Data Analysis

This research using SPSS version 23. The data processing process in this study started from preparing the data by collecting, checking (editing), giving identity (coding), tabulating data, analyzing and interpreting data. The analysis technique includes univariate analysis to determine the initial description and bivariate analysis using chi square to determine the factors associated with the level of significance used is 95% or equal to 0.05.

RESULTS AND DISCUSSION

This research was conducted in the working area of Puskesmas Pandian Village with a sample of 182 respondents. The study was conducted visit the respondent's house, where the entire population met the inclusion criteria.

Table 1. General Characteristics of Respondents

Characteristics		Frequency (n)	Percentage (%)
Toddler's age			
	12-36 months	98	53.8
	37-60 months	84	46.2
Gender			
	Male	92	50.5
	Female	90	49.5
Diarrhea			
	Yes	132	72.53
	No	50	27.47
Nutritional status			
	Malnutrition	23	12.6
	Undernutrition	86	47.3
	Good nutrition	73	40.1

Sources: Primary data 2016

Based on the table above, respondents are at the age of 12-36 months 53.8% and age 37-60 months 46.2%. From the respondent's data, it was found that malnutrition was 12.6%, under nutrition was 47.3% and good nutrition was 40.1%. In addition, the nutritional status of the respondents tended to be undernourished, which is 47.3%. Based on the table above, it can be seen that most of the toddlers suffer from diarrhea as much as 132 (72.53%). The results of the analysis used in this study were followed bivariate analysis, as follows:

Bivariate Analysis

Table 2. The Relationship Between Nutritional Status Variables and The Incidence of Diarrhea.

Factors	Incidence of Diarrhea				Total	CI 95%	p
	Diarrhea		Not Diarrhea				
	n	%	n	%			
Nutritional Status							
Malnutrition	12	9.1	11	22.0	23	1.671-7.842	0,001
Undernutrition	74	56.1	12	24.0	86		
Good nutrition	46	34.8	27	54.s0	73		
Total	132	100	50	100	182		

Sources: Primary data 2016

Based on the results of the study using the chi square statistical test ($\alpha = 0.05$), it was found that the p value was 0.001, which means that there was a significant relationship between nutritional status and the incidence of diarrhea.

Malnutrition was a factor causing diarrhea, prolonged infection, especially in diarrhea, can lead to decreased nutritional intake, decreased intestinal absorption function, and increased catabolism (Valentina, 2020; Yusuf, 2011). In addition,

malnutrition decrease intestinal mucosal barrier protection which increases the susceptibility to enteral infections resulting in diarrhea (Kurniajati, 2015).

Research conducted Brown (2003) in his symposium said that anthropometric factors such as feeding patterns and nutritional status emerged since the 70's, while the influence of nutritional status with the incidence of diarrhea has been discussed since the late 80's. Suraatmaja's theory (2010) dan Sodikin (2011) says that the impact on toddlers with malnutrition can cause toddlers to suffer from PEM (protein energy deficiency), the mucosa in small intestine atrophy, not only the small intestine but liver and pancreas also atrophy which results in enzymes which are secreted organs such as lactase, maltase, sucrase, HCL, trypsin, pancreatin, and lipase are deficient which can result in food not completely digested, if there is a meal the pressure in the digestive tract increases which can cause osmotic diarrhea, and if allowed to continue eating there overgrowth of bacteria that were originally normal to become pathogenic so that diarrhea can occur.

Lack of nutritional status the predisposition for diarrhea in toddlers higher because negative effect on mucosal defenses with changes in immune function in the body (Brown, 2003). Decreased immune function occurs due to malnutrition can be in the form of loss of delayed hypersensitivity response, decreased lymphocyte response, decreased T-lymphocyte, decreased phagocytic function due to decreased complement and cytokines, and decreased immunoglobulin A (IgA) (Primayani, 2016; Poeverawati, 2011).

The nutritional status of children under five requires more attention because good nutritional status will increase the body's resistance to infectious diseases (Nuryanto, 2012). Poor nutritional status can inhibit physical growth, mental and thinking abilities and reduce work productivity. The type of food and the method of giving it also need to accordance with the state of body growth and intellectual development. Thus, a balanced nutrition will be obtained for toddlers (Hasdianah et al., 2014). Research conducted Mulyana (2018) found that toddlers with poor nutrition had diarrhea six times more at risk of experiencing diarrhea than toddlers with good nutrition.

In toddlers who suffer from diarrhea, the clinical symptoms that occur mostly fever (70%) as a result of the inflammatory process of infection entering the body and a continuous decrease in food intake toddlers according to the severity and duration of infection (Scrimshaw, 2003; Budihardjo et al., 2020). In addition, dehydration, hypovolemic shock, seizures and protein energy malnutrition also occur (Nanny, 2010; Amare et al., 2016). All children with malnutrition will experience repeated diarrhea, not only that but other diseases such as acute respiratory infection (ARI) and tuberculosis affected in these toddlers (Nurcahyo, 2010; Mshida et al., 2018).

Research conducted Rosari (2013) there is no relationship between nutritional status and the incidence of diarrhea in children under five with a value ($p = 0.742$). This nutritional status heavily influenced three main components such as aspects consumption, children's conditions including current and past child health, and psychosocial care (Martianto, 2006). Children under five more susceptible to infectious diseases, especially diarrhea because they have started to actively move to play so they easily contaminated dirt (Emiralda, 2006; Alamu et al., 2020). In addition, children aged

2-5 years often have the habit of buying food, both in terms of presentation and processing, so that it is kept clean so that it is easily contaminated germs that cause diarrhea (Palupi, 2009; Alamu et al., 2018).

The results of research conducted researchers found other factors that are most likely to be the cause of diarrhea in toddlers, most toddlers like snacks at random, while the behavior and frequency of indiscriminate snacks one of the factors that can affect the incidence and emergencies of diarrhea due to where to get food, drinks and the level of hygiene and sanitation of food sold is still low (Ayuningtyas, 2012). Individual hygiene factors related to the incidence of diarrhea in toddlers which causes diarrhea (Rahayu, 2019). Contamination can occur, one of which is due to food or eating utensils that infested by flies so that they can transfer germs from garbage to food. Flies are one of the creatures that play a role in the spread of diarrhea events, acting agents and/or mechanical vectors that only act as passive transfer devices with the understanding that pathogenic germs do not undergo any changes. The impact of poor nutrition on toddlers results in decreased immunity, malnutrition and makes children more susceptible to disease (Tekele et al., 2019).

Research conducted Kurniajati, (2015) suggests that there is no relationship between nutritional status and food sanitation on the incidence of diarrhea in children under five with a value ($p = 0.052$). Food sanitation is an effort to prepare, process and serve food properly to avoid contamination and foodborne diseases (Rauf, 2013). Most of the toddlers who suffer from diarrheal diseases are the result of source and host such as through water or general contact with feces that are directly transmitted by other people attached to unwashed hands and then put in their mouths, such as holding food, so there is no relationship between food sanitation with the incidence of diarrhea in toddlers but can occur due to bad environmental factors (Alamsyah, 2013).

The other factors related to the nutritional status of children under five are socioeconomic levels, education, parents occupations, and utilization of health services and protein consumption adequacy rates (Fuada, 2011; Otsuka, et al., 2019). The need for more attention to the growth and development of children at the age of toddlers is based on the fact that malnutrition in this golden age is irreversible (cannot be recovered), while malnutrition can affect children's brain development (Marimbi, 2010; Valentina, 2020). According to Marmi (2014), parents who have a high education will better understand food and choose good food for their children.

CONCLUSION

In this study, nutritional status was found to be related to the incidence of diarrhea in children under five in Pandian Village, Sumenep District. From the results of this study, the researchers reminded respondents of the importance of monitoring the health of toddlers, especially for caregivers of toddlers because at this age toddlers are susceptible to infection so that efforts are needed to improve nutritional status, as well as clean and healthy living behaviors such as washing hands with soap before carrying out activities related to toddlers. The nutritional status of toddlers is an important thing that every parent must know.

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