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CHILD DEVELOPMENT IN CHILDREN WITH MALNUTRITION

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Abstract

Problems that often occur in malnutrition in toddlers are susceptibility to disease and delays in their development. The purpose of this study was to observe the development of children under five with malnutrition. This study uses a case study description method with multiple cases. The cases taken were multiple cases with purposive sampling, with a total of 9 children under five as subjects. Data were collected through interviews, anthropometric measurements, developmental screening, and a healthy home assessment. We use descriptive analysis and pattern-matching analysis. We have a Result that seven toddlers experiencing suspected in delay development. Characteristics of the parents of 9 subjects are the subject has complete parents and living at the same home. Mothers as domestic workers. the Majority of fathers work as private workers, with unhealthy housing conditions. Characteristics of toddlers are five toddlers born with LBW, one born prematurely. Down syndrome, have a history of severe icterus, nutritional disturbances, persistent diarrhea, children completing Tuberculosis treatment, a history of epilepsy, and the other with a fever cold cough. Our Conclusions: other causes of developmental delays are due to malnourished toddlers being susceptible to disease, and low birth weight.

Keywords: child, development, malnutrition, delay development

1. Introduction

Malnutrition/poor nutrition is a condition that refers to a deficiency, excess, or imbalance in a person's energy and or nutrition intake. There are three categories of malnutrition, namely wasting (low weight for height), stunting (low height for age), and underweight (low weight for age); micronutrient-related malnutrition, which includes micronutrient deficiencies (lack of essential vitamins and minerals) or micronutrient excess; and overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes, and some cancers). WHO data in 2020 reported that 149 million children under five were stunted, 45 million were wasted and 38.9 million children were obese. Around 45% of deaths in children under the age of 5 years are due to malnutrition occurring in low- and middle-income countries, one of which is Indonesia (Yadav et al., 2016).

Sewon District is one of the sub-districts in the Bantul Regency, Yogyakarta Special Region Province which has nutritional problems in toddlers. Based on data from the Puskesmas in February 2021, it was found that 147 children

under five were malnourished, and 3 were malnourished. The nutritional status of a child is influenced by two factors, directly and indirectly. Parenting is one of the factors that indirectly cause the nutritional status of children apart from food security in the family, health care, and environmental sanitation.

Malnutrition can cause short-term problems in the growth and development of toddlers. short-term impact is a problem of infection that often occurs in children with malnutrition. The long-term impact that can occur is a decrease in children's abilities, both in motor, adaptive, language, and thinking / cognition aspects. It will even affect the child's ability to socialize, so that in everyday life the child experiences difficulties. Malnutrition will have long-term and short-term effects on the body's ability to function (Gruszfeld & Socha, 2013).

The relationship of malnutrition associated with developmental delays is found mostly in families with lower middle incomes. This is because the family's economic conditions affect the ability to meet nutrition. However, there are other causes of malnutrition, including lack of knowledge, parenting practices and inadequate child feeding which also exacerbate nutritional imbalances in toddlers. Maternal health during pregnancy has a significant effect on the condition of the fetus it contains. Many women who become pregnant during their teens experience anemia during pregnancy or chronic energy deficiency (KEK) increases the risk of premature labor and giving birth to low birth weight babies (LBW) (UNICEF, 2021)Based on the background above, the authors are interested in identifying the characteristics and developmental status of under-fives with malnutrition Based on the above background, the writer is interested in identifying the characteristics and developmental status of malnourished children under five.

2. Materials and Methods

This is a case study with multiple cases. it aims to describe in detail related to the development of toddlers with malnutrition. The subjects of this study were toddlers with nutritional malnourishment. The sampling technique was purposive sampling in cases of under-fives with malnutrition with an indicator of weight/height <-2SD in the working area of the Sewon II Health Center, Bantul, Yogyakarta. The process of research activities begins with the management of research ethics with number 2256/KEP-UNISA/VII/2022. In conducting the study, we conducted interviews, observations and direct examinations. Interviews were conducted with the subject's mothers, observing the home environment, conducting examinations, anthropometry, and developmental screening in toddlers. Data collection in this interview was recorded using an audio recorder using Indonesian and a mixture of Javanese. During the interview, verbal and non-verbal communication were used to provide appropriate feedback. For example, researchers nod in understanding or motivate participants to continue the story.

The data compilation process was carried out anonymously to maintain the confidentiality of the subject. The anthropometric examination carried out is weighing using a digital scale that has been confirmed to be valid and reliable. Measurement of body length with an infantometer, examination of child development using Form Denver II. A healthy home examination uses a healthy home questionnaire from the Ministry of Health In data processing and interpretation of nutritional status we use WHO anthro aplication. The analysis in this study uses descriptive analysis and pattern matching analysis, so that an overview of the developmental status of toddlers with malnutrition can be described and compared from initial predictions and existing facts after it was carried out study.

3. Results and Discussion

Sewon II Health Center is a health center located in the Sewon sub-district, Bantul Regency, Yogyakarta Special Region. The scope of the Puskesmas area is 2 sub-districts, Panggungharjo and Bangunharjo villages. The services at

the Sewon II Health Center include services inside the building and outside the building. Efforts made by Primary health care in improving public health include Individual Service Efforts and Community Health Efforts. Individual service efforts include general medicine, dental and oral services, maternal and child health services and family planning, consultation, laboratories, and pharmacies. This service activity is mostly carried out in the Puskesmas Building. Meanwhile, public health efforts are carried out in the form of health promotion, environmental health, maternal and child health, nutrition services, elderly services, and mental health, The services provided by primary health care in optimizing growth and development are by being directly involved in existing 19 under-five integrated service post activities. Activities carried out include identification of nutritional status, monitoring of development, direct intervention, and provision of referrals. The nutritional status of children under five is monitored in the online application system for recording and reporting on community-based nutrition. Development monitoring activities utilize the 2012 Stimulation of Developmental Intervention Detection book.

Figure 1. Subject Characteristics

Subject	mother age	father age	mother occupation	father occupation	pregnancy history	house conditions
R1	33	40	No	yes	Bed rest during 20 weeks of pregnancy, hipertention	unhealthy
R2	23	25	No	yes	HBSAg+, Anemia, urinary tract infection, hiperemesis gravidarum	unhealthy
R3	40	43	No	yes	emesis gravidarum, IUGR,	unhealthy
R4	39	42	No	yes	gemelli	unhealthy
R5	39	42	No	yes	gemelli	unhealthy
R6	39	50	yes	yes	IUGR	unhealthy
R7	31	37	No	yes	Low blood pressure in late pregnancy	heathy
R8	36	42	No	yes	spotting	unhealthy
R9	34	40	No	yes	no	unhealthy

The results of the study obtained 72.7% of mothers as housewives, and 1 mother worked as a seller. A total of 77.79% of the informants belong to underprivileged families, with jobs in the informal sector, namely handicraft workers, gas agent workers, poster sellers, workshop workers, and fish sellers. The fulfillment of household needs comes from the father's income. The monthly income generated by the family is in the range of 1-2 million rupiah. The income generated by the family is used for various needs ranging from the father's needs for work operations, payment of various monthly bills, and the operation of fulfilling one family's food. The income of a family is linear with the provision of a safe and clean environment, adequate clean water, and adequate sanitation. an environment consisting of the availability of clean drinking water, good sanitation, and healthy home conditions with toilets that are not open will reduce the incidence of stunting in toddlers. This is because poor sanitation will reduce food safety it can increase the risk of infection (Taguri et al., 2015). low- income households commonly spend a half or more of additional income on food expenditures with proportional increases of animal sourced foods generally greater than those for grains and tubers (Manley et al., 2022).

When viewed from the status of residence ownership, the majority own homes, but one subject family lives in a boarding house, 2 families live with parents who do not work. Poverty is one of the biggest factors contributing to the waste rate in children under five, this is because families have obstacles in providing food and providing nutrition

services (UNICEF, 2021). Lack of family food availability in the long term can result in malnutrition even though the toddler is not sick (Rahmah et al., 2020). Rahma, Arifin, and Hayatie (2020) in their research proved that toddlers from underprivileged families have a 10.222 times greater risk of experiencing malnutrition and malnutrition than those from well-off families. Low family income accompanied by a low level of maternal education has a high risk of nutritional problems in toddlers (Owoaje et al., 2014).

Development is the process of developing cells and body tissues that can be marked by the child's ability to carry out activities and activities. Developmental delay can be identified with reasonable accuracy using a validated screening tool (Vitrikas et al., 2017). Developmental assessment can be done with Denver II Form which has 3 interpretations of the assessment results, namely, normal, suspect and untestable. Normal means, the child is able to do all the activities shown, suspect means the possibility of a delay in his development because the child is not able to do at least 1 activity under his age, while untestable means that it cannot be assessed. Suspect can be one of the suspicions of delays in toddler development. Table 2 shows that 7 malnourished toddlers experience developmental delays. This is because malnutrition causes the child's cognitive development to be weak (Chattopadhyay & Saumitra, 2016). Developmental delay is common in malnourished boys (De & Chattopadhyay, 2019). The problems that occurred in this case (table 3) the majority experienced delays with the classification of severe disorders. This is because the child's functional age is <60% of his chronological age (Choo et al., 2019).

Malnutrition causes changes in body composition and changes in cognitive function, immune function, and muscle function (Rokhanawati & Nuzuliana, 2021). These changes are due to poor nutrition undergoing a catabolism process (breakdown of nutrients, especially protein) resulting in a decrease in muscle mass, and an increase in infection/inflammation. Changes in children's cognitive function are related to brain development. Where structurally there is tissue damage, cell differentiation becomes disordered, nerve synapses are reduced, synaptic neurotransmitters are reduced, nerve fiber demyelination is inhibited, and brain growth and maturation are also inhibited. In the end, malnutrition will interfere with the formation of the brain's neural circuits (Galler et al., 2017). In this case the number and size of brain cells will experience shrinkage. Because the brain is an important organ that functions as a center for control, thinking, emotion and behavior, the decrease in the number and size of cells will have a direct impact on their development. (Khofiyah, 2019).

Children who are malnourished will not have optimal gray matter development (brain building) so that their level of intelligence decreases. Malnourished children also experience changes in the gut microbiota. Enterobacteriaceae microbiota that interact with Enterococcus and Bacteroides will produce enteropathy (intestinal disease). The presence of enteropathy will affect the absorption of food that is less than optimal. Changes in the metabolism of macronutrients and changes in the gut microbiota result in an increase in the energy needs of malnourished children. Malnourished children have a double burden that must be met by their bodies, namely the fulfillment of energy for weight gain and catch-up growth. If the catch-up growth process is not fulfilled, the consequence is that the child experiences stunting (short posture) (Dewi & Angkasa, 2018). The impact of malnutrition in the short term is an increase in the child's susceptibility to infection. Malnutrition impairs the function of effector memory T cells leading to immune system dysfunction. A poor immune system makes a child's body more susceptible to infection, even though infection can cause the body's metabolic needs to increase and can exacerbate malnutrition (Gruszfeld & Socha, 2013).

The problem of this developmental delay begins with the birth of a baby with low birth weight. LBW increases perinatal mortality, neurological disability and chronic disease in adults while also causing impaired immune function and poor cognitive development(Joseph et al., (2014) De & Chattopadhyay, (2019)). Toddlers born with low birth weight, and accompanied by health problems will increase the risk of delays in toddlers. The development of toddlers is also influenced by parenting patterns, interactions carried out in the home, community, school environment. Positive

interactions with parenting patterns that are not temperamental given by parents make toddler development will be better (Gallegos et al., 2021)

Developmental delays in this studi have become more prevalent among children of parent with low socioeconomic status and education levels. Study showed that poor economic status (OR=2.8; 1.4–5.7) and lower education level (OR=2.5, 1.3–4.9) significantly increase the risk of developmental delay among children (Oumer et al., 2022). The majority of children who have developmental delays from mothers who do not work. This is because mothers who do not work are less intensive in providing stimulation, while working mothers leave their children in the play group so that the time left behind can be replaced by activities that can stimulate children's development in the play group (Nuzuliana et al., 2016).

Children with suspected developmental delay, should follow further specialist assessment. children may be referred to appropriate therapies, such as speech language therapy, physiotherapy, occupational therapy and behavioral interventions (eg psychologists). Children who could benefit from intensive and long-term interventions, such as those with GDD, are referred to EIPIC (Early Intervention Programs for Infants and Children) centers during their preschool years. Some children with developmental delays may require cognitive tests (eg IQ tests) and assessment of adaptive function at around six years of age. This will guide the appropriate placement of schools if they are deemed more suitable for special education schools. Children in public schools who continue to have developmental delays may need ongoing therapy services provided in hospitals or private settings (Choo et al., 2019).

Figure 2. Caracteristic and Child Development

Subject	age (mounth)	sex	weigh for height	gestasional pregnancy (week)	birth history		health problem	Denver II result	development's problem
					weight (gram)	height (cm)			
R1	30	L	-2sd-3sd	36	2000		moaning birth, Down syndrome, history of severe jaundice at birth.	suspect	The development of gross motor, fine motor, and language of children is like the development of children aged 6 months, while the development of personal social like children aged 8 months. The language development that he can do is that the child can sit without rolling over, but cannot stand on his own. The existing language achievement is

									that children can babble. Personal social children can play ball with the examiner/friends
R2	36	P	<-3sd	38	2700	47	Has a history of epilepsy at the age of 6 months, and has a history of TB disease.	suspect	Achievement of child development like an 18-month-old child. achievement of personal social development, namely being able to brush teeth with assistance. Achievement The child's language is able to say 6 words, but can't string words together.
R3	19	L	<-3sd	37	1800	39	was born at term but the weight at birth was 1700 grams. In the study of maternal weight gain during pregnancy, the mother did not experience an increase in body weight in accordance with the weight gain target. The development child during the womb experiences intrauterine growth retardation (IUGR). has a history of TB disease.	suspect	When viewed in terms of personal social development, fine motor, and language development of children according to their age, but in gross motor development, developmental achievements are equivalent to children aged 6 months.
R4	17	L	<-3sd	38	2710	47,5	fever Cold Cough	suspect	R4 and R5 are twin toddlers, with a history of LBW. Both of them have problems with language. Children can't
R5	17	L	-2sd	38	1965	45,5	fever Cold Cough	suspect	

									express their wishes in clear language but still, use the word eh.. eh … the child has not been included in the playgroup
R6	12	P	<-3sd	35	1400	40	The child suffers from nutritional disorders so the NGT is recommended by the treating doctor.	suspect	In the assessment the child looks weak, the ability in fine motor skills the child has not been able to hold objects with his strength. His ability is equivalent to a 9-month-old child
R7	53	L	<-3sd	38	3000	50	fever Cold Cough	Normal	His development is normal according to his age. Activities carried out in stimulating children's development are always included in playgroups in the surrounding environment.
R8	17	P	-3sd	40	2450	48	Persistent Diarrhea, Cough Cold fever	Suspect	Developmental problems in the Language sector. The new child is able to say one word. Children's language skills are equivalent to children aged 15 months.
R9	27	P	<-3sd	40	2700	49	Maternal weight gain of 4 kg during pregnancy	normal	normal child development according to age. But at the time of inspection, the child had problems with his eyes. Children often

									narrow their eyes as if closing their eyes. According to his mother, this problem arises because the child often sees his mother's cellphone.

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4. Conclusion

From the results of this study, it can be concluded that the majority of children with malnutrition are at risk of being delayed with the classification of severe retardation (children's functional age is <60% of their chronological age). In addition, the indirect factors of delays and malnutrition in toddlers are due to poverty, low birth weight, and an unhealthy environment. The limitation of this study is that researchers did not directly examine the stimulation that parents often give to support their development.

Suggestions that can be given are efforts to improve toddler nutrition by living a clean and healthy life and providing food consumption according to the nutritional needs of toddlers.

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