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ORIGINAL RESEARCH

NUTRITION STATUS AND COGNITIVE DEVELOPMENT IN TODDLER

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ABSTRACT

The toddler is the most important step of all stages of development. Children of this age have tremendous potential, but the potential will arise when got enough nutrition. Malnutrition in early childhood has an impact on low cognitive abilities. The purpose of this research was to determine the correlation of nutritional status with cognitive development in toddler age children in Mojowates Rejo Village, Mojokerto Regency. The research method was analytic correlation with cross-sectional approach. The population in this research were all children of toddler age in Mojowates Rejo Village, Mojokerto Regency in May 2017 as many as 62 children. Sampling technique used purposive sampling. The sample size was 59 people. The results of research suggested that more than a half (61.5%) of children with obese nutritional status had good cognitive development, more than a half (61.9%) of children with normal nutritional status had adequate cognitive development, and the majority (100%) Children with thin nutritional status had less cognitive development. Data analysis used Spearman's rho test with a result of ρ value was 0,010. There was a correlation between nutritional status with cognitive development in toddler age children. Children who had good nutrition got optimal brain development, thus supporting the child's cognitive development. Parents should provide balanced nutritional intake, control child feeding to avoid obesity, buy educative games to stimulate child development, teach nannies about stimulating child development and allow children to explore the environment without ignoring it.

Keywords

Nutritional Status, Cognitive Development, Toddler

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INTRODUCTION

The toddler is the most important age of all stages of development. So called the golden age period where the physical, motor, intellectual, emotional, language, and social development is very fast. Brain tissue of children who grow normally reaches 80% of the adult brain's weight before the age of 3 years. So that less nutrition will cause abnormal physical function, mental, and motor function (Veria&Mubarokah, 2012). If the potential in the golden age period is not maximized, there will be a loss of window opportunity or with other sentences lost the golden period that can not be replaced in the future (Yulaikha, 2008). Malnutrition in early childhood affects the low cognitive abilities and IQ scores characterized by low learning ability and achievement in school. Lack of nutrition can cause children to lose an IQ of 5-11 points (Solihin et al., 2013).

WHO data shows that cases of under-five-year-olds are 7.7% underweight, underweight by 15.0% and overweight children overweight by 6.3% (WHO, 2015). Nationally, in Indonesia, the nutritional status of children under five consist of 5.7% malnutrition, 13.9% less nutrition, 75.9% better nutrition, and 4.5% more nutrition. The nutritional status of children under five in East Java consists of 4.9% malnutrition, 14.2% less nutrition, 76.7% better nutrition, and 4.1% more nutrition (Kemenkes RI, 2015). In Mojokerto regency 2015, there are 68,144 under-five children weighed by 0.8% below the red line (BGM) (DinkesKabupatenMojokerto, 2016).

The results of preliminary study is in MojowatesRejo Village, Mojokerto Regency, in 5 mothers with toddler age children found that 4 mothers said that their children were 2-3 years old. They were able to recognize 2 colors, can mention limbs, have been able to arrange the blocks and knocking it down, the four children, the observation of the KIA book. 3 children of nutritional status on the green ribbon, and one child's nutritional status on the top yellow ribbon, while 1 mother said her child could not recognize the color because he was only 2 years old, body, can not mention his name clearly and precisely and the results of observation KIA book, nutritional status of children on the yellow ribbon down.

The results of Veria and Mubarokah (2012) study on the relationship of nutritional status with cognitive development in the golden age period in Sragen regency showed that most children with less developmental were found in children with a short body. Fisher exact test results show that there is a significant relationship between nutritional status with the cognitive development of children. The results of Hanum and Khomsan (2012) study on the correlation of nutritional status with language and cognitive development in normal and stunted children in SumurBatuBantarGebang Bekasi Village showed that normal toddlers group had the higher achievement of language and cognitive development than the group of children under five stunted.

According to Anwar (2000) in Indriyani&Permatasari (2014), nutrients consumed by toddlers will affect the nutritional status of toddlers. Differences in nutritional status of toddlers have different effects on each child's development, where if the nutrients consumed are not met properly then the development of children under five

will be hampered. If a toddler is malnourished it will affect growth limitations, susceptible to infection, inflammation of the skin and ultimately can impede child development including cognitive, motor, language, and skill compared with toddlers who have good nutritional status. Impacts experienced by children with developmental disorders include functional limitations on major life events, mental retardation characterized by cerebral palsy, specific learning disabilities, general developmental disorders, autism, visual and hearing impairment, and communication disorders (Arvin, 2009).

The government has sought to overcome the problem of nutrition by developing family nutrition improvement business (UPGK). The main activities of UPGK are nutrition counseling through family and community empowerment. Another strategy that can be done is through the family conscious nutrition or also called KADARZI. The goal of the KADARZI program is to increase family knowledge and behavior to address nutritional problems. Nutritionally conscious family indicators include; nutritional status of family members especially mother and child well, no more low birth weight baby in family, all family members consume iodized salt, all mother give only breast milk to baby until age 6 month and all balita weighed weight gain according to age (Depkes RI in Merdawati& Sabri, 2008). Healthcare efforts aimed at infants by providing health services by standards by health personnel who have clinical health competence at least four times during the age of 1-12 months (Kemenkes RI, 2013).

The purpose of this study was to analyze the relationship of nutritional status with cognitive development in toddler age children in MojowatesRejo Village, Mojokerto Regency.

MATERIALS AND METHODS

The design of this research is an analytic correlation with cross-sectional approach. In this study population is all children age toddler in MojowatesRejo Village Mojokerto regency in May 2017 that is 62 children. Sampling in this study using purposive sampling technique, so that found 59 respondents.The inclusion criteria in this research are: Children aged 1-3 years in healthy condition, Parents allow their children to research. The exclusion criteria in this research are: Children aged 1-3 years who have physical and mental disabilities.The statistical test used Spearman rho and used SPSS with 95% confidence level (α = 0,05). Nutritional status is measured based on body mass index/age. Cognitive development is measured by development checklist.

RESULTS

Table 1. Distribution Frequency of respondent Based on Family Income in MojowatesRejo Village, Mojokerto Regency in May 2017

Table2. Distribution of Respondents Frequency Based on Mother's Education in MojowatesRejo , Mojokerto Regency in May 2017

Table 3. Distribution of Respondent Frequency Based on Mother's job in MojowatesRejo Village Mojokerto Regency in May 2017

Table 4. Distribution of Respondents Frequency Based on Nutrition Status in MojowatesRejo Village Mojokerto Regency in May 2017

Table 5. Distribution of Respondents Frequency Based on Cognitive Development in MojowatesRejo Mojokerto regency in May 2017

Table 6. Relationship of Nutritional Status with Cognitive Development in MojowatesRejo Village, Mojokerto Regency In May 2017

Data	Frequency	%
Income Family		
- Above minimum wages	20	33,9
- under minimum wages	39	66,1
Mother's Education		
- Elementary school, junior high school	10	16,9
- Senior high school	43	72,9
- College	6	10,2
Mother's job		
- Working	16	27,1
- Not working	43	72,9
Nutrition Status		
- Obesitas	13	22,0
- Normal	42	71,2
- Thin	4	6,8
- Very thin	0	0
Cognitive development		
- Good	24	40,7
- Enough	29	49,2
- Less	6	10,2

Table 6 Relationship of Nutritional Status with Cognitive Development in MojowatesRejo Village, Mojokerto Regency In May 2017

Nutrition status	Cognitive development						Total	
	Good		Enough		Less			
	f	%	f	%	f	%	f	%
Obesitas	8	61,5	3	23,1	2*	15,4	13	100
Normal	16	38,1	26	61,9	0	0	42	100
Thin	0	0	0	0	4	100	4	100
Total	24	40,7	29	49,2	6	102	59	100

Based on the above table it is known that more than half (61.5%) of children with obese nutritional status have good cognitive development, more than half (61.9%) of children with normal nutritional status have enough cognitive development, and the majority (100% children with thin nutritional status had less cognitive development.

The results of Spearman's rho test showed that ρ value is 0.010 whose value is smaller than α (0,05). This shows that H1 is accepted, meaning there is relationship between nutritional status with cognitive development in toddler age children in MojowatesRejo Village, Mojokerto Regency

DISCUSSION

1. Nutritional Status In Toddler

The results of the study most of the respondents have normal nutritional status. Nutritional status is influenced by external and internal factors. external factors affecting nutritional status include income where nutrition problems due to poverty indicator is the level of family economy, which is related to the purchasing power of the family; essential nutritional education changes knowledge, attitudes, and behavior of parents or community about good nutritional status, work for mothers will have an effect on family life, and culture will affect behavior and habits. Internal factors that affect nutritional status, among others, age will affect the ability or experience of parents in the nutrition of children under five, the physical condition of children whose health is bad, is very vulnerable, because in this period of life nutrient needs are used for rapid growth, and infections can cause decreased appetite or cause difficulty swallowing and digesting food (Marmi, 2013).

Respondents with normal nutritional status were 74.4% of the respondents with the same family income or below the minimum wages, 83.3% of the respondents with highly educated mothers, and 72.1% of the respondents with unemployed mothers. The child is still very dependent on the caregiver, so the food given will tend to be the same as the caregiver. If the food menu served by the family to meet the nutritional needs of children, then the child will also be able to grow with good nutrition. Minimum wages Mojokerto regency is high, that is Rp3,279,980,00, so many families who had income under minimum wages. However, this does not mean that the family cannot meet the nutritional needs of children, because the price of nutritious food can still be reached with income under minimum wages because Mojokerto regency still provides many food sources with high nutrients but at an affordable price, especially when in families do not have many family members who are covered so as to meet the nutritional needs of children. Highly maternal education is able to receive information about nutrition so as to know the food with good nutrition for their children so that children can grow normally. Mothers who do not work have more time to care and pay attention to the growth of children and seek information about child nutrition so as to meet child nutrition.

Respondents with nutritional fat status were 30% of respondents with a family income above minimum wages, 25.6% of respondents with medium-educated mothers, and 31.2% of respondents with working mothers. High family income tends to satisfy all the children's wishes in terms of food because one of the goals people have high income is to meet the needs of family food so that families who can not control the child's eating will cause children to become obese. if the mother is unable to sort out the correct information and feel able to buy the favored food of the child where the child likes sweet food, it will cause the child to become obese. Working mothers will entrust upbringing to other caregivers so that mothers who do not give control or teach caregivers about their child's nutrition, so with high economic ability, caregivers tend to comply with the will of children so that it can cause children to become obese.

Respondents with thin nutrition status were 7.7% of respondents with equal family income or below under wages when the income is low then the needs of children are not met, so that causes children to be thin.

2. Cognitive development

The results showed that almost half of the respondents had enough cognitive development. The cognitive development is influenced by the age factor where there is a child's sensitive life to some types of learning, this sensitive period is the stage in development when the state of the brain is growing, making it easier for children to do certain types of learning (Suparno, 2007), the environment can increase or decrease the intelligence of children especially in the early days of his life; stimulation in childhood can change the size and chemical function of the brain, the more that children see and hear, the more they want to know; the off spring sets the upper limit for the level of the child's intelligence; the physiological of the brain in which the cortex of a child's brain is roughly comparable to a computer, which needs to be programmed before it can work effectively; an exploration drive where every child has the

drive to do something and learn to do something. He tries, repeats, researchers, and strives to master his environment as much as possible (Sobur, 2013, FEUI, 2010)

Respondents with sufficient cognitive development were 51.3% of respondents with family income below minimum wages, 50% of respondents with highly educated mothers, and 50% of respondents with working mothers. Families with incomes under minimum wages can buy some games at low prices to stimulate cognitive development of children, for example by buying educative toys in the form of blocks so that children are able to arrange blocks or color pencils so that children are accustomed to holding and using colored pencils. Mothers with higher education can stimulate child development by teaching children according to their developmental tasks. Mothers who work, the child will be more liberal in exploring the environment because caregivers will not prohibit children from doing anything they want when compared with parents who tend to worry if their children try to explore the environment, such as fear of solving something, fear of damaging things. Uncertain cognitive development includes drawing, scribbling, and naming full names

Respondents with good cognitive development were 40.0% of respondents with a family income above minimum wages, 50% of respondents with highly educated mothers, and 41.9% of respondents with unemployed mothers. High earnings can meet the needs of children including educational toys that can stimulate the cognitive development of children, mothers who are educated even though they have to work but can control the development of children by teaching the caregiver to stimulate child development through toys provided by parents because with a high education, mothers more easily absorb information and tend to want to know about the development of children so trying to improve the child's cognitive development. Mothers who do not work more have time with children, by allowing children to explore the environment without neglecting it will make children have good cognitive development.

Respondents with less cognitive development were 15% of respondents with a family income above minimum wages, 20% of respondents with primarily educated mothers, and 12.5% of respondents with working mothers. High family income but children have less cognitive development because high income is not used to provide games that can straddle cognitive development of children so that development is lacking. Mothers with basic education lack the knowledge of how to stimulate child development so that children are allowed to develop as they are. Mothers who work when handing the child carefully to the caregiver without asking the caregiver to teach the child, the caregiver will tend to pay attention to the growth of the child that is in the case of feeding, so that the child who looks physically fit is considered enough without paying attention to the child's development.

3. Relationship of Nutritional Status with Cognitive Development

The result of this research showed that there is a relationship between nutritional status with cognitive development in toddler age children in MojowatesRejo Village, Mojokerto Regency.The results of Veria and Mubarokah (2012) researched about the relationship of nutritional status with

cognitive development in the golden age period in Sragen regency which states that most children with less developmental are less present in children with a short body. This is in accordance with the results of Fisher exact test showed that there is a significant relationship between nutritional status with the cognitive development of children. The results of Hanum and Khomsan (2012) researched on the correlation of nutritional status with language and cognitive development in normal and stunted children in SumurBatuBantarGebang Bekasi Village showed that normal toddlers group had higher achievement of language and cognitive development than the group of children under five stunted

Lack of protein causes a decrease in total mass of cells in brain organs and decreased maturity that can ultimately lead to the impaired mental development of children. Indirectly, nutrition affects the intelligence through the mechanism of social isolation. Savings are made through the reduction of social interaction activities, activities and attention, motivation, and declining environmental exploration behavior (Sunarti, 2007). Nutrition can affect brain development indirectly. Children's and environmental experiences are important factors in brain development and cognitive development. Nutrition affects physical growth, motor development, and physical activity, which in turn can affect brain development. Malnutrition may also often be painful and therefore fussy, irritable, and withdrawn. In addition, lower levels of activity will limit the exploration of malnourished children about the environment, which can also lead to poor brain development (Prado & Dewey, 2012).

At oral stage (0-2 years), the main source of baby interaction applies through the mouth, so the sucking reflex is very important. The mouth is very important to eat, and the baby feels the arousal of oral stimulation through tasting and sucking activity. Babies feel the comfort through the oral stimulation.

Cognitive development is determined by the nutrition of children related to their ability to explore the environment. Children with normal nutritional status have good and sufficient cognitive development, indicating that with normal nutrition the child will be easier in receiving stimuli and exploring the environment so that no cognitive development is lacking. Cognitive development is sufficient because of the age of young children in the range of developmental tasks, e.g., age 30 months, can not mention the full name and cannot draw circular, but in older children can be, eg, age 35 months, children can experience increased cognitive development.

Obese children have less cognitive development, because children can not draw straight lines with pencils, this can happen because the child has not been introduced with a pencil, the child is still 16 months old where the child still likes to put something into his mouth so that parents are afraid of his son impaled pencils, this is what causes the child can not do this developmental task, the child also can not use comb because combing requires hand skill that must often be trained, child, can only put on head but not yet able to use it. Children can not follow the simple command; this can be due to 16-month-old children are still very fond of playing and know the environment, so it is difficult to give orders, where the normal

child half do not obey. The child also can not mention the name; this can be because the child is not accustomed to being called by his name, such as "adek," "sister," "dear," and other calls so the child can not mention his name.

The obese children age 23-month-old also have less cognitive development because they can not do developmental tasks using sticks to pick up distant toys, this is because previously children were not introduced using a stick, nothing of stimulation from parents to use a stick makes the child not yet know what its usefulness. Children can not make a tower of 4 cubes; this is because not all parents give children an educational game in the form cubes so that there is no stimulation to do the game of arranging cubes, the child is still asking for help to arrange the cubes. Children can not imitate vertical streaks; this is because the child still likes to scribble at his own desires, when exemplified vertical line streaks, the child still makes the streaks he likes. The child can not throw a small ball from the bottle, this is due to the lack of stimulation from parents who teach or buy a small ball toy that is then put into the bottle, because part parent does not know that the game trains children's cognitive development about how he thought to take a small ball out of the bottle. Children also can not feed themselves; this can happen because children are always fed during meals, for some parents do not want their children to look dirty and messy so as not to teach children to eat themselves, this causes the child cannot eat alone at the age that should can eat alone.

CONCLUSION

Nutritional status is associated with cognitive development in toddler age children in MojowatesRejo Village, Mojokerto District. Children who had good nutrition got growth optimal. Children who grow optimally will have a quality brain. So by getting stimulation will improve the cognitive development of children.

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