

Nutritional Status on the Cognitive Development of Early Childhood (5-6 Years) at TKQ/TPQ Al hafiz Medan

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ABSTRACT

Research purposes are analyzing nutritional status, stimulation, psychosocial factors, and influencing factors in cognitive development in preschool children. Study This was carried out in Babakan Village, District Dramaga, Bogor Regency, West Java. Study This cross-sectional design was done with respondents mothers who have children ages 3–5 years old. Fifty-eight children are involved. Spread-level education Mother Of the various percentages, the largest (44.8%) had a high school education. About 78% of per capita income families are classified as not poor and 22.4% are in the poor category. The average score of knowledge nutrition for mothers amounted to 76.7 ± 2.5 (the category currently). Most of the child preschools (84.4%) have score stimulation psychosocial in category medium (30-45). Nutritional status of toddlers showed that 15.5% of toddlers were underweight, 5.2% were underweight, 3.4% were severely underweight, and 19% of children entered the categories of short and very short (stunted). Regression results gradually show that stimulation psychosocial ($P < 0.001$), participation in early childhood education ($P = 0.002$), and nutritional status based on index height against age ($P = 0.028$) had an effect positive and significant on the development of cognitive child preschool (adjusted R^2 , 0.434; $P = 0.028$).

Keywords: cognitive, child age early, nutrition

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1. INTRODUCTION

Malnutrition is marked by an imbalance between the need for substance nutrition and the consumption of substance nutrition by someone, as well as conditional nutrition excess and lack of nutrition. Malnutrition is caused by a lack of energy, protein, or vitamins and minerals and is a current global problem. This is what hinders the growth of a flower child. For children, small, lacking nutrition can cause emaciation, stunting, and wasting, or various deficiency micronutrients. Worldwide, 149 million children experience stunting, and 45 million children experience wasting. Inadequate protein and energy intake adequate in childhood relate direct with reduced growth, and is indication from a number of problem psychosocial later day. Disadvantaged children's nutrition also shows disturbance in development and decline in functional capacity. Malnutrition in children is marked by a lack of adequate body weight, a low body weight per height, or a low body weight per body length, and is a direct contributor to disturbance skills cognitive.

The brain needs all nutrition essentials, including proteins, fats, carbohydrates, vitamins, minerals, and water, to form and maintain its structure. Therefore, adequate nutrition is very important for the development and function of the brain. However, substances nutrition micro, like substances iron, zinc, choline, iodine, folate, B12, and non-fatty acids fed up double-chain-long (LC-PUFA), have been identified as highly relevant with cognitive development. Substance iron is very important for the development of neurological influences in the brain. For two years First life, kids experience rapid growth, which increases need substance iron and put they are at risk more tall For suffer from deficiency anemia iron.

Deficiency substance iron or deficiency anemia iron can impact negative to intelligence and development cognitive in a way overall, esp If happens to children age early. Zinc is an important mineral present in the brain that contributes to the structure and function of the brain. Lack of zinc during infancy is linked with lateness in motor development and effects bad for attention and memory. Deficiency zinc is long linked with stunting. Choline is very important for the integrity of structural membrane cells and myelination. Animal studies show lack choline impact bad on memory. However, the effect of choline on cognition is Still not fully understood.

Iodine is an important mineral for the synthesis of the hormone thyroid and necessary for the development of the brain. Lack iodine can impact bad at function cognitive, and is reason main disability intellectuals around the world. Folate is a soluble vitamin in the water required for DNA and RNA synthesis as well as the formation of the nervous system. Deficiency folate in the mother at the stage of pregnancy is linked with enhancement incident abnormality congenital, including spina bifida and anencephaly. Vitamin B12 is a cofactor in various reactions necessary for catalytic neurotransmitter synthesis and function. A study has connected B12 deficiency with atrophy, cerebral disorders, and neurological disorders. Vitamin A plays an important role in visual function. LC-PUFA, in particular docosahexaenoic acid (DHA) and acid eicosapentaenoic acid (EPA), is required for brain growth and development. LC-PFAs intake is not adequate and is linked with disturbances in the development of nerves, visual recognition, and memory.

At 1000 days, first life is a period of crucial brain development where adequate nutrition is very important for growth and development of optimal cognitive abilities. This time was identified as a sensitive period for the most vulnerable children to disturbances in behavioral and cognitive domains. Overview: A systematic overview that focuses on 1000 days of first life identifies important macronutrients, such as protein and LC-PUFA, in optimizing brain development.

specifically, malnutrition of protein energy at the start of life can hinder the growth of an adequate brain, so the brain becomes smaller. Another review shows that maintenance of substance status and adequate iron and zinc contribute to adequate growth at the start of life because of the significant positive effect seen in the child's weight-for-age z-score (WAZ) and weight-for-height z-score. Apart from that, supplementation with choline in the mother or children has proven to support the development of a normal brain. Since 1000 days First life identified as period development important cognitive, makers policy has give strong emphasis on implementation policy encouraging nutrition development Healthy brains in babies and toddlers. However, public policy often does not cover child-age preschool, even though it's a 1000-day second life, which is also a critical period in the growth of a cognitive and behavioral child.

Children experience the most dynamic development during their preschool years, and acquiring skills is an important contributor to their readiness for school. specifically, memory work and control attention experience progress fast, so their impact will be broad on the achievements of academic children in the years to come. Developmental cognitive attainment in preschool years often predicts later achievements in life. However, only a little exploratory article impacts intervention nutrition on cognitive child-age preschool results. Kids who don't accept nutrition and stimulation and adequate psychosocial stimulation tend to perform poorly at school and have poor levels of cognition and education, which are related to low income later in life [46, 48, 49].

Overview systematic This aim is to synthesize and evaluate the impact of intervention nutrition on cognitive child-age preschool. Impact intervention supplementation micronutrient-based food, single, and multiple 1000 days First life is period development, and the brain is important. Adequate nutrition is very important for growth and development of optimal cognitive abilities. This time was identified as a sensitive period for the most vulnerable children to disturbances in behavioral and cognitive areas.

Overview: systematic overview that focuses on 1000 days First life identifies important macronutrients, such as protein and LC-PUFA, in optimizing brain development. specifically, malnutrition of protein energy at the start of life can hinder the growth of an adequate brain, so the brain becomes smaller. Another review shows that maintenance of substance status and adequate iron and zinc contribute to adequate growth at the start of life because of the significant positive effect seen in the child's weight-for-age z-score (WAZ) and weight-for-height z-score . Apart from that, supplementation with choline in the mother or children has proven to support the development of a normal brain.

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Based on the conceptual framework of UNICEF (1990), three must-aspects noticed for increasing quality of life in children are consumption of food (nutrition), health, and stimulation psychosocial. Additionally, patterns Parental care also plays an important role in growing an optimal child and leading to a normal and independent life.

One of aspect pattern foster care plays a role important in grow flower child is pattern feeding and stimulation psychosocial.

It's fast-growing flower child occurs at age < 5 years, and phase growth rapid (growth spurt) of the brain happens until 18 months old. Malnutrition at range ages 1-5 years result obstruction growth physical, developmental motor skills, and disorders development cognitive. Effect This can cause an IQ decrease of 15 points. Apart from that, there are shortcomings in the nutrition impact change, behavior, social decline, attention, and ability study, as well as the bad results study. Impact negatively on cognitive ability No only happens to children nutrition bad (severe underweight) but also in children short (stunted) consequences nutrition bad chronic with age early. Research in several countries reveals that malnutrition at an early age influences the growth of physical and developmental brains in children. The number of experienced children who lack overweight or underweight has reached 18.4% in Indonesia, and the number of stunted children reached 36.8% of children <5 years old. Disappearance generation will happen if the nutrition problem is resolved.

Children are assets, and generations are the successor nation. Therefore, they're expected to grow and thrive optimally as well as become healthy adults in physical, spiritual, social, and emotional ways. A child with various potentials can develop optimally and deeply in conditions like this. One of the indicators of the power quality of a human being is cognitive intelligence (such as IQ). That matter is a basic and key factor for somebody's success in the future.

Cognition, interpreted as all events and thought processes, is someone who is formed through organization and adaptation. Cognitive development refers to the way intellectual individuals adapt to the environment. Ability cognitive develop in a way gradually along with development physical and developmental system nerve central, and good factor default nor environment influence development cognitive. Congenital factors refer to factors existing in genetics since fertilization, while environmental factors are helpful factors in the cognitive development of a child, such as nutritional status and stimulation psychosocially.

Stimulation covers activities and sustainable play for stimulating the brain left and right through all over sensory and stimulating abilities like thinking, communicating, expressing emotions, and enjoying music, as well as various other abilities. Stimulation psychosocial covers stimulation education for developing cognitive, physical, motor, and social-emotional abilities. The more early stimulation psychosocial given so the more the results are good too . Although there is no indication certain about the effect of stimulation of growth and development in the brain, whether additive or interactive, children are receptive to a combination of intervention, nutrition, and stimulation. Psychosocially, their own performance is better compared to if they're the only ones accepting one. Quality brain is not only determined by intake of nutrition but also influenced by a quality stimulation environment. The more frequent and varied stimuli received by the baby in content (age 6 months pregnant) to 2–3 years old, then the more good and strong connection synapse brain right and left.

Various study show that period of development fastest intellectual occurs at 4-5 years First life. Thus, preschool is the most appropriate time to provide enrichment programs in an environment for maximizing intellectual development. Study This is done for knowing characteristics of social economy family, analyzing nutritional status and development of cognitive child preschool, knowing level stimulation psychosocial in children preschool, and analyzing influencing factors for cognitive child age preschool.

2. RESEARCH METHODS

Study This was carried out at TKQ/TPQ Al Hafiz. Study This study is cross-sectional, involving mothers who have children in preschool as respondents. The subject study is child preschool. Ages 3-5 years are selected through random sampling and criteria inclusion, as follows: (1) children in preschool still have mother; (2) stay together with a mother; and (3) live in Babakan Village. Sample size was calculated using Slovin's formula with an error value of $0.1 + 10\%$. Fifty-eight children are involved.

The data covers aspects of social economy. House stairs (level education mother, knowledge nutrition, and per capita income family), participation children in PAUD (Early Childhood Education = education child age early childhood [PAUD]), nutritional status, cognitive development child at age preschool, and stimulation psychosocial moment This. Condition, social economy, family, and involvement of children in education were obtained through a questionnaire. Nutritional status child be measured in a way anthropometry. Development data cognitive and stimulation psychosocial were collected with the use of questionnaires and direct observations.

Mother's education shared into four categories: school elementary, school intermediate first, school intermediate above, and university or college tall. Instrument knowledge nutrition consists of the 17 questions; it covers content nutrition food, substance influencing nutrition intelligence child, and grow flower child. Every answer A correct answer is given a score of 1, and an incorrect answer is given a score of 0. The total score changed to low (< 60%), medium (60–79%), and high (> 80%). category. Nutritional status data for children, namely Z score according to body weight age (WAZ), Z score height according to age (HAZ), and Z score body weight according to body height (WHZ), was obtained through measurement anthropometry (direct weight and height) and processed with

the use of method anthropometry. Device WHO Anthro software 2005. Developments cognitive child assessed use instrument development children developed by the Indonesian Ministry of National Education.

Three twelve items represent aspects: using symbols, understanding identity, understanding causality, ability to classify, and understanding numbers. All aspects describe task development during the cognitive period of Piaget's preoperational [11]. Stimulation psychosocially can be measured using the Home Observation for Measurement of the Environment Inventory with children aged 3-6 years, which was developed by Caldwell and Bradley [2]. Instrument This consists of 55 related items with eight aspects: 1) toys and materials learning (stimulation learning), 2) stimulation language, 3) stimulation academic, 4) pride and love dear, 5) acceptance (punishment positive), 6) exemplary, 7) variation stimuli, and 8) environment physique. Aspects of toys and materials learning (stimulus learning) include giving a child facilities such as puzzles, cards, colors, and books with pictures.

Question item score for every variable summed and categorized into intervals, Nutritional status data is analyzed using the WAZ, HAZ, and WHZ indices. The standard used to determine nutritional status in children < 5 years old is the National Center for Health Statistics/World Health Organization (WHO) standards. Stimulation data is psychosocially processed by adding up the scores of each dimension, and the total score is categorized as low (0–29), medium (30–45), and high (46–55). The higher the score combined with each dimension and total score, the more good stimulation psychosocially provided respondents. The cognitive development data is processed with an add-up score for each item, which is changed from a percentage to a category: low (< 60%), medium (60–79%), and high (> 80%). development of cognitive skills. The progression score of the cognitive child highest is 100%.

3. RESEARCH RESULTS & DISCUSSION

Spread-level education, Mother Enough variety and percentage The largest (44.8%) occurred in the senior high school category (Table 1). Twelve percent Mother has succeed finish education until university level. As many as 8.6% of mothers do not finish school basic, and the rest, amounting to 22.4%, only finish education level 1. Although level education Mother relatively low, however all over Mother can reading and writing.

Table 1. Categories respondents and children (n = 58)

Category	N	%
Mother's Education		
- Kindergarten	5	8.6
- elementary school	13	22.4
- JUNIOR HIGH SCHOOL	8	13.8
- high school	25	43.1
- College	7	12.1
Income		
- Category Middle down	13	22.4
- Category Middle to above	45	77.6
Knowledge nutrition		
- Not enough	10	17.2
- Enough	19	32.8
- Good	29	50
Participation in Development child		
- Do not participate	26	44.8
- Follow participate	32	55.2
Stimulation psychosocial		
- Low	3	5.2
- Enough	49	84.4
- Tall	6	10.4
Nutritional Status		
HAZ	3	5.2
- Experience obstacle Enough critical		
- Experience obstacle currently	8	13.8
- Normal	47	81
WAZ		
- Underweight	9	15.5
- Normal	45	77.6

- Excess weight	4	6.9
WHZ		
- Wasted vain	2	3.4
- Wasted	3	5.2
- Normal	48	82.8
- Excessive	5	8.6
Development Children's Cognitive		
- Low	12	20.6
- Enough	28	48.2
- Tall	18	31.2

From the category per capita income obtained, there are 77.6% of families classified as prosperous or intermediate to above, and 22.4% of families classified as intermediate to lower. Whereas for category knowledge nutrition, mother knowledge nutrition is a precondition important in changing attitudes and behaviors toward nutrition. Knowledge score nutrition Mother ranges between 7 and 17, or 41% to 100% of the score, with a maximum of 100%. Almost half of mothers own knowledge relative nutrition is good (50%), whereas the rest own knowledge nutrition is moderate (32.8%) or bad (17.2%). The average score for knowledge of nutrition for mothers amounted to 76.7 ± 2.5 (category currently).

Based on the spread of knowledge, nutrition Mother-to-be nutrition food, some big mothers (86.4%) answered correctly about the benefits of DHA and omega-3 fatty acids in milk. However, lots of mothers who don't know protein functions as nutrition Viewed from spread knowledge nutrition Mothers who grow flower children, 84.7% know that the minimum body weight must be achieved by the time the child is 2 years old. But mothers still do not know about the information contained in the KMS (Card Towards Healthy = card going to health). Only 66.1% of mothers answered correctly when asked about the colored line function in KMS for monitoring weight in children < 5 years.

Participation Mother-in-education child-age early childhood education (PAUD) is around 55.2%. Meanwhile, 44.8% of mothers do not participate in education for children. Then the prevalence of wasted children according to WHZ is 5.2% and very thin (very thin) is 3.4%. Prevalence category HAZ children short and very short by 19%, and no someone came in category tall. Prevalence in category low based on WHO stunting criteria is < 20%. Nutritional status: the child being measured with WAZ shows that 77.6% of preschool children have good nutritional status, 15.5% are skinny, and the rest have excess weight.

In the category of stimulation psychosocial, in part, big child preschool (84.4%) had a stimulation psychosocial medium (30–45). More from my own half-sample score currently for stimulation learning, pride and love, darling, stimulation academic, exemplary, and variation stimulation. Stimulation and receptivity scores: language in general enters category high, while almost half of the sample is in category environment physique low. Then, on the categories of development cognitive child, there is a percentage: the largest (48.2%) children are in the category of development cognitive moderate (60–79%), and as many as 31.2% of children are in the category of high (>80%), and the rest are in the category of low (< 60%).

Correlation of various types of variables with cognitive development; among them are education mothers, per capita income, knowledge nutrition mothers, participation of children in pre-school (PAUD), stimulation psychosocial, and nutritional status. Tables 2 and 3 present map various score / level development cognitive related children with category.

Table 2. Development scores cognitive and its correlates with various variables

Category	N	Progression score cognitive child (%)	Correlation test between development cognitive
Income			$r = 0.304$ $p = 0.019$
- Category Middle down	13	65	
- Category Middle to above	45	72	
Knowledge nutrition			$r = 0.327$ $p = 0.011$
- Not enough	10	64.5	
- Enough	19	65.3	
- Good	29	76.9	
Stimulation psychosocial			$r = 0.513$ $p < 0.001$
- Low	3	51.9	
- Enough	49	70.3	
- Tall	6	84.8	
Nutritional Status			
HAZ	3	58.3	$r = 0.368$ $p = 0.004$

- Experience obstacle Enough critical			
- Experience obstacle currently	8	63.5	
- Normal	47	73.2	
WAZ			r = 0.373 p = 0.004
- Underweight	9	60	
- Normal	45	71.3	
- Excess weight	4	88.6	
WHZ			r = 0.187 p = 0.155
- Wasted vain	2	73.8	
- Wasted	3	73.9	
- Normal	48	68.7	
- Excessive	5	87.9	

Table 3. Chi-square test scores development cognitive and various variables

Variable	Development Value Cognitive	
	Low (<60%)	High (>60%)
	N (%)	
Education		
- Category low	9 (75.0)	17 (37.0)
- High Category	3 (25.0)	29 (63)
Observe Development child		
- Yes	2 (16.7)	24 (52.2)
- No	10 (83.3)	22 (47.8)

The results of the chi-square test ($P = 0.018$) showed a significant positive connection between level of education and the development of cognitive children (Table 3). Development level cognitive child increase along with increasing level education Mother. Children from family prosperous own score development distant cognitive more high (72%) in comparison children from poor families (65.1%). There is a positive and significant connection between income per capita family and the development of cognitive children (Table 2). Income per capita and family size tend to increase score development in cognitive children. Stable families, in a way, have the opportunity to give their relative upbringings more good compared to families who aren't independent in a way.

There is difference big in score development cognitive child between Mother with level knowledge nutrition low / medium and mother with level knowledge nutrition high (Table 2). There is a positive correlation ($P = 0.011$), indicating that the more good nutrition a mother has, the more good progress a cognitive child makes. The chi-square test (Table 3) shows a connection between participation in early childhood education and the cognitive development of children ($P = 0.028$). Children who attend PAUD tend to develop more cognitively compared to kids who don't follow education. Table 2 shows that development cognitive Lowest found in children who receive it stimulation psychosocial bad, meanwhile child with stimulation psychosocial tall have score development cognitive highest ($P < 0.001$). Stimulation psychosocial correlated significant with development cognitive child.

observon theBasedindexZ index, severely stunted chav the lowestscore forve score deve (58.3%)(58.3%) which increasewith theong with enhancement nutritionalcategory. Likewise with WAZ index showing exists enhancement score development cognitive along with improving nutritional status child results are resulfrom theeen from difin cognitivece score devescorognitive between child nutritandbad with child nugood. A child with anild with und ownht owdevelopsecognitivelyognitive by 6lessfthanmapared twith aild with normal nutrstatus, whose statusdevelopsecognitivelyognitive by 71.3% (Table 2). There isn't any connection observed significance between nutritional status (WHZ) and cognitive development.

Regression test results gradually show that stimulation psychosocial ($P < 0.001$), participation in early childhood education ($P = 0.002$), and nutritional status based on index height against age ($P = 0.028$) have a positive and significant influence. influential to the development of cognitive child preschool (adjusted R^2 , 0.434, $P = 0.028$; Table 4). This result show that 43.4% development cognitive child can explained by the third variable. With so, increasingly good stimulation psychosocial, PAUD participation, and nutritional status will improve cognitive development in preschool children.

Research result This shows that education and mother have a role important to the development of cognitive children because, at an enhancement level, education and mother have an impact on increasing the average score of cognitive development in children. Education starts with experience. Studying someone makes it possible for them to

understand various objects, whether positive or negative. These results, in line with research, show that education is influencing factors in the development of cognitive children. An educated mother is more open to things new. Because it is easier to get information beneficial from the media, more children understand development. Not so case with moms educated less low understand and tend dominate his children .

Good maternal education and sufficient income No optimal support for the development of a cognitive child without knowledge and good nutrition. Our research results show a trend that mothers with knowledge nutrition have a child with a higher cognitive score compared to mothers with low knowledge nutrition currently or bad. Mother owns knowledge of good nutrition and tends to give a pattern of eating healthy to her son to fulfill his need for nutrition. This is in turn impact positive on development cognitive child.

The prevalence of a child with underweight is 15.5%. The criteria set by the Ministry of Health of the Republic of Indonesia in 2002 stated that problems in public health happen if prevalence of children with underweight > 10% and percentage of underweight children > 5%. Therefore, the location of our research has a health-marked society with a prevalence underweight because of wasting exceeding the specified limit. Regression test results gradually show that stimulation psychosocial, PAUD participation, and nutritional status of children based on the HAZ index have a significant and positive effect on cognitive development in preschool children. Participation child in PAUD and stimulation good psychosocial increase development cognitive in children.

Intelligence level a child at an early age determines the direction of life in adulthood. Therefore that, increasingly tall parents ' knowledge and abilities in educate and nurture her child at that age early, then the more big possibly parents capable give various stimulation constructive that will be speed up development intelligence his son.

A child's development intelligence will be more optimal if involved in preschool. Participating children in the PAUD program have a higher score for cognitive development compared to kids who don't attend an early childhood education program. ECE prepares children of preschool age for education. A study by the National Education Department's Balitbang Research and Development Center in 1999 showed there is an influence of positive PAUD on readiness school children. Student school base class one who attends PAUD shows difference significant in development cognitive, incl readiness reading, writing and arithmetic, development expression self, development socio-emotional, and abilities help self Alone.

Different from stimulation provided outside the home in PAUD, stimulation psychosocially provided by the mother is carried out in the environment of the house. The percentage sample highest in our research is in the stimulation psychosocial category currently. Stimulation psychosocial is effort education for developing ability cognitive, physical, and motor, as well as ability social and emotional. Development theory and cognitive Piaget stated that children in preschool are in the category of thinking pre-operational. They start with an introduction to function symbolic, i.e., the ability to use something as a symbol to represent something else.

Therefore, that's stimulation that is very important because children are taught to draft color, shape, and size. Furthermore, the child was taught about draft space and dimensions, as well as the introduction number. With so, increasingly big stimulation provided so ability child in know symbol will the more Good . Children need a lot of knowledge to analyze their words and hear; with that, some knowledge of language must be introduced from an early age [19]. Most of the our sample (83.1%) had level stimulation high language from Mother they. This matter is marked by its height proportion. Mom started teaching his son what the name of the object is. Children are also taught about requests for sorry, greetings, accepting love, and expressions of greetings.

4. CONCLUSION

Research results show that child-aged preschoolers who experience severe stunting have the lowest average cognitive development score, namely 58.3%. This is an important finding because stunting conditions describe malnutrition as chronic. Study previously show that the nutritional status (dwarf) has influence negative to development Skills motor smooth and rough as well as ability language. Children who experience stunting at 2 years of age still have a lower cognitive development compared to normal children after that. Although good nutrition increase development cognitive child, however stimulation psychosocial and engagement child in education child age Early childhood also plays a role important as factor intermediary development cognitive. We conclude that nutritional status, stimulation, psychosocial stimulation, and participation of children in PAUD play important roles in the development of cognitive skills in preschool. Good nutrition can help children prepare themselves to accept stimulation psychosocially and optimally. However, optimal cognition cannot be achieved if only supported with good nutrition without effort and good stimulation too. There is intervention nutrition and stimulation psychosocial expected can give contribution to development cognitive optimal child.

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