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The Influence of Development Stimulation Education in Mothers Over Child Cognitive Development

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Abstract. Early detection coverage of child development which is still low affects the optimum human resources formation indirectly. Parents as the main caretaker mostly have lack of knowledge about development stimulation as the main key of child development. The study is to investigate the effect of child development stimulation education in mothers over child cognitive development of 12-24 months old. The *quasi* design of study was implemented at Purworejo Primary Health Centre. The samples were mothers who have 12 – 24 months old child and were divided into 2 groups: intervention group (with intervention) and control group (without intervention). The samples were taken as many as 30 samples with 10% additional samples which were taken using *Cluster Random Sampling*. The follow up was performed in 6 weeks to observe the development score change. The data analysis was done through 3 steps: univariable by using frequency distribution and *mean*; bivariable by using *t-test*; and multivariable by using *linear regression*. The result of this research was there were differences of the mean increase in children's cognitive development scores significantly between the intervention group and the control group (p-value = 0:03). It could be concluded that the education of developmental stimulation affected on the increase of children's cognitive development scores. It is suggested to give routine education for mothers on good and guided development and to create training for cadres about stimulation and early detection of child development.

INTRODUCTION

The keyword of nation development in developing country including Indonesia is human resources. In creating qualified human resources, early maintenance is very important by considering child health especially under five. The optimum human resources development both physical and psychological health depends on the growth and development in the early ages.

A guided and correct monitoring of child growth and development guarantees an optimum child development which creates qualified, intelligent, responsible and contributes to the natioN [1]. The key success of child care especially in the under five years old is on the parents because almost of all child's lifetime is spent with his parents [2].

One of the way to assist the child to grow and develop optimally is by giving stimulation to stimulate child's basic ability which is started as early as possible as well as continuously in every opportunity. The lack stimulation can lead to the disorder of child's growth and development even permanent disorder [3].

The child development coverage especially in under five at Purworejo is still low. The low coverage shows that there are many children whose growth and development are not monitored. Further, the early growth and development detection of children does not use the real instrument namely KTSP or *Denver* II but by using a glance monitoring that the child look healthy and active.

As stated before, the reasons encourages the researcher to investigate the influence of child development stimulation education in mothers over 12-24 months old child cognitive development at Purworejo primary health centre of Purworejo region. The objective of the study is to investigate the influence of child development stimulation education in mothers over 12-24 months old child cognitive development.

Development is the aspect of progressive adaptation towards the environment which is qualitative in nature for example the increase of functional capacity of some smaller skills mastering [4]. Development is a series of continuous, organized and related body organ function. Like growth, development also has distinctive identifying mark as a permanent pattern although the variety is very broad [5].

In child development, there is a critical period in which important stimulation is needed to develop the potential and thus, it needs serious attention. Stimulation is an important part in child growth and development. A child who receives guided and organized stimulation will grow fast compared to the child who does not receive or lack of stimulation [1].

Children have normal growth and development which is a result of many factors interaction which influence their growth and development and one of them is stimulation. Lack of stimulation can cause growth and development disorder and even can cause permanent disorder [3]. Health education is an intervention or effort addressed to behavior so that the behavior is in accordance with health. The effect from health education on the public behavior change will take a long time [6].

EXPERIMENTAL

Research Design

The study is a *Quasi Experiment* using design *Non-Equivalent Control Group Design*. This study compares the cognitive development of children aged 12-24 months in the group whose mothers had received intervention stimulation developmental education with groups of women who were not given the intervention.

Research Subject

The population in this study were all women who still have children aged 12-24 months who reside in Purworejo Primary Health Center. The sample in this study was divided into two groups, intervention and control groups. The intervention group was a group of mothers who was given stimulation developmental education, while the control group is a group of mothers who were not given the stimulation developmental education. Sampling was done by cluster random sampling method. Determination of the sample size is calculated as the sample size to test the hypothesis 2 unpaired proportions, with a 95% confidence level (1.96) and the power of the study to 80% [7]. Obtained 20 samples of the intervention group and the control group of 20 samples that have met the inclusion and exclusion criteria. The sample is calculated based on an identical study in the United States regarding the provision of stimulation of child development [8].

Research Instrument

The instrument used was a structured questionnaire to determine maternal age, maternal education, maternal employment, parenting nutrition, stimulating, number of children and sex of the child. The Bayley scale (BSID form) is used to measure the cognitive development of children according to age. Bayley scale used to measure cognitive development of children [9].

Data Analysis

The collected data were analyzed by descriptive and analytical study of all the variables. Invariable analysis was performed to obtain the picture of each research variable's characteristic by presenting frequency distribution; the percentage of each variable. Bivariate analysis was done to find out the amount of treatment effect namely mean different and statistical test used *Independent Sample t-test*. The influence of independent variable on dependent variable which consider other external variable is revealed by multivariable test namely *Linear Regression.*

RESULTS AND DISCUSSION

Overall respondents in this study are 40 children at the age of 12-24 months. There is one kid who can not be assessed progress due to illness. So successful in the analysis of as many as 39 children, divided into 20 children in the intervention group and 19 children in the control group.

TABLE 1. Frequency Distribution of Respondents Characteristic and Homogenity

Mother's caharacteristics	Group				χ^2/t	P
	Intervention		Control			
	n	%	N	%		
Mother's education level						
High	17	85,0	6	31,5	11,5	0,001
Low	3	15,0	13	68,4		
Maternal employment status						
Not working	11	55,0	14	73,7	1,5	0,22
Working	9	45,0	5	26,3		
Nutrition Care Pattern						
Good	13	65,0	11	57,9	0,21	0,65
Enough	7	35,0	8	42,1		
Number of children						
1 child	6	30,0	9	47,4	1,2	0,27
≥2 children	14	70,0	10	52,6		
Sex of child						
Male	11	55,0	9	47,4	0,23	0,63
Female	9	45,0	10	52,6		

Univariable analysis show for the intervention group, most of the mother's education level are higher education (85.0%). Maternal employment status is mostly not working or housewife (55.0%). Nutrition care pattern of breastfeeding and complementary feeding are given by mothers to their children has largely been good (65.0%). The number of children mostly have more than one child (70.0%) and ex of the child mostly male (55.0%).

As for the control group, most of the mother's education level with low education (68.4%). Maternal employment status is mostly not working or housewife (73.7%). Nutrition care pattern of breastfeeding and complementary feeding are given by mothers to their children has largely been good (57.9%). The number of children mostly have more than one child (52.6%) and the sex of the child are mostly women (52.6%).

TABLE 2 Frequency Distribution of Child Cognitive Development

Variable	Intervention (n=20)		Control (n=19)		χ^2/t	P
	Mean	Min-max	Mean	Min-max		
Cognitive aspect						
Before	95,3	75-115	98,2	70-125	-0,69	0,49
After	121,5	80-145	112,4	90-130		

Table 2 shows in the intervention group, cognitive development of children before the mother given educational stimulation has a mean 95.3, Whereas, after the mother given educational stimulation has a mean of 121.5. As for the control group, cognitive development of children before the mother given educational stimulation has a mean of 98.2, and after the mother given educational stimulation has a mean 112.4.

TABLE 3 Independent t-test analysis of Stimulation Education to Change in Cognitive Aspects of Child Development

Variable	Before mean±SD	After mean±SD	t	diff	Diff of mean	95%CI	P
Cognitive Aspect							
Intervention	95,3±2,9	121,5±3,9	6,4	26,2	12,0	1,28 – 22,79	0,03
Control	98,2±2,9	112,4±2,8	4,3	14,2			

Table 3 shows the cognitive aspect, the difference of the mean difference between the intervention and control groups was 12.0 to 2.3 t and a p-value of 0.03 ($p < 0.05$). This shows that there are significant differences in the mean difference of cognitive development scores between the intervention and control group.

TABLE 4 Linear Regression Analysis of Education Stimulation Effect on Cognitive Development Children with Variable Control Affairs

Variables	Model 1 Coef CI 95%	Model 2 Coef CI 95%	Model 3 Coef CI 95%
Treatment	12,04 (0,029) 1,28-22,79	12,25 (0,029) 1,35 – 23,15	15,60 (0,042) 0,57 – 30,63
Nutrition Care Pattern		-3,00 (0,0590) -14,19 – 8,19	-3,65 (0,0611) -18,14 – 10,85
Stimulation			-0,08 (0,819) -0,83 – 0,66
Mother's education level			-4,68 (0,543) -20,16 – 10,81
Number of children			1,75 (0,772) -10,45 – 13,95
Maternal employment status			1,19 (0,869) -13,32- 15,70
Constanta	14,21	15,95	23,03
R^2	0,12	0,13	0,15

Model 1 shows the treatment of the education has regression coefficient of 12.04 with a value of $p < 0.05$, which means that there is a relationship between education provision stimulation with increased scores for cognitive development of children. R^2 value of 0.12 means that the provision of education can influence changes in cognitive development scores at 12%.

In model 2 variable stimulation educational administration still affect the cognitive development of children ($p = 0.029$), while giving stimulation has no effect on cognitive development of children ($p = 0.590$). Value gained 0.13 R^2 can be concluded that the provision of educational stimulation in women with controlled predict the sex of the child can be a child's cognitive development was higher by 13%.

Model 3 variable stimulation educational provision remain in effect ($p = 0.042$) on the cognitive development of children, while all external variables did not significantly ($p > 0.05$). Value gained 0.15 R^2 can be concluded that the provision of educational stimulation in women with controlled external variables can predict the cognitive development of children is higher by 15%.

Based on the modeling presented in table 4, selected model 1 that is stimulation education without be controlled by the outside variables.

Characteristics of study subjects between the intervention and control groups in this study were homogeneous. Based on the statistical test showed that there was no significant difference in the nutritional characteristics of parenting, number of children, and the mother's occupation between the intervention and control groups ($p > 0.05$). It shows that the ability of the two groups was the same early (not much different), although for the characteristics of maternal education were no significant differences between the intervention and control groups. If the baseline characteristics of both groups, so if there is a change in the increase in knowledge, attitudes and skills can be ascertained by a given intervention, and not by other factors [10].

Based on the results of the bivariate analysis showed that stimulation education for mother give a significant difference to the scores of cognitive development of children aged 12-24 months. It can be seen from the changes in a child's cognitive development scores were greater in the intervention group than the control group.

The mean value of cognitive development in children whose mothers had been given a stimulation education increased by 26.2 points, while the control group difference in their mean value of 14.2 points. Differences in the mean difference in cognitive development between the intervention and control group was 12 points with p value of 0.03. This result means that the provision of stimulation education increase and affect the child's cognitive development effectively. Cognitive development can not be separated from genetic and environmental factors. Family environment is one environment for children to obtain stimulation [11]. This is also supported by research Albers, et al. (2010) which states that the stimulation can encourage baby's cognitive development [12].

This is in line with research conducted by Walker in 2005 who also said that low cognitive ability in children can be corrected by giving early stimulation [13]. Likewise with other research on child development in developing countries that indicate that one of the factors that play a role and achievement of optimal child development are psychosocial factors. Included in the psychosocial factors is one parenting factors include cognitive stimulation and opportunities for children to learn [14].

In this study, stimulation of education given to the mother alone as primary caregivers in the intervention group while the number of working mothers is greater than the control group and did not assess how family upbringing to the environment outside the family, especially the nanny when the mother left work. According to the Posyandu cadres explained that children in the intervention group many kept by caregivers, especially

mothers who work, but some respondents also there that still use the caregiver even though the mother does not work. The results of this study are not consistent with studies conducted Huang, who said that mothers who are knowledgeable tend to spend the time to teach their children [15]. Research supports the claim that maternal employment negatively affect cognitive abilities of children in the first years, but did not settle and will change as older age [16]. When entering the child's school will socialize with others so the ability of children will increase. Slightly different from Notoadmodjo statement that people who work are always working to stay healthy in order to carry out its activities as workers [17].

Levels of formal education is the basis of intellectual knowledge of a person. This relates to the knowledge, the higher one's education, the greater its ability to receive information so that knowledge more widely. The results of this study are not consistent with the statement that the low parental education may influence preschool children achieve cognitive development [18]. Mothers with low education tends to be unable to provide the optimal stimulation of development so that the child is not able to achieve the optimal development anyway. In this study it can be concluded that the lack of mother's education is not a limiting factor in the mother to stimulate the development of children so that the child's ability to develop optimally if the mothers are given information on child development appropriate stimulation.

CONCLUSION

According to the research result there were differences of mean scores increase between children's cognitive development in mothers who take a part in education of developmental stimulation with mothers who did not take a part in education of developmental stimulation. It can be concluded that the education of developmental stimulation affected on the increase of children's cognitive development.

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