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# The effect of maternal role identity application on cognitive development in stunting children aged 1-3 years in a public health center

*by* Diyah Arini

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# The effect of maternal role identity application on cognitive development in stunting children aged 1-3 years in a public health center

El efecto de la aplicación de la identidad del rol materno en el desarrollo cognitivo en niños con retraso del crecimiento de 1 a 3 años en un centro de salud pública

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## SUMMARY

**Introduction:** Disorders of cognitive development in children aged 1-3 years are generally caused by stunting conditions at the role of mother care that is less than optimal. This study aimed to determine the effect of maternal role identity on cognitive development in children aged 1-3 years in the public health center.

**Methods:** The research design used a quasi-experiment with two groups pretest-posttest design. A simple random sampling technique was used to select 60 mothers with children aged 1-3 years with cognitive developmental disorders. The instrument is an observation sheet on applying maternal role identity according to the intention-based maternal role

attainment module and a capture scale assessment sheet. Data analysis was undertaken by using paired samples t-test and independent samples t-test.

**Results:** The results showed that most mothers had stunted children aged 12-24 months (46.7%) and males (66.7%). Applying maternal role identity according to the intention-based maternal role attainment module effectively increased cognitive development in stunting and normal children aged 1-3 years ( $p\text{-value} = 0.0001$ ).

**Conclusion:** It is highly recommended that the intervention for applying the mother's role according to the intention-based maternal role attainment module be implemented to increase the role of the mother's care in nurturing and stimulating children's cognitive development. Therefore, Public health center cadres need to provide counseling related to the application of the intention-based maternal role attainment module.

**Keywords:** Cognitive development, learning module, maternal role attainment, stunting, toddler children.

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## RESUMEN

**Introducción:** Los trastornos del desarrollo cognitivo en niños de 1 a 3 años generalmente son causados por condiciones de retraso del crecimiento y el papel de la madre que es menos que óptimo. Este estudio tuvo como objetivo determinar el efecto de la identidad del papel materno sobre el desarrollo cognitivo en niños de 1 a 3 años en el centro de salud pública.

**Métodos:** El diseño de la investigación utilizó un diseño cuasi-experimental con dos grupos pretest-postest. Se utilizó una técnica de muestreo aleatorio simple para seleccionar 60 madres con niños de 1 a 3 años con trastornos del desarrollo cognitivo. El instrumento es una hoja de observación sobre la aplicación de la identidad del papel materno según el módulo de logro del rol materno basado en la intención y una hoja de evaluación de la escala capute. El análisis de datos se llevó a cabo utilizando la prueba t de muestras pareadas y la prueba t de muestras independientes.

**Resultados:** Los resultados mostraron que la mayoría de las madres tenían niños con retraso del crecimiento de 12 a 24 meses (47,6 %) y del sexo masculino (66,7 %). La aplicación de la identidad del papel materno de acuerdo con el módulo de logro del papel materno basado en la intención aumentó efectivamente el desarrollo cognitivo en niños normales y con retraso del crecimiento de 1 a 3 años (valor  $p = 0,0001$ ).

**Conclusión:** Se recomienda encarecidamente que se implemente la intervención para solicitar el papel de la madre según el módulo de logro del papel materno basado en la intención para aumentar el papel del cuidado de la madre en la crianza y estimulación del desarrollo cognitivo de los niños. Por lo tanto, los cuadros de los centros de salud pública deben brindar asesoramiento relacionado con la aplicación del módulo de logro del rol materno basado en la intención.

**Palabras clave:** Desarrollo cognitivo, módulo de aprendizaje, logro del rol materno, retraso en el crecimiento, niños pequeños.

## INTRODUCTION

Becoming a mother is a valuable yet challenging experience as a new role and responsibility in women's life. Becoming a mother requires knowledge, skills, and the ability to adjust to physical, psychological, and social status (1,2). The achievement of the mother's role is a process where a mother can reach her ability in carrying out her role as a mother and integrate her motherly attitude until they get a new role where they gain self-confidence and harmony with their new identity (3). Maternal identity is formed four months after giving birth. In the first year after the birth of a child, 4 % of mothers fail to establish a maternal identity as maternal identity peaks four months after birth. Mothers said they felt less competent and their observed maternal competence decreased significantly at 8 and 12 months (4). On the other hand, children need appropriate parenting roles

for optimal development. Likewise, stunting children who experience cognitive developmental disorders need the right parenting role. Poor role of mothers who unmet the basic needs of children certainly have a negative impact on children. If the mother's role is unsuccessful, the child will experience growth and development disorders. Moreover, it will be difficult to detect whether the child has a growth delay (5).

Based on the United Nations International Children's Emergency Fund (UNICEF), globally, about 1 of 4 children under five experience stunting, and the prevalence of stunting is 171 million children, of which 167 million occur in developing countries (6). In 2017, the number of children under five who experienced stunting was around 32.2 %, or 150.8 million children under five. Stunting affects about a quarter to half of the children in developing countries due to poverty, malnutrition, and infectious diseases. In Indonesia, based on Indonesian basic health research in 2013 (7), 37.2 % of children under five are stunted. From the results of these percentages, 19.2 % of children are short, and 18.0 % are very short. Stunting prevalence has increased compared to the 2010 results of 35.6 % (7). Based on research results (8), the prevalence of stunting is 35.8 %, while in the Surabaya City area, the prevalence of stunting in children is 21.5 % (9). Based on data from the Surabaya Health Office in 2019 in the Kenjeran Health Center Surabaya area, the prevalence of stunting in children was 21.78 % (10). In a preliminary study conducted at one of the public health centers in Surabaya, Indonesia, there were 610 stunting toddlers or 21.78 % in 2019.

Direct and indirect factors can cause stunting. The direct causes are lack of food intake and infectious diseases in toddlers (11-13), while the indirect cause is one of mothers' knowledge and poor parenting. The low knowledge of mothers about stunting causes the parenting pattern of giving food to the family to be not good (14). Parents, especially mothers, play a role in raising children and providing education to children so that children's development is optimal. Children who get less attention to their parents' diet will experience impaired growth and cognitive development caused by nutritional disorders (15,16). Inappropriate parenting roles have an impact on children's

cognitive development or intelligence. Cognitive development is related to physical development, namely in the development of the brain and nervous capacity. It is also related to language, emotion, and moral development (17). The nervous system's performance in stunted children often decreases, which has implications for the child's low intelligence (18). The bad impact that nutritional problems in the short term can cause is disruption of brain development, intelligence, impaired physical growth, and metabolic disorders in the body. While in the long term, the bad consequences that can be caused are a decrease in cognitive abilities and learning achievement (19).

Nurses act as educators, nursing care providers, and collaborators. As educators, they provide health education to mothers in applying maternal role identity to raise children for optimal child development<sup>36</sup>. Nurses as nursing care providers develop nursing care processes (routine weighing, measuring, and monitoring child development), while as collaborators, they collaborate with nutritionists to provide additional food for pregnant women, fulfilling nutrition for children so that it is expected to minimize stunting incidents. This means providing food of good quality and quantity to support growth and development so that children can grow normally and healthy, and free from disease (20). Mothers' knowledge and care about nutritional needs, feeding methods,<sup>33</sup> child feeding schedules play an essential role in determining the nutritional status of children<sup>43</sup>. One of the efforts that can be made is to meet children's basic needs. In applying maternal role identity in overcoming cognitive developmental disorders in stunted and normal children, it is necessary to achieve the mother's role and develop correct and appropriate maternal behaviour<sup>5</sup>. Based on these data, this research studies the effect of maternal role identity application on cognitive development in stunting children aged 1-3 years in the public health center.

## <sup>20</sup> METHODS

This<sup>24</sup> study used an experimental research design with a quasi-experimental type of research. The two-group pretest-posttest design method

was used<sup>16</sup> to reveal a causal relationship by involving the control group<sup>17</sup> in addition to the experimental group. The sampling technique in this study was probability sampling with a simple random sampling approach with a total of 60 respondents divided into stunting and normal children. This study involved mothers with children with cognitive developmental disorders. The instrument in this study used an observation sheet on the mother's parenting role according to the intention-based maternal role attainment learning module and the capture scales<sup>6</sup> assessment sheet. The analytical test used was the Paired Samples T-test and the Independent Samples T-test. This study obtained ethical<sup>23</sup> clearance from Sekolah Tinggi Ilmu Kesehatan Hang Tuah Surabaya with the number PE/17/VI/2021/KEPK/SHT.

## RESULTS

<sup>39</sup> Table 1 showed the results of the characteristics of respondents in mothers with stunting children in the treatment group, and more children were aged 12-24 months (46.7 %), male (66.7 %), 2nd child (60 %), and immunization status complete (86.7 %). As many as 40 % of mothers were aged 20-29 years with senior school education (40 %) and not working or housewives (73.3 %). While the characteristics of fathers with stunting children, 60 % had a high school education and worked as laborers (53.3 %) with an IDR 2,000,000-4,000,000 per month (40 %). While in the normal treatment group, most of the children were aged 25-36 months (73.3 %), male (66.7 %), second child (80 %), and complete immunization status (93.3 %).

Table 2 showed that the cognitive development of stunted children before maternal role attainment intervention was 100 % experiencing cognitive development disorders with an overall average score of 82.81. However, after being given an intention-based maternal role attainment intervention, the average value of cognitive development increased to 89.06, with 9 (60 %) normal and 6 (40 %) suspected of experiencing<sup>27</sup> cognitive development disorders. The paired samples t-test showed that p-value = 0.0001, which means there was an influence before and after the application of maternal role identity

THE EFFECT OF MATERNAL ROLE IDENTITY APPLICATION

according to the intention-based maternal role attainment module on cognitive development in stunted children aged 1-3 years. In the same way, if an intention-based maternal role attainment intervention was given to normal children, the average value of cognitive development increased to 89.26. This showed an influence before and after applying the maternal role identity according to the intention-based maternal role

attainment module on cognitive development in normal children aged 1-3 years (p-value < 0.0001). However, the test result used an independent sample t-test showed a difference in the effect after applying maternal role identity according to the intention-based maternal role attainment module on cognitive development in stunted and normal children aged 1-3 years (p-value = 0.0001).

Table 1  
Respondents Characteristic

Respondents Characteristic	Stunting Children				Normal Children			
	Treatment		Control		Treatment		Control	
	n	%	n	%	n	%	n	%
<b>Age</b>								
<12 Months	0	0	0	0	0	0	0	0
12-24 Months	7	46.7	2	13.3	1	6.7	0	0
25-36 Months	6	40.0	6	40.0	11	73.3	15	100.0
15 Months	2	13.3	7	46.7	3	20.0	0	0
<b>Child Sex</b>								
Male	10	66.7	5	33.3	10	66.7	5	33.3
Female	5	33.3	10	66.7	5	33.3	10	66.7
<b>Child Order</b>								
First Child	3	20.0	1	6.7	0	0	0	0
Second Child	9	60.0	14	93.3	12	80.0	15	100.0
Third Child	3	20.0	0	0	3	20.0	0	0
<b>Number of Children in a family</b>								
Only Child	3	20.0	1	6.7	0	0	0	0
2 siblings	9	60.0	14	93.3	12	80.0	15	100.0
3 siblings	3	20.0	0	0	3	20.0	0	0
<b>Immunization Status</b>								
Complete	13	86.7	15	100.0	14	93.3	15	100.0
19 Complete	2	13.3	0	0	1	6.7	0	0
<b>Mother's Age</b>								
<20 years	1	6.7	0	0	1	6.7	0	0
20-29 years	6	40.0	6	40.0	6	40.0	6	40.0
30-39 years	4	26.7	6	40.0	5	33.3	6	40.0
40-49 years	4	26.7	3	20.0	3	20.0	3	20.0
<b>Mother's Last Educational Status</b>								
Elementary School	3	20.0	2	13.3	2	13.3	2	13.3
Junior High School	3	20.0	4	26.7	2	13.3	4	26.7
Senior High School	6	40.0	9	60.0	8	53.3	9	60.0
Higher Education	3	20.0	0	0	3	20.0	0	0
<b>Mother's Occupation</b>								
Housewives	11	73.3	10	66.7	10	66.7	10	66.7
Private	2	13.3	3	20.0	2	13.3	3	20.0
Labor	2	13.3	2	13.3	3	20.0	2	13.3
<b>Mother's Income (IDR per Month)</b>								
Unemployed	11	73.3	10	66.7	11	73.3	10	66.7
< 2,000,000	2	13.3	2	13.3	3	20.0	2	13.3
2,000,000-4,000,000	0	0	2	13.3	0	0	2	13.3
4,000,000	2	13.3	1	6.7	1	6.7	1	6.7

Continued on page S917...

...continuation Table 1.

Respondents Characteristic	Stunting Children				Normal Children			
	10 Treatment		Control		Treatment		Control	
	n	%	n	%	n	%	n	%
Father's Age								
20-29 years	5	33.3	5	33.3	4	26.7	5	33.3
30-39 years	5	33.3	5	33.3	6	40.0	5	33.3
40-49 years	5	33.3	5	33.3	5	33.3	5	33.3
12 Father's Last Educational Status								
Elementary School	0	0	1	6.7	0	0	1	6.7
Junior High School	2	13.3	1	6.7	2	13.3	1	6.7
Senior High School	9	60.0	13	86.7	9	60.0	13	86.7
Higher Education	4	26.7	0	0	4	26.7	0	0
Father's Occupation								
Private	6	40.0	7	46.7	7	46.7	7	46.7
Public	1	6.7	0	0	1	6.7	0	0
Labour	8	53.3	7	46.7	7	46.7	7	46.7
Farmer	0	0	1	6.7	0	0	1	6.7
Father's Income (IDR per Month)								
<2,000,000	4	26.7	8	53.3	5	33.3	8	53.3
2,000,000-4,000,000	6	40.0	6	40.0	4	26.7	6	40.0
>4,000,000	5	33.3	1	6.7	6	40.0	1	6.7
Type of the Family								
Nuclear Family	11	73.3	14	93.3	11	73.3	14	93.3
Extended Family	4	26.7	1	6.7	4	26.7	1	6.7
Single Parents Family	0	0	0	0	0	0	0	0
Total	15	100.0	15	100.0	15	100.0	15	100.0

Table 2

5  
The Effect of Applying Maternal Role Identity on Cognitive Development in Stunted and Normal Children Aged 1-3 Years

Group	Cognitive Development						Median p-value	p-value
	Normal		Suspect		Mental Retardation			
	n	%	n	%	n	%	(Min-Max)	
Stunting Children (Treatment)								
Pre Test	0	0	15	100	0	0	82.81 (79.83-84.31)	0.0001*
Post Test	9	60	6	40	0	0	89.06 (80.25-97.34)	
22 Stunting Children (Control)								
Pre Test	0	0	15	100	0	0	83.52 (82.00-84.84)	0.107
Post Test	0	0	15	100	0	0	83.71 (82.50-84.84)	
Normal Children (Treatment)								
Pre Test	0	0	15	100	0	0	82.95 (81.67-83.94)	0.0001*
Post Test	11	73.4	4	26.4	0	0	89.26 (83.46-97.70)	
38 Normal Children (Control)								
Pre Test	0	0	15	100	0	0	83.52 (81.29-84.86)	0.085
Post Test	0	0	15	100	0	0	83.98 (82.29-84.86)	

29  
\*Paired t-test \*\*Independent sample t-test

## DISCUSSION

The results showed that cognitive development in stunted children mostly occurred at 12-24 months. This was in line with previous research, which stated that the condition of children who experienced stunting at the age of 0-2 years could interfere with children's cognitive, language, and motoric development (22). The results of theory and research (23) explained that each organ (physically and psychologically) was claimed to be mature when it reached its ability to carry out its respective roles. This was related to the chronological age of the child. This was in line with Santrock's research (24). Cognition refers to mental activities about how information enters the mind, is stored and transformed, and is recalled and used in complex activities such as thinking (25).

There is a difference in the effect of applying maternal role identity according to the intention-based maternal role attainment module on cognitive development in stunted children aged 1-3 years at the public health centre. The results of this study were supported by Santrock (26,27) that cognitive development coexisted with the process of genetic growth or physical maturity of children. Stunting in early childhood could cause permanent damage to cognitive development, followed by less than optimal motor and intellectual development (28). Thus, it can have an impact on education. This was based on the theory of Chang et al., in 2010 who indicated that stunting was related to cognitive development as seen in the ability to count, spell, read words and read thoroughly (29) and the relationship between fine motor abilities and school achievement and intelligence. Method: A cohort of stunted children who had participated in a randomized trial of psychosocial stimulation and/or nutritional supplementation in early childhood was compared with a group of non-stunted children. Fine motor abilities were assessed in 116 stunted (67 males, 49 females). Hence, stunted children achieve lower education compared to normal children. The results of this study were supported by research by Ijarotimi and Ijadunola in Nigeria (30), which found that children with poor nutrition will experience changes in metabolism that impact cognitive

abilities and brain abilities. This was because the cortex in children was malnourished, and a lack of protein energy will affect the function of the hippocampus and brain in forming and storing memories (14).

The parenting role of mothers has an essential impact on children's cognitive and social development (31). This was in line with Mercer's (2004) research which suggested that it took a long time for a new mother to understand the role of the mother. Through daily interactions with infants in microsystem components, mothers practice infant care practices and understand how infants react to themselves and others (32). Parents, especially mothers, play a role in raising children and providing education to children so that children's development is optimal. This is evidenced by Widianoro et al. in 2013, who concluded that parents who give a stimulus could positively impact children's growth and development (33). Moreover, it was following normal developmental stages. Based on the observations, the researcher assumed that applying maternal role care according to the intention-based maternal role attainment module can help mothers play a good role in stimulating children to improve their cognitive development.

The results showed differences in the effect of applying maternal role (maternal role identity) according to the intention-based maternal role attainment module on cognitive development in normal children aged 1-3 years. Nursalam's study (2005) said that providing repeated and continuous stimulation in every aspect of child development has provided opportunities for children to grow and develop optimally (34). Nerve cells form a new connection to store information. Cells that store information will expand, while those that are rarely or unused will perish. This is the importance of stimulation that is routinely given. The stimulation will strengthen the relationship between the nerves formed so that brain function will automatically improve (35). Toddler-age children need regular stimulation as early as possible and continuously every opportunity. Lack of stimulation can cause deviations in growth and development and even cause permanent disturbances (34). Parents, especially mothers, play a role in raising children and providing education to children so that children's development is optimal. This is



evidenced by a previous study, which concluded that parents who give a stimulus could positively impact children's growth and development (33). Moreover, it was following normal developmental stages. Based on the results of observations, researchers assumed that applying good parenting in providing stimulation to children could improve their cognitive development.

### CONCLUSION

It can be concluded that there is a significant increase in the value of cognitive development in stunted children aged 1-3 years before and after the intervention for the application of maternal role identity according to the intention-based maternal role attainment module in stunted and normal children. The application of the role of maternity care is an important part, so there is a need for socialization among cadres and health workers to increase health coverage and children's cognitive development.

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#### THE EFFECT OF MATERNAL ROLE IDENTITY APPLICATION

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