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The Relationship of Mother's Knowledge of Early Stimulation With fine motor development in children Toddler Age (1-3 Years) at the Health Center Central City of Gorontalo City

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ABSTRACT

Fine motor development in toddlers can be delayed if they do not get the right stimulation from an early age. However, there are still many mothers who have limited knowledge about the importance of early stimulation so that the provision of stimulation is not optimal in daily life. This study aims to determine the relationship between maternal knowledge about early stimulation and fine motor development in toddler children (1–3 years) at the Puskesmas Kota Tengah, Gorontalo City. The research method used is quantitative with an analytical observational design through a cross-sectional approach. The study population amounted to 88 mothers and toddlers who were taken using purposive sampling techniques. The research instrument used a questionnaire on maternal knowledge about early stimulation and a Pre-Screening Developmental Questionnaire (KPSP). Data analysis was carried out univariate and bivariate using the Chi-Square test. The results showed that most mothers had poor knowledge about early stimulation as many as 45 respondents (51.1%), and most toddler-age children experienced doubtful fine motor development as many as 52 children (59.1%). The results of the Chi-Square test showed that there was a relationship between maternal knowledge of early stimulation and fine motor development in toddlers (1-3 years) with p-value = 0.001 ($p < 0.05$). The results of this study are expected to encourage health workers to increase education to mothers about the importance of early stimulation by utilizing the services of the health center in the child growth and development section and using the KIA book at home as a guide for stimulation and monitoring of fine motor development according to the child's age.

INTRODUCTION

Children toddler is a child in the age range of 12–36 months or a child aged 1-3 years (Ramadia et al., 2021). Children toddler often referred to as Golden Period (golden mass), window of opportunity (window of opportunity), and critical period (critical period) (Titiek et al. 2023). Therefore, children with the age of toddler is a child who needs great attention from parents, especially in his growth and development (Ika et al., 2022).

Growth and development are two different but interrelated things. Growth is a change related to a measurable physical form. Meanwhile, development is a change related to the maturity of body functions. Often parents are unaware of the delay in the growth and development of the child (Khadijah et al., 2025).

According to World Health Organization (WHO) In 2021, it was reported that globally, 149.2 million children under the age of 5 had developmental disorders (Harefa & Herawati 2022). According to national data from the Indonesian Ministry of Health, in 2020, in Indonesia the number of toddlers was 10% of the total population, where the prevalence (average) of developmental disorders varied from 12.8% to 16%, so it is recommended to conduct observation/screening for growth and development in every child (Anggriani, 2022). About 10% of children are estimated to have developmental delays, and it is estimated that 13% of children under

5 years of age in Indonesia experience general developmental delays including fine motor development (such as: difficult to write, difficult to draw) (Novia & Erika, 2022).

Fine motor disorders are a deviation that often occurs in children toddler and can cause difficulty in carrying out daily activities (Jessica & Hayu, 2023). Fine motor development is a movement ability that involves directional activities such as writing, drawing, buttoning clothes and playing (Safitri, 2022). Therefore, appropriate and pleasant interventions, such as early stimulation are needed (Legi, 2025).

Early stimulation is a series of activities that aim to provide an initial experience (Early experience) in children through various activities that stimulate the formation of basic abilities, so that children's growth and development can take place optimally (Khadijah et al., 2022). Early stimulation in children can be done by parents, especially mothers, caregivers, family or people around the child. To maximize early stimulation, the mother's knowledge plays an important role in providing the right stimulation according to the child's developmental stage (Mega, Susari, & Anwar 2022).

Maternal knowledge is the understanding and mastery of information possessed by a mother regarding aspects of child growth and development, including appropriate early stimulation efforts, so that it can be applied in daily life to support optimal development (Bening & Ichsan, 2022). Mothers who lack knowledge about early stimulation are at risk of inhibiting children's fine motor development (Dewi, 2022)

Based on data obtained from the Gorontalo Provincial Health Office for the January-June 2025 period, there were 64 children with developmental disorders out of a total of 54,307 children. The three regions with the highest number of cases are North Gorontalo Regency (26 children), followed by Gorontalo Regency (24 children), and Gorontalo City (13 children) (Gorontalo Provincial Health Office, 2025).

If you look at the data at the Gorontalo City Health Office, there are 4 health centers with the number of cases of toddlers who are detected with developmental disorders. The four health centers with the highest number of cases are the Central City Health Center (8 children), East City (2 children), Sipatana (2 children), and North City (1 child) (Gorontalo City Health Office, 2025). Furthermore, the initial observation data conducted by the Central City Health Center, found the highest number of toddlers who experienced developmental disorders, where 3 children aged 0–1 years (infants), 3 children aged 1–3 years (toddlers), and 2 children aged 4–5 years (pre-school) experienced disturbances in developmental aspects, especially fine motor

Based on the results of initial observations, the number of toddlers (1 – 3 years) who were detected to have fine motor development disorders at the Central City Health Center in January – September 2025 was found as many as 3 cases in toddler children (1 – 3 years old) who were detected to have fine motor development disorders. To obtain an initial picture of mothers' knowledge about early stimulation and fine motor development of toddlers (1 – 3 years), the researcher conducted initial interviews and measurements of fine motor development using KPSP sheets assisted by the Kota Tengah Health Center which has been certified and has been trained on 8 mothers who have toddler children (1 – 3 years).

Based on the results of the short interview, it was found that 5 out of 8 interviewees who had toddler children (1-3 years old) said they did not know about early stimulation. Based on the results of the examination of fine motor development assisted by the Central City Health Center which has been certified and has been trained using the KPSP sheet, it shows that 5 out of 8 children whose mothers were interviewed have not reached the stage of fine motor development of toddlers (1 – 3 years).

Based on the description of the problem above, it can make researchers interested in conducting a study entitled "The relationship between maternal knowledge about early stimulation and fine motor development in toddlers (1 – 3 years) at the Central City Health Center, Gorontalo City".

RESEARCH METHODS

This study is a quantitative research with an analytical observational design using a cross-sectional approach. This research was carried out on January 5 – January 12, 2026. The population in this study is 88 mothers and toddler children (1-3 years) who are registered as posyandu participants at the Central City Health Center, Gorontalo City with. The sampling technique uses purposive sampling in accordance with the criteria that have been set, so that the number of samples needed in this study is 88 respondents. The research instrument used a questionnaire on maternal knowledge about early stimulation and a developmental pre-screening questionnaire (KPSP). Data analysis was carried out univariate and bivariate using the Chi-Square test

RESEARCH RESULTS

Respondent Characteristics

Table 1 Characteristics of respondents by last education

Final Education	N	%
SD	23	26.1
Junior High School	27	30.7
High School	23	26.1

College	15	17.0
Quantity	**88**	**100**

Based on table 1, it can be seen that most of the respondents were educated at the end of junior high school with a total of 27 respondents (30.7%).

Table 2 Characteristics of respondents by occupation

Jobs	N	%
IRT	50	56.8
Employees	14	15.9
Entrepreneurship	24	27.3
Quantity	**88**	**100**

Based on table 2, it shows that most of the respondents work as IRTs with a total of 50 respondents (56.8%).

Table 3 Characteristics of respondents by Maternal Age

Age	N	%
Late Youth (17-25)	24	27.3
Early Adulthood (26-35)	49	55.7
Late Adulthood (36-45)	15	17.0
Quantity	**88**	**100**

Based on table 3, it can be seen that most of the respondents in this study consisted of early adulthood (26-35 years) with a total of 49 respondents (55.7%).

Table 4. Characteristics of respondents by Age of Children

Child's Age	N	%
12-14	7	8.0
15-17	11	12.5
18-20	14	15.9
21-23	10	11.4
24-29	18	20.5
30-35	16	18.2
36	12	13.6
Quantity	**88**	**100**

Based on table 4, most toddlers are in the age group of 24-29 months, which is as many as 18 toddlers (20.5%).

Table 5 Characteristics of respondents by Child's Sex

Gender	N	%
Male – Male	45	51.1
Women	43	48.9
Quantity	**88**	**100**

Based on table 5, it can be seen that the majority of toddlers are male, namely 45 respondents (51.1%).

Univariate Analysis

Table 6 Characteristics of respondents based on Mother's Knowledge of Early Stimulation

Mother's Knowledge	N	%
Good	15	17.0
Enough	28	31.9
Less	45	51.1
Quantity	**88**	**100**

Based on table 6, it shows that most of the mothers have less knowledge as many as 45 respondents (51.1%)

Table 7 Characteristics of respondents based on Fine Motor Development

Fine Motor Development	N	%
There is a Possibility of Deviation (DP)	3	3.4
Dubious (DM)		
Normal Age (DS)	52	59.1

	33	37.5
Quantity	**88**	**100**

Based on table 7, it shows that most toddlers have doubtful fine motor development (DM) as many as 52 toddler-age children (59.1%).

Bivariate Analysis

Table 8 Relationship of Maternal Knowledge of Early Stimulation with Fine Motor Development in Toddlers

Knowledge Mother About Stimulation Düsseldorf	Development Fine Motor			N	P-Value
	There Kemung Kinan Snoop Doggy Stuttgart (DP)	Doubtful can (DM)	Normal Conform Age (DS)		
Good	0	7	8	15	**0.001**
Enough	1	9	18	28	
Less	2	36	7	45	
Quantity	**3**	**52**	**33**	**88**	

Based on table 8, it is known that out of a total of 88 respondents, there are 45 mothers (51.1%) who have less knowledge about early stimulation, most toddlers (1-3 years) have doubtful fine motor development (DM), namely 36 children (40.9%), while children with normal fine motor development according to age (DS), as many as 7 children (8.0%), and children with fine motor development who have the possibility of deviation (DP), as many as 2 children (2.3%). While 28 mothers (31.8%) who had sufficient knowledge about early stimulation, most of the children had normal fine motor development according to age (DS), as many as 18 children (20.5%), while children with doubtful fine motor development (DM), as many as 9 children (10.2%), and children with fine motor development who had a possibility of deviation (DP), as many as 1 child (1.1%). And 15 mothers (17.0%) who had good knowledge of early stimulation, most of the children had normal fine motor development according to age (DS), as many as 8 children (9.1%), while children with doubtful fine motor development as many as 7 children (8.0%), and children with fine motor development who had a possibility of deviation (DP), as many as 0 children (0.0%). The results of the Chi-Square test showed a p-value = 0.001 ($< \alpha = 0.05$), so it can be concluded that there is a significant relationship between the mother's knowledge of early stimulation and the fine motor development of toddlers (1-3 years) at the Puskesmas Kota Tengah, Gorontalo City.

DISCUSSION

Mother's Knowledge about Early Stimulation in Toddlers (1-3 years) at the Central City Health Center, Gorontalo City

The results of the percentage of the study showed that the majority of respondents were in the category of lack of knowledge about early stimulation, namely 45 respondents (51.1%). The findings show that some respondents still do not understand the indicators of understanding, goals, benefits, and stages of stimulation. Mothers' understanding of early stimulation is not optimal, affecting its accuracy and consistency.

This finding is in line with the theory of IDAI (2022) that low parental understanding makes parenting undirected, even though early stimulation needs to be planned and depends on knowledge. This is supported by research by Lizam (2025) which shows that low maternal knowledge increases the risk of child developmental delay by times.

Judging from the characteristics of the majority of respondents with low level of knowledge, namely 16 respondents (35.5%) graduated from junior high school and elementary school. Education affects the mindset and actions of mothers in providing stimulation. This is supported by the theory of Syafitri (2023) which states that maternal education is a key factor in increasing knowledge about children's growth and development.

Although most of the respondents were poorly educated, it was found that 13 respondents (28.8%) were high school graduates who still had less knowledge. Formal education does not guarantee knowledge because it is influenced by access to information, experience, and health education. The findings are strengthened by the theory of Notoatmodjo (2022), knowledge is influenced by information and experience, and is supported by research by Sari & Handayani (2023) which states that second-educated mothers remain at risk of low knowledge if they do not actively participate in counseling.

This study also found respondents with sufficient knowledge as many as 28 respondents (31.8%). The results of the analysis showed that in the indicators of goals, benefits, and stages of stimulation, most of the respondents had answered correctly. The mother's understanding tends to be applicable but less conceptual, so the practice of stimulation is not fully directed and comprehensive.

According to the theory from the Ministry of Health of the Republic of Indonesia (2022), it is stated that the understanding of stimulation must include basic concepts so that its implementation is directed and in accordance with the stage of development, not just practice. This is supported by research by Andriani et al., (2024) which shows that a lack of conceptual understanding reduces the quality of stimulation, so concept- and practice-based education is needed.

The majority of respondents are knowledgeable enough to be IRT (57.1%). Work can affect knowledge because it is a source of information. This is in accordance with the theory of Sullivan & Baruch (2021) that the work environment encourages continuous learning, and is supported by research by Dewi (2022) which shows that working mothers have better access to information.

In addition, 15 respondents (17.0%) knew about early stimulation about early stimulation. Based on the results of the research in the category of good knowledge, most of the respondents' answers were correct on all indicators, which included the definition, objectives, benefits, and stages of providing stimulation. This shows that well-informed mothers are able to provide precise, consistent, and appropriate stimulation according to the fine motor stage.

According to the theory World Health Organization (2022), Parental knowledge is important for appropriate and consistent stimulation according to the child's developmental stage. These results are supported by research Ekayamti (2025), showing that knowledge both helps with child development and early detection of delays.

Based on the characteristics of the mother's age for the category of good knowledge, the majority of mothers with good knowledge were in early adulthood (26–35 years) as many as 12 respondents (80%), while a small percentage in late adolescence as many as 2 respondents (13.3%). This is in accordance with Santrock's (2021) theory that in early adulthood, cognitive abilities are maturing. This is supported by research Nisa et al., (2023) which shows that increasing age increases thinking maturity, knowledge, and ease of receiving information.

Fine motor development in toddlers (1-3 years) at the Central City Health Center, Gorontalo City

The results of the research presentation showed that most of the children were in the category of dubious fine motor development, which was 52 children (59.1%). These findings are supported by the results of a study in which the proportion of fine motor development is doubtful influenced by physiological factors as well as the quality and consistency of parental stimulation.

According to the theory Insane (2025) states that fine motor development is influenced by stimulation, social interaction, and adult guidance. This is supported by research by Widyastuti et al., (2023) which shows that parental involvement improves children's hand coordination.

The age characteristics of children in the category of fine motor development are doubtful, the majority of children with doubtful fine motor development are at the age of 24–29 months (25%). According to the theory of the American Academy of Pediatrics (2022), this age is an important phase of fine motor development that is still in the process of maturing so it is often not age-appropriate. This is supported by Febriyanti's (2025) research that the age of 2–3 years is a developmental transition period, where fine motor skills begin to develop but are not yet fully mature.

This study also found that there were 33 children with normal fine motor development according to age (DS) as many as 33 children (37.5%). These findings are supported by the results of research where normal development is supported by neuromuscular maturity and appropriate and consistent and repetitive stimulation.

This is supported by Santrock's (2021) theory that fine motor development takes place gradually, influenced by maturity and experience through environmental stimulation, and needs to be trained in a directed manner (Wahyuningrum & Watini, 2022). This is in line with Nuraisyah's (2025) research showing that optimal development requires parental stimulation in daily life. In Daeli's (2024) study, it was also found that children who received stimulation had better fine motor development.

Based on the characteristics of the child's gender for the category of normal fine motor development according to age (DS), the majority of children were female as many as 22 children (66.6%) and a small number of children were male as many as 11 children (33.3%).

This finding is strengthened by the theory according to Santrock (2021) that this difference is influenced by biological and environmental factors, where women tend to mature faster in fine motor. This is supported in Suheti's (2025) research that girls are more skilled in fine motor activities such as drawing and assembling small objects.

Boys with fine motor delays can still achieve normal development through proper and sustained stimulation. This is influenced by the plasticity of the brain which allows for neural development through consistent exercise (Kurniawan & Lestari, 2024). In the study, Permatasari & Hadi (2023) also stated that regular stimulation according to age can improve hand and finger coordination so as to support optimal development.

Furthermore, fine motor development in the category of the possibility of deviation (DP), was only found in 3 children (3.4%). These findings are supported by the results of a study in which fine motor delay is influenced by a combination of biological factors and environmental factors. In theory, fine motor delay can be caused by a lack of stimulation, biological barriers, and a lack of exploration (Ministry of Health of the Republic of Indonesia, 2022), In research Squirt (2025) It also emphasizes that delays can be prevented through early stimulation and good environmental interaction.

The findings of this study show that 3 children with possible deviations (DP), all were boys. This shows that boys tend to be more prone to fine motor delays than girls.

Theoretically, boys have a relatively slower maturation of the central nervous system, especially in the areas of fine motor coordination and executive function (Putranto & Sari, 2022). In research, Andriani & Wijayanti (2023) stated that neurological regulation that is not optimal can cause a delay in graphomotor skills in early childhood.

The Relationship of Mother's Knowledge of Early Stimulation with Fine Motor Development in Toddlers (1-3 years) at the Central City Health Center, Gorontalo City

Based on the results of statistical analysis using the Chi-Square test, a p-value = 0.001 ($p < 0.05$) was obtained, which shows that there is a statistically significant relationship between maternal knowledge of early stimulation and fine motor development in toddlers (1–3 years) at the Kota Tengah Health Center, Gorontalo City.

Furthermore, the results of the analysis of the relationship between mother's knowledge of early stimulation and fine motor development in toddler children were found that of 45 mothers (51.1%) who had less knowledge about early stimulation, most toddlers (1-3 years) had doubtful fine motor development (DM), namely 36 children (40.9%), while children with normal fine motor development according to age (DS), as many as 7 children (8.0%), and children with fine motor development who have a possibility of deviation (DP), as many as 2 children (2.3%). While 28 mothers (31.8%) who had sufficient knowledge about early stimulation, most of the children had normal fine motor development according to age (DS), as many as 18 children (20.5%), while children with doubtful fine motor development (DM), as many as 9 children (10.2%), and children with fine motor development who had a possibility of deviation (DP), as many as 1 child (1.1%). And 15 mothers (17.0%) who had good knowledge of early stimulation, most of the children had normal fine motor development according to age (DS), as many as 8 children (9.1%), while children with doubtful fine motor development as many as 7 children (8.0%), and children with fine motor development who had a possibility of deviation (DP), as many as 0 children (0.0%). The results showed that mothers with less knowledge about early stimulation were more at risk of having children with doubtful or deviant fine motor development than mothers with good knowledge.

If reviewed further, the results of the study show that mothers with low knowledge (51.1%) have 36 children (40.9%) in the category of dubious fine motor development (DM). Inaccuracy of understanding, especially at the stimulation stage, causes inconsistent, undirected, and inappropriate practices in the child's developmental stage.

According to Soetjiningsih's (2022) theory, stimulation must be given gradually, repeatedly, and according to age so that brain development is optimal. This is in line with the research of Ramadia (2021) showing that there is a significant relationship between mothers' knowledge of stimulation and children's fine motor development.

In mothers with low knowledge, 7 children (8.0%) had normal fine motor development according to age (DS) influenced by protective factors such as family interaction and playing with siblings. According to Santrock's theory (2021), development is influenced by the microenvironment.

These findings are in line with the WHO (2022) theory that motor development is influenced by biological maturity and consistent responsive stimulation. Although the mother's knowledge is limited, family stimulation still optimizes development. Pramesti research (2024) also shows that the involvement of other families improves toddlers' fine motor skills.

In addition, there were 2 children (2.3%) in the category of fine motor development with the possibility of deviations (DP) in mothers with low knowledge, where the interview results showed a misconception that the child developed without stimulation. The two children aged 1.9-2.6 years who should be able to do simple fine motor activities, but are more often given mobile phones when fussy. In addition, both children also have a history of BBLR which is a developmental risk factor.

Theoretically, motor development is influenced by biological, environmental, and upbringing factors (Krisnanto, 2022). In these cases, BBLR, low maternal awareness, and use Telephone allegedly increases the risk of developmental irregularities.

This finding is supported by the results of research obtained that as many as 20.5% of children. Her mother is in the category of having understood the goals, benefits, and stages of early stimulation and applying them in daily activities. Children also get a balanced nutritious diet and regular monitoring at the posyandu

In theory, according to the Ningtyas et al., (2025), also emphasized that diet and stimulation are the main factors in supporting optimal growth and development of children. This is in line with Amalia's (2023) research showing that good nutritional status increases the chances of motor development according to age.

Meanwhile, as many as 9 children (10.2%) were in the category of dubious fine motor even though the mother had sufficient knowledge. Most of whom have understood the purpose and benefits of stimulation (75.4%), but 44.8% have not understood the age stage so that stimulation is unstructured, not routine, and (55.6%) is hampered by the busyness of entrepreneurial work.

According to Feist's (2022) theory, children learn through observation and repetition so that inconsistent stimulation can limit development. Hapsari's (2024) research also shows that irregular stimulation is related to suboptimal development in children aged 1–3 years. In addition, double burden and maternal fatigue can decrease

the quality of play engagement. According to Sari's (2023) theory, mothers with additional work tend to have shorter and less focused interactions, reducing developmental stimulation.

There is 1 child (1.1%) in the category of fine motor development there is a possibility of deviation (DP) even though the mother is knowledgeable enough, all mothers understand the meaning, purpose, and benefits of stimulation, but 100% is not appropriate at the age stage so that stimulation is not according to needs, plus minimal play equipment, lack of independent exercise, and children are often fed so that fine motor skills such as holding a pencil and picking up small objects are not optimal.

In theory, Hurlock (2021) also emphasized that independence such as eating oneself is important for fine motor development. In Aisyah's (2023) study, it was found that a lack of independent exercise increases the risk of fine motor delay.

In well-informed mothers, 8 children (9.1%) had normal fine motor development. Where the mother has understood all the stimulation indicators and actively provides directed stimulation so that the child is able to perform various fine motor activities according to age such as arranging blocks, doodling, and making lines.

These findings are in line with the theory of UNICEF (2021) which states that responsive and appropriate stimulation is important for strengthening children's neural and motor connections. Lestari's research (2023) also shows that well-informed mothers are better able to provide the right stimulation so that children develop according to age.

Meanwhile, as many as 7 children (8.0%) of well-informed mothers were in the doubtful category. Where (85.7%) mothers work as employees so that interaction time is limited, and although they understand the concept of stimulation, some are not appropriate at the age stage so that stimulation is not fully in accordance with the needs of child development.

In theory, Suryani (2022) said that working mothers have lower interactions, so proper stimulation planning is needed. Maharani's (2023) research also shows that the accuracy of understanding the stages of stimulation is related to children's fine motor achievements.

In the category of good knowledge, no children with possible deviations were found (0%). From the results of the study, it was found that the mother had understood the definition, purpose, benefits, and stages of stimulation, although some of it was not consistent. However, this condition has not yet caused irregularities in fine motor development in children.

This finding is in line with Soetjiningsih's (2022) theory that age-appropriate stimulation can prevent delays, and is supported by research by Bening & Ichsan (2022) which shows that well-informed parents are able to adjust stimulation to children's development.

CONCLUSION

Mothers' knowledge about early stimulation in toddlers (1-3 years) at the Kota Tengah Health Center, Gorontalo City, was obtained by 45 respondents (51.1%), 28 respondents (31.8%) in the adequate category, and 15 respondents (17.0%) in the good category.

Fine motor development in toddler children (1-3 years) at the Kota Tengah Health Center, Gorontalo City, was obtained in the dubious category (DM) as many as 52 children (59.1%), the normal category according to age (DS) as many as 33 children (37.5%), and the category with the possibility of deviation (DP) as many as 3 children (3.4%).

There was a relationship between maternal knowledge about early stimulation and fine motor development in toodler children (1-3 years) at the Puskesmas Kota Tengah Gorontalo City using a chi-square test with p-value = 0.001 which means < α = 0.05.

ADVICE

For the Nursing Study Program

This research is expected to expand insights and strengthen the theory of child nursing related to maternal knowledge about early stimulation and fine motor development of toddlers at the Puskesmas Kota Tengah, Gorontalo City.

For Health Agencies

This research is expected to encourage the Central City Health Center to provide education about early stimulation to increase parents' knowledge and ability to support the development of fine motor skills in toddlers.

For Respondents

This research is expected to add to the mother's insight into the importance of child stimulation to support development and detect delays early.

For the Next Researcher

The researchers are then expected to add other factors such as parenting, nutritional status, and work environment and use a broader method to obtain a more comprehensive picture of a child's fine motor development.

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