

Effect of Health Education Based on the Information–Motivation–Behavioral Skills Model on Maternal Knowledge, Motivation, Skills, and Behavior in Stimulating Child Speech Development

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ABSTRACT

Background: The primary education of children under the age of three is provided by caregivers, and mothers are the principal caregivers within the family. The key to optimizing child development lies in enhancing mothers' ability to provide developmental stimulation. This study aimed to examine the effectiveness of health education based on IMB theory in improving mothers' health behaviors related to speech development stimulation.

Subjects and Method: The study employed a quasi-experimental pretest-posttest control group design. The intervention group received health education in stages over four weeks, whereas the control group received health education through standard health services provided by health personnel. Each group comprised 30 mother–child dyads with children aged 2–3 years, selected according to the inclusion criteria. Data analysis compared pre- and post-intervention score differences using Wilcoxon test with Stata 13.

Results: The pretest–posttest score comparisons in the intervention group showed statistically significant results and medium effect sizes for information ($r = 0.32$; $p = 0.014$), motivation ($r = 0.35$; $p = 0.007$), skills ($r = 0.37$; $p = 0.005$), and maternal behavior ($r = 0.34$; $p = 0.008$). In the control group, the mean differences in pretest-posttest scores for all variables were not statistically significant: information ($r = 0.22$; $p = 0.083$), motivation ($r = 0.10$; $p = 0.465$), skills ($r = 0.08$; $p = 0.564$), and maternal behavior ($r = 0.05$; $p = 0.706$).

Conclusion: Structured and integrated interventions addressing informational, motivational, and behavioral skills components have been shown to be more effective in enhancing speech development stimulation in toddlers. Future research should emphasize the use of behavior-theory-based approaches in the development of early childhood health programs.

Keywords: information-motivation-behavioral skills model, health education, maternal behavior, speech development

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BACKGROUND

The age range of 12 to 36 months is considered the golden age period, characterized by rapid brain development that fosters an exceptional drive for learning (Widaningsih & Ramadhena, 2024). Global data indicate that approximately 20–40% of children aged 0–24 months experience delays in growth and development due to insufficient stimulation (Unicef & WHO, 2020). In Indonesia, according to the 2022 report of the Ministry of Health, approximately 5–10% of young children are also estimated to experience developmental delays. Developmental delays in early childhood can be addressed through responsive caregiving and active parent–child interaction (Directorate of Family Health, Ministry of Health of the Republic of Indonesia, 2022).

Active interaction between parents and children is essential to support child development and to identify developmental abnormalities at an early stage (WHO, 2020). During early childhood, most children are cared for within the family. The family constitutes a child's first educational environment. Children tend to imitate and emulate the speech and behavior of those closest to them. Through speech, children can communicate their needs, ideas, and emotions more effectively (Rajesh & Venkatesh, 2019).

Speech development in children is important for shaping their quality of life. It has a substantial impact on their social, cognitive, and emotional domains. Speech development begins in infancy, when children are only able to produce sounds such as crying and laughing. Subsequently, children begin to produce vocalizations and attempt to engage people around them in conversation (Undiyaundeye & Basake, 2018). According to Santrock, children use speech to adapt to and communicate with

their environment, exchanging thoughts, ideas, and emotions. In line with their growth and development, children's speech abilities increasingly expand in capacity, breadth, and complexity (Santrock, 2011).

Speech is an essential means through which children express themselves and interact with others. Speech development in children does not occur spontaneously; rather, it requires stimulation from the environment. A common problem in children's speech development is speech delay, which may occur due to insufficient stimulation from the family, particularly from parents. Parents are central figures responsible for supporting children's speech development (Rajesh & Venkatesh, 2019). Preliminary findings indicated that most mothers had not yet been able to provide appropriate speech-development stimulation. They still demonstrated deficiencies in the skills of reading storybooks and storytelling, as well as in encouraging children to share their experiences (Nursanti et al., 2025a).

Health personnel provide monitoring, stimulation, early detection, and intervention services for the growth and development of toddlers at least twice a year, in collaboration with Posyandu cadres and early childhood education (ECE) teachers. The government also provides the Maternal and Child Health (MCH) handbook as a guide for mothers to conduct monitoring and stimulation independently at home (Ministry of Health of the Republic of Indonesia, 2022). However, data from the relevant ministry indicate that many families and parents still have limited understanding of quality caregiving practices to stimulate child development (Ministry of Women's Empowerment and Child Protection, 2020).

Strengthening the role of the family in quality caregiving can be achieved through

family-based health promotion to improve knowledge, understanding, and caregiving practices (Nursanti et al., 2025b). Previous observational research has shown that health promotion based on the Information-Motivation-Behavioral Skills (IMB) theory is effective in improving mothers' health behaviors in stimulating child development. The skill factor in performing stimulation practices has the strongest correlation with improved health behaviors in providing developmental stimulation to children (Nursanti et al., 2024).

The IMB behavior change theory posits that information, motivation, and

behavioral skills are determinants of an individual's health behavior. Individuals who possess adequate knowledge, strong motivation, and the requisite behavioral skills are better able to sustain health-promoting behaviors effectively (Fisher & Fisher, 2002). The IMB model framework for improving child development posits that when the desired behavior change involves specific skills, an individual's information and motivation operate through behavioral skills to influence health behavior (Nursanti et al., 2024). The study framework based on the IMB model is summarized in Figure 1.

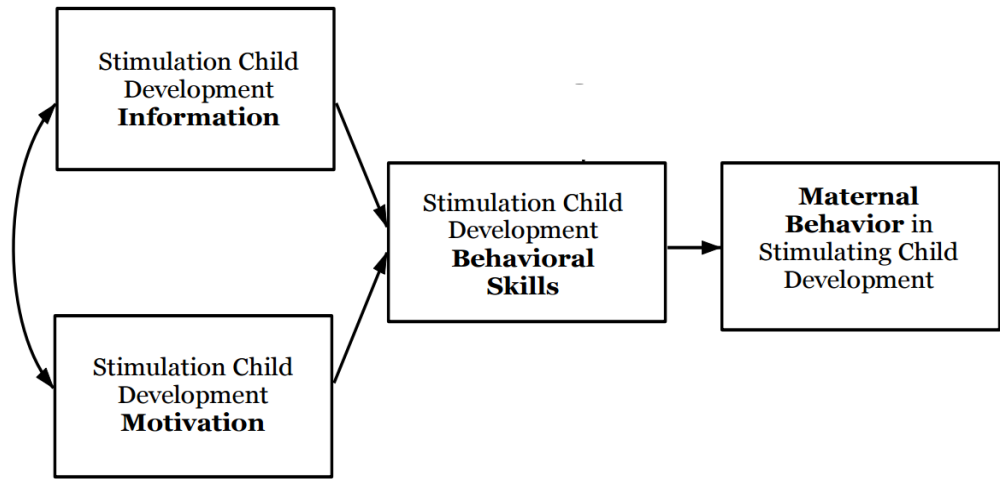


Figure 1. Information-Motivation-Behavior Skills Model to Improve Child Development (Nursanti et al., 2024)

According to the 2023 Bantul Regency Health Profile Report, Yogyakarta Special Region Province, Jetis 1 Community Health Center in Bantul Regency had the lowest coverage of growth and development monitoring services and Stimulation of Early Detection Intervention for Child Growth and Development services, at 69.34% and 61%, respectively (Bantul Regency Health Office, 2023). Based on the data presented above, the researchers conducted a study aimed at analyzing the effectiveness of health education based on the IMB model

in improving mothers' information, motivation, skills, and behaviors in speech development stimulation. Although the informational content provided was identical, the IMB-based health education intervention was expected to yield better outcomes in the experimental group than in the control group, owing to the addition of motivational components and demonstration media for speech stimulation. Accordingly, the experimental group was anticipated to demonstrate superior know-

ledge, motivation, and speech-stimulation skills compared with the control group.

SUBJECTS AND METHOD

1. Study Design

This study employed a quasi-experimental pretest–posttest design with a control group. The intervention group received an educational intervention consisting of knowledge on speech development, motivational support for implementing speech development stimulation, and practical training in speech stimulation skills. The control group received standard health services from health personnel and studied using the MCH handbook. The study was conducted from June to August 2025.

2. Population and Sample

The study population comprised mother–child dyads with children under the age of three in the Jetis 1 Community Health Center catchment area, which included 1,160 toddlers. Each group consisted of 30 mother–toddler dyads. The sample size was determined using the Lemeshow formula, with a proportion value of 0.33 derived from a previous study (Meliati & Ekayani, 2018).

The respondent groups were determined using cluster simple random sampling, with each group drawn from a single hamlet (Ponggok hamlet for the intervention group and Barongan hamlet for the control group). Respondents were selected through purposive sampling. The inclusion criteria were mothers with children aged 2–3 years who possessed the MCH handbook and, for the intervention group, owned a smartphone and were able to operate it effectively. The exclusion criteria were mothers of twins, children receiving routine treatment, children with congenital disabilities, and children already diagnosed with developmental disorders.

The researchers were present at the Posyandu activities in the selected location to explain the study objectives and procedures. Mothers of toddlers who met the criteria and agreed to participate were informed of their rights and responsibilities as respondents, and subsequently signed an informed consent form to indicate their willingness to take part in the study.

3. Study Variables

The independent variable in this study was health education provided to mothers of toddlers. The dependent variables were the constructs of the IMB model, namely information, motivation, behavioral skills, and maternal behavior in stimulation speech development

4. Operational Definition of Variables

Health Education is a series of activities providing material and training on speech development stimulation to mothers of toddlers. The health education intervention was carried out in stages for 4 weeks, namely: 1) showing a video on speech development stimulation to increase parents' understanding of speech development stimulation; 2) providing material on the theory of hope to increase mothers' motivation to carry out speech development stimulation; and 3) teaching speech development stimulation techniques to improve speech development stimulation skills.

Information refers to the information mothers possess regarding their children's speech development and stimulating their toddlers' speech development.

Motivation is what makes mothers feel compelled to achieve the goal of having toddlers with optimal speech development.

Behavioral skills are mothers' skills in practicing speech stimulation in toddlers.

Maternal behaviors are positive actions by mothers that routinely contribute to

speech stimulation to accelerate their toddlers' speech development.

5. Study Instruments

Health education was delivered by nurses who had received training in child development stimulation and behavior change health promotion. Three facilitators were involved, each responsible for 10 respondents. The health education process was conducted over a four-week period. The first stage employed video media containing material on speech development stimulation.

Information, motivation, and behavior were measured using questionnaires, whereas maternal skills were assessed using an observation sheet. All instruments used were previously confirmed to be valid and reliable based on testing conducted with 20 respondents in an earlier study.

Data collection was conducted in two phases: pretest, when mothers had not yet received the intervention in either the control or intervention group; and posttest, administered four weeks after mothers had completed the intervention in both groups.

6. Data analysis

Statistical analysis of the research data began with a normality test using the Shapiro–Wilk test (data were considered normally distributed when $p > 0.05$). The results of the normality test served as the basis for determining whether parametric or non-parametric analysis would be employed. If to the presence of non-normally distributed data in several measured variables, the inferential analysis employed was non-parametric. The criteria

for categorizing the research variables as "Good" or "Less" were determined using two methods: for variables with normally distributed data, the "Mean" value was utilized, whereas for variables with non-normally distributed data, the "Median" value was applied.

Univariate analysis was employed to examine the characteristics of the research data. Bivariate analysis used the parametric paired t-test to compare pre- and post-intervention mean values for information, motivation, skills, and maternal behavior. Bivariate analysis: Parametric analysis used a paired t-test to compare pre- and post-intervention mean scores for maternal information, motivation, skills, and behavior variables. Non-parametric analysis used the Wilcoxon test to measure differences in pre- and post-intervention data. Differences were considered significant if $p < 0.05$.

7. Research Ethics

The researchers obtained ethical clearance from the Health Research Ethics Committee of Universitas Jenderal Achmad Yani Yogyakarta, No. SKep/221/KEP/V/-2025.

RESULTS

1. Sample Characteristics

The study was conducted from June to August 2025. All mother respondents in both the intervention and control groups completed the study in its entirety. The respondent characteristics are presented in Table 1

Table 1. characteristics of the elderly in Indonesia

Characteristic Respondent	Intervention		Control Group		p
	n	%	n	%	
Mother's Characteristics					
Mother's age					
- 20-30 years	10	33.33	11	36.67	0.436

Characteristic Respondent	Intervention		Control Group		p
	n	%	n	%	
- >30 years	20	66.67	19	63.33	0.250
Mother's educational					
- Junior High School	6	20.00	10	33.33	
- Senior High School and Higher Education	24	80.00	20	66.67	0.587
Mother's employment status					
- Unemployed	21	86.67	19	63.33	
- Employed	9	13.33	11	36.67	0.065
Parity					
- Primipara	8	26.67	15	50.00	
- Multipara	22	73.33	15	50.00	0.073
Household monthly income (the provincial minimum wage: 2.1 million rupiah)					
- <2.1 million rupiah	18	60.00	19	63.33	
- ≥2.1 million rupiah	12	40.00	11	36.67	0.795
Child's Characteristics					
Child's age					
- 24-29 Months	12	40.00	11	36.67	0.194
- 30-36 Months	18	80.00	19	63.33	
Child's gender					
- Male	20	66.67	15	50.00	0.065
- Female	10	33.33	15	50.00	
Child's birth order					
- First	9	30.00	15	50.00	0.601
- Second subsequent	21	70.00	15	50.00	
Child's development					
- Normal	17	56.67	19	63.33	0.601
- Suspect	13	43.33	11	36.67	

2. Bivariate Analysis

Table 3 presents the results of the comparison of pre and post scores in the intervention group: the information variable shows an increase in the percentage of respondents who have information in the good category (66.67% to 86.67%). The difference in the mean of the pretest and posttest data shows a significant value with a medium effect size ($r = 0.32$; $p = 0.014$); the motivation variable shows an increase in the percentage of respondents who have motivation in the good category (63.33% to 73.33%) and the difference in the mean of the pretest and posttest data shows a significant value with a medium effect size ($p = 0.007$, $r = 0.35$); the behavior skills variable shows an increase in the percen-

tage of respondents who have skills in the good category (46.67% to 73.33%). The difference in the mean of the pretest and posttest data shows a significant value with a medium effect size ($r = 0.37$; $p = 0.005$); the maternal behavior variable shows an increase in the percentage of respondents who have behavior in the good category (50.00% to 73.33%). The difference in the mean of the pretest and posttest data shows a significant value with a medium effect size ($r = 0.34$; $p = 0.008$).

The results of the comparison of pre and post scores in the control group: the information variable shows an increase in the percentage of respondents who have information in the good category (60.00% to 66.67%) and the difference in the mean

of the pretest and posttest data is not significant ($r = 0.22$; $p = 0.083$) and the motivation variable shows an increase in the percentage of respondents who have motivation in the good category (43.33% to 56.67%). The difference in the mean of the pretest and posttest data is not significant ($r = 0.10$; $p = 0.465$); the behavior skills variable shows an increase in the percentage of respondents who have skills in the

good category (43.33% to 60.00%) and the difference in the mean of the pretest and posttest data is not significant ($r = 0.08$; $p = 0.564$); the maternal behavior variable shows an increase in the percentage of respondents who have information in the good category (43.33% to 60.00%) and the difference in the mean of the pretest and posttest data is not significant ($r = 0.05$; $p = 0.706$).

Table 3. Comparative Analysis Effect of Intervention Pre- and Post-Test Between Groups

	Variable	Pre-test		Post-test		r	p
		n	%	n	%		
Intervention	Information						
	- Good	20	66.67	26	86.67	0.32	0.014
	- Less	10	33.33	4	13.33		
	Motivation						
	- Good	11	36.67	22	73.33	0.35	0.007
	- Less	19	63.33	8	26.67		
	Behavior Skills						
	- Good	14	46.67	22	73.33	0.37	0.005
	- Less	16	53.33	8	26.67		
	Maternal Behavior						
Control	- Good	15	50.00	22	73.33	0.34	0.008
	- Less	15	50.00	8	26.67		
	Information						
	- Good	18	60.00	20	66.67	0.22	0.083
	- Less	12	40.00	10	33.33		
	Motivation						
	- Good	13	43.33	17	56.67	0.10	0.465
	- Less	17	56.67	13	43.33		
	Behavior Skills						
	- Good	13	43.33	18	60.00	0.08	0.564
	- Less	17	56.67	12	40.00		
	Maternal Behavior						
	- Good	13	43.33	18	60.00	0.05	0.706
	- Less	17	56.67	12	40.00		

DISCUSSION

Parents are responsible for providing positive caregiving to children through early stimulation and a positive social environment. Child-rearing is not a simple activity; it requires specialized skills integrated into everyday interactions (Baumrind, 2013). According to data from the relevant ministry, many mothers still experience

difficulties in child-rearing due to limited knowledge and developmental stimulation skills (Ministry of Women's Empowerment and Child Protection, 2020). The findings of this study are consistent with the behavioral IMB model framework for promoting child development, as developed by (Nursanti et al., 2024). It was found that health education interventions improved

knowledge, motivation, and skills, thereby enhancing changes in maternal health behavior in providing speech development stimulation for children.

Change in Information Level

Information is defined as the extent of a mother's understanding of child development and the stimulation of speech development in children. Mothers with a sound understanding of child development are able to establish realistic expectations and adjust their actions to meet the child's biological, physical, cognitive, and socio-emotional needs (Cuartas et al., 2020). The information possessed by mothers constitutes an important initial foundation for fostering curiosity, enhancing competence, and optimizing the early stimulation of child development (Pereira & Barros, 2019; Schuengel & Oosterman, 2019).

The findings of the study indicate that, prior to the health education intervention, both groups had relatively high mean scores. This suggests that most mothers of toddlers already possessed good information regarding speech development stimulation. This finding is supported by the mothers' characteristics, namely that all mothers had the MCH handbook. The MCH handbook serves as a source of health information and education from pregnancy until the child reaches five years of age. In addition, most mothers had more than one child (73.33% and 50.00%). This indicates that the mothers had previously obtained information about children's speech development through reading, explanations from community health cadres or health personnel, and social media (Nursanti et al., 2025a). Most mothers also had moderate to high levels of education (80.00% and 66.67%); mothers with higher educational attainment were better able to identify and filter credible information from social media (Strand & Westergren,

2024). Mothers who have access to reliable sources of information are more likely to engage in positive stimulation behaviors (Sylvia et al., 2021).

The intervention group showed a significant difference in mean information scores before and after the intervention. The intervention group demonstrated a medium effect size. The medium effect size in the intervention group indicates that the delivery of structured and contextualized material was more effective in improving mothers' understanding of child development stimulation in toddlers. IMB-based health education not only conveyed material through educational media in the form of a speech development stimulation video, but also through interactive face-to-face sessions that enabled two-way communication, allowing mothers to ask questions, engage in discussion, and receive immediate feedback regarding information and stimulation skills. This support played an important role in advancing respondents' knowledge from merely knowing and understanding to being able to apply it, such as reading storybooks aloud and inviting children to sing.

The findings of this study are consistent with previous research showing that mothers who received health education had better knowledge of child development. Exposure to information on toddler development and positive caregiving has been shown to be effective in improving mothers' knowledge of early childhood development, including caregiver-child interaction practices, reading books, singing songs, and playing games (Andrew et al., 2020; Meliati & Ekayani, 2018).

Change in Motivation Level

Motivation serves as an important mediator between knowledge and behavior, particularly for sustained behaviors such as child caregiving (Fisher & Fisher, 2002).

Mothers' motivation to engage in developmental stimulation practices in children is influenced by knowledge, satisfaction with previous caregiving experiences, mood conditions, attitudes, and cultural traditions within the community (Bornstein et al., 2018; Hajal et al., 2019).

Before the intervention, respondents in both groups had a low percentage of good category scores (36.67% and 43.33%). Presenting information on the risks of developmental disorders enhanced motivation by increasing awareness and strengthening self-efficacy in carrying out child developmental stimulation. The significant score differences in the intervention group after the intervention indicate that the delivery of structured and contextualized material was more effective in fostering maternal motivation.

Positive maternal motivation from an early stage influences the implementation of quality caregiving practices through child care and developmental stimulation (Nursanti et al., 2024). Positive maternal motivation is demonstrated by improved skills in quality child-rearing, increased playtime, and active communication with the child (Bornstein et al., 2018; Hajal et al., 2019; Zhong, He, Chen, et al., 2020).

Change in Behavioral Skills Level

In the context of speech development, skills encompass the ability to provide stimulation through activities such as reading storybooks, inviting children to sing, or engaging in symbolic play that involves verbal communication. Behavioral skills refer to the process of applying one's abilities, knowledge, and experience to implement strategies for improving child quality through high-quality caregiving (Sumargi et al., 2015). Mothers with well-developed skills will practice effective communication and demonstrate warmth in their interactions with children. Well-

developed skills determine the implementation of sustained, high-quality caregiving (Zhong, He, Chen, et al., 2020).

Maternal skills in providing high-quality caregiving are influenced by knowledge acquired through learning new information, previous caregiving experience, or observation of models (Jensen et al., 2021; Nursanti et al., 2025b). Active mother-child interaction in daily caregiving is determined by the mother's stimulation skills (Bornstein et al., 2018).

The significant score differences in the intervention group after the intervention indicate that mothers who were given opportunities for direct practice and concrete examples were able to acquire speech development stimulation practices more quickly and accurately. Programs that emphasize parental skills training are more effective in improving stimulation practices and parent-child interaction than passive education (Jeong et al., 2021). Training and counseling provided by health professionals are essential to equip mothers with the necessary skills and confidence. Previous research has demonstrated that training delivered by health workers and early childhood education teachers has a significant effect on mothers' skills in providing developmental stimulation, particularly in reading and storytelling (Maher et al., 2021; Suardi & Samad, 2020).

Before the intervention, most mothers in both groups had low skills in providing speech development stimulation to their children (respondents with good category 46.67% and 43.33%). Most respondents had not yet developed adequate skills in reading storybooks aloud. This finding indicates that, although some respondents understood the importance of speech stimulation, they were not yet able to implement it appropriately and consistently in their daily interactions with their

children. The findings of this study are consistent with previous research showing that, although mothers may possess sufficient knowledge about the importance of speech stimulation, their practical skills in implementing it are not necessarily optimal. Children raised with active verbal stimulation exhibit better speech development than those who receive passive stimulation (Suardi & Samad, 2020).

Respondent characteristics influenced the limited speech stimulation skills observed; namely, the majority of respondents were homemakers (87.5%). Although they had greater time and opportunity to interact with their children, not all respondents possessed the experience or confidence required to provide appropriate stimulation. This is consistent with previous research indicating that homemakers generally have more opportunities to interact with their children, but do not necessarily provide optimal stimulation due to limited experience and insufficient skills (Sulaiman et al., 2023).

After receiving the intervention in the form of an educational video and face-to-face mentoring in this study, respondents showed a significant improvement in skills. The mentoring provided through two-way education enabled families to gain a more concrete understanding through demonstration, discussion, and direct practice. This intervention gave families the opportunity to observe, imitate, and directly apply speech development stimulation. In addition to mentoring, educational play materials (storybook) were used during the intervention to support families in providing child development stimulation. These findings are consistent with previous research, indicating that direct speech stimulation interventions can improve speech stimulation skills and

practices consistently (Machmud et al., 2023).

The factors contributing to the high post-intervention scores in speech/speech stimulation skills were likely influenced by maternal characteristics, namely: (a) most mothers had moderate to high educational attainment (80.00% and 66.67%), and mothers with higher education are more able to identify various strategies to improve their skills and possess greater competence in providing speech stimulation to children (Huang et al., 2022; Strand & Westergren, 2024). In addition, most respondents had more than one child (73.33% and 50.00%), which may have allowed them to previously practice speech/speech stimulation in child-rearing. The combination of this educational approach and these supportive characteristics made the intervention more effective in improving family skills.

Change in maternal health-promoting behavior

Mothers of toddlers effectively stimulate speaking skills through active interaction in daily childcare. From the time of childbirth, mothers interact with their infants using conversational patterns. Most mothers habitually provide speech and speech stimulation through singing and by naming objects, letters, and numbers. For mothers, talking and singing to children expresses enthusiasm, provides stimulation, increases the child's attention, strengthens the emotional mother-child bond, and enhances the child's social understanding. Stimulation through talking and singing does not require play equipment; rather, mothers must have clear articulation skills and speak more slowly (Fancourt & Perkins, 2018).

Before the intervention, most mothers of toddlers did not yet demonstrate good behavior in stimulating speech/speech

development through the practice of reading storybooks, storytelling, and role play (respondents with good category scores of 50.00% and 43.33%). The findings of this study are consistent with the results of a national survey in Bangladesh, which reported that 41.6% of parents in rural areas still did not read books, tell stories, sing songs, or play with their children (Rahman et al., 2023). Mothers withdraw from reading and storytelling behaviors because they have low self-efficacy regarding their ability to read and tell stories effectively (Bornstein et al., 2018). Maternal confidence in reading and storytelling can be developed through habitual practice with the child and guidance from professionals, such as health workers or early childhood education teachers (Colgate et al., 2017).

After the intervention, a significant difference with a medium effect size was observed in the intervention group. This indicates that the delivery of structured and sustained material improved mothers' health-promoting behaviors in child developmental stimulation. These findings are consistent with previous research showing that mothers' behaviors in child developmental stimulation can be enhanced by providing adequate information, sufficient knowledge, strong motivation, and the ability to appropriately apply child-rearing skills (Nursanti et al., 2024; Susanto et al., 2019; Zhong, He, Gao, et al., 2020).

Respondent characteristics that supported the improvement of maternal health-promoting behavior in child developmental stimulation included the following: (1) parental education level, particularly that of the mother, exerts a significant influence on behaviors that support child development and success. Mothers with higher levels of education are more likely to consider investing their

resources in stimulating the development of toddlers (Cuartas et al., 2020). Mothers with low levels of education are at risk of being unable to provide optimal speech development stimulation (Farkas et al., 2020); (2) most mothers were homemakers, and therefore had more time to accompany and interact with their children; (3) most families had sufficient income. Higher family income increases mothers' efforts to invest in their toddlers' development in order to achieve optimal child development (Davis-Kean et al., 2021). Mothers with higher socioeconomic status are more likely to provide play facilities and engage children in play activities that support developmental outcomes (Jankowska et al., 2024; Li et al., 2017).

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CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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