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Implementation of the Information-Motivation-Behavior Skills Model in Child Development: A Path Analysis

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ABSTRACT

Background: Child development problems also still occur in DI Yogyakarta. Children's development is influenced by parents in educating and nurturing children. Many factors affect maternal parenting patterns including knowledge, attitudes, motivation and skills. The purpose of the study was to analyze the contextual influence of maternal parenting behavior on the development of children under five in Sleman Regency.
Subjects and Method: This study uses a cross-sectional design. The research was conducted in 25 Integrated Health Posts with a total of 200 research subjects for mothers of toddlers and children under five. The sampling techniques are stratified random sampling and simple random sampling. The independent variables in this study were information, motivation, skills/skills of child development, parenting behavior, and maternal age, while the dependent variable was the development of children under five. Data collection was carried out using a questionnaire and analyzed by path analysis.
Results: Every 1 unit increase in parenting behavior (b= 0.60; CI 95%= 0.44 to 0.76; p< 0.001), skills/skills of child development through parenting behavior (b= 0.44; CI 95%= 0.33 to 0.56; p<0.001), information through parenting behavior (b=0.20; CI 95%= -.074 to 0.32; p= 0.002), motivation through parenting behavior (b= 0.18; CI 95%= 0.06 to 0.30; p= 0.003), and maternal age through parenting behavior (b= 0.05; CI 95%= -0.05; CI 95%= -0.05 to 0.15, p= 0.323) will be followed by an improvement in child development.
Conclusion: The Information, Motivation, and Behavior skill model can be used to explain parenting behavior and child development. Children's development increases with good parenting behavior. Parenting behavior is influenced by children's developmental skills/skills influenced by the presence of information and motivation.

Keywords: IMB, child development, parenting behavior

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BACKGROUND

The toddler period is a critical period so useful stimulation is needed to develop so that it needs to get attention from the environment or family. Indonesia is one of a developing countries with the number of

children 0 to 17 years old one-third of the population, and the age of 0 to 5 years (toddlers) is the golden age for growth and development (Frosch et al., 2021). Toddlers who experience growth and development disorders are at risk of declining intellectual ability and productivity later in life (Pramono et al., 2024). At the world level, there are developmental problems in preschool-age children. Globally, it is reported that children with disorders in the form of anxiety are around 9%, emotional irritability 11 to 15%, and behavioral disorders 9 to 15% (Black et al., 2017).

Child development problems still occur at the Asian level. Based on research conducted by McCoy et al. (2016) identified that the number of toddlers experiencing developmental problems at the South Asian level was 37.7% (27.7 million) and in East Asia was 25.9% (15.1 million). In addition, another study conducted by Khasanah et al. (2022) stated that motor delays, language, autism and hyperactivity behaviors that occur in Thailand amount to around 24%, and in Argentina by 22%. According to WHO, in poor and developing countries there are 43 percent of 249 million children at risk of developmental failure. in Indonesia, around 45.12% have developmental disorders (WHO, 2019). The total development index of children aged 36-59 months (88.3%) and for reading ability based on children's speaking and language skills (64.6%) is still below that of Thailand (91.1%) and (69.3%), which incidentally are both developing countries (Frosch et al., 2021). Child development problems are also still occurring in Yogyakarta. In Yogyakarta Province, the achievement of health services in the growth and development of toddlers is around 65.9% which should be 85% (Yogyakarta Health Office, 2023).

Children's development is influenced by parents in educating and nurturing children. In the process of social development of preschoolers, parents must provide affection, attention and teaching to children in the form of parenting styles applied by parents (Koshy et al., 2021). Parents who provide good/positive parenting will make children able to socialize in their environment and will make children have an attitude to respect themselves and others, but if the parenting provided by parents is lacking/negative, children will tend to feel inferior to themselves and children's social development will not be achieved (Yoon, 2022).

Delays and disturbances in children's growth and development can be minimized by monitoring that can be carried out by parents and health workers to the pediatric specialist so that a child can develop optimally (Rahman et al., 2023). According to the American Academy of Pediatrics, prevention for developmental disorders is carried out for healthy children by parents where parents through health care centers are provided with education and health promotion regarding child development (Wang, 2016).

The number of Integrated Health Post in Sleman Regency does not eliminate the existence of health problems for toddlers such as nutritional problems/prevalence of malnutrition (7.38%) which significantly affects the development of toddlers. In 2023, there will be approximately 74,561 children under five in the Sleman Regency area. There are still toddlers in the Sleman Regency who have not gone to health services to carry out SDIDTK, namely approximately 15,467 (4.8%) toddlers spread across the Sleman Regency area. Therefore, the researcher wants to analyze the construction of information, motivation, and behavior skills models that can explain maternal behavior in the development of children under five.

SUBJECTS AND METHOD

1. Study Design

The type of research used is observational analysis with a cross-sectional design, namely by observing the population and sample at the same time in the 25 Integrated Health Post Sleman Regency, Yogyakarta.

2. Population and Sample

The population in this study is mothers and toddlers aged 24 to 60 months. The number of samples per variable is between 15 and 20 subjects. The sample calculation formula is (number of variables x 15 or number of samples x 20). The sample size in this study involves 6 variables so that this study uses a minimum sample of 90-100 research sample for path analysis. Sample considerations will be more representative if the number of samples is increasing and to avoid dropouts, researchers use as many as 200 research subjects. The sampling technique was simple random sampling. Simple random sampling is a random sampling method from all toddlers aged 24 to 60 months who are assumed to have the same chance to be a research sample. The researcher randomly sampled 8 toddlers in each Integrated Health Post. The inclusion criteria for the study were that the mother could read well, was willing to be a research subject, and the toddler did not experience congenital abnormalities. Meanwhile, the exclusion criteria are that mothers and toddlers are not in the Sleman area of Yogyakarta.

3. Study Variables

The dependent variable in this study is child development, while the independent variables are information, child development skills/skills, motivation, parenting behavior, and maternal age.

4. Operational Definition of Variables

Child development: Increase in more complex body structures and functions in gross motor skills, fine motor, speech and language as well as socialization and independence in children aged 24-60 months. The measuring instrument uses KPSP with a continuous scale.

Information: How much information the mother has/level of knowledge about the child's development. The measuring instrument uses a questionnaire with a continuous measurement scale.

Motivation: The mother's encouragement /desire to monitor the child's development. The measuring tool uses a questionnaire with a continuous scale

Parenting behavior: How parents treat their children, educate, guide, and stimulate children. The measuring instrument uses a questionnaire with a continuous design.

Maternal age: The length of the mother's life is calculated based on the full month to the time of the study. The measuring tool uses a questionnaire with a continuous design.

5. Study Instruments

The data collection technique uses a questionnaire given to mothers of 24-60 months of toddlers which. Look at the KIA book to see the birth weight history, as well as weigh and measure development using KPSP. Data collection was carried out by researchers and researcher enumerators. The researcher enumerator has received an explanation and similarity of perception regarding the research questionnaire. During the study, the enumerators totaled four enumerators. The enumerator used is Diploma III or Applied Bachelor of Midwifery education. The instrument used uses KPSP to measure child development. Other data was obtained with questionnaires that have been given to mothers of toddlers, namely questionnaires on information, motivation, behavioral skills, and parenting behavior.

6. Data Analysis

The data was analyzed by multivariate analysis. The multivariate analysis used in this study is path analysis. Path analysis is a

technique to analyze the influence of an independent variable on dependent variables whether they directly or indirectly affect them. This analysis is used to measure information, motivation, and behavior skills on maternal parenting behavior in child development.

7. Research Ethics

Research ethics include informed consent, anonymity, and confidence. The researcher has received a letter of ethical eligibility from the Ethics Commission of the Yogyakarta Ministry of Health Polytechnic No. DP.04.03/e-KEPK.1/514/2024.

RESULTS

1. Characteristics Respondent

Table 1, shows the results of the characteristics of respondents based on continuous data with a total of 200 subjects. The age of the child showed the result (Mean= 40.67; SD= 10.92) with a minimum age of 24 months and a maximum age of 60 months. The mother's age showed the result (Mean = 30.32; SD= 5.73) with a minimum age score of 18 years and a maximum age of 45 years. Based on the income of families with a total of 200 subjects, the results (Mean = 2,162,250; SD= 1324,427) with a minimum score of 500,000 and a maximum score of 8,500,000.

Table 2, shows that of the 200 respondents studied, in the female gender, there were 89 subjects with a percentage (45.1%), while in the male gender there were 108 subjects with a percentage (54.8%), so that the dominant gender was the male gender of 108 subjects. Based on the age of the children, of the 200 subjects studied, there were 100 subjects with a percentage (50.0%) of <40.5 months of age and 100 subjects with a percentage (50.0%) of ≥ 40.5 months of age.

Based on the age characteristics of mothers, there were 200 subjects with 98 subjects (49.0%) aged < 30 years and 102 subjects (51.0%) aged ≥ 30 years. For the characteristics of maternal education, it shows that of the 200 research subjects studied, there are 9 subjects with a percentage (4.5%) having the last elementary education, 30 subjects (15.0%) having the last junior high school education, 99 subjects (49.5%) having the last high school education, and as many as 62 subjects with a percentage (31.0%) having the last university education, so the dominant maternal education is in high school education.

The results of the study also showed that of the 200 research subjects, there were 98 research subjects with a percentage (49.0%) earning less than Rp. 2,000,000, while 102 research subjects with a percentage (51.0%) earning more than equal to Rp. 2,000,000, so the dominant income was more than equal to Rp. 2,000,000.

Table 1. Characteristics of research respondents (continuous data)

Characteristics	Mean	SD	Min	Max
Child's age	40.67	10.92	24	60
Mother's age	30.32	5.73	18	45
Family Income	2,162,250	1,324,427	500,000	8,500,000

Table 2. Characteristics of the study respondents (dichotomy data)

Characteristics	Category	Frequency (n)	Percentage (%)
Child's gender	Female	89	45.1
	Male	108	54.8
Child's age	< 40.5 months	100	50.0
	≥ 40.5 months	100	50.0
Maternal age	< 30 years	98	49.0
	≥ 30 years	102	51.0

Characteristics	Category	Frequency (n)	Percentage (%)
Maternal education	Elementary Education	9	4.5
	Junior High School	30	15.0
	Senior High School	99	49.5
	Higher Education	62	31.0
Family Income	< Rp. 2.000.000	98	49.0
	≥ Rp. 2.000.000	102	51.0

Table 3, shows the results of univariate analysis that out of 200 research subjects, maternal information showed results (Mean= 8.69; SD= 1.92) with a minimum score of 3 and a maximum score of 13. The motivation variable showed the result (Mean= 25.21; SD= 4.72) with a minimum score of 14 and a maximum score of 33. Based on the variable of child development skills, that of the 200 subjects studied, it was known that the results (Mean= 5.70; SD= 1.45) with a minimum score of 1 and a maximum score of 7.

The results of the study also showed that the results of the parenting behavior variable (Mean= 53.36; SD= 11.29) with a minimum score of 26 and a maximum score of 73). Based on the variables of child development, it was found that out of 200 respondents showed results (Mean = 9.09; SD= 1.10) with a minimum score of 6 and a maximum score of 10.

Table 3. Results of univariate analysis of information, motivation, skills/skills of child development, parenting behavior, and child development

Variable	Mean	SD	Min	Max
Information	8.69	1.92	3	11
Motivation	25.21	4.72	14	33
Child development skills/skills	5.70	1.45	1	7
Parenting behavior	53.36	11.29	26	73
Child Development	9.09	1.10	6	10

2. Bivariate Analysis

Table 4 shows there is a positive influence between information and child development and the relationship is statistically significant. Each increase in one unit of information will be followed by an increase in child development by 0.13 units (OR= 0.13; CI 95%= 0.05 to 0.21; p= 0.001). With a confidence level of 95%, every increase in one unit of information will be followed by an increase of 0.05 to 0.21.

Based on the motivation variable, it shows the results that motivation affects the development of children. The results of the study were influential and statistically significant. Mothers who have high motivation are 0.07 times more likely to develop their children appropriately than mothers with low motivation (OR= 0.07; CI 95%= 0.04 to 0.10; p<0.001). With a confidence level of 95%, every increase in one unit of motivation will be followed by an increase in child development of 0.04 to 0.10.

Table 4 shows that there is a significant influence between child development skills/skills and child development with a value (OR= 0.32; CI 95%= 0.22 to 0.41; p<0.001). Mothers who have good child development skills/skills are 0.32 times more likely to have children with appropriate development compared to mothers who do not have child development skills/skills. With a confidence level of 95%, every increase in one unit of skills/skills in child development will be followed by an increase in child development of 0.22 to 0.41.

Table 4 shows that there is a positive influence between parenting behavior and

child development and the relationship is statistically significant (OR= 0.04; CI 95%= 0.03 to 0.05; p<0.001). Mothers who have good parenting behavior are 0.04 times more likely to have children with appropriate development than mothers with poor parenting behavior. With a confidence level of 95%, every increase in one unit of parenting behavior will be followed by an increase in child development (0.03 to 0.05).

Table 4. Results of bivariate analysis of information, motivation, skills/skills of child development, and parenting behavior on child development

Independent Variables	OR	CI 95%		p
		Lower Limit	Upper Limit	
Information	0.13	0.05	0.21	0.001
Motivation	0.07	0.04	0.10	<0.001
Child development skills/skills	0.32	0.22	0.41	<0.001
Parenting behavior	0.04	0.03	0.05	<0.001

3. Multivariate Analysis

The path analysis model made by the researcher based on theory is tested for compatibility with the best variable relationship model. Figure 1 shows the structural model with the estimation

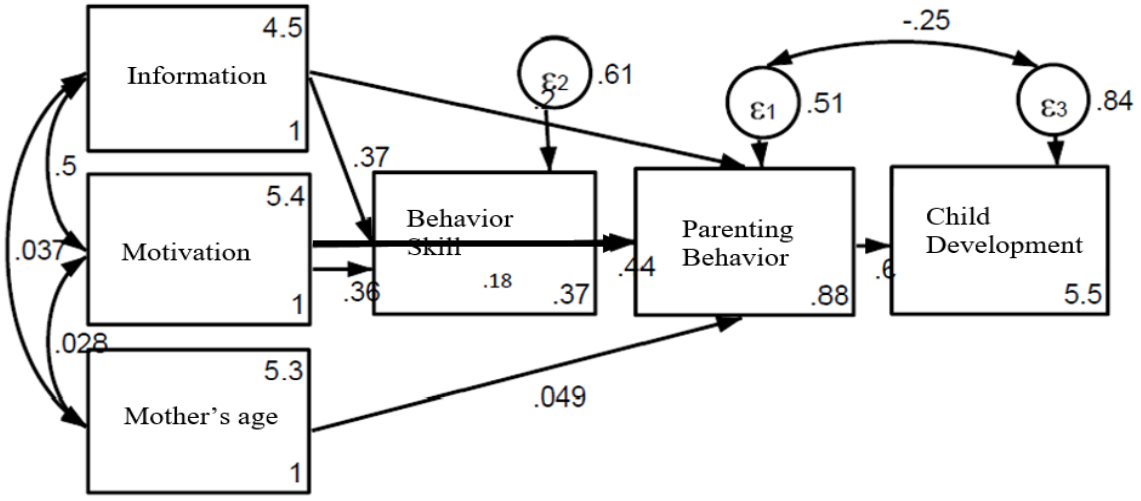

Figure 1. The structural model with estimation

Table 5 shows, there is a direct and positive influence between parenting behavior on child development and statistically significant. Children with good parenting behavior were 0.60 units more likely to have appropriate development than children with poor parenting behavior (b= 0.60; CI 95%= 0.44 to 0.76; p< 0.001). There is an indirect influence between children's developmental skills on children's development through parenting behavior and is statistically significant. Each increase in one unit of child development skills/skills will be followed by an increase in child development by 0.44 units (b= 0.44; CI 95%= 0.33 to 0.56; p<0.001). The results show there is a positive and statistically significant indirect influence between information and child development through parenting behavior. The research subjects with good information had a logit score with parenting behavior of 0.20 in subjects with poor information. Every increase in one unit of information will increase parenting behavior by 0.20 units (b=0.20; CI 95%= -0.07 to 0.32; p= 0.002).

Mothers with high motivation had a probability (logodd) of having a child with a developmental level 0.18 units higher than low motivation and the relationship was statistically significant (b= 0.18; CI 95%= 0.06-0.30; p= 0.003). There was a positive relationship between maternal age and parenting behavior, but it was not statistically significant. An older person has a 0.05 unit lower likelihood of having a developmentally appropriate child than a mother with a younger age (b= 0.05; CI 95%= -0.05 to 0.15, p= 0.323).

Table 5 shows that there is a positive and statistically significant relationship between information and developmental skills. Mothers with good information have a probability (logodd) to have developmental skills/skills 0.37 units higher than poorly informed (b= 0.37; 95% CI: 0.25 to 0.49, p<0.001. The results of the analysis also showed that there was a positive and statistically significant relationship between motivation and developmental skills/skills. Mothers with high motivation had a probability (logodd) to have developmental skills/skills 0.36 units higher than low motivation (b= 0.36; CI 95%= 0.24 to 0.48; p<0.001). Based on the path analysis carried out using STATA 13, it can be done to form equations and estimates. After the estimation and equation are formed, a goodness of fit test is carried out. The goodness of fit test test is based on Table 5. Based on the results of data processing and acceptance criteria, the goodness of fit test model based on the absolute fit measure that determines the degree of overall prediction (measurement structural model) against the correlation and covariance matrix is good.

The results showed that the chi square value was 6.8 so overall, the smaller the chi-square value, the more suitable the model. The Root Mean Square Error of Approximation (RMSEA) value of 0.06 indicates that the RMSER is a close fit because it is below 0.08 while based on the incremental fit measure, namely comparing the proposed model with the baseline model is also very good because the Comparative Fit Index (CFI) value is 0.99 and the Tucker Lewis Index (TLI) of 0.97, meaning greater than 0.90. So that overall the path analysis equation model used is acceptable.

Table 5. Results of path analysis

Dependent Variables		Independent Variables	b	CI 95%		p
				Lower Limit	Upper Limit	
Direct Effect						
Child development	←	Parenting behavior	0.60	0.44	0.76	<0.001
Indirect Effect						
Parenting behavior						
Parenting behavior	←	Skills	0.44	0.32	0.56	<0.001
Parenting behavior	←	Information	0.20	0.07	0.32	0.002
Parenting behavior	←	Motivation	0.18	0.06	0.30	0.003
Skills	←	Mother's age	0.05	-0.05	0.15	0.323
Skills	←	Information	0.37	0.26	0.49	<0.001
	←	Motivation	0.36	0.24	0.48	<0.001
N observation: 200						
Log-likelihood: 6.80						
Chi-square: 6.8						
RMSEA: 0.06 (<0.08)						
CFI: 0.99 (≥ 0.90)						
TLI: 0.97						

DISCUSSION

Behavior Skills Model (IMB Model) can be applied by considering various constructs that play a role in shaping healthy care and parenting behaviors. The following are the main constructs in the IMB Model that can affect the development of children under five.

The results of the study showed that there was a positive and statistically significant indirect influence between information and child development through parenting behavior. Mother's knowledge of the developmental stages of a child under five, such as motor, language, social, and cognitive abilities, is an important factor in effective parenting. Accurate information about what is expected at each stage of a child's development can help mothers understand and respond appropriately to their child's needs. Knowledge of healthy nutrition and lifestyle habits that support the health of toddlers is an important aspect of caring for children. This information includes healthy food types, proper portion sizes, sleep needs, and disease prevention measures.

Various studies support that children's developmental preferences and health knowledge/information predict children's developmental behaviors. The findings of this study provide further support for interventions on children's and adolescent food preferences and information/ knowledge to influence behavior and efficacy in child development. The magnitude of the problem and factors of child development starts from the mother's knowledge during pregnancy, toddler and it will be a global concern for future generations (Sastrawijayah et al., 2024). In addition, mothers who have information about child development will provide healthy results for children, especially practices that facilitate children's physical health and safety, are known to be more likely to implement these practices. To optimize child development, parents need a basic understanding of infant and child developmental milestones and norms as well as the types of parenting practices that encourage the achievement of these milestones in children (Suwarni et al., 2017).

A number of strong correlational studies show different variations in parents' knowledge of parenting. Some studies show that parents with higher levels of education tend to know more about the stages and processes of child development and effective parenting strategies. This greater knowledge may reflect differences in access to accurate information, differences in parents' trust in information or information sources, and parents' comfort with their own abilities, among other factors (Choi et al., 2021).

In an analysis of data from a prospective cohort study that controlled for potential confounding studies, children of mothers who had greater knowledge of child development at 12 months of age were less likely to develop behavioral problems and scored higher on child IQ tests at 36 months of age than children of mothers with less developmental knowledge (Grolnick, 2015). This and other observational studies have also shown that parental knowledge is associated with improved parenting and the quality of the home environment, which, in turn, is related to children's outcomes, in addition to dependence on parental attitudes and competencies (Sak et al., 2021).

Mother's motivation is related to child development through parenting behavior and child development skills/skills. The motivation of mothers to give their toddlers the best for their toddler's development can be influenced by various factors, such as love for children, aspirations for a bright future for children, and a desire to meet the expectations of family or society. Strong moti-

vation can encourage mothers to be actively involved in supporting their child's development (Torquato et al., 2019).

Motivation is a change in energy in a person that is characterized by the emergence of positive feelings and responses to a goal. In today's era, many mothers do not pay attention to the growth and development of their children. Most mothers are career women, so there is a reduction in supervision of children. Even though children who get a lot of stimulation will develop faster than children who do not get stimulation. The earlier and longer the stimulus is given, the greater the benefits for babies and toddlers (Fisher and Fisher, 2023). But in reality, parents' awareness of stimulation is still low. These problems include the reluctance of parents to provide stimulus to their children because it is considered intended for children with developmental delays. Even though children have normal development, children still need stimulation (Wijayanto et al., 2022).

Child development skills/skills are related to child development through parenting behavior. Skills in various aspects of parenting, including communicating with children, providing proper attention, handling children's emotions, and building healthy relationships, are essential for the development of children under five. The ability of mothers to implement positive parenting practices and support child development is the result of a combination of knowledge, motivation, and experience (Fitrian et al., 2019).

Mothers who have good child development skills/skills will encourage children's cognitive growth and sensitivity to baby cues 2 months after the program, compared to mothers who do not have child development skills/skills. Hossain et al. (2015) concluded that parenting skills consist of the ability to develop and clarify parental expectations clearly, be able to manage emotions when children are in a fussy state, be consistent in giving positive and negative consequences, be a role model for children, and reward children's behavior. In addition to these opinions, there are also indicators of parenting skills developed by ConstantiNescu (2017), namely parental skills in developing warm interactions with children, empathic communication skills, problem-solving skills, the application of positive discipline, and the fulfillment of children's physical and psychological needs.

Parenting skills are not always easy for parents to implement. There are external factors and innate factors from the father or mother that affect the ability of parents to apply this when interacting with children. According to Dunst et al. (2014) social environmental conditions that have a high risk (multiple factors) will have a negative impact on the functioning of parents. Families with high-risk factors will trigger obstacles in the development of individuals in the family. These risk factors can be in the form of parental stress, depression, violence, and neglect in children which can have an impact on the cognitive, physical, and social development of children. In addition to environmental factors, innate conditions that affect parenting, parenting skills are also influenced by the mental health of parents and relationships with partners (Fitrian et al., 2019). Parenting skills are also influenced by the socioeconomic status and education level of parents. Parents who have awareness of the importance of education for their children show more involvement in accompanying their children's education at home (Sak et al., 2021).

Parenting skills are parenting skills that are important for parents to do because they have the greatest power and strong influence on children's lives. Various studies that support the importance of parenting

skills in the interaction of children and parents have been widely conducted. Positive parental skills will improve the process of child growth and development optimally, on the contrary, low parenting skills will cause obstacles in child development. The impact of low quality of parent-child relationships can trigger various negative developments in children's social-emotional skills (Samfira, 2022), children's behavioral deviations, and children's mental health (Torquato et al., 2019). On the other hand, when children are raised in positive parenting, their development will be optimal. Deng et al. (2022) prove that a family environment full of warmth and positive stimulation during the adolescent development phase has an impact on the formation of good brain structure and positive emotional regulation ability. Parenting practices or mother-to-parenting behavior can be the main cause of child growth and development disorders. Factors such as poor parenting behavior can cause problems in children's growth and development, this is because mothers do not understand the correct way of parenting, especially related to feeding children (Erick, 2022).

The application of the IMB Model in the development of children under five highlights the importance of providing mothers with accurate information, generating strong motivation to support child development, and developing the behavioral skills necessary in healthy parenting. By understanding and strengthening these factors, it is hoped that mothers can provide optimal care and support the optimal development of children under five.

This study concludes that the Information, Motivation, and Behavior skill models can be used to explain parenting behavior and child development. Children's development increases with good parenting behavior. Parenting behavior is influenced by children developmental skills/skills influenced by the presence of information and motivation.

It is recommended to health workers to provide counseling related to child development and good parenting behavior to optimize the quality of life of children. For mothers of toddlers, it is recommended to increase knowledge about growth and development, increase activeness in child growth and development stimulation activities, monitor growth and development, and provide a good environment.

AUTHOR CONTRIBUTION

Diani Fadmi Putri as the main researcher who designed the research, searched for articles, and analyzed the data. Eti Poncorini and Bhisma Murti as assistant researchers improved the article, provided input and consideration in writing the article.

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CONFLICT OF INTEREST

There was no conflict of interest in this study

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