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Unlocking Maternal Potential: A Pathway Analysis of Information, Motivation, and Skills Application on Child Development in Sleman, Yogyakarta, Indonesia

Anisah Firdaus[1)], Hanung Prasetya[2)], Bhisma Murti[1)]

[1)]Master's Program in Public Health, Universitas Sebelas Maret
[2)]Study Program of Accupuncture, Health Polytechnics, Ministry of Health Surakarta

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ABSTRACT

Background: Toddlers (ages 0-5 years) are a golden period in human development. In this period, there is rapid development in various aspects, such as physical, cognitive, language, social, and emotional. Mother's behavior in providing stimulation and care can affect the development of toddlers. This study focuses on the analysis of the influence of the Information Motivation Behavior Skill Model application on maternal behavior for the development of toddlers.

Subjects and Method: This study is a cross-sectional study conducted at 25 integrated health posts in Sleman Regency, Yogyakarta from April to May 2024. The sample consisted of 200 mothers of toddlers aged 24-60 months who were selected using the simple random sampling method. The dependent variable in this study was maternal behavior in nurturing the development of toddlers. The independent variables were maternal information/knowledge, maternal motivation, maternal behavior skills, and maternal income. Data collection was carried out by interviews and questionnaires. The data analysis was using path analysis.

Results: The results of path analysis show that maternal behavior in nurturing the development of toddlers is positively related to good behavioral skills. (OR= 1.22; CI 95%= 0.70-0.80; p< 0.001). Maternal behavioral skills are influenced by information (OR= 1.35; CI 95%= 0.899-1.90; p<0.001) and motivation (OR= 1.36; CI 95%= 0.82-1.89; p<0.001). The path analysis model showed good fit (p= 0.134 (>0.05); RSMEA= 0.06 (<0.08); CFI= 0.98 (>0.90); TLI= 0.97).

Conclusion: Maternal behavior in nurturing toddler development is directly influenced by maternal behavioral skills, maternal information/knowledge, maternal income. Mother's behavior in nurturing toddler development is indirectly influenced by information on maternal behavior through maternal behavior skills and maternal motivation towards maternal behavior through maternal behavior skills. Thus, the Information Motivation Behavior Skill Model can be used to improve maternal behavior in nurturing toddler development.

Keywords: Information Motivation Behavior Skill Model, maternal behavior, toddler development care.

Correspondence:
Anisah Firdaus. Master's Program in Public Health, Universitas Sebelas Maret. Jl. Ir. Sutami 36A, Surakarta 57126, Central Java, Indonesia. Email: anisahfirdaus15@gmail.com. Mobile: +6285728161369

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BACKGROUND

Toddlers (ages 0-5 years) are a golden period in human development. During this period, there is rapid development in various aspects, such as physical, cognitive, language, social, and emotional (Marliani, 2015). Proper stimulation and care during this period are very important to support optimal toddler development. Mothers are the closest people to toddlers and have an important role in providing stimulation and care (Fairuz et al, 2023). Maternal behavior in providing stimulation and care can affect toddler development.

Development is the increase in more complex body structures and functions in gross motor skills, fine motor skills, speech and language, as well as socialization and independence (Amalia, et al., 2021). The development process occurs simultaneously with growth, so that each growth is accompanied by development. Development is the result of the interaction of the maturity of the central nervous system with the organs it influences. Child development is influenced by internal and external factors (Rahmawati, et al., 2022).

The developmental stages of toddlers in the world until nowadays turned out to have many problems. Various problems of child development include problems of gross motor delays, the incidence of gross motor delays in the world is 23.5%, while in the United States it ranges from 12-16%, Thailand is 24%, Argentina is 22% and in Indonesia it reaches 13-18% (Unicef, 2018). According to WHO (2020), in poor and developing countries there are 43 percent of 249 million children who are at risk of experiencing developmental failure. Data obtained from the 2018 Basic Health Research (Riskesdas) stated that the number of children aged 1-5 years old was 4,902,456 people, the number of children whose physical development is in accordance with their age is 83.4% and those who are not in accordance are 16.6% (Basic Health Research, 2018).

In the Special Region of Yogyakarta Province itself, the problem of toddler development is still experiencing quite significant problems. Although DI Yogyakarta has reached 65.9% in health services for toddler growth and development, there is still a gap with the target of 85% that has been set. This is evidenced by the results of a preliminary study at one of the Posyandu in Sleman Regency which showed that out of 39 children aged 4-5 years old, there were still several cases that needed special attention related to their development (Public health Office-DIY, 2023).

Child growth and development is a primary, essential, and positive process that begins from conception to the end of adolescence. The early years of life, especially the first years, are very important for the physical, intellectual, motor, social, and emotional development of children. Success during this period will determine the child's future and the quality of human resources in the future. Therefore, early detection and appropriate intervention are very important to ensure optimal child growth and development (Amalia et al., 2021).

Maternal behavior is a form of behavior shown by mothers during the toddler development process. Toddler development cannot be separated from the role of the mother as a wife and mother of her children, mothers have a role in taking care of the household, as caregivers and educators of their children, protectors and as one of the groups of their social roles and as members of society from their environment, mothers can also act as additional breadwinners in their families (Fairuz et al, 2023). Maternal behavior in toddler development is very

important and crucial. Mothers can provide cognitive, language, social and emotional, and physical stimulation to help children develop optimally. Examples of positive maternal behavior include greeting children with affection, providing age-appropriate stimulation, being a good listener, and giving praise (Wiguna and Sunariyadi, 2021).

The strategy applied in improving knowledge and behavior is to use the Information Motivation Behavior Skill (IMB) model approach, namely a learning model by providing information, motivation, and support to improve individual health behavior (Fisher, 1999). This model has been proven effective in improving maternal knowledge and behavior in various aspects of health, including exclusive breastfeeding, knowledge about child growth and development, and healthy eating behavior (Lestari et al, 2021). The application of IMB in helping maternal behavior in toddler development is divided into 3, namely information, motivation and support.

Based on the background, developmental disorders are caused by many factors, especially parents who are responsible for toddler development. Therefore, there needs to be research to improve maternal behavior on toddler development. This study focuses on the analysis of the effect of Information Motivation Behavior Skill Model application on maternal behavior for toddler development in Sleman district.

SUBJECTS AND METHOD

1. Study Design

The type of research used was quantitative research with an analytical observational method with a cross-sectional study. This research was conducted in the Sleman Regency area, Yogyakarta. This study was conducted in April-May 2024.

2. Population and Sample

The population in this study were mothers of toddlers aged 24-60 months old in Sleman Regency. The number of integrated health posts used in the study was 25 toddler health posts. Each integrated health post observed 8 mothers of toddlers aged 24-60 months old. The researcher used 200 research subjects and the sampling technique was simple random sampling.

3. Study Variables

The dependent variable was the maternal behavior in nurturing the development of toddlers. The independent variables were the maternal information/ knowledge, maternal motivation, maternal behavior skills, and maternal income.

4. Operational Definition of Variables

Maternal Behavior: The mother's ability to carry out behaviors that allow for the development of the child in carrying out his/her developmental tasks. Data were taken using a questionnaire with a continuous scale.

Information/ Maternal Knowledge: The amount of information/ level of knowledge that the mothers have regarding child development. Data were collected using a questionnaire with a continuous scale.

Maternal Motivation: Mother's encouragement/ will to monitor child development. Data were collected using a questionnaire with a continuous scale.

Maternal Behavior Skill: The mother's ability to carry out behaviors that allow for the development of the child in carrying out his/her developmental tasks. Data were taken using a questionnaire with a continuous scale.

Maternal Income: The amount of real income from mothers used to fulfill individual needs in the household. Data was taken using a questionnaire with a continuous scale.

5. Study Instrument

The research instrument used for data collection was a questionnaire**.**

6. Data analysis

Univariate analysis was conducted with the aim of determining the frequency distribution and percentage of each variable studied, namely the Information Motivation Behavior skill Model including maternal information/knowledge, maternal motivation, maternal behavior skills, maternal income towards maternal behavior in nurturing the development of toddlers. The next analysis was bivariate which was conducted on each exogenous variable, namely the Information Motivation Behavior skill Model on the endogenous variable, which was maternal behavior in nurturing the development of toddlers and multivariate analysis using the path analysis model.

7. Research Ethics

Research ethics including informed consent, anonymity, and confidentiality were handled carefully throughout the research process. The research ethics permit approval letter was obtained from the Research Ethics Committee of Dr. Moewardi Hospital, Surakarta City on April 22, 2024 with the number: 978/IV/HREC/2024.

RESULTS

This research was conducted in April-May 2024 on 200 mothers of toddlers aged 24-60 months old in the Sleman Regency area, Yogyakarta.

1. Sample Characteristics

Table 1 shows the distribution of respondent characteristics that can be seen from several variables including child gender, child age, maternal age, maternal education level, and maternal income. In the study, 200 research subjects were obtained in the female child gender, there were 89 subjects with a percentage (45.18%), while the male gender there were 108 subjects with a percentage (54.82%), Based on the child's age, of the 200 subjects studied, there were 100 subjects with a percentage (50%) aged <40.5 months old and 100 subjects with a percentage (50%) aged ≥ 40.5 months old. Based on the characteristics of the mother's age, there were 200 subjects with 98 subjects (49%) aged <30 years old and 102 subjects (51%) aged ≥ 30 years old. For the characteristics of maternal education, it showed that of the 200 research subjects studied, there were 9 subjects with a percentage (4.5%) whose last education was elementary school, 30 subjects (15%) whose last education was junior high school, 99 subjects (49.5%) whose last education was high school, and 62 subjects with a percentage (31%) whose last education was college.

The results of the study also showed that out of 200 research subjects, there were 98 research subjects with a percentage of (49%) earning income below Rp. 2,000,000, while 102 research subjects with a percentage of (51%) earned income of more than or equal to Rp. 2,000,000, therefore, the dominant income was more than or equal to Rp. 2,000,000.

Table 1. The description of sample characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Child's Gender	Female	89	45.18
	Male	108	54.82
Child's Age	< 40.5 months old	100	50
	≥ 40.5 months old	100	50
Maternal Age	< 30 years old	98	49
	≥ 30 years old	102	51

Characteristic	Category	Frequency (n)	Percentage (%)
Maternal Education	Elementary School	9	4.5
	Junior High School	30	15
	Senior High School	99	49.5
	College	62	31
Maternal Income	< Rp. 2,000,000	98	49
	≥ Rp. 2,000,000	102	51

2. Univariate Analysis

Table 2 shows the results of univariate analysis that from 200 research subjects, mother's information shows results (Mean = 14.86; SD = 2.93) with a minimum score of 5 and a maximum score of 14. The motivation variable shows results (Mean = 25.21; SD = 4.71) with a minimum score of 14 and a maximum score of 33. Based on the behavior/skill variable, from 200 subjects studied, it is known that the results (Mean = 4.89; SD = 1.31) with a minimum score of 1 and a maximum score of 6.

The results of the study also showed that the results of the maternal behavior variable (Mean = 18.045; SD = 4.96) with a minimum score of 7 and a maximum score of 25). Based on the income variable, it was found that out of 200 respondents, the results showed (Mean= 2126.75; SD = 1327.387) with a minimum score of 500 and a maximum score of 8500.

Table 2. Univariate analysis

Variable	N	Mean	SD	Min	Max
Information	200	14.86	2.93	5	26
Motivation	200	25.21	4.71	14	33
Behavior skill	200	4.89	1.31	1	6
Income	200	2126.75	1327.387	500	8500
Maternal behavior	200	18.045	4.966	7	25

3. Bivariate Analysis

Table 3 shows the analysis of the direct effect between variables including maternal information/ knowledge, maternal motivation, maternal behavioral skills, maternal income and maternal behavior in caring for the development of toddlers.

Maternal Information/Knowledge on Maternal Behavior

Maternal information/knowledge has a positive and statistically significant relationship to maternal behavior in nurturing the development of toddlers. Every increase in one unit of information will be followed by mother's behavior by 0.63 units (OR = 0.63; 95% CI = 0.41-0.85; p < 0.001). With a 95% confidence level, every increase in one unit of information will be followed by an increase of 0.41 to 0.85.

Maternal Motivation on Maternal Behavior

Maternal motivation has a positive and statistically significant relationship with maternal behavior in nurturing the development of toddlers. Every 1 unit increase in mother's motivation score will be followed by an increase in mother's behavior by 0.39 units (OR = 0.39; 95% CI = 0.25-0.53; p <0.001). With a 95% confidence level, every one unit increase in motivation will be followed by an increase in child development of 0.25 to 0.53.

Maternal Behavior Skill on Maternal Behavior

Maternal behavior skills have a positive and statistically significant relationship to

maternal behavior in nurturing toddler development. Every 1 unit increase in expectation score will be followed by an increase in mother's behavior by 1.73 units (OR = 1.73; 95% CI = 1.25-2.20; p <0.001). With a 95% confidence level, every one unit increase in behavior skills will be followed by an increase in child development of 1.25 to 2.20.

Maternal Income on Maternal Behavior

Mother's income has a positive and statistically significant relationship with maternal behavior in nurturing the development of toddlers. Every 1 unit increase in self-efficacy score will be followed by an increase in tertiary preventive behavior by 0.0011 units (OR = 0.0011; 95% CI = 0.0006-0.0016; p <0.001). With a 95% confidence level, every one unit increase in parenting behavior will be followed by an increase in child development of 0.0006 to 0.0016.

Table 2. Bivariate analysis of of information, motivation, and skills application on child development

Independent Variable	OR	CI 95%		p
		Lower Limit	Upper Limit	
Information	0.63	0.41	0.85	<0.001
Motivation	0.39	0.25	0.53	<0.001
Behavior skill	1.73	1.25	2.20	<0.001
Income	0.01	0.0006	0.0016	<0.001

3. Multivariate Analysis

Table 4 shows the results of the multivariate analysis where this study used path analysis on the variables of maternal information/ knowledge, maternal motivation, maternal behavioral skills, maternal income and maternal behavior in caring for the development of toddlers.

Maternal Behavior Skills on Maternal Behavior

Maternal behavior skills can directly influence maternal behavior in nurturing toddler development. Mother's behavior skills have a positive and statistically significant relationship to mother's behavior in nurturing toddler development. Mothers with good behavior skills are likely to have appropriate behavior by 1.22 units than mothers with poor parenting behavior (b= 1.22; CI 95%= 0.70-0.80; p< 0.001).

Maternal Knowledge on Maternal Behavior

Maternal information/knowledge can directly influence maternal behavior in nurturing toddler development. Mother's information/knowledge has a positive and statistically significant relationship to maternal behavior in nurturing toddler development. Every one unit increase in information will be followed by an increase in child development by 0.29 units (b= 0.29; CI 95%= 0.06-0.50; p=0.016).

Maternal Income on Maternal Behavior

Maternal income can directly affect the mother's behavior in nurturing the development of toddlers. Maternal income has a positive and statistically significant relationship to the mother's behavior in nurturing the development of toddlers. Every increase of one unit of income will be followed by the mother's behavior of 0.001 units (b= 0.001; CI 95%= 0.000-0.001; p=0.031).

Maternal Information/ Knowledge on Maternal Behavior through Maternal Behavior Skills

There is a positive and statistically significant indirect effect between information and maternal behavior through behavior skills. Subjects of the study with good information have a logit score with maternal behavior of 0.13 on subjects with poor information. Each increase in one unit of information will increase maternal behavior by 0.13 units (b=0.13; CI 95%= 0.06-0.20; p< 0.000).

Maternal Motivation on Maternal Behavior through Maternal Behavior Skills

There is a positive and statistically significant indirect effect between motivation and maternal behavior through Behavior skills. Mothers with high motivation have a possibility (logodd) to have appropriate maternal behavior 0.11 units higher than those with low motivation and the relationship is statistically significant (b= 0.11; CI 95%= 0.07-0.15; p= 0.003).

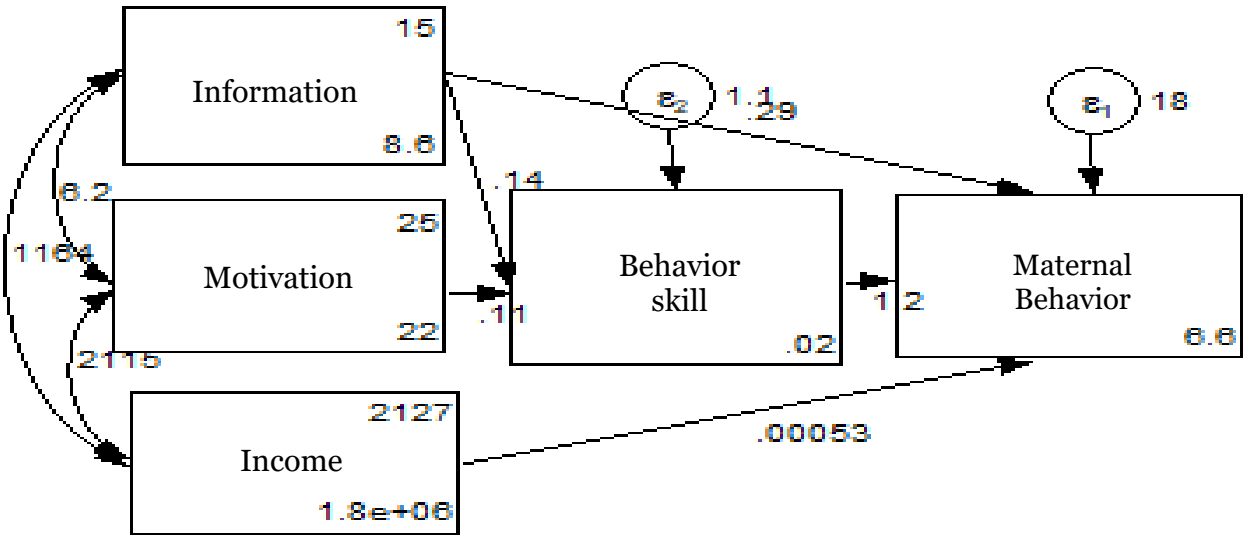

Figure 1. Path analysis of the application of the information motivation behavior skill Model on maternal behavior for nurturing the development of toddlers

Table 4. Results of path analysis of maternal behavior in nurturing the development of toddlers

Dependent Variable	Independent Variable	OR	95%CI		p
			Lower Limit	Upper Limit	
Direct Effect					
Maternal Behavior	← Behavior skill	1.22	0.70	1.80	<0.001
	← Information	0.29	0.06	0.50	0.016
	← Income	0.001	<0.001	0.001	0.031
Indirect Effect					
Behavior skill	← Information	0.13	0.06	0.20	<0.001
	← Motivation	0.11	0.07	0.15	<0.001
N observation: 200					
Log likelihood: -3641.1748					

Dependent Variable	Independent Variable	OR	95%CI		p
			Lower Limit	Upper Limit	
Chi-square: 7.03 Prob > chi2 : 0.134 RMSEA: 0.06 (<0.08) CFI: 0.98 (≥ 0.90) TLI: 0.97					

DISCUSSION

Maternal behavior in nurturing toddler development is influenced by the mother's behavior skills. The results of this study indicate that there is a direct and positive influence between Behavior/Skill on Mother's Behavior and it is statistically significant. Mothers with good Behavior/ Skill are more likely to have appropriate behavior by 1.22 units than mothers with poor parenting behavior (b= 1,22; CI 95%= 0.70-0.80; p< 0.001).

Research shows that maternal behavioral skills directly influence maternal behavior, which in turn has an impact on family life, especially in handling child development. Behavioral skills, which are the ability of individuals to take preventive measures and are based on self-efficacy and perceived behavioral control are the main key. According to Wibowo and Nurhayati (2023), behavioral skills are a prerequisite for good information and motivation to encourage effective preventive measures or behavioral changes. These skills enable mothers to translate their knowledge and motivation into real actions in family life, especially in monitoring child development.

Maternal information/ knowledge directly influences mothers' behavior in nurturing the development of toddlers and it is statistically significant. It is indicated by the existence of every increase in one unit of information, it will be followed by an increase in child development by 0.29 units (b = 0.29; 95% CI = 0.06-0.50; p = 0.016). The information provided by the IMB application can empower mothers in making the right decisions regarding child care. Good knowledge allows mothers to choose the best way to care for their children. This information also helps mothers provide a safe and stimulating environment and encourages their children to reach their full potential (Choi et al., 2021). With accurate and up-to-date information, mothers will be more confident and capable in caring for children. Overall, IMB is a valuable tool for mothers to increase their knowledge and understanding of child care, thus encouraging them to apply positive and optimal parenting patterns for their children's development.

Maternal income can directly affect the mother's behavior in nurturing the development of toddlers. Mother's income has a positive and statistically significant relationship to the mother's behavior in nurturing the development of toddlers. Every increase of one unit of income will be followed by the mother's behavior of 0.001 units (b= 0.001; CI 95%= 0.000-0.001; p=0.031).

Mothers with higher incomes generally have greater access to resources that support positive parenting, such as early childhood education, health services, and healthy food choices. This can contribute to better child development and well-being (Hagan et al., 2018). According to Wambui and DeStefano (2008) mothers with higher

incomes tend to experience lower levels of depression and anxiety. In addition, mothers with higher incomes may have more time and resources to engage in their communities, such as volunteering at their child's school or attending parent group meetings. This can strengthen their sense of social connection and improve their mental well-being (Eggebeen et al, 2016). Therefore, it is important for full-time working mothers to find a balance between work and family. This can be done in a variety of ways, such as delegating household tasks, making the most of time with children, and seeking support from family and friends.

Research shows that information has an indirect effect on maternal parenting behavior through maternal skills. Subjects of the study with good information have a logit score with maternal behavior of 0.13 on subjects with poor information. Each increase in one unit of information will increase maternal behavior by 0.13 units (b=0.13; CI 95%= 0.06-0.20; p< 0.000).

Knowledge about child development is an important factor in shaping the mother's behavioral abilities in caring for children. Mothers who have good information about child development, nutritional needs, health, and healthy parenting can make the right decisions and take actions that support their child's development (Ansar et al, 2023). Research conducted by Lestari, et al. (2020) shows that parental knowledge about child development is positively related to the quality of parent-child interactions and the likelihood of parental involvement in practices in the form of positive behavior shown by mothers to support child development. Mothers who have information about child development compared to those who do not have such information have higher behavioral quality with children and are more likely to engage in parenting practices related to child health development (Yuniarsih et al, 2022).

Research shows that motivation and behavioral skills are two important factors that are interrelated and mutually reinforcing in determining maternal parenting behavior. Mothers with high motivation are more likely to have appropriate maternal behavior 0.11 units higher than those with low motivation and the relationship is statistically significant (b= 0.11; CI 95%= 0.07-0.15; p= 0.003).

Maternal motivation has an indirect and positive influence on parenting behavior through behavioral skills (Yuniarsih et al, 2022). This motivation can come from various things, such as the desire to provide the best for the child, family values, hopes for the child's future, or personal childhood experiences. The higher a mother's motivation, the more likely she is to learn and apply positive parenting practices (Fairuz et al, 2023). These practices are reflected in the behavior shown by the mother, thereore, with behavioral skills, the mother's behavior will be more positive than before because of the high motivation to be better at taking care of child development.

AUTHORS CONTRIBUTION

All authors have made significant contributions to the data analysis and preparation of the final manuscript.

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CONFLICT OF INTEREST

There was no conflict of interest in this study.

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