

## **Factors Associated with Mothers' Behaviors in Selecting Complementary Feeding in Surabaya, Indonesia**

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### **ABSTRACT**

**Background:** Complementary feeding is provided for babies at the age of 6 to 24 months. Appropriate types, amounts, and methods of feeding are crucial for baby growth and development. Many factors affect mothers' behavior in selecting complementary feeding.

**Purpose:** This study aimed to investigate factors affecting mothers' behaviors in selecting complementary feeding for their babies.

**Methods:** A descriptive analytical study with a cross-sectional approach was conducted on 153 mothers having babies aged 6-12 months old in Surabaya, Indonesia, recruited using simple random sampling. The independent variables were knowledge, attitude, belief, family income, and family support, while the dependent variable was mothers' behavior in selecting complementary feeding. Data were collected using questionnaires and analyzed using the Spearman rho's test with a significance level of <0.05.

**Results:** The results showed that knowledge ( $p=0.021$ ), attitudes ( $p=0.030$ ), beliefs ( $p=0.006$ ), income ( $p=0.000$ ), and family support ( $p=0.006$ ) were factors affecting mothers' behavior in selecting complementary feeding.

**Conclusion:** Knowledge, attitudes, beliefs, income and family support had a significant correlation with mothers' behaviors in selecting complementary feeding. This finding emphasizes pivotal needs to increase knowledge and attitude of complementary feeding for both mothers as the infant primary caregivers, and families as the closest support system for mothers.

**Keywords:** Complementary feeding; feeding behavior, infant feeding

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### **BACKGROUND**

The golden and critical periods of growth and development of infants occur at the age of 0 to 23 months old. The golden period can be achieved if the infants receive appropriate nutritional intakes that are suitable with their growth and development. On the contrary, infants that experience unmet nutritional needs can be in a critical period of growth and development (World Health Organization, 2020).

Research shows that 45% of the Infant Mortality Rate (IMR) in Indonesia is related to malnutrition (Ministry of Health of the Republic of Indonesia, 2018). In addition, the prevalence of stunting in Indonesia has also increased by 29.6% in 2018 from the previous year at 29% (Data and Information Center, 2018). However, the largest proportion of stunting occurs during the complementary feeding period (6-23 months). Adequate complementary feeding is critical to support optimal physical growth and brain development in children. Complementary foods need to be nutrient-rich and be fed frequently to prevent stunting (Aguayo & Menon, 2016). According to the World Health Organization, one third of Indonesian children who experienced stunting at the age of 5 months already lacked of height about 7 cm, and nearly 14 cm at the age of 17 years old. The common cause of stunting and malnutrition is improper intakes. Research in Purworejo, Indonesia, on 577 children aged 11-23 months showed that energy adequacy of complementary feeding was only 30%, while the protein adequacy was 45% (Indonesian Pediatric Association, 2015).

The age of 6-12 months old is a critical period for introducing solid foods gradually to stimulate oral-motor skills. A delay in the introduction of solid food until more than 12 months of age can lead to the possibility of having eating problems at a later age. The World Health Organization (2020) has recommended guiding principles for appropriate complementary feeding, that include on-demand breastfeeding until the age of two years old or beyond, responsive feeding, good hygiene and proper food handling, and gradual increase of food consistency and variety. Furthermore, increasing the number of times that the children are fed, use of fortified complementary foods or vitamin-mineral supplements as needed, and increasing fluid intakes, as well as offering soft and favorite foods during illness are also recommended (World Health Organization, 2020).

Mothers play a significant role in providing complementary feeding for infants. However, many mothers lack the knowledge of proper types, amounts, and methods of complementary feeding. A preliminary study found that there were some mothers who thought that feeding a baby with rice and mashed bananas was sufficient to meet the baby's needs. Infants need the most nutrient-rich foods since children of less than two years of age have high nutrient needs to support their growth and development (Dewey, 2013). Another phenomenon shows disagreement about giving instant porridge as a complementary feeding due to suspicion of flavoring and food preservatives. Research in Padang, Indonesia, shows that 42% of children who were given instant porridge had better nutritional status compared to those who received home-made foods (10%) (Lestari, Lubis, & Pertiwi, 2014).

Various factors can influence mothers' behavior in selecting complementary feeding. Previous research has showed that the determinants of maternal behaviors in fulfilling complementary feeding can be examined by the PRECEDE-PROCEED model (Shams, Mostafavi, & Hassanzadeh, 2016). The model explains that there are predisposing, enabling, and reinforcing factors that influence a person's behavior. However, no previous studies have examined overall factors in the PRECEDE-PROCEED model in relation to the selection of complementary feeding. In this study, the factors related to this behavior include knowledge, attitudes, beliefs, income, and family support. Mothers' knowledge and attitude are closely related to the selection of food ingredients, processing,

and provision of appropriate complementary feeding (Susanto, Syahrul, Sulistyorini, Rondhianto, & Yudisianto, 2017). Belief is assessed due to the existence of traditions about the types and ways of feeding for generations and the participation of grandmothers (Gross, Van der Sand, Girardon-Perlini, & Cabral, 2011). Economic status and family support are needed to ensure sustainability in providing quality complementary feeding in a family. More adequate family income will lead to higher ability to buy nutritious foods for children (Schuster, Szpak, Klein, Sklar, & Dickin, 2019). Complementary feeding is, therefore, essential to support children's growth and development, but there are many incidents in which mothers do not provide proper complementary feeding for their babies. There is necessity to conduct a study to determine what factors are related to mothers' behavior in selecting complementary feeding, so that the right solutions can be drawn up.

## **PURPOSE**

This study aimed to investigate factors affecting mothers' behavior in selecting complementary feeding for their babies based on the PRECEDE-PROCEED model, including the knowledge, attitudes, beliefs, income, and family support.

## **METHODS**

### **Research design and participants**

This study used a descriptive design with a cross-sectional approach, and was conducted in one of the public health centers (PHCs) with the highest incidence of malnutrition in Surabaya, Indonesia. The population in this study was mothers having babies aged 6-12 months in the area of the selected PHC with a total of 248 mothers. Based on the sample size calculation, 153 mothers were randomly recruited to participate in the study.

### **Data collection**

The data were collected in May 2019 by visiting the respondents' homes with the help of cadres of the integrated healthcare center to distribute the questionnaires. Permission from the midwife in charge of the PHC was obtained prior to data collection. The midwife provided information about the address of cadres and mothers with babies of 6-12 months. During the visit, the researchers provided an explanation of the aims and objectives of the study, and asked respondents' availability to participate in the study. Those who agreed to participate signed an informed consent. Respondents' participation was voluntary without coercion. Furthermore, respondents were asked to complete the questionnaires of demographic data, knowledge, attitudes, beliefs, income, family support, and maternal behavior in selecting complementary foods for their babies.

### **Instruments**

The independent variables in this study were knowledge, attitudes, beliefs, income, and family support, while the dependent variable was mothers' behavior in selecting complementary feeding. All variables were measured using the questionnaires that were developed by the researchers by accommodating the parameters of each variable. The questionnaires were tested for validity and reliability to 20 people outside the research respondents. The questionnaires were considered valid if the Pearson's product moment test showed that the r-count for each question in the questionnaires was higher than the r-table (0.444, 95% CI). The results showed that the r-count for all questions in each

questionnaire was as follows: knowledge (0.457-0.8060), attitude (0.525-0.788), belief (0.483-0.703), family support (0.591-0.806), and mothers' behavior (0.445-0.803). The Cronbach Alpha test was also used to examine the reliability of the questionnaires. The results showed that the Cronbach alpha scores for each questionnaire were as follows: knowledge (0.846), attitude (0.842), belief (0.763), family support (0.910), and mother behavior (0.904). Thus it can be concluded that all questionnaires were reliable.

In this study, the knowledge was measured by asking 12 questions about the definition, time of delivery, type, benefits, method of administration, conditions, and composition of complementary feeding. A correct answer would obtain a score of 1, while a wrong answer would obtain a score of 0. The total score ranged from 0-12. The total score of knowledge then was categorized into good (9-12), moderate (5-8), and poor (0-4). Meanwhile, the attitude questionnaire measured mothers' response to reasons and considerations in fulfilling the four conditions (i.e., timely, adequate, safe and properly fed) for providing complementary feeding. Likert scales with options of never (1), ever (2), rare (3), and often (4) were utilized. There were 8 questions, so that the total score ranged from 8 to 32. The attitude was categorized into positive if the total score was higher than the mean data, and negative if the total score was less than mean data.

The questions about the belief included the myths and facts related to the tradition of complementary feeding that applies in the community. The questionnaire consisted of 8 questions with Likert scales of strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The total score ranged from 8-32, and were categorized into positive (the score was higher than the mean data) and negative (the score was less than the mean data). Furthermore, the family income was grouped as inadequate and adequate based on the monthly family income, whether above or below the regional minimum wage in Surabaya. Meanwhile, the family support questionnaire was developed based on parameters of emotional, material, and informational support provided by families in selecting complementary feeding. There were 13 questions with never, rarely, often, and always options (score 1-4). The total score ranged from 13-52. The family support was categorized into good (higher than the mean data) and poor (less than the mean data). The last, the behavior of mothers in selecting complementary feeding was measured by asking questions regarding the way of the food was prepared, type (instant and / or homemade), composition, and variations of complementary feeding menus. There were 16 questions with the options of never (1), rare (2), often (3), and always (4), with a total score of 16-64. The behavior was categorized as appropriate if the score was higher than the mean data, and inappropriate if the score was less than the mean data.

### **Data analysis**

All data in this study were ordinal since the total score of measurement was categorized into several levels. The Spearman's rho statistical test with a significance level of  $\leq 0.05$  was, therefore, utilized to determine the relationship between variables.

### **Ethical considerations**

This study obtained ethical approval from the Health Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga (No. 1415-KEPK). All participants were informed of the study and signed an informed consent for their voluntary participation.

## RESULTS

### Demographic data of the participants

The results of study showed that the majority of respondents were aged 20-35 (109; 71.2%), senior high school graduates (89; 58.2%), housewives (130; 85%), Javanese (114; 74.5%), and had inadequate family income (123; 81.6%), and extended family (86; 56.2%) (Table 1).

*Table 1. The demographic characteristics of respondents (n=153).*

Characteristics	<i>f</i>	%
Age of mother		
<20 years old	18	11.8
20-35 years old	109	71.2
>35 years old	26	17.0
Education		
Junior high school	41	26.8
Senior high school	89	58.2
Higher education	23	15.0
Family income		
Inadequate	123	81.6
Adequate	30	18.4
Occupation		
Housewife	130	85.0
Employed	17	11.1
Self-employed	6	3.9
Tribe		
Javanese	114	74.5
Madurese	38	24.8
Others	1	0.7
Type of family		
Nuclear	67	43.8
Extended	86	56.2
Age of infant		
6 months	29	19.0
7 months	10	6.5
8 months	16	10.5
9 months	27	17.6
10 months	21	13.7
11 months	17	11.1
12 months	33	21.6
Weight of infant		
(6.0 – 8.0) kg	76	50
(8.0 – 10.0) kg	31	20
(10.0 – 12.0) kg	46	30
Height of infant		
(60.0 – 80.0) cm	26	17
(80.0 – 100.0) cm	89	58
(100.0 – 120.0) cm	38	25

**Factors associated with mothers' behavior in selecting complementary feeding**

Table 2 shows factors associated with mothers' behavior in selecting complementary feeding based on the PRECEDE-PROCEED model which include knowledge, attitudes, beliefs, income, and family support. The result showed that 102 (66.6%) mothers had appropriate behavior in fulfilling complementary feeding for their babies. A majority of mothers (118; 77.1%) had good knowledge and adequate income (123; 81.6%). Nearly half of respondents (76; 49.6%) had positive attitude, 81 (53%) had positive beliefs, and 78 (50.9%) had good family support. The statistical test showed that all independent variables (knowledge, attitudes, beliefs, income, and family support) had a significant yet a weak correlation with maternal behavior in selecting complementary feeding.

*Table 2. Factors associated with mothers' behavior in selecting complementary feeding (n=153).*

	Mothers' behavior		Total	Spearman-rho test	
	Appropriate	Inappropriate		p	r
	f(%)	f(%)			
Knowledge					
Good	84 (54.9)	34 (22.2)	118 (77.1)	0.021	0.187
Moderate	17(11.1)	13(8.49)	30 (19.6)		
Poor	1 (0.65)	4 (2.61)	5 (3.26)		
Attitude					
Positive	57 (37.2)	19 (12.4)	76 (49.6)	0.030	0.176
Negative	45 (29.4)	32 (21)	77 (50.33)		
Belief					
Positive	62 (40.5)	19 (12.4)	81 (53)	0.006	0.222
Negative	40 (26.1)	32 (20.9)	72 (47)		
Income					
Inadequate	28 (18.3)	2 (1.3)	30 (18.3)	0.000	0.582
Adequate	74 (48.3)	49 (33.3)	123 (81.6)		
Family support					
Good	60 (39.2)	18 (11.7)	78 (50.9)	0.006	0.222
Poor	42 (27.4)	33 (21.5)	75 (49.0)		
Total	102 (66.6)	51 (33.3)	153 (100)		

*Notes: p = Significance value; r = Correlation strength value*

**DISCUSSION**

The PRECEDE-PROCEED model is a comprehensive structure used to assess health related behaviors and environments that affect it. PRECEDE stands for Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation, while PROCEED stands for Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (Shams et al., 2016). The discussion of this study will be focus on the predisposing, reinforcing, and enabling factors associated with mothers' behavior in selecting complementary feeding, so that they can contribute to developing programs as an effort to solve the problems.

The results of this study reported that most respondents with good knowledge showed appropriate behavior in selecting complementary feeding. In contrast, respondents who

had poor knowledge tended to show inappropriate behavior of selecting complementary feeding. This result is in line with a previous study (Yeganeh, Motamed, Boushehri, Pouladi, & Ravanipour, 2018) which reported that mothers who have good knowledge will provide appropriate complementary foods, as they know more about breastfeeding, complementary feeding practices, food safety, suitable food for children, how to cook the right food and how to access the information needed.

The results also showed that there was a significant correlation between attitude and the choice of complementary feeding. The majority of respondents had positive attitudes and appropriate behavior in choosing the type of complementary feeding. This result is in line with a study conducted in India, reporting that most mothers have a positive attitude towards infant nutrition (Deshpande & Gokhale, 2020). Another study stated that attitude is one of the factors that determine the behavior of complementary feeding (Fabrizio, Van Liere, & Pelto, 2014). This study also found that respondents with negative attitudes tend to have inappropriate behavior in fulfilling complementary foods for their children, which can be due to their low education background. Educational level is in line with the knowledge and thinking patterns (Kim, Mejía-Guevara, Corsi, Aguayo, & Subramanian, 2017). Attitude is one of the factors that can encourage certain actions to be taken by someone. Attitude is a predisposition to do or not to do a thing or behavior, so that attitude is not only a condition from within a person that involves the purely physical inner state, but it is more interpreted as a process of awareness that is individual. If a mother has good or positive attitudes towards the provision of complementary feeding, the behavior in selecting the type of complementary feeding to be given to her baby will also be good or positive. In this case, this mother will choose the right type of complementary feeding that is complete in macro and micro-nutrient composition, so that the nutritional needs of the baby can be fulfilled (Kittisakmontri, Fewtrell, Roekworachai, Phanpong, & Lanigan, 2018). There are many factors that influence mothers' attitudes in selecting complementary feedings, including experience, cultural influences, religion and the influence of others (Yeganeh et al., 2018). A person can still have positive attitudes even though he/she has moderate or inadequate knowledge due to the influence of environment around them (Yeganeh et al., 2018).

This study showed that there was a correlation between the beliefs and the selection of complementary feeding. Respondents with positive beliefs had the appropriate selection of complementary feeding, while respondents with negative beliefs had the opposite. This is in line with research in Ghana which reported that beliefs and cultures are factors that influence the determination of complementary feeding in Infant and Young Child (IYC) (Kalra et al., 2018). In addition, ethnographic-based research in Kenya stated that culture and beliefs are the determining factors for complementary feeding for IYC (Thuita, Pelto, Musinguzi, & Armar-Klemesu, 2019). The respondents in this study were mostly Madurese and Javanese who are already known for their belief in and adherence to the culture of their ancestors; one of which is providing single menu for babies. They believe that babies will experience allergies if given food consisting of various ingredients (Nurzeza, Larasati, & Dyah Wulan, 2017)). Mothers who are born and raised in such an environment will automatically follow the way of life carried out by parents and their environment. In other words, they adhere to the traditions of their parents (Wang et al., 2019). Lack of knowledge about nutrition in extended families who live with mother and

child will also have an impact on the practice of feeding for toddlers (Manjunath, Biradar, Goud, & Rajagopal, 2016). In addition, the characteristics of the respondents in this study indicate that more than half of the respondents have the extended family type, meaning that mothers, in caring for their children, also get the influence of culture from their family.

This study showed a significant correlation between income and behavior in selecting complementary feedings. The higher the income, the more the respondents pay attention to the type of complementary feedings given to their babies, so that they had appropriate behavior in selecting complementary feeding. Respondents with low income, that is less than the minimum wage, were less concerned about the type of foods given to their babies, leading to inappropriate behavior. This result is line with previous research in Makassar, Indonesia, which reported that family income affected children's nutritional status, due to feeding patterns (Tahangnacca, Ridwan, Ansariadi, & Syam, 2020). Research in Romania suggests that parents with low incomes are at risk of providing inappropriate complementary feeding (Becheanu, Țincu, & Leșanu, 2018). Socio-economic factors are factors related to financial conditions that cause greater purchasing power for foods. In the case of complementary feeding, family income is important because higher family economy will increase the purchasing power of complementary foods, and in contrast, low family economy will decrease the purchasing power of such foods (Barachetti, Villa, & Barbarini, 2017).

In this study family support is significantly related to the selection of complementary feeding behavior. This means that respondents with good family support had more appropriate behavior in selecting complementary feedings than those with poor family support. Previous research states that proper family support in childcare plays a role in children's nutritional status (Cislak, Safron, Pratt, Gaspar, & Luszczynska, 2012). In terms of feeding the baby, good family support is motivating the mother to provide appropriate complementary feeding, giving psychological support to the mother and preparing balanced nutrition for the baby (Barachetti et al., 2017). In this study the majority of respondents showed good family support since the majority of them lived in their extended families. Respondents who live in extended families will have greater family support in terms of emotional, material and informational support due to direct interactions (McDole & Limke, 2008).

This study has a limitation concerning a small number of respondents who participated in the questionnaire validity and reliability test. Despite the limitation, this study provides significant information on the factors affecting mothers' behaviors in selecting complementary feeding in Surabaya, Indonesia.

## **CONCLUSION**

The application of the PRECEDE-PROCEED model as a diagnostic tool to identify factors associated with mothers' behavior in selecting complementary feeding in babies age 6-12 months yielded findings that mothers' knowledge, attitudes, beliefs, family income, and family support were factors that determined mothers' behaviors. Good knowledge and positive attitude are the main assets for mothers to be able to choose the appropriate complementary feeding for babies. Beliefs about the culture and traditions



held by the community and the environment around the mothers also greatly influence the mothers' behavior in selecting complementary feeding. Family income is related to the purchasing power of a family, so good income affects the selection of appropriate complementary feeding as well. The last but not least, good family support is a driving factor for mothers to be able to choose the appropriate complementary feeding.

The findings in this study are useful for arranging interventions in order to improve mothers' behavior in providing complementary feeding by improving training services provided by health practitioners to increase knowledge and attitudes about appropriate complementary feeding in terms of types, numbers, methods of processing, and modes of administration. The services should be continuously given both to mothers as the primary caregiver of infants and families as the closest support system for mothers.

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#### **CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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