FACTORS PREDICTING MATERNAL FEEDING BEHAVIORS FOR TODDLERS IN JAVA ISLAND, INDONESIA

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ABSTRACT:

Background: Maternal feeding behaviors are well known as a key to toddlers' health and development. Unfortunately, the impacts of inappropriate maternal feeding behaviors on toddlers' health are actually increasing in Indonesia. In order to have an effective intervention to promote appropriate maternal feeding behaviors, factors related to maternal feeding behaviors need to be characterized. Therefore, this study aimed to identify the predicting factors of maternal feeding behaviors for toddlers in Java Island, Indonesia. The predicting factors were derived from Pender's Health Promotion Model and also from empirical literature related to maternal feeding behaviors.

Methods: The study aimed to identify whether maternal age, education, perceived benefits, perceived barriers, perceived self-efficacy and social support could predict maternal feeding behaviors. One hundred and ten Indonesian mothers who were the main caregivers of their toddlers and lived on Java Island were obtained through multistage random sampling. The research instruments included the Maternal Feeding Behaviors Questionnaire (MFBQ), the Demographic Characteristic Questionnaire, the Perceived Benefits of Maternal Feeding Behaviors Questionnaire (BeFBQ), the Perceived Barriers to Maternal Feeding Behaviors Questionnaire (BaFBQ), the Perceived Maternal Feeding Behaviors Self-efficacy Questionnaire (FBSeQ) and the Multidimensional Scale of Perceived Social Support (MSPSS). Data were collected at the participants' houses. The predictive factors for maternal feeding behaviors were examined by stepwise regression analysis.

Results: Four variables including perceived benefits, perceived barriers, perceived self-efficacy, and social support were found to have statistically significant correlations with maternal feeding behaviors at the .05 level. There were significant positive relationships between perceived benefits, perceived self-efficacy, social support, and maternal feeding behaviors ($r=.542$, $p<.01$; $r=.490$, $p<.01$; $r=.196$, $p<.05$, respectively). And significant negative relationship between perceived barriers and maternal feeding behaviors ($r=-.213$, $p<.05$). Perceived benefits alone could explain for 29.4% of the variance in maternal feeding behaviors for toddlers in Java Island ($R^2 = .294$, $F = 44.98$, $p<.05$). The combination between perceived benefits and self-efficacy could explain 36.2% of the variance in maternal feeding behaviors ($R^2 = .362$, $F = 11.36$, $p<.05$). Moreover, perceived benefits, self-efficacy and barriers could explain 38.5% of variance in maternal feeding behaviors ($R^2 = .385$, $F = 4.07$, $p<.05$).

Conclusion: A nursing intervention aimed at promoting appropriate maternal feeding behaviors should deal with the perceived benefits, self-efficacy, and barriers. Nurses should assist Indonesian mothers of toddlers to perceive the benefits of appropriate feeding behaviors in addition to motivating them to have enough self-efficacy to overcome the barriers.

Keywords: Maternal feeding behaviors, Pender's Health Promotion Model, Toddler, Indonesia

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INTRODUCTION

Maternal feeding behaviors are the activities of mothers related to the maintenance of adequate food intake for their toddlers. These behaviors include providing toddlers with age-appropriate and healthy foods; enhancing good eating behaviors; and promoting a pleasant eating environment. Appropriate maternal feeding behaviors are well-recognized as a key to toddler health and development. However,

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the number of inappropriate maternal feeding behaviors is actually increasing in Indonesia, especially on Java Island, which is the most crowded island in Indonesia. The practices of inappropriate maternal feeding behaviors such as giving the children instant and ready-to-eat foods, encouraging children to eat healthy food by using unhealthy food such as sweet foods, and using food as a reward and punishment were increased [1-4]. These poor practices lead to numerous negative effects on the health and development of children such as malnutrition, diarrhea, anemia, infection, impaired development, diabetes, decreased brain power, etc. [5, 6]. In 2011, the total number of malnourished children under five years old in Special Region of Yogyakarta Province of Indonesia was 0.98%, which is approaching the national's threshold (1%) [7]. It was also found in Surakarta, Central Java Province that the number of malnourished toddlers with categorized as stunded was approximately 57.61%, underweight 46.74%, and wasted 9.78%. The prevalence of anemia in toddlers was 25% [8]. And the incidence of diarrhea in West Java Province has increased due to the unhygienic food preparation, particularly in children aged 6 to 24 months [2].

Pediatric nurses have a responsibility to encourage mothers to provide appropriate maternal feeding behaviors to prevent the above potentially negative impacts on toddlers. Recently, some efforts to promote appropriate maternal feeding behaviors have been implemented in Indonesia, such as health promotions related to maternal feeding behaviors, children's health, nutrition and development, monitoring nutrition status, preventing diarrhea, etc. [9]. Unfortunately, the incidence of diarrhea, anemia and malnutrition with negative impacts on inappropriate maternal feeding behaviors has increased [2, 7, 8]. In consideration of having an effective intervention to decrease the number of inappropriate maternal feeding behaviors, nurses need to know the factors that related to maternal feeding behaviors. Without this piece of information, pediatric nurses will not achieve an effective nursing intervention to promote maternal feeding behaviors in toddlers.

Regarding the aim to promote toddler health and avoid preventable illness related to food intake, maternal feeding behaviors can be considered as health-promoting behaviors. Therefore, the hypothesized predicting factors in this study were selected based on Pender's Health Promotion Model (HPM) (2006) and empirical literature related to maternal feeding behaviors. The HPM consists of the following three main categories: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcome [10]. As a result, six possible predictors of maternal feeding behaviors were identified. Two of these, maternal age and education were taken from the individual characteristics and experiences in Pender's HPM. The other four, perceived benefits, perceived barriers, perceived self-efficacy and social support, belong to the behavior-specific cognitions and affect.

As mentioned above, encouraging mothers to perform appropriate feeding behaviors is essential to toddler health and development. In order to obtain information leading to effective interventions, this correlational study aimed to identify predictors of maternal feeding behaviors for toddlers on Java Island, Indonesia.

METHODS

Sample

The sample size for this study was calculated by Thorndike's formula (1978) {sample size = 10 (number of variable) + 50}. This study consisted of 6 variables. Therefore, the sample size was 110 mothers. The sample was selected based on inclusion criteria which were Indonesian nationality mothers who had toddler (1-3 years old). The mothers were main caregiver and performed maternal feeding behaviors for their toddler. Also, they had ability to speak, write, and read in Bahasa Indonesia. A multi-stage random sampling was applied to obtain 110 Indonesian mothers living on Java Island (Figure 1).

Research instruments

Self-administered questionnaires were used for obtaining data included the Maternal Feeding Behaviors Questionnaire (MFBQ), the Demographic Characteristic Questionnaire, the Perceived Benefits of Maternal Feeding Behaviors Questionnaire (BeFBQ), the Perceived Barriers to Maternal Feeding Behaviors Questionnaire (BaFBQ), the Perceived Maternal Feeding Behaviors Self-efficacy (FBSeQ), and the Multidimensional Scale of Perceived Social Support (MSPSS). Permission to use the PFBQ and the MSPSS was obtained from the copyright holders. The remaining measures were developed by the researchers.

1. The Maternal Feeding Behaviors Questionnaire (MFBQ) was modified by the researchers from the Parental Feeding Behaviors Questionnaire (PFBQ) developed by Lusmilasari, Chaiyawat and Rodhamdee [11] after obtaining the permission from the author in order to be appropriately focused on the mothers. The modification

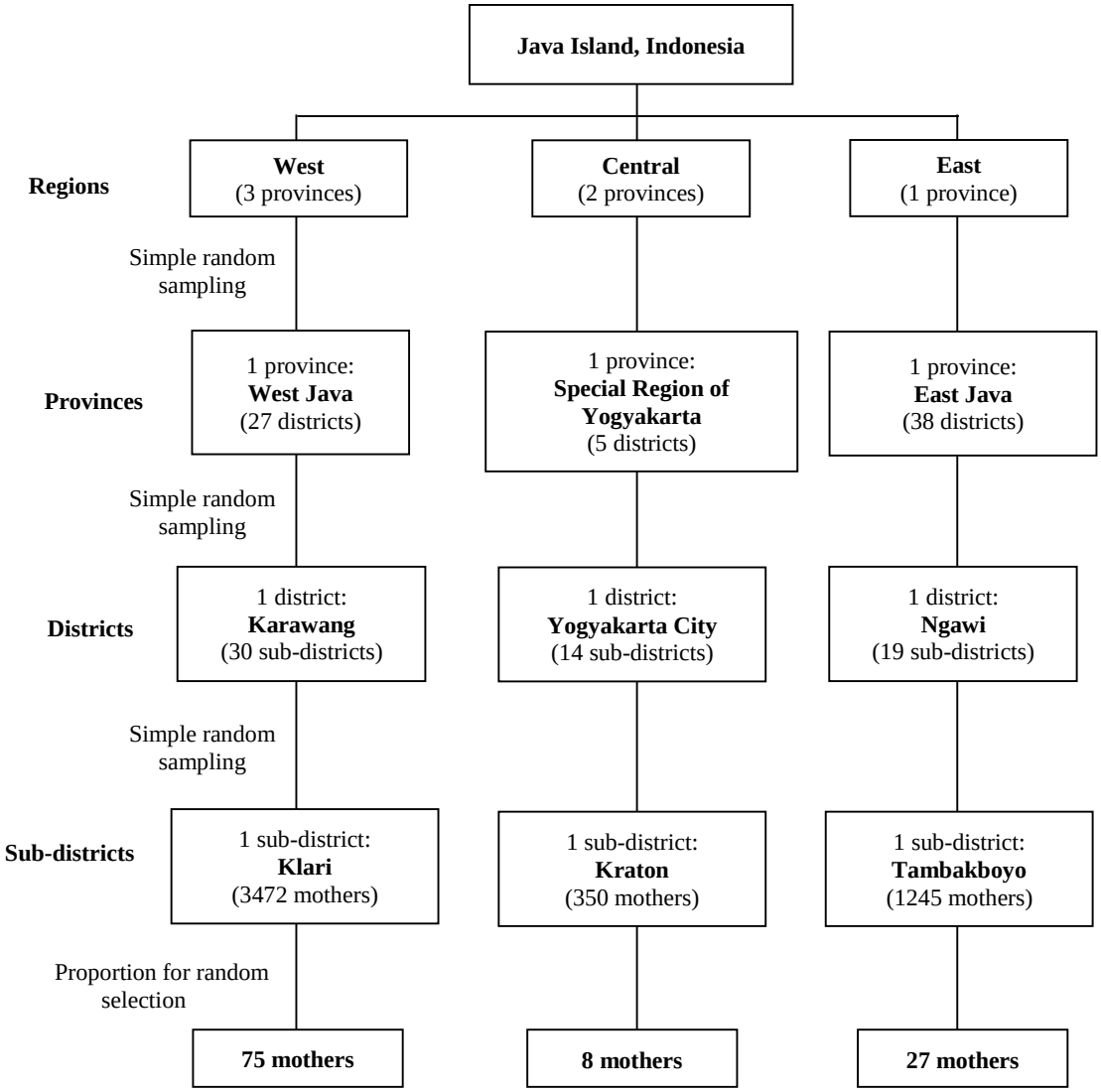

Figure 1 The sampling technique and selection with multi-stage random sampling

was only changed the term "parents" in PFBQ to be "mothers" in MFBQ, and then used it. MFBQ using the term "mothers" because in this study only focused on mothers. For the content, items and scale of the questionnaire were the same. The questionnaire contains 56 items with a 5-point Likert-scale, (1=never to 5=always). The items can be categorized into the following three dimensions: providing age appropriate and healthy foods (19 items), enhancing good eating behavior (26 items) and promoting a pleasant eating environment (11 items). Scores for the 56 items were summated into the total score ranging from 56 to 280. Then the total score of MFBQ were classified into three levels (low, moderate, and good) based on the class interval, which calculate the class interval by dividing range of the data set (56-280) with the width of the class intervals (3) [12]. As a result, those three levels were; low (56-131), moderate (132-206), and good (207-280).

2. The Perceived Benefits of Maternal Feeding Behaviors Questionnaire (BeFBQ) contains nine items with a 5-point Likert-scale format ranging from strongly disagree to strongly agree. The possible summated score ranges from 9 to 45 points. Higher scores indicate higher perceived benefits of maternal feeding behaviors.

3. The Perceived Barriers to Maternal Feeding Behaviors Questionnaire (BaFBQ) is comprised of 11 items with a 5-point Likert-scale with 1= strongly disagree and 5 = strongly agree). Its summated score ranges from 11 to 55. Higher scores show that the mother perceives more barriers to feeding behaviors.

4. The Perceived Maternal Feeding Behaviors Self-efficacy Questionnaire (FBSeQ) consists of three items with a 5-point Likert-scale (1 = not confident to 5 = highly confident). The range of the total scores was 3 to 15. High scores indicate high

Table 1 Demographic characteristics of subjects (n=110)

Demographic characteristics	Frequency	Percentage
Maternal age (yrs)		
21-25	8	7.3
26-30	36	32.7
31-35	39	35.5
36-40	21	19.0
41-46	6	5.5
Maternal level of education		
Elementary School	10	9.1
Junior high School	20	18.2
Senior high School	65	59.1
Diploma	5	4.5
Bachelor	8	7.3
Master	2	1.8
Maternal ethnicity		
Javanese	103	93.6
Others	7	6.4
Maternal marital status		
Married	109	99.1
Divorced	1	0.9
Maternal religion		
Islam	101	91.8
Christianity Protestantism	7	6.4
Christianity Roman Catholicism	2	1.8
Maternal occupation		
Private company	16	14.6
Civil	1	0.9
Teacher	2	1.8
Merchant	3	2.7
Housewife	86	78.2
Farmer	2	1.8
Mothers' time spending outside the house (hours/day)		
< 8	100	90.9
8	6	5.5
> 8	3	2.7
Total number of person who stay at the same house		
1-4	1-4	67.3
>4	>4	32.8
Total number of children		
1	36	32.7
2	58	52.7
>2	16	14.6
Age of toddlers (months)		
12-24	65	59.1
25-36	45	40.9
Sex of toddlers		
Male	55	50
Female	55	50

Table 2 Descriptive of all variables (n = 110)

Variables	Possible range	Actual range	Mean	Standard deviation (SD)	Skewness	Kurtosis
Maternal feeding behaviors	56-280	125-277	217.11	28.819	-.463	.430
Low (56-131): n=1 (0.9%)						
Moderate (132-206): n=37 (33.6%)						
Good (207-280): n=72 (65.5%)						
Perceived benefits	9-45	17-45	39.13	4.957	-1.395	3.566
Perceived barriers	11-55	11-51	27.52	8.094	1.177	1.296
Perceived self-efficacy	3-15	6-15	12.00	1.882	-.488	.998
Social support	12-84	12-84	65.05	9.806	-1.556	6.623

Table 3 Correlation matrix of the variables (n = 110)

Variables	MFB	Age	Edu	Benefits	Barriers	SE	SS
MFB	1.000						
Age	.065	1.000					
Edu	.141	-.096	1.000				
Benefits	.542**	.056	.193*	1.000			
Barriers	-.213*	-.005	-.350**	-.160	1.000		
SE	.490**	.096	.004	.483**	.002	1.000	
SS	.196*	.077	.005	.249**	.128	.354**	1.000

** Correlation is significant at 0.01 (2-tailed).

* Correlation is significant at 0.05 (2-tailed).

Note: MFB = maternal feeding behaviors, Age = maternal age, Edu = maternal level of education, Benefits = perceived benefits, Barriers = perceived barriers, SE = perceived self-efficacy, SS = social support

levels of self-efficacy in maternal feeding behaviors.

5. The Multidimensional Scale of Perceived Social Support (MSPSS) by Zimet [13] was translated from English into Bahasa Indonesia with the back-translation technique carried out by a panel of three translators. The MSPSS is a 12-item questionnaire measuring support from the following three sources: family (Items 3, 4, 8, and 11), friends (Items 6, 7, 9, and 12) and significant others (Items 1, 2, 5, and 10). The MSPSS is a brief, easy-to-administer self-report questionnaire in which all of the items are rated on a 7-point Likert-scale with scores ranging from "very strongly disagree" (1) to "very strongly agree" (7). Its total score ranges from 12 to 84 points. Higher scores indicate higher levels of social support.

The content validity of the newly developed tools was established by a panel of five experts. Acceptable S-CVI scores were obtained at 1.00 for the BeFBQ, FBSeQ and MSPSS and .85 for the BaFBQ. The internal consistency of all instruments also reached acceptable levels. The Cronbach's coefficients for the MFBQ, BeFBQ, BaFBQ, FBSeQ and MSPSS were .93, .92, .91, .80, .81, respectively.

Data collection and ethical considerations

Data were collected by researcher without research assistance from January to February 2015. After the researchers had been granted approval from the relevant Institutional Review Board (IRB) (No. Ref: KE/FK/1400/EC, dated 23 December 2014) and permission from each randomly selected sub-district Government Office of National and Political Unity, the PI contacted the head of Puskesmas (Public Health Center), responsible health care providers and Kaders (person who help health care providers) in each area to obtain access to potential participants. The first author visited the potential participants at their houses to inform them about the research objectives, confidentiality and anonymity issues and the right to withdraw from the study at any time without negative consequences. Those willing to participate were asked to sign informed consent forms.

Afterward, the questionnaires were distributed. While the participants completed the questionnaires, the data collector spent time with their children to avoid any interruption. The returned questionnaires were immediately reviewed for completeness.

Data analysis

Statistical Package of the Social Science for Personal Computer (SPSS/PC) version 17.0 was used to analyze the data. The level of significant was set at the .05 level. Prior to the analysis, data were reviewed for missing data, normality and linearity. Pearson's correlation coefficient was calculated to determine the relationships among the variables. Normality and homoscedasticity were calculated to examine multi-collinearity. Then the predictors of maternal feeding behaviors were examined by stepwise regression analysis.

RESULTS

All subjects were aged between 21 and 46 years. Majority of them identified senior high school as their highest education level (86.4%). Most of subjects were Javanese, married, and Muslim (93.6%, 99.1%, and 91.8%, respectively). Only a small number worked outside the home (21.8%). Approximately 78% of the participants were housewives, and 90.9% spent less than 8 hours per day outside the home. Many of them (67.3%) stayed together with 1-4 persons in the same house. Half of subjects had 2 children (52.7%). The age of their children ranged from 12 to 36 months and half of them were male (Table 1).

The results indicated that mostly mothers had good level of maternal feeding behaviors (65.5%), 33.6% had moderate level and only one mother (0.9%) had low level of maternal feeding behaviors. The perceived benefits ranged from 17 to 45

Table 4 Standard multiple regression of independent variables on maternal feeding behaviors

Predictors	B	SE	Beta	t	*p-value*
Constant	86.536				
Benefits	2.219	.537	.366	4.135	.000
SE	5.007	1.395	.313	3.588	.001
Barriers	-.577	.288	-.155	-2.007	.047

Note: R= .621, R^2= .385, SE=23.903, F=22.132, *p-value* = .000

($\bar{X}$ = 39.13, SD = 4.957), perceived barriers ranged from 11 to 51 ($\bar{X}$ = 27.52, SD = 8.094), perceived self-efficacy ranged from 3 to 15 ($\bar{X}$ =12, SD = 1.882), and social support ranged from 12 to 84 ($\bar{X}$ = 65.05, SD = 9.806) as show in Table 2. Four variables including perceived benefits, perceived barriers, perceived self-efficacy, and social support were found to have statistically significant correlations with maternal feeding behaviors at .05 level. Only perceived barriers had a negative correlation (r=-.213) with maternal feeding behaviors. The remaining variables, perceived benefits, perceived self-efficacy, and social support had positive relationships with maternal feeding behaviors (r=.542, .490, and .196, respectively) (Table 3).

Stepwise regression analysis revealed that perceived benefits, perceived self-efficacy and perceived barriers could jointly explain 38.5% of the variance in maternal feeding behaviors for toddlers in Java Island (Table 4). Among the three predictors, perceived benefits were the best predictor with ability to explain 29.4 % of the variance in maternal feeding behaviors, while perceived self-efficacy and perceived barriers could explain 6.8 % and 2.3% of the variance in maternal feeding behaviors, respectively. The regression equation for maternal feeding behaviors based on information from Table 4 was 86.54 + 2.22 perceived benefits + 5.00 perceived self-efficacy - .58 perceived barriers.

DISCUSSION

Maternal age, education, perceived benefits, perceived barriers, perceived self-efficacy, and social support were hypothesized to predict maternal feeding behaviors for toddlers on Java Island. This hypothesis was partially supported. Only three variables belonging to the behavior-specific cognitions and affect in Pender's HPM [10] (perceived benefits, perceived self-efficacy, and perceived barriers) could predict maternal feeding behaviors. This finding is congruent with Pender's HPM in supporting that behavior-specific cognitions and affect can influence behavioral outcome, which is a health promoting behavior [10]. These three variables were found to consistently influence maternal feeding behaviors. For example, perceived benefits could influence mothers in performing appropriate maternal feeding behaviors [14] by influencing how the mothers could make decisions related to maternal feeding behaviors [15]. In addition, perceived benefits and barriers could influence how Indonesian mothers feed their children [16]. Perceived self-efficacy had significant correlation with maternal feeding behaviors (p = 0.001 and r = 0.356) [17] and it was able to influence Indonesian mothers in how they feed their children appropriately [18, 19], by decreasing the level of the barriers [18]. However, the barriers, such as expense and the costly of the healthy food could restrain Indonesian mothers for performing appropriate maternal feeding behaviors maternal feeding [20].

The three predictors of feeding behaviors of Indonesian mothers for their toddlers were also found to be the predictors of health promoting behaviors in other populations such as female professional nurses [21] and elders with chronic illnesses [22]. Although perceived benefits, perceived self-efficacy and perceived barriers are the major parts of behavior-specific cognitions and affect directly motivating behavioral outcome [10], the number of predictors and the amount of variance in health promoting behavior explained by these variables varied depending on the type of health-promoting behaviors and populations. Perceived benefits and perceived self-efficacy were found to account for 47% of the variance in health promoting behaviors in pregnant adolescents [23], but for only 19.5% of maternal health promotion for toddlers [24]. Perceived barriers and perceived self-efficacy were found to be predictors of compliance in COPD patients, accounting for 43.1% of the variance [25] and explaining 51.8% of the variance in health promoting behaviors of pregnant women with induced hypertension [26]. Perceived self-efficacy was found to explain 79.0% of the variance in health-promoting behaviors in nursing students at a Thai governmental university [27], but account for only 43.3% variance in adults with asthma [28].

The remaining independent variables in this study (maternal age, education and perceived social support) could not predict maternal feeding

behaviors for toddlers on Java Island, Indonesia. As identified in Table 1, the aforementioned were weakly correlated with maternal feeding behaviors; therefore, they could not be identified as predictors. In addition, these variables were not like the three predictors of maternal feeding behaviors in that they were not the main variables in the HPM. They were substructed from what Pender identified in the HPM.

The other possible explanation regarding perceived social support was related to the measures employed. The MSPSS used in this study was developed to measure social support in general and was not specific to maternal feeding behavior. This may have reduced its potential for predicting maternal feeding behaviors. Although this issue was identified at the beginning of the study, this measure was selected based on its length. The MFBQ, the measure of maternal feeding behaviors, was long and required quite a lot of time for mothers to complete. Therefore, a short measure of perceived social support is necessary to avoid burden on these mothers.

CONCLUSION

Perceived benefits, perceived self-efficacy and perceived barriers were found to be predictors of maternal feeding behaviors for toddlers in Java Island, Indonesia. In order to encourage mothers to perform appropriate feeding behaviors for toddlers, health professionals should consider manipulating these three predictors in their interventions.

It is recommended that this study be replicated with a measure of perceived social support specific to maternal feeding behaviors. In addition, items of the Maternal Feeding Behaviors Questionnaire should be reduced in order to be more practical.

LIMITATION

Regarding to the multi-stage random sampling of this study, there was too small sample size to represent the central region of Java Island, which were only 8 mothers. However, that number of sample size was based on the proportion calculation of the subjects in each randomly selected sub-district. Therefore, this study cannot be generalizing to broader population. Then, for the future research may increase the sample size in order to generalizing the findings of the study.

MFBQ in this study was long and time-consuming, and then the future study may modify it to be more practical. And also for MSPSS, it was used to measure the social support. However, MSPSS by Zimet et al. (1988) was used to measure social support in general, not specific in maternal feeding behaviors. Therefore, it should be modified in order to get better and more valid result about maternal social support especially related to maternal feeding behaviors.

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