

Maternal Attributes Are Positively Associated with Feeding Practices of Children Aged 2-5 Years in West Java, Indonesia

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ABSTRACT

Introduction: Feeding practices are influenced by multiple factors including maternal attributes, which can affect the health and nutritional status of children. The objective of this study was to investigate maternal factors associated with feeding practices of young children. **Methods:** A cross-sectional study was conducted in five villages in Karawang District, West Java, Indonesia. Mothers of children aged 2-5 years (n=202) were interviewed on indicators of feeding practices, their knowledge and attitude on child feeding, self-perceived health status and exposure to health information. The data were analysed using multiple logistic regression to identify factors associated with feeding practices. **Results:** Most of the children achieved minimum dietary diversity (86.1%) and frequency of meal and snacking (71.8%). However, more than half of the mothers did not use a variety of cooking methods (73.3%), had poor feeding responsiveness (65.3%), and showed poor feeding practices during child's illness/recovery (50.5%). Maternal attributes that were positively associated with healthy feeding practices were good knowledge and favourable attitude towards child nutrition and feeding practice, having exposure to nutrition/health information, and perceiving herself as healthy. Living as a nuclear family with only 1-2 children also contributed to favourable feeding practices. **Conclusion:** While most of the children achieved minimum dietary requirements, overall feeding practices could be improved with enhancing mothers' knowledge on use of variety in cooking methods, feeding responsiveness during/after child's illness, and exposure to nutrition/health information.

Key words: 2-5-year-old children, feeding practices, Indonesia, maternal attributes

INTRODUCTION

Child care is a complex set of behaviours that ranges from child feeding practices, responses that promote a safe and healthy environment for the child, to the provision of adequate health care, and psychosocial interactions and emotional support. Feeding practices can be regarded in terms of their biological component, which relates to the foods given to the child, the

behavioural component which involves the ways the child is fed (the feeding style), when to feed (the frequency and scheduling of feeding), where to feed (the feeding environment), and who does the feeding (the caregivers) (Engle, Menon & Haddad, 1996). Multiple behaviours and physiological events of the child feeding care practice (which involve among others the amount of foods given, food

consistency, frequency and scheduling, how and where the foods are given to the child, etc) have made the practice complex and challenging (Pelto, Levitt & Thairu, 2003).

Studies on breastfeeding and complementary feeding focus on children below 2 years of age, and may emphasise a single feeding practice indicator such as food diversity, meal frequency, responsive feeding, or food safety (Blaney, Februhartanty & Sukotjo, 2015a; 2015b). There is lack of research on the quality of feeding practices among children aged 2-5 years using multiple indicators of feeding practices. This is the period when rapid growth and development occurs (Serrano & Powwell, 2013). In this phase, children start to choose food by themselves. At the same time, eating problems (e.g., fussy eating) are common among this age group (Leung, Marchand, & Sauve, 2012). Hence, they may not consume a nutritionally adequate diet that will meet the special dietary needs of the growing child; they are therefore very susceptible to acute and chronic undernutrition (Reinhard & Wijayaratne, 2002).

Mothers have a powerful role in influencing their children's food consumption because the amount of food that children consume may depend on the mothers' active encouragement of eating (Engle, 1999). Some behaviour change theories have been used to explain and influence the health behaviours of both individuals and social groups. In the context of feeding practice behaviours, the determinants that have relevance for feeding practices include maternal time allocation, belief, knowledge and perceptions on child nutrition and feeding practices, mothers' health status, social pressures, social support, and normative expectations (such as prevailing norms on being a good child caregiver, norms on a healthy child) (Engle, 1999). In addition, maternal exposure to nutrition and health information has been studied as a factor

to shape maternal knowledge. However, studies on child feeding have focused on maternal demographic characteristics (Blaney *et al.*, 2015b).

As part of an inter-centre collaboration among Southeast Asian Ministers of Education Organisation (SEAMEO) centres in Indonesia, there was a need for baseline data on the livelihoods (including nutrition and health status) of villages in the Karawang International Industry City (KIIC) cooperation. An earlier study in this area found that 85% of children above two years old were energy deficient and 29% were protein deficient based on the results of dietary assessment (Nirmala, 2009). However, these inadequacies needed further investigation in relation to the feeding practices of the caregivers. Therefore, as part of the focus of the SEAMEO Centres on nutrition, the present study was conducted to provide information on the factors which may influence feeding practices (indicated by dietary diversity, frequency of meal and snack, cooking method, feeding responsiveness, and feeding during a child's illness and recovery) among mothers of children aged 2-5 years old.

METHODS

Study design and sampling

This cross-sectional study was conducted in five selected villages in Karawang District, West Java Province under KIIC cooperation. Mothers, as the main caregivers of the child, who were apparently healthy and not pregnant, were randomly selected from a list provided by a community health post (called *Posyandu* in the Indonesian language) at sub-village level. The minimum sample required for studying the five feeding practice indicators was 202 mothers based on the formula for estimation of a population proportion using an absolute precision approach devised by Lwanga & Lemeshow (1991). There were no rejections from the

prospective subjects during recruitment. The prospective subjects who were not at home during recruitment (only a few of them) were substituted with others listed in the sample selection frame.

Measures

Data were collected using a structured questionnaire in the Indonesian language by trained full time enumerators on demographics, socio-economic status, maternal knowledge and attitude towards child nutrition and feeding practices, mother's health, and exposure to health and nutrition information. The feeding practices consisted of five indicators: food diversity; frequency of meals and snack given per day; cooking method; feeding responsiveness; and feeding during child's illness and after recovery. A single 24-h recall was carried out to assess the dietary intakes of the children. The interviews were conducted at the respondents' houses. Food models were used to help the mothers recall the serving size of foods the child had eaten. The single 24-h recalls were equally distributed across the days of the week. In addition, to complement feeding responsiveness practice reported by the mothers, observations of responsive feeding were conducted on subsamples (30% of the mother-child pairs, $n=61$) when feeding was taking place during home visits (done without appointment with the mothers through consent given by the mothers during the first visit). The time for the observation ranged between 30 min to 2 h per subject depending on the dynamics of the feeding event demonstrated by each of the mother-child dyad.

Data analysis

A Dietary Diversity Score (DDS) was calculated and analysed based on data obtained from the single 24-h food recall. Dietary diversity was defined as the number of different foods or food groups consumed over a given reference period. DDS was calculated using a set of eight

food groups: cereals, roots and tubers; vitamin A-rich fruits and vegetables; other fruits and vegetables; meat, poultry and fish; eggs; pulses and nuts; milk; foods cooked with oil (Swindale & Bilinsky, 2005). The total score (ranging from 0 to 8) was then categorised into good dietary diversity (≥ 5 food groups) and poor (< 5 food groups).

The frequencies of meals and snacks were calculated from the single 24-h food recall, and subsequently expressed as the total frequency of daily food consumption. Sufficient frequency was defined as a combination of ≥ 3 times per day meals and ≥ 2 times per day of snacks (King *et al.*, 2015). The definition of meal or snack was based on the time when the food was given to the child. For instance, foods given at around 7 to 9 am, 11 am to 1 pm, and 5 to 7 pm were considered 'meal' for breakfast, lunch and dinner respectively. Any other foods given beyond those times (i.e. given between meals) were considered 'snack'. The definition was further verified by the mothers.

Cooking methods were also assessed from the single 24-h food recall by considering both homemade and bought foods. The cooking methods consisted of 7 types which included soups (e.g., chicken soup, spinach clear soup, etc.), deep frying (e.g., fried carp fish, fried tempeh and tofu, etc.), boiling (e.g., rice-chicken porridge, boiled chicken egg, etc.), steaming (e.g., steamed vegetable, etc.), roasting/grilling (e.g., roasted fish or chicken, etc.), raw/fresh (e.g., raw vegetable, etc.), stir frying (e.g., stirred spinach, stirred long bean, soy sauce stirred beef, etc.). The cooking method score was calculated by summing the number of different cooking methods. The total score (ranged from 0 to 7) was then categorised into 'varied' if the total score ≥ 4 ($\geq 75^{\text{th}}$ percentile) and 'not varied' if total score < 4 ($< 75^{\text{th}}$ percentile).

Feeding responsiveness was assessed by categorising mothers' multiple answers on what they often did when the child

refused to eat and when the child did not finish the food. Mothers' responses were then identified as either 'appropriate' (scored 3), 'somewhat inappropriate' (scored 2), 'inappropriate' (scored 1), or 'no-response' (scored 0) which resulted in a total score that ranged from 0 to 6. The total score was further categorised into 'appropriate responsive feeding' if the total score was ≥ 5 ($\geq 75^{\text{th}}$ percentile) and 'inappropriate responsive feeding' if the total score was < 5 ($< 75^{\text{th}}$ percentile). Further explanation on the scoring system of the feeding responsiveness practice in is provided in Appendix 1.

Feeding during child's illness and recovery was assessed by summing the score of answers to four questions regarding feeding of food during illness and after recovery; also feeding of fluid during illness and after recovery (the score: (1) less food or fluid, (2) same amount of food or fluid, (3) more food or fluid). The total score (ranged from 4 to 12) was then categorised into 'good feeding during child's illness and recovery' if total score was ≥ 10 ($\geq 75^{\text{th}}$ percentile) and 'poor feeding during child's illness and recovery' if total score was < 10 ($< 75^{\text{th}}$ percentile). The summary of all five feeding practice indicators and their categories in are given in Appendix 2.

Mother's knowledge was assessed based on 19 questions related to feeding practices (detailed questions and distribution of the answers are presented in Table 2; Cronbach's alpha was 0.64). The knowledge score was calculated as the sum of all correct answers (each incorrect answer scored as 0 and correct as 1). The percentile distribution of total knowledge score (ranging from 0 to 19) was used to classify mothers with 'good' knowledge when the total score ≥ 15 ($\geq 75^{\text{th}}$ percentile) and 'poor' knowledge when the total score was < 15 ($< 75^{\text{th}}$ percentile).

Mother's attitude was assessed using 18 questions that were divided into 4 questions on food variety, 4 questions on meals and snacking frequency, 2 questions

on cooking methods, 5 questions on responsive feeding, and 3 questions on feeding during and after illness (detailed questions and distribution of the answers are presented in Table 3; Cronbach's alpha was 0.63). Mothers' attitude was measured on a 5-point Likert scale, ranging from 1=strongly disagree, to 5=strongly agree with a possible total score ranging from 18 to 90. Thus, those who scored ≥ 52 ($\geq 75^{\text{th}}$ percentile) were categorised as having a favourable attitude.

Maternal knowledge and attitude instruments were pre-tested among 50 subjects of similar socio-economic characteristics. The internal consistency of the pretested scale was determined by Cronbach's alpha coefficient. After several rephrased or deleted items, the scales had medium consistency shown by Cronbach's alphas as mentioned above.

Data entry and statistical analyses were done using SPSS program for Windows version 15. Multiple logistic regression analysis using backward (stepwise Wald) method was done to assess factors associated with feeding practices based on its odds ratio (OR). Factors with $p < 0.20$ from bivariate logistic regression (Field, 2000) or relevant indicators likely to be associated with feeding practices based on previous studies were included in this analysis.

Ethical consideration

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Ethical Committee of the Faculty of Medicine, Universitas Indonesia (no. 143/PT02.FK/ETIK/2010).

RESULTS

More than half of the children (56.4%) were girls. The age groups were based on differences in their dietary intake requirements. Almost three-quarters of the

Table 1. Subjects' socio-demographic characteristics (n=202)

Characteristics	n (%)
Children	
Sex, girls	114 (56.4)
Age group	
24 - 47 months	149 (73.8)
48 - 59 months	53 (26.2)
Parents	
Age of the mothers (year), mean \pm SD	31.76 + 5.69
Mother's education	
Lower education (nine-year of schooling or lower)	101 (50)
Higher education	101 (50)
Mother's working status	
Not working	142 (70.3)
Working	58 (28.7)
Household	
Household income	
Less than USD 66,42*	23 (11.4)
More than or equal to USD 66,42	179 (88.6)

*Based on minimum regional wage

children (73.8%) were below 4 years old. Of the 101 mothers with lower education, 62 had only graduated from elementary school or less. Approximately 30% of the caregivers were working mothers in occupations such as entrepreneur, private employee, tailor, kindergarten teacher, or holding non-permanent jobs. Most households had incomes that were more than the regional minimum wage (Table 1). Tables 2 and 3 present the distribution of maternal knowledge and attitude about feeding practices respectively. The overall median total score was 14 (min-max: 2-19) for knowledge and 50 (34-54) for attitude. Table 4 shows overall maternal attributes. More than half of the mothers had poor nutrition knowledge. The majority of the mothers had less favourable attitudes towards feeding practices. The majority of the mothers responded either strongly agree or agree about the following practices: 'Drinking milk is important' (96%), 'Providing meals 3 times a day for my child is not time consuming' (97.5%), 'I can do various cooking methods well' (88.2%), 'I adopt a

face-to-face feeding position when feeding my child' (93.6%), and 'I feed my child slowly and patiently during illness and after recovery' (96.1%) (Table 3). More than one-third of the mothers experienced a health problem such as a headache or flu/cough. Most mothers were from households living as a nuclear family, and more than half of them had 1 or 2 children. The mothers were exposed to health and nutrition information from various sources but mostly from relative/neighbour (74.3%), TV (72.8%), *Posyandu* (62.9%), and health workers (52%) (Table 4).

Figure 1 shows that most of the children (86%) had high dietary diversity score, with the median score of child's dietary diversity being 6 (1-8). The meal and snacking frequency of the children was mostly (72%) sufficient; snacking was more frequent than meals (6 (0-9) vs 3 (1-6) respectively).

Most mothers (73.3%) did not use varied cooking methods (median was 3 (1-6)). When the child refused to eat, persuading the child to eat was commonly

Table 2. Distribution of maternal knowledge on feeding practices¹

<i>Description</i>	<i>n (%)</i>
Food diversity	
Could mention example of carbohydrate source	109 (54.0)
Could mention example of animal protein source	174 (86.1)
Could mention example of plant protein source	64 (31.7)
Could mention example of vitamin and mineral source	143 (70.8)
Could mention example of calcium source	126 (62.4)
Could mention example of fiber source	134 (66.3)
Could mention example of vitamin A source	153 (75.7)
Could mention example of iron source	95 (47.0)
Understood healthy balanced diet	128 (63.4)
Understood that salt and sugar should only be used a little in children's food	141 (69.8)
Meals and snack frequency	
Meal frequency per day	
< 3 times	18 (8.9)
3 times	152 (75.2)
>3 times	32 (15.8)
Snack frequency per day	
<2 times	18 (8.9)
2 times	96 (47.5)
>2 times	88 (43.6)
Cooking method	
Reasons for having various cooking methods	
To avoid boredom, increase palatability and nutrient value	192 (95.0)
To increase child weight	10 (5.0)
Feeding responsiveness	
The good feeding situation,	
Playful	192 (95.0)
Forceful	10 (5.0)
Response when children refused to eat,	
Giving the child's favorite food(s)	184 (91.1)
Giving worm drug, herbal drink ('cekok' in local dialect)	18 (8.9)
Feeding during child's illness and recovery	
The amount of food given during child's illness,	
less than usual	90 (44.6)
the same as usual	64 (31.7)
more than usual	48 (23.8)
The amount of fluid given during child's illness,	
less than usual	7 (3.5)
the same as usual	27 (13.4)
more than usual	168 (83.2)
The amount of food given after child's recovery,	
less than usual	6 (3.0)
the same as usual	83 (41.1)
more than usual	113 (55.9)
The amount of fluid given after child's recovery,	
less than usual	2 (1.0)
the same as usual	71 (35.1)
more than usual	129 (63.9)
Total score of mothers' knowledge ²	14 (2-19)

¹n=202; ²median(min-max)

Table 3. Distribution of maternal attitude on feeding practice¹

Description	n%				
	SD	D	U	A	SA
Attitude on variety of foods					
To prepare balanced diet for my child is easy	1 (0.5)	34 (16.8)	21 (10.4)	136 (67.3)	10 (5.0)
To persuade children eating vegetables is easy to do	1 (0.5)	61 (30.2)	31 (15.3)	102 (50.5)	7 (3.5)
To drink milk is important for the child	0	3 (1.5)	5 (2.5)	122 (60.4)	72 (35.6)
To minimise the use of sugar and salt on child's menu is easy to apply	0	11 (5.4)	16 (7.9)	165 (81.7)	10 (5.0)
Attitude on frequency of meals and snacking					
Mother can make efforts to provide meal at least 3 times a day for child	0	9 (4.5)	6 (3.0)	164 (81.2)	23 (11.4)
Mother can make efforts to provide snack at least 2 times a day for child	0	16 (7.9)	6 (3.0)	169 (83.7)	11 (5.4)
To provide meals 3 times a day for my child is not time consuming	1 (0.5)	1 (0.5)	3 (1.5)	161 (79.7)	36 (17.8)
To provide snack 2 times a day for my child is necessary	0	11 (5.4)	7 (3.5)	166 (82.2)	18 (8.9)
Attitude on cooking method					
Mother can do various cooking methods well	0	8 (4.0)	16 (7.9)	148 (73.3)	30 (14.9)
Mother has enough time to cook food in various ways	1 (0.5)	9 (4.5)	16 (7.9)	150 (74.3)	26 (12.9)
Attitude on responsive feeding					
Mother tends to use tone and words during feeding the child	0	16 (7.9)	4 (2.0)	159 (78.7)	23 (11.4)
Mother provides play material	1 (0.5)	35 (17.3)	5 (2.5)	148 (73.3)	13 (6.4)
Mother does not force the child to finish the food	0	42 (20.8)	24 (11.9)	129 (63.9)	7 (3.5)
Mother allows the child to self-feed	0	16 (7.9)	6 (3.0)	157 (77.7)	23 (11.4)
Mother adopts face to face feeding position during child feeding	0	4 (2.0)	9 (4.5)	170 (84.2)	19 (9.4)
Attitude on feeding during illness and after recovery					
Mother increases the amount of food and fluid given to the child during and after illness	0	47 (23.3)	41 (20.3)	101 (50.0)	13 (6.4)
Mother gives small but frequent feeds to the child	0	10 (5.0)	11 (5.4)	162 (80.2)	19 (9.4)
Mother feeds the child slowly and patiently	0	1 (0.5)	7 (3.5)	148 (73.3)	46 (22.8)
Total score of mothers' attitude ²	50 (34-54)				

¹ n=202; ² median(min-max)

SD= strongly disagree; D= disagree; U= undecided; A= agree; SA= strongly agree

Table 4. Distribution of maternal attributes associated with feeding practices

Variables	n (%)
Mother's knowledge ¹	
Good	80 (39.6)
Poor	122 (60.4)
Mother's attitude ²	
Favourable	66 (32.7)
Less favourable	136 (67.3)
Mothers with health problem in the last 6 months	65 (32.2)
Number of children in the households	
1-2 children	141 (69.8)
3 or more	61 (30.2)
Household composition	
Nuclear family	159 (78.7)
Extended family	43 (21.3)
Source of exposure about health and nutrition information ³	
Religious groups, social gathering, and women's group meeting	10.9
Relatives/neighbours	74.3
Posyandu	62.9
Health workers	52.0
Radio	6.4
Magazine/newspaper	31.2
TV	72.8
Internet	2.0

¹ Mother's knowledge was assessed based on 19 questions on feeding practices (Table 2). Knowledge level was set at the 75th percentile of the total knowledge score (> 15 was categorised as good and < 15 was poor)

² Mother's attitude was assessed using 18 questions: 4 questions on food variety; 4 on meals and snacking frequency; 2 on cooking methods; 5 on responsive feeding; and 3 on feeding during/after illness (Table 3). It was categorised using the 75th percentile of the total attitude score based on a 5-point Likert scale (> 52 was grouped as favourable and < 52 was less favourable)

³ % based on multiple answers

done by most of the mothers (54%). However, when the child did not finish the food, 61.4% of the mothers stopped feeding. When categorised into the appropriateness of feeding responsiveness, 65.3% of mothers had inappropriate feeding responses (Figure 1).

When a child was ill, most of the respondents gave less food (80.2%) but more fluid than usual (74.3%). After recovery from illness, more food (53.9%) and more fluid (61.9%) were reported to be given to the children. Half of the respondents (50.5%) were categorised as having poor feeding practices during a child's illness and recovery (Figure 1).

The pattern noticed is that children aged below 4 years (about three-quarters of the observed children) need more time to finish the food, compared to the older children. Various forms of feedback was given during feeding such as 'Come on eat'; when the child played while eating, the mother said 'Stop and play later on'; then when the child did not want to finish the food, the mother said 'Come on, one more spoon of this food, then finish' or 'Open your mouth' and some of the mothers scared the child with things like 'Look! Your father's got angry with you' or 'Look! Mang Fajar (name of a neighbour who could make the child scared) is coming', then the child

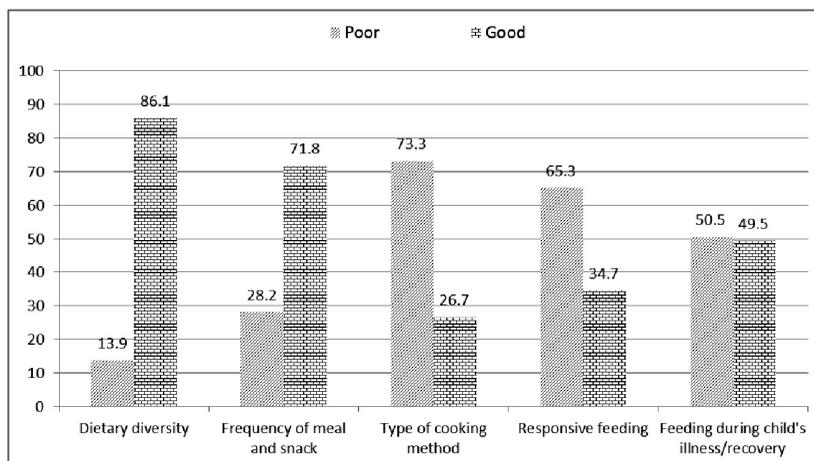


Figure 1. Profile of the feeding practices

Note: Dietary diversity: good (≥ 5 food groups) and poor (< 5 food groups); Frequency of meal and snack: good (combination of ≥ 3 times/day for meal and ≥ 2 times/day for snack) and poor (less or more than 'good' combination); Type of cooking method: good (> 4 methods) and poor (< 4 methods); Responsive feeding: using 75th percentile of the total score, good (score > 5) and poor (score < 5); Feeding during child's illness/recovery: using 75th percentile of the total score, good (score > 10) and poor (score < 10).

would eat the food and when the child finished the food, the mothers praised the child by saying 'How clever you are'. Some of them talked to their children while eating and said 'If you finish your food, we will later go to town to buy you a shirt' or 'We will go shopping in town'. Mothers were observed to adopt various positive feeding strategies to maintain their patience when feeding their children such as embracing, using verbal persuasion and eye contact, encouraging self-feeding, imposing playful eating experience, taking a lead by feeding the food; sometimes mothers also stopped feeding before the children finished their food but planned to feed them again at a later time.

The multivariate analyses (Table 5) showed that mothers' favourable attitudes to meal and snacking frequency were associated with increased odds of having appropriate meal and snacking frequency. However, living in an extended family was associated with lower odds of having sufficient meal and snacking frequency.

Maternal nutrition knowledge was associated with increased odds of using varied cooking methods. Mothers with a health problem and living in an extended family were less likely to report appropriate responsive feeding. Favourable attitude, good nutrition knowledge, and exposure to information from religious groups, social gatherings, and women's associations were associated with increased odds of good feeding during child's illness and after recovery. In contrast, maternal exposure to information from *Posyandu* and households having three or more children were associated with less feeding during child's illness and recovery.

DISCUSSION

In general, the feeding practices of the mothers were relatively poor. Among the five indicators of feeding practices assessed in the present study, only food diversity and sufficient frequency of meals and snack were categorised as good practices. Studies have shown that a high score of

Table 5. Association of feeding practices with maternal attributes (n=202)¹

Independent variables	Dependent variables								
	Mothers with favourable attitude on meal and snacking frequency	Mothers with favourable attitude on feeding during and after illness	Mothers with good knowledge	Mothers with health problem	Living in extended family	Household had 3 or more children	Exposure from magazine/newspaper	Exposure from religious group, social gathering and women's association	Exposure from Posyandu
Dietary diversity			2.17 (0.88 - 5.37)						
Meals and snacking frequency	5.23 (1.33 - 20.60)*				0.47 (0.23 - 0.98)*		2.12 (1.00 - 4.49)*		
Cooking methods			2.21 (1.17 - 4.16)*						
Feeding responsiveness				0.44 (0.22 - 0.89)*	0.41 (0.18 - 0.96)*				
Feeding during illness/after recovery		2.23 (1.09 - 4.54)*	2.66 (1.43 - 4.95)**			0.35 (0.18 - 0.69)**		2.89 (1.01 - 8.21)*	0.50 (0.27 - 0.93)*

*p<0.05, **p<0.01

¹ Independent variables included in each multiple logistic regression were all maternal internal (knowledge and attitude related attributes, health status) and external (household composition, number of children, exposure to information) factors. R squares were 0.027, 0.117, 0.043, 0.082, 0.205 for each analysis respectively of dietary diversity, frequency of meals/snacks, cooking methods, responsive feeding, and feeding during illness/after recovery. Factors shown in table above are those with p values less than 0.05 except maternal knowledge on dietary diversity.

dietary diversity and sufficient meals and snacking frequency do not reflect how much food is actually eaten by the children (Blaney, Februhartanty & Sukotjo, 2015a; 2015b), but may be related to other feeding practice behaviours (such as use of varied cooking methods and responsive feeding strategies) that will have an impact on the child, e.g., the child may get excited with the foods and the feeding experiences.

The high consumption of snacks also contributed to the high dietary diversity score in this study. According to the single 24-h diet recalls, children consumed various types of snacks, such as sweetened condensed milk, peanut coated with flour and fried sago chips. Beside dietary diversity score, snacks also contributed in frequency of meals and snacks. Almost all of the children in the present study had snacking frequencies of more than 2 times/day and 28% of them had meal frequencies of less than 3 times/day. Unfortunately, in the present study, their snacks were of low nutrient content. A similar phenomenon was observed in a study by Blaine *et al.* (2015) where mothers fed snacks to children for several reasons such as to help the child grow, worry about the child being hungry, or as a reward. Children of parents who reported offering non-nutritive snacks more frequently were less likely to meet dietary recommendations.

In the present study, most mothers did not use a variety of cooking methods, although, most of them were aware that cooking foods in various ways could stimulate children's appetite. Poor cooking skills is a typical problem among young mothers. This may force them to prepare breakfast, lunch, and dinner with the same type of cooking. A study among Indonesian urban mothers showed that the preparation of children's food was sometime done by other family members or even by a domestic helper. This was true of those who reported they could not cook, or who lived in an extended family,

or worked outside the home (Roshita, Schubert & Whittaker, 2012)

Through our observations, the focus of maternal behaviours seemed more on ensuring that the child ate enough food. Maternal feeding practice was influenced by their child's eating behaviour. Pressure to eat often occurs when the parent feels that the child is eating insufficient food (Haycraft & Blissett, 2012). Several strategies were observed to be adopted by the mothers when the children refused to eat including encouragement to eat, giving compliments, praising the children, or even scaring them.

However, when the children stopped eating, more than half of the mothers just stopped feeding them. This could be that the mothers recognised the child's cues of satiety and considered the child had eaten enough. This response may be a useful way to prevent obesity (Power *et al.*, 2015). Alternatively, mothers may give up making the child finish the meal. A qualitative study regarding parents' perception toward their pre-school children's eating behaviour found that mothers of preschoolers became frustrated when feeding their children. They had tried some strategies, either verbal encouragement and or praise or improved cooking methods. When these strategies did not work, mothers felt exasperated and tired (Duncanson *et al.*, 2013).

During an illness, a child may be too weak to eat. When children are ill and after recovery from an illness, special attention may need to be given as they may have poor appetite. More food and fluids should be given to the child (Engle *et al.*, 1996). However, the present study demonstrates that the majority of mothers gave less food to children when they were sick. Mothers may desperately try to feed the child frequently in small amounts when the child is ill, and so they may encourage the child to drink more rather than eat more. In reality, greater patience and understanding

of the child needs will increase the chances of successful feeding (Engle *et al.*, 1996).

Evidence from the present data suggests that mothers' favourable attitudes are positively associated with good feeding practices. This finding highlights the results of a previous study which showed that attitude of parents, reflected in a strong sense of parental responsibility, was associated with child feeding (Duncanson *et al.*, 2013). Likewise, mother's nutrition knowledge also appeared to be a protective factor and is associated with toddlers' nutritional status (Siagian & Halisitjayani, 2015). Indeed, improvements in nutrition knowledge, appears to increase the toddlers' intake (Haripin *et al.*, 2015). Attitude, knowledge, and skills are required to assimilate dietary recommendations into child feeding practices for optimal nutritional status.

Maternal health problems were negatively associated with feeding responsiveness. It is known that mothers generally spend significantly more time than any other family member on parenting (including mealtimes) (Bora *et al.*, 2014). Thus, a mother's illness might weaken her responsiveness toward child feeding.

This study also reveals that living in an extended family or having more than two children is negatively associated with meal and snacking frequency, responsive feeding, and feeding practice during/after a child's illness. Feeding practices reflect principles of care including time, attention, and support from other household members (UNICEF, 1998). Thus, increasing numbers of family members may lessen the quality of feeding practice. It may even impact on the nutritional status of children through inadequate intake. A study in the USA showed a positive relationship between the number of siblings and higher food insecurity with lower body weight (Bhargava, Jolliffe & Howard, 2008).

Multivariate analysis also indicates that mothers who received nutrition and health information from various sources

have better feeding practices during or after the child's illness than those who receive information only from the *Posyandu*. This finding is contrary to a South African study which concluded that mother's feeding decision was influenced by information that came mainly from clinic nurses, and then this was followed by information from friends, books, relatives, and magazines/newspaper (Bester, 2006). *Posyandu* in Indonesia's health system is usually run by voluntary community health workers with varied experiences and skills. Therefore, it is possible that information coming from the *Posyandu* may have included mixed messages that may have confused mothers.

In conclusion, feeding practices among mothers in this area were relatively poor. Since maternal knowledge and attitude are significantly associated with mother's feeding practice, enhancing exposure to proper information about child feeding through channels where mothers and the children usually gather could be a primary measure to improve feeding skills.

The present study, however, has one limitation. The use of single 24-h diet recall to estimate the children's dietary diversity and usual frequency of meal and snacking is probably appropriate to establish the usual habits of groups of mothers but not of individuals. Therefore, a careful interpretation of its application for use on individuals is suggested.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Appendix 1. Feeding responsiveness scoring system

<i>Questions</i>	<i>Possible responses</i>	<i>Type of response</i>	<i>Score</i>
What mothers often do when the child refused to eat (multiple response)	Feed while playing	appropriate	3
	Feed while carrying the child	appropriate	
	Give the child's favorite food	appropriate	
	Persuade the child to eat	appropriate	1
	Encourage self feeding	appropriate	
	Strike/pinch the child	inappropriate	
	Scold or shout at the child	inappropriate	0
	Do nothing	no-response	
	Combination between appropriate and inappropriate or no-response	somewhat inappropriate	
What mothers often do when the child does not finish eating the food (multiple response)	Be patient until the food is mostly finished	appropriate	3
	Change to another menu	appropriate	
	Give the child snacks	appropriate	
	Encourage self feeding	appropriate	1
	Push the child to finish	inappropriate	
	Strike/pinch the child	inappropriate	
	Scold or shout at the child	inappropriate	0
	Stop feeding	no-response	
	Combination between appropriate and inappropriate or no-response	somewhat inappropriate	

Appendix 2. Summary of feeding practice indicators, their cut-offs and categories

<i>No</i>	<i>Indicator</i>	<i>Category</i>	<i>Cut off point</i>
1	DDS	(1) High dietary diversity (0) Low and medium dietary diversity	≥ 5 food groups < 5 food groups
2	Frequency of meals and snacks	(1) Sufficient frequency (0) Poor frequency	≥ 3 times/day (meal) ≥ 2 times/day (snack) else than the above
3	Cooking method	(1) Varied (0) Not varied	total score ≥ 4 total score < 4
4	Feeding responsiveness	(1) Appropriate feeding responsiveness (0) Inappropriate feeding responsiveness	total score ≥ 5 total score < 5
5	Feeding during child's illness and recovery	(1) Good feeding during illness (0) Poor feeding during illness	total score ≥ 10 total score < 10