

# Factors and Caregiver's Behavior Affecting Inadequate Complementary Food of Infants Aged 6-12 Months in Naresuan University Hospital

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## ABSTRACT

**Objective:** Food plays an important role in infant nutrition. Hence, the various factors and behavior that affect the right choice of nutrition for infants aged 6-12 months by caregivers need to be investigated. The objectives were to study the associated factors and caregiver's behavior affecting inadequate feeding of food to infants aged 6-12 months.

**Methods:** This present work was a cross-sectional study in which 54 caregivers for infants were included. In this study, a survey was performed by using questionnaires for collecting data. The data were analyzed statistically in terms of percentage and mean and by using Chi-Square test (Fisher's Exact Test) and z-test.

**Results:** It was found that most of the infants (79.6 %) had normal weight. The age at the start of proper feeding was 5 months and 27 days old. The education level, age, occupation, and income of the caregivers were factors affecting the food choices for the infants at  $p < 0.05$ . Inappropriate feeding practices were as follows: feeding pre-masticated foods, liquid food feeding, drinking sweetened juice and soft drinks, eating sweets, and adding salt, sugar, monosodium glutamate and fish sauce to the infants' food. The caregivers chose food by judging for age and FDA logo on product labels. Advertising did not affect their decision to purchase food. Moreover, occupation, education, and income of the caregivers were not associated with purchasing the right food for the baby.

**Conclusion:** Occupation, income, age, and education level of the infant caregivers were associated with the food selection. The inappropriate feeding behaviors were still persisting.

**Keywords:** Complementary food; caregiver's behavior; associated factors; feeding pre-masticated food; sweetened juice (Siriraj Med J 2017;69: 255-261)

## INTRODUCTION

Food and nutrition during infancy is the foundation of health and intelligence in the long run. It is very important to prevent chronic non-communicable diseases. Infants get enough nutrients from breast milk at age 4-6 months. After that, the infant needs to get energy and certain nutrients from food, such as protein, iron, calcium, zinc, etcetera. for normal growth because breast milk alone is no longer nutritionally sufficient for an infant after 6 months of age, and the initiation of complementary feeding allows the child to transition gradually to eating family foods.<sup>1,2,3</sup> The World Health

Organization infant feeding guidelines recommend that infants should be exclusively breast-fed for the first 6 months of life, after which complementary foods may be introduced in conjunction with continued breast-feeding to achieve optimal growth, development and health.<sup>4,5,6</sup> The food for a young infant or complementary food provides nutrients sufficient for growth. This helps infant adaptation of feeding from liquid to semi-solid to adult food, so the child develops the appropriate eating habits. If changing to eating semi-solid food is too slow it can cause a baby to refuse food intake.<sup>4,7</sup> According to the World Health Organization, there are four aspects of

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Received 15 March 2017 Revised 14 June 2017 Editor Accepted 15 June 2017

doi:10.14456/smj.2017.51

feeding complementary food: timely, adequate, safe, and appropriately fed. Currently, in addition to preparing food in their own households, there are also numerous food products for infants sold in the market.

This research was aimed to investigate the factors and behavior affecting inadequate feeding of complementary food for the infants aged 6-12 months in hope that the information will motivate all concerned parties to make the investment required to ensure the nutritional needs of infants and young children are met. The results from this study will also stimulate research and development to broaden the range of interventions to improve infant and young child appropriate complementary feeding.

## MATERIALS AND METHODS

A three-month cross-sectional study of the population consisting of 150 caregivers for the healthy infants aged 6 to 12 months in the outpatient department at the Children's Health Clinic, Naresuan University Hospital, Phitsanulok, Thailand. Inclusion criteria were healthy infants with normal development and infants who received inadequate complementary food. Exclusion criteria were caregivers of infants who had underlying diseases such as congenital anomaly, diabetes, heart disease, kidney disease, or food allergies. The infants were not taking any medication on a regular basis. Out of the total 150 caregivers, 54 caregivers were recruited under inclusion criteria for the infants who were healthy and had inadequate age-appropriate food intake. In this current work, several steps were taken to maximize the reliability of the data. First, the returned questionnaires were checked for completeness. All acceptable questionnaires were designed with an identification number. The questionnaires were analyzed using Cronbach's alpha coefficient to evaluate the reliability of the questionnaires used. The reliability of all instruments were within 0.83, indicating that all items were excellent. Questionnaires which had been the validated for index of consistency (IOC) by a panel of experts prior to data collection were used to interview the caregivers. This was followed by a pilot study, of which the result was used to revise the questionnaires. Baseline data were collected on how age-appropriate food was chosen, age-appropriate methods of feeding considering energy needs per day, milk for the infants, the method of preparing the food, how age-appropriate ready-made food was chosen, and environmental factors affecting inadequate food intake considering the child's age.

### Statistical analyses

This research was survey based using questionnaires

for collecting data. The data was statistically analyzed for percentage, mean, standard deviation, methods in choosing complementary food and factors associated with inadequate complementary feeding by using Chi-Square test (Fisher's Exact Test). The significant associations ( $p < 0.05$ ) were tested with a Chi square test to determine the relationships between factors and behaviors affecting the inadequate feeding of complementary food to the infants with the Z-test for differences in choosing age-appropriate food for the infants.

## RESULTS

The reliability of questionnaires was 0.83, which indicated that all items were excellent. The general data from the parents of 54 infants indicated that the infants received inadequate age-appropriate food. The adequate energy for an infant per day aged 6-8, 9-11 and 12-17 months is 632, 702 and 797 Kcal, respectively: from complementary food per day being 219, 323 and 451 Kcal, respectively, and from breast milk per day being 413, 379 and 346 Kcal, respectively.<sup>1</sup>

1. Characteristics of the infants and caregivers: As shown in Table 1, the basic information of the infants was as follows: 27 males and 27 females with a mean age of 8 months 16 days. The average weight was 8.5 kg and average height was 71.2 cm. The usual body weight in the 50<sup>th</sup>-75<sup>th</sup> percentile was found for 33 infants (61.1%). The average for the start of complementary food was 5 months and 27 days. Occupation, income, age, and education of caregivers were associated statistically with feeding ( $p = 0.001$ ).
2. Behavior of feeding of complementary food (Table 2): It was found that only 68.5% of the caregivers cooked the food for infants at home. The methods of cooking and type of food were improper for the age of the children. The foods provided were mostly in a liquid form (56.3%) followed by semi-solid (25%) and liquid and powdered food (18.8%). It was found that liquid feeding was statistically associated ( $p = 0.001$ ) with inadequate age-appropriate texture of food. The semi-liquid/pulp texture was 43.1% which was also found to be statistically significant at  $p = 0.001$ . Ten infants were fed complementary food beginning at an age over 7 months which significantly correlated ( $p = 0.003$ ) with body weight of less than the 50<sup>th</sup> percentile. Some infants started eating meat after the age of 7 months, twelve of whom weighed below the 50<sup>th</sup> percentile and this was statistically significant ( $p = 0.001$ ). Caregivers fed sweetened juice and soft drinks to 2 children (3.8%). Six infants were given dessert and snacks (11.1%). Complementary food

with added salt was given to 15 infants. Most infants ate added salt (13 infants or 86.7%), and 2 infants (13.3%) ate fish sauce. An analysis of relationships showed that eating snacks and sweets was significantly related ( $p=0.001$ ) to infants consuming insufficient food for their age. Almost all infants (52 infants, 96.3%) were spoon fed. Two infants (3.7 %) were fed with pre-masticated foods.

3. Factors associated with choice of complementary food: A number of caregivers (30.8 %) bought food from convenience stores. Some caregivers bought food from the fresh market (29.7%). It was found that 54% of the caregivers were influenced by their families in the selection of the infant's food

( $p=0.001$ ). However, community beliefs had an impact on the selection of food that was inadequate for young infants ( $p=0.001$ ). This was not associated either with age, education, or income of the caregivers. Fifty-two caregivers (40.9%) were significantly influenced ( $p=0.03$ ) by television advertisements in their decision to purchase complementary food. Similarly, 24.1% of the caregivers were significantly influenced by internet advertisements on the decision to buy complementary food ( $p=0.002$ ). Only 8.6% and 13.8% were insignificantly influenced by advertisements in magazines and by suggestions from medical staff, respectively. The advertisements influencing food choice for infants are shown in [Table 3](#).

**TABLE 1.** Characteristics of caregivers and infants.

Characteristics of carers	Data (n=54)	N	%
Average age (n=54) (min.-max.)		32.74 (18-70)	
Education level (n=54)			
Elementary education		4	7.41
Secondary education		17	31.5
>Bachelor's degree		33	61.1
Occupation (n=54)			
Housekeeper		8	20.5
Agriculture		1	2.6
Trade		7	18.0
Contractor		6	15.4
Government		17	43.6
Employee		5	12.8
Business		5	12.8
Other		5	12.8
Income average (Baht/month) (n=54)		25,100 (5,000-100,000)	
Experience in caring for an infant (Average n)		1	
Most people caring for of the infant (n=54) were the mothers with an average age of 30.4 years			
Characteristics of infants	Data (n=54)	N	%
Sex (n=54)			
Boy		27	50.0
Girl		27	50.0
Age (month) (n=54) avg., (min.-max.)		8 months 16 days (6-12 months)	
Weight (Kg.) (n=54)		8.5 (4.8-10.5)	
Height ( cm.) (n=51)		71.2 (64-80)	
Birth weight (g.) (n=52)		3,095 (2,185- 4,200)	
Average age exclusive breast feeding(n=54)		4 months 16 days	
Beginning age of complementary food average (n=54)		5 months 27 days	

**TABLE 2.** Behavior of feeding of complementary food.

Behavior	N	%
Pattern of feeding (n=54)		
Cook at home, only	37	68.5
Both cook at home and ready to eat supplement	16	29.6
Ready to eat supplement, only	1	1.9
Texture of food (n=51)		
Blended until liquid	3	5.9
Pulp/semi-liquid	22	43.1
Ground/coarse	20	39.2
Cut into small pieces	3	5.9
Normal form for age	3	5.9
Pattern of food rice (n=45)		
White rice	33	73.3
Brown rice	12	26.7
Egg (n=45)		
Cooked egg yolk	34	75.6
Cooked egg white	1	2.2
Cooked egg	10	22.2
Meat	35	
Sea food (n=19)		
Fish	17	89.5
Shrimp	1	5.3
Squid	1	5.3
Juice	30	55.6
Sweet soft drink	2	3.7
Snacks/desserts	6	11.1
Method of choosing complementary food (n=49)		
Chose by reading the labels	10	20.4
Chose foods that are appropriate to the age of the infant	14	28.6
Chose products that have past the expiry date	8	16.3
Choose products without added sugar, honey, salt, or monosodium glutamate	8	16.3
Chose a product with no artificial colors, fragrances, or preservatives	9	18.4
Method of complementary feeding (n=54)		
Used spoon feeding	52	96.3
Pre-masticated food	2	3.7
Food advertising affects purchasing decisions for complementary food (n=58)		
TV	21	36.2
Megazine	5	8.6
Advertising at point of sale	2	3.5
Internet	14	24.1
Supermarket	4	6.9
Newspaper/Brochure	2	3.5
Basket before leaving the hospital.	2	3.5
Guided by medical staff	8	13.8

**TABLE 3.** Correlation: factor and behaviour of inadequate feeding of complementary food.

Data	N (%)	P-Value
Age (year)	54	0.002
< 20	3 (5.6)	
20-40	40 (74.1)	
>40	11 (20.4)	
Education	54	0.001
Elementary	4 (7.4)	
Secondary	17 (31.5)	
>Bachelor's degree	33 (61.1)	
Income	54	0.002
<10,000	8 (14.8)	
10,000-20,000	19 (35.2)	
>20,000-30,000	12 (22.2)	
>30,000	11 (20.4)	
Occupation	54	0.001
Method of complementary feeding	54	
Used spoon feeding	52 (96.3)	0.001
Pre-masticated food	2 (3.7)	
Texture of food	51(94.4)	0.001
Course/liquid	54	0.001
Rice	45	0.002
White rice	33 (73.3)	
Brown rice	12 (26.7)	
Desserts/snacks	8	0.001
Sweet soft drink	2 (25.0)	
Desserts	6 (75.0)	
Advertizing influences the decision to buy	54	0.001
No	0	
Yes	54 (100.0)	
Beliefs influence the decision to buy	47	0.001
No	42 (89.4)	
Yes	5 (10.6)	
The family influence the decision to buy	50	0.001
No	23 (46.0)	
Yes	27 (54.0)	

## DISCUSSION

Age-appropriate feeding is critical to the growth and development of infants.<sup>8,9</sup> Infants need to be fed with breast milk between the ages of 6-8 months and 9-11 months.<sup>10</sup> If complementary food is introduced too early, there is the risk of allergy because proteins and large molecules can be absorbed through the intestinal

wall of the infants when fed complementary food before the age of 4 months. However, starting to feed infants too slowly (more than age 6 months old) may result in the infants refusing food, and infants may develop protein and energy deficiency diseases, such as obesity, diabetes, high cholesterol, and so on. This research also found that the behavior of feeding complementary food to infants

was not appropriate. In this present work, there were two infants fed with pre-masticated food. The habit of chewing the food before feeding an infant is a cultural difference in each community.<sup>11</sup> At present, no clear conclusion has been made on the benefit or harm of feeding pre-masticated food to the infant. However, some infants may have contacted some bacteria<sup>12,13</sup> and virus<sup>14</sup> from pre-masticated food. Therefore, the proper feeding behaviors should be focused on, to avoid unnecessary gastrointestinal infection. In addition, there were some infants who ate whole eggs before the age of 9 months. This may increase the risk of the infant to develop allergy.<sup>10,15</sup>

This present research demonstrated that for some infants eating meat was delayed to after 7 months old. These infants already weighed below the 50<sup>th</sup> percentile and thus, they will be at risk to develop malnutrition. It is recommended that infants should be minimally be weekly given animal foods such as milk and fish.<sup>16</sup> Infants who ate mostly seafood, ate sea fish (19 infants, 100%). They started eating at about 4-7 months. However, it is suggested that infants should not start eating seafood except fish before the age of 12 months because they could possibly develop allergies to seafood.<sup>17</sup>

Infants should avoid flavored food and be trained to eat natural food, but not sweet and salty food. A study on perception and satisfaction in taste has shown that taste occurs from infancy and may continue up to adulthood.<sup>18</sup> Most caregivers used salt and fish sauce for seasoning and gave the infants sweet soft drinks, sweets and snacks. This may cause a risk of chronic diseases, such as obesity, diabetes, hypertension, and cardiovascular disease.<sup>16</sup> In addition to food preparation at home, many food products are sold in the market. This is a convenient time-saving way to feed children, but care must be taken. Buying age-appropriate ready-made food products for infants is popular because they are easy, convenient, and fast to prepare. It was found that advertisements greatly influenced the decision to buy age-appropriate ready-made food products. Parents preferred to buy the age-appropriate ready-made food in the market. The family of child caregiver had an influence on choosing complementary food, and this was statistically significant. The present work showed that the majority of parents preferred to buy food from the fresh market rather than convenient stores or shopping mall, possibly because most of them did not live in an urban area. Easily accessed television and internet advertisements might also have some influence on the decision to buy complementary food.

It can be concluded that age, occupation, income, and education of parents are factors which affect the food

choices of complementary food which are inadequate for infants aged 6-12 months. It was also found that inappropriate behaviors of the caregivers included adding salt and fish sauce as well as giving snacks, desserts, and sweet soft drinks as well as feeding of pre-masticated food to the infants. It is imperative that pediatricians, doctors and medical personnel should provide general public advice and encourage feeding behavior that is age-appropriate for infants. These results should be confirmed by further study, in which a large population and other related factors are thoroughly investigated.

## ACKNOWLEDGMENTS

The present study was supported by a Naresuan University research grant. The author gratefully acknowledges Assoc. Prof. Mary Sarawit, Deputy Director of NUIC, Naresuan University, Asso. Prof. Sutatip Pongcharoen and Prof. Dr. Waykin Nopanitaya, Faculty of Medicine, Naresuan University, for their critical readings, and thanks is given to Ms. Sasinipa Srikanlayaniwart, Statistics Technical Officer, Research Center, Faculty of Medicine, Naresuan University for statistical analysis.

**Conflict of Interest:** None

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