Knowledge, Attitude, and Practices of Complementary Feeding by Mothers in the BayaniJuan Southville 7 Resettlement Village in Calauan, Laguna, Philippines

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ABSTRACT

Complementary feeding refers to the stage when the breast milk produced by the mother is no longer sufficient to meet the nutritional requirements of infants thereby prompting the need for nutritional supplements. The study assessed the knowledge, attitudes, and practices (KAP) on complementary feeding of mothers and the nutritional status of their 6 to 24-month old children at Bayanijuan sa Southville 7 in Calauan, Laguna. Data were gathered through interviews with 114 randomly selected mothers. A 24-hour food recall was administered to describe the dietary intake of children. The median energy and nutrient intake were calculated including percent adequacy of food intake.

Results revealed that 14% of the children were underweight, 28.1% were stunted, and 12.3% were wasted; whereas 16.7% of the mothers were underweight, 13.2% overweight, and 4.4% obese. Such findings indicate that malnutrition is prevalent among children and mothers in the selected site. More than half of the mothers (66.7%) had high level of knowledge on complementary feeding. The percentage adequacy of intake for iron (26.4%), vitamin A (14.1%) and vitamin C (25.5%) among the 6 to 11 group were found to be low. The highest iron intake was recorded among 12 to 24 months old children (71.2%). The energy intake provided 70% of the recommended amount.

The actual energy and nutrient intake of children were far from the recommended amount. About 45% of the children were given complementary foods before six months of age, falling short of the World Health Organization (WHO) recommendation, which is at six months. Age and education were found to be associated with the mother's knowledge and attitude on complementary feeding. Marital status, mother's education, and household size were associated with the nutritional status of children.

Findings of this study revealed that malnutrition problem among children and mothers exist in the relocation site and therefore residents of the relocation site Bayanijuan sa Southville 7 in Calauan, Laguna are nutritionally at risk.

INTRODUCTION

The period of complementary feeding, when other foods are added to the diet of breastfed children is a time of particular vulnerability to nutritional deficiencies. From the age of six months, the need for energy and nutrients of infant starts to exceed what is provided by breast milk and complementary feeding becomes necessary to fill the energy and nutrient gap (Dewey and Brown, 2003). If complementary foods are not introduced or are given inappropriately at this age, the growth of infants may falter.

Studies have shown that inappropriate feeding practices can have profound consequences on the growth, development, and survival of infants and children, particularly in developing countries like the Philippines (Bhandari, et al., 2004; Bloss, et al., 2004; Brown, et al., 1995; Butte, et al., 2000). Insufficient quantities and inadequate quality of complementary foods, poor child-feeding practices, and high rates of infection have a detrimental impact on health and growth during these important years. Even with optimum breastfeeding, children can become stunted if they do not receive sufficient quantities of quality complementary foods at six months of age (Lancet, 2008).

The first two years are considered the most critical in the life of the child. This is the "critical window" for the promotion of optimal growth, health, and development (WHO/PAHO, 2003). Children at this age are vulnerable to undernutrition because they are growing and developing rapidly yet do not consume adequate quantities of food. Undernutrition in the Philippines was recorded highest among young children aged 1 and 2 years, with a prevalence of 30.3% and 31.3%, respectively (DOST-FNRI, 2008).

The nutritional status of young children is noted to be influenced by their dietary intake, which in turn is determined by the knowledge, attitudes, and practices (KAP) of breastfeeding and complementary feeding by mothers. The KAP of the mothers on complementary feeding directly affect the quality of care they give to their children. Part of the care given to the child is the complementary feeding practices that do not only depend on the availability of a variety of foods in the household, but also on the feeding practices of the caregivers who are often the mothers (Saha, et al., 2008).

Appropriate complementary feeding depends on accurate information and skilled support from the family, community, and health care system. Inadequate knowledge about appropriate foods and feeding practices is often a greater determinant of malnutrition than the lack of food (WHO, 2004).

The common inappropriate complementary feeding practices include (1) delayed introduction of complementary foods, (2) low energy and nutrient density of foods offered, (2) feeding in small amounts at meals, and (4) food restrictions due to cultural beliefs. This situation is also found widespread even in parts of Southeast Asia where income and food availability have improved steadily over the last decade (WHO, 2002).

In the Philippines, the knowledge, attitudes, and practices of mothers on complementary feeding, particularly in relocation communities, is less explored. The increasing number of migrant families, composed of informal settlers from Metro Manila, led to the rise in the number of community members in relocation sites in the Philippines. Relocated individuals are at risk to malnutrition since they are likely to have unstable means of living, thus increasing the probability of being part of the low income group of the society.

This study aims to (1) identify the associated socio-demographic determinants of mothers on the nutritional status of children and (2) to describe the knowledge, attitudes, and practices of mothers living in relocation sites on complementary feeding. Findings will be useful in developing policies and interventions to promote appropriate complementary feeding practices that support the Global Strategy for Infant and Young Child Feeding (IYCF).

MATERIALS AND METHODS

A cross-sectional study in the relocation site of BayaniJuan sa Southville 7 in Calauan, Laguna, Philippines was conducted from July to September 2010. The study site was the first well-documented relocation site established in Calauan with the resident families already settled in the area.

The population of this study consists of mothers with infants and young children, aged 6 to 24 months. Sample respondents were drawn using simple random sampling without replacement. Consent of the respondents were solicited to become part of this study.

From the total population, a sample size of 114 was obtained using the formula below:

$$n = \frac{Npq}{N/D^2 + pq}$$

Where:

$q = 1-p$

p = *perceived value of the population proportion* $= 0.50$

$D = \frac{Z\,a/2}{B}$

B = *error of estimation* $= 0.80$

$Z\,a/2$ = *standard normal variate with area to the right* $a/2$

$a = 0.05$

Data collection was conducted using a structured questionnaire. The questionnaire was pretested among 10 mothers with 6 to 24 months old infants and young children in Los Baños, Laguna. The questionnaire generated information on the socio-demographic profile of the households and the knowledge, attitudes, and practices on complementary feeding.

The knowledge level of mothers on complementary feeding was determined through a ten-item test based on the ten key messages for complementary feeding as recommended by the World Health Organization (WHO, 2004). Mothers were asked to answer if they know, do not know, or were uncertain about the statements being read to them in Tagalog.

A score of one was given for each statement known by the respondent. The level of knowledge of the mothers were determined based on their scores and were categorized as low (0 to 3); medium (4 to 7); and high (8 to 10).

The attitudes on complementary feeding was determined using a five-point Likert Scale, which indicates the degree that best describes the perceptions/feelings of mothers on the ten statements read to them also in Tagalog, with a rating of 1 for "strongly agree" and 5 as "strongly disagree". During the analysis, the scale of 1 and 2 was recategorized as "1" and classified as "agree"; "3" retained for "neutral", and the previous "4" and "5" ratings were reclassified into "3" for "disagree". Each item was scored and the scores for each variable were summed. The higher the score the more favorable is the attitude toward complementary feeding.

Dietary assessment

Dietary intake of the infants and young children were obtained using a one-day or 24-hour food recall. Specific food items, method of preparation, and estimated amounts of food intake were determined. This was facilitated with the use of food models such as pictures of thick and thin porridge, and fortified products with Sangkap Pinoy Seal (SPS).

In addition, frequency and duration of breastfeeding were recorded. Food items were converted to household measures using Food Exchange Lists for Meal Planning (DOST-FNRI 2002) whereas nutrient contents were computed using the Food Composition Table (DOST-FNRI 1997). The amount and nutrient content of breast milk however, were not determined. Percent adequacies of nutrient intake were evaluated by comparing the intakes with the Philippine Recommended Energy and Nutrient Intakes (DOST-FNRI 2002).

Anthropometry

The weight of mothers and 6 to 24-month old children were recorded using a Detecto weighing scale and Salter weighing scale, respectively. The

height of mothers and 24-month old children were obtained using microtoise (nearest 0.1 cm). For children ages 6 to 23 months, length was measured using infantometer (nearest 0.1 cm). Instruments were calibrated every after five subjects to maintain accuracy and precision. The data on anthropometric measurements and the age of the child were used to yield three indices of nutritional status, namely: (1) length/height-for-age, (2) weight-for-age, and (3) weight-for-length/height.

The Z-scores, used to determine the nutritional status of children, were automatically computed using WHO Anthro Version 3.2.2. Children with length-for-age Z-score (HAZ), weight-for-age Z-score (WAZ), and weight-for-height (WHZ) Z-score of <-2 SD were classified as stunted, underweight, and wasted, respectively. HAZ, WAZ, WHZ of >2 SD are classified as tall, overweight, and wasted. The nutritional status of mothers were determined using the body mass index (BMI) computed using the formula weight (kg)/height(m2). The BMI of mothers were compared with the BMI of the WHO cut-off for Asians.

Data gathered were coded and analyzed using the software Statistical Package for Social Sciences (SPSS) version 18.0. Descriptive statistics such as frequency, percentage, mean, median, range, and standard deviation were used to analyze the socio-demographic characteristics of households. Likelihood Ratio Test was used to determine the associations between the independent and dependent variables postulated in the conceptual framework of the study.

Given the limited number of samples in the study, results may not be generalized for other relocated households in the country. The study covered only one relocation village in the municipality of Calauan, which was selected on the basis of availability of secondary data to identify population for the study.

Dietary assessment for the 6 to 24 months children was limited only to 24-hour food recall although mothers reported it is the typical diet of their 6 to 24 months old children. The amount and nutrient intake from breast milk is not evaluated therefore it does not reflect the total dietary intake.

Socio-demographic characteristics of the respondents

Table 1 provides a profile of the respondents. Almost three-fifths of the mothers interviewed (56.1%) were aged 26 to 36 years old while about one third of them (32.5%) were still very young (15-25).

Majority of the mothers (57.9%) were legally married while more than one-fourth of them (27%) were living in together their partners. Most of them (59.6%) either reached high school or graduated from high school; only 15.8% of the mothers had either attained or finished college degree.

The average household size was composed of five (5) members with majority of the households (58.8%) having 3 to 5 members and about three-fourths (75.4%) had 1 to 3 children. Most of the mothers (85.1%) were unemployed. A few of them worked as bracelet maker, laborer, teacher's aid, and factory worker. Monthly household income ranged from Php 1,000 to Php 9,999, which usually came from the husband's income as construction worker, pedicab and/or tricycle driver, and vendor. Additional income came from the relatives. Based on the 2006 annual per capita poverty threshold of the Philippines (PhP 15,057) and for rural areas in Laguna (PhP 17,724), more than 90% of the households were classified as poor and about 5% belonged to above poverty threshold (BayaniJuan Community Profile, 2010).

Almost half (49.1%) of the mothers were newly relocated in the area, with less than a year of residency. Their families were victims of Typhoon Ondoy, which hit Metro Manila in 2009 (BayaniJuan Community Profile, 2010). About half (48%) of the respondents' families were already residing in the relocation site for one year or more.

The characteristics of those newly relocated and who resided for more than one year were found to be comparable except for the height of mothers based on t-test and Likelihood Ratio Test.

Table 1. Characteristics of respondents with 6 to 24 month-old children in the BayaniJuan resettlement site in Calauan, Laguna

	Freq	%
Age of Mothers		
15-25	37	32.50
26-36	64	56.10
37-47	13	11.40
Marital Status		
Single	14	12.30
Married	66	57.90
Separated	3	2.60
Live-in	31	27.00
Highest Educational Attainment of Mothers		
No Schooling	1	0.90
Elementary	25	21.90
High School	69	59.60
College	19	15.80
Household Size		
3-5	67	58.80
6-9	42	36.80
10-12	5	4.40
No. of Children (≤ 12 y/o)		
1-3	86	75.40
4-6	27	23.70
>6	1	0.90
Years of Residency		
<1	56	49.10
1-2	45	39.50
3-4	11	9.70
>5	2	1.80
Occupation of Mothers		
None	97	85.10
Laundry woman	1	0.90
Vendor	7	6.10
Sari-sari store owner	5	4.40
Others	4	3.60
Household income (monthly)		
P0.00	2	1.80
<P1,000	2	1.80
P1,000-P4,999	44	38.60
P5,000-P9,999	50	43.90
P10,000-P14,999	11	9.60
P15,000-P19,999	4	3.50
>P20,000	1	0.90

Nutritional status of children and mothers

Based on the WHO Child Growth Standard (CGS) of weight-for-age index, 14% of infants and young children were underweight and 7.9% was severely underweight. As to the length/height-for-age index, 28.1% or about one third of the infants and young children were stunted while 7.9% of the children were severely stunted.

Based on the weight-for-length/height index, around 12% and 28.10% of the respondents' children were classified as wasted and stunted. There was a recorded high prevalence of malnutrition among infants and young children, particularly underweight, stunted, and wasted, in the area. Based on BMI, more than half (65.8%) of the mothers had normal nutritional status while 16.7%, 13.2 %, and 4.4% of the mothers were recorded to be overweight, underweight and obese, respectively. The findings imply that there is "double burden" of malnutrition in the community, which refers to the dual burden of the persistence of undernurition, along with the rapid rise in overweight and obesity (Table 2).

Table 2. Nutritional status of mothers and children

Nutritional status of children*	Freq	%
Weight-for-age		
Severely underweight	9	7.90
Underweight	16	14.00
Normal	89	78.10
Length/height-for-age		
Severely stunted	9	7.90
Stunted	32	28.10
Normal	73	64.00
Tall	0	0.00
Weight-for-length/height		
Severely wasted	2	1.80
Wasted	14	12.30
Normal	98	86.00
Overweight	0	0.00
BMI of Mothers**		
Underweight	19	16.7
Normal	75	65.8
Overweight	15	13.2
Obese I	5	4.4

**Based from WHO Child Growth Standards, 2008.*
***Based from BMI WHO cut-off for Asians.*

Mothers' knowledge on complementary feeding

More than half of the mothers (66.7%) had high knowledge on complementary feeding, 32.5% had medium level of knowledge, and only 1% had low knowledge. This might be attributed to the educational attainment of mothers, wherein the respondents reached high school (59.6%) and college (15.8%) and the presence of nutrition information dissemination activities in the area.

Nutrition education, in addition to formal education of the mothers is important as it increases awareness about important nutritional needs for their infants, thereby increasing the receptivity towards educational message (Huh, et al., 2011). Educated mothers are more likely to be willing to receive information or ideas from health workers or advertising and commercial promotion by food manufacturers than uneducated ones, which may lead to higher level of knowledge on complementary feeding. Lack of knowledge about how to continue breastfeeding, the appropriate complementary foods to give, and good feeding practices are often greater determinants of malnutrition than the availability of food (Huh, et al., 2011).

Among the statements used to measure knowledge of the mothers, item number 10 "*Encourage the child to drink and to eat during illness and provide extra food after illness to help them recover quickly*" (Table 3) was the most correctly answered (97.4%). More than half (53.5%) of the mothers did not know that foods, which are thick enough to stay on the spoon give more energy. The consistency or thickness of food can improve its energy density, thus helping the infant to attain the recommended energy intake (DOST-FNRI, 2002).

Table 3. Percentage distribution of the mothers' responses on the ten key messages of WHO guidelines on complementary feeding

Statements	Answers					
	Correct		Incorrect		Uncertain	
	Freq	%	Freq	%	Freq	%
1. Complementary feeding means giving other foods in addition to breast milk.	86	75.40	22	19.30	6	5.30
2. Breastfeeding for 2 years of age or longer helps a child to develop and grow strong and healthy.	93	81.60	15	13.20	6	5.30
3. Starting other foods in addition to breast milk at 6 months helps a child to grow well.	101	88.60	8	7.00	5	4.40
4. Foods that are thick enough to stay in the spoon give more energy to the child.	53	46.50	36	31.60	25	21.90
5. Animal foods are especially good for children, to help them grow strong and lively.	82	71.90	19	16.70	13	11.40
6. Peas, beans, lentils, and nuts and seeds, are good for children.	71	62.30	29	25.40	14	12.30
7. Dark green leaves and orange colored fruits and vegetables help the child to have healthy eyes and fewer infections.	107	93.90	5	4.40	2	1.80
8. A growing child needs a variety and increasing amounts of food.	101	88.60	5	4.40	8	7.00
9. A young child needs to learn to eat: encourage and give help with lots of patience.	107	93.90	3	2.60	4	3.50
10. Encourage the child to drink and to eat during illness and provide extra food after illness to help them recover quickly.	111	97.40	1	1.80	1	0.90

Attitudes of mothers towards complementary feeding

Out of the 114 mothers, 47.4% had neutral attitude, which means that the mothers' attitude is neither favorable nor unfavorable towards complementary feeding. Meanwhile 46.5% had favorable attitude and the remaining 6.10% had unfavorable attitude towards complementary feeding.

The neutrality of the mothers' attitudes may be attributed to conflicting ideas between science-based facts and the traditional beliefs and practices in the area. In the WHO Guidelines on Complementary Feeding (2004), it is recommended to give peas, beans, lentils, and nuts and seeds to their children however, the mothers in the community believed that those are not appropriate for their children because the coarse food texture and the belief that these food items cause their children to suffer from indigestion.

Majority of the mothers (93.9%) believed that the taste of food is more important than its nutrient content (Table 4). This attitude affects the selection of food for their children. Mothers are more particular on which food is generally acceptable for their children, rather than the nutritional quality of foods.

Among the complementary foods given, rice was the most acceptable among infants and young children as reflected to be the most frequently given as compared with other complementary foods. In addition, 60% of the mothers did not worry about the foods their baby eat as long as they take supplements. It can be noted that more than 60% of the children were given vitamins and mineral supplements based from the infants' 24-hour food recall and was verified by checking the labels of the vitamins and minerals.

This attitude of the mothers may have serious effects on their children's nutritional status and overall wellness. Most mothers (81.6%) also felt some uncertainties towards their time in preparing complementary foods for their children. Sometimes they had time to prepare complementary foods, but there were also times when they really cannot and opted to give their children what was readily available. More than three fourths of the mothers (78.9 %) are uncertain if the type of food they choose for their children will complement their milk intake.

Complementary feeding practices of the mothers

About 44.7% of the mothers already introduced complementary foods before their children reached sixth month. In 2004, the WHO recommends that complementary feeding should start when the child turns six months old. The practice of giving complementary foods to children less than six months old can be harmful since they are not yet physiologically ready for foods other than milk.

Several studies have raised issues regarding the association of early introduction of complementary foods with obesity and the association of early cessation of breastfeeding with stunting by replacing milk with complementary foods. In a study conducted by Huh, et al. (2011), it was found that "*among formula-fed infants or infants weaned before the age of four months, introduction of solid foods before the age of four months was associated with increased odds of obesity at age three years*".

Table 4. Percentage distribution of mothers' reactions to attitudinal statements on complementary feeding

Statements	Responses					
	Agree		Diagree		Uncertain	
	Freq	%	Freq	%	Freq	%
1. I feel that the food my baby eats now will affect his/her future health.	43	37.70	15	13.20	56	49.10
2. I feel that any kind of food can be given to my child as long as he/she is full and contented.	61	53.50	13	11.40	40	35.10
3. I feel that I do not have to worry about the food my baby eats as long as he takes his vitamins.	69	60.50	9	7.90	73	31.60
4. I believe that nutrition is not so important as long as my baby eats a lot of food.	32	28.10	9	7.90	73	64.00
5. I do not have to worry about my child's food intake now because he/she is still small.	26	22.80	11	9.60	77	67.50
6. I believe that I should only give healthy food when my baby is sick.	32	28.10	1	9.00	81	71.10
7. I believe that the taste of food is more important than its nutrient content.	107	93.90	5	4.40	2	1.80
8. I like to try different foods for my baby.	24	21.10	5	4.40	85	74.60
9. I choose the foods that I give to my child to complement his milk intake.	21	18.40	3	2.60	90	78.90
10. I feel that I do not have time to prepare complementary foods for my child.	19	16.70	2	1.80	93	81.60

On the other hand, results of a cohort study done by Barennes, et al. (2011) showed that stunting at six months was associated with early rice supplementation. Almost half (47%) of the infants and young children were given commercial baby foods as first weaning food. Thirty-one percent (31%) of the infants were given rice/lugao/cereals, also as first weaning food, followed by rootcrops (8%). Very few (3%) introduced meat/fish/poultry and vegetables. Commercial baby foods were given to households as part of the donations given by the different agencies helping the relocation site.

As long as the households receive supplies of commercially prepared baby foods, it is the priority food given to their children. This kind of practice was also seen in an investigation done by the FNRI. They observed that "*whenever possible, commercially sold supplementary foods are given first--and very seldom afterwards-for the sake of just being able to taste such novelty baby foods that are usually affordable only to well off families*" (FNRI Digest 1999).

Forty-six percent (46%) of the infants and young children were receiving complementary foods together with breastfeeding (Table 5). The remaining 53.5% received complementary food as the sole source of nutrients. Whole milk intake was considered as part of complementary food. In this study, whole milk is defined as the child's milk intake aside from breast milk and which are usually commercially prepared milk formulas.

Table 5. Mothers' complementary feeding practices

	Freq	%
Age of introduction of complementary food to infants		
Less than 6 months	51	44.70
6 – 12 months	63	55.30
Type of feeding practice		
Complementary feeding only (including whole milk intake)	61	53.50
Complementary feeding with breastfeeding	53	46.50

Mothers have been found to stop breastfeeding their children due to several reasons. The most common reason among mothers was because they do not have the time to breastfeed their children and had too many household chores and others had to work for additional source of income.

Complementary foods given to infants and young children were usually prepared as part of the family diet. Rice, as a staple food in every household, was the most frequently eaten complementary food (6 days a week), including rice gruel and cereals.

Evidently, complementary foods given in the relocation site were carbohydrate-rich. Aside from rice, bread and biscuit were the next frequently eaten by infants (four days a week). There was a nearby bakery and a number of small convenience stores in the area, thus bread and biscuit are always available aside from being affordable for most of the households. Complementary foods given to infants were very low in protein. Meat and egg were only given to infants twice a week. Protein is essential for the growth and development. Infants consumed vegetables thrice a week and mothers secured their vegetable supply right from their own backyards. They usually sautéed mixed vegetables and mashed it before giving it to the infant.

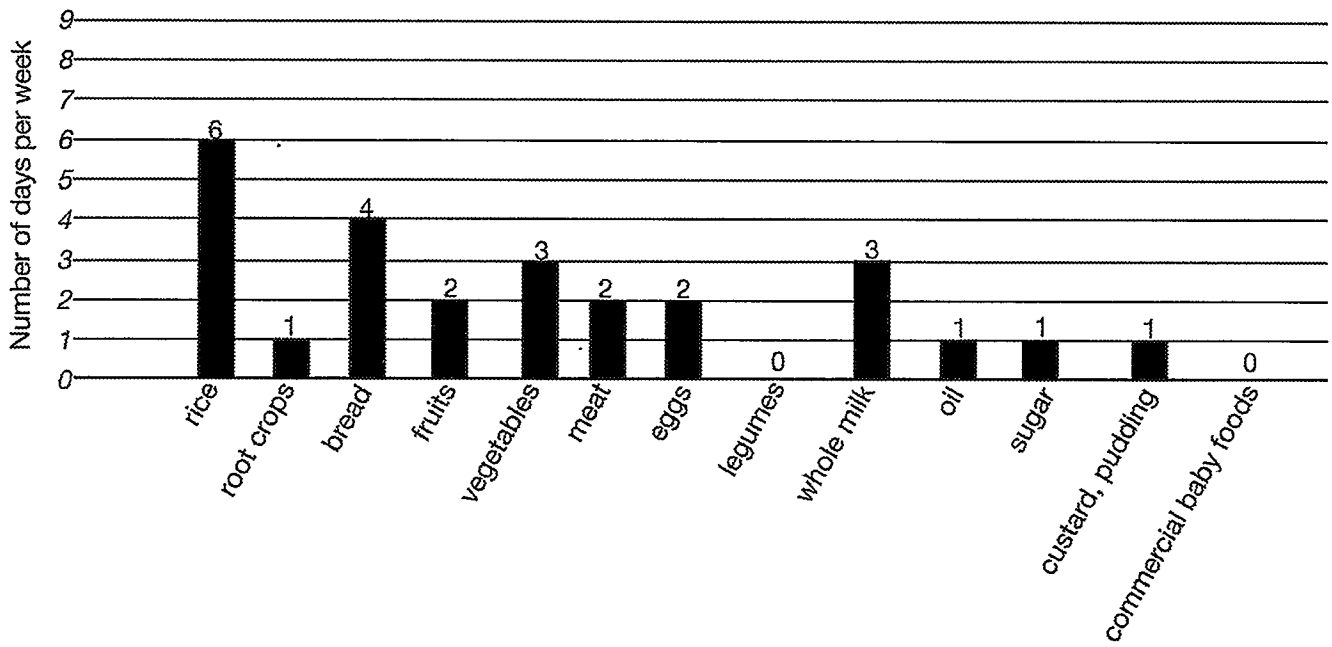

Figure 1. Mean frequency intake per week according to food groups* of infants and young children
**Adapted from the Nutritional Guidelines for Filipinos 2000 edition, DOST-FNRI*

Dietary assessment of infants and young children

The adequacy of energy intake of the respondents' children ranged from 53.6 to 69.2%. The adequacy of protein intake of the infant and young children was highest in children of 6 to 8 months with 88.1%. Adequacy of iron intake was low in ages 6 to 11 months with 26.4%. It was also observed that there was low adequacy in vitamin A and vitamin C consumption (Table 6).

In addition, more than half of the respondents (61.4%) were giving supplements to their children. Some of the supplements mentioned included ascorbic acid, multivitamins, and Immunosin.

During the first two years of life, nutrient needs of infants and young children are very high due to rapid rate of growth and development (WHO/ UNICEF, 1998). Breast milk provides important nutrients such as protein and many vitamins for children between 6 to 24 months of age. Relatively small amounts of complementary foods consumed at 6 to 24 months should have high nutrient density.

The daily consumption of vitamin A-rich fruits and vegetables will aid in the absorption of other vitamins and prevent consequences of vitamin A deficiency as well. Fat intake supplies essential fatty acids, facilitates the absorption of fat soluble vitamins, and improves dietary energy density and sensory qualities. Generally, breast milk is a richer source of fat than most complementary foods. A total fat intake, therefore, decreases with age as the contribution of breast milk to total dietary energy reduces (Dewey, 2001). Avoidance of sugary drinks is important as to increase the appetite of young children for more nutritious foods. As well, excessive consumption of juice diminishes the desire for other foods and causes loose stools.

Fortified complementary foods or vitamin-mineral supplements given to infants and young children will ensure the normal level of certain nutrients in the body. Unfortified plant-based complementary foods generally produce inadequate amounts of key nutrients. However, animal-source foods added in the diet can bridge the gap in some

instances but can initiate higher cost, becoming impractical for the lowest income groups. In addition, the amount of these food sources may cause insufficiency in providing iron, calcium, and sometimes zinc (Huffman, 1998) to meet the nutrient needs during infancy, which is distinct in developing countries.

Factors associated with knowledge and attitudes of mothers on complementary feeding

The typical household was composed of a father, a mother, and children. Household size was significantly associated with the knowledge of mothers on complementary feeding (Table 7). This association can be attributed to the mother's acquired knowledge from rearing her first child up to the youngest child. This result may suggest that the more children a mother had raised, the higher level of knowledge the mother has regarding complementary feeding is acquired.

In terms of attitudes, the age of mothers was significantly associated (p-value = 0.018) at 5% probability level with the attitudes towards complementary feeding. The educational attainment of the mothers was also found to be significantly associated (p-value = 0.069) at 10% probability level with attitudes with the attitudes towards complementary feeding.

Table 6. Percent adequacy of nutrient intake of infants and young children

Nutrient	RENI	Median Intake	% Adequacy
Energy (Kcal)			
6 to 8 mos.	720	467	64.90
9 to 11 mos.	720	386	53.60
12 to 24 mos.	1070	740	69.20
Protein (g)			
6 to 8 mos.	14	12	88.10
9 to 11 mos.	14	11	81.70
12 to 24 mos.	28	21	74.60
Iron (mg)			
6 to 11 mos.	10	2.64	26.40
12 to 24 mos.	8	5.75	71.90
Vitamin A			
6 to 11 mos.	400	56	14.10
12 to 24 mos.	400	209	52.40
Vitamin C			
6 to 11 mos.	30	8	25.50
12 to 24 mos.	30	10	34.00

The young mothers' attitudes are more likely to deviate from the international child feeding guidelines (WHO, 2004) and older mothers are more likely to follow traditional practices that is proven to be beneficial to their children. Education plays a special role in forming the mothers' mindset towards child feeding and care. Mothers' with higher educational attainment would probably more critical with her practices on complementary feeding. The findings may suggest that mothers' attitude with regards to complementary feeding and childcare is highly affected by the mothers' age and educational attainment.

Table 7. Likelihood ratio on the association of socio-demographic characteristics with knowledge and attitude on complementary feeding of mothers

Socio-demographic characteristic	Knowledge		Attitude	
	Value	p-value	Value	p-value
Age	4.768	0.312	11.959	0.018**
Educational Attainment	5.088	0.533	11.684	0.069*
Household Size	8.253	0.083*	4.069	0.397
Occupation	7.720	0.656	5.352	0.866
Household Income	10.756	0.550	11.842	0.458
Marital Status	4.052	0.670	10.357	0.110

*** Significant at 5% probability level*
** Significant at 10% probability level*

Association of socio-demographic characteristics of mothers with nutritional status of children

Among the socio-demographic characteristics, only the age of mothers and household size were significantly associated at 5% probability level (p-value = 0.048, p-value 0.020) with nutritional status based on weight-for-age index. The lack of experience of young mothers in providing care for their children could influence the nutritional status of the child (Pascale, et al., 2007). Large household size suggests that there is more competition for food among members of the family.

The marital status and educational attainment were significantly associated with nutritional status at 10% probability level (Table 8). In this study more than 40% of mothers were single, separated and with live-in partners this indicates that they are more unstable than the married women, which could affect child caring practice. Likewise, children whose mothers have some education but have not completed middle school were much less likely to be stunted, wasted, or underweight than are children whose mothers were illiterate. Children whose mothers have completed middle school or higher education are even less likely to suffer malnutrition (Mishra and Retherford, 2000).

Association of attendance in health/nutrition education activities and the level of knowledge and attitude of mothers

The attendance in health/nutrition education activities was not associated (p-value = 0.224) with the level of knowledge and attitude of mothers. Mothers who did not attend the health/nutrition education activities had high level of knowledge and attitude. On the other hand, mothers who attended the health/nutrition education class had at least medium level of knowledge and attitude.

No significant associations were noted between the socio-demographic characteristics gathered and complementary feeding practices of the mothers. Although the mothers' knowledge and attitude were associated with some socio-demographic characteristics such as age, educational attainment, and household size, it was not translated in to their practice on complementary feeding.

Table 8. Likelihood ratio on the association of socio-demographic characteristics with nutritional status of infants and young children

Socio-demographic characteristic	Nutritional Status					
	Weight-for-height		Height-for-age		Weight-for- age	
	Value	p-value	Value	p-value	Value	p-value
Age	3.168	0.530	6.210	0.184	9.601	0.048**
Educational Attainment	12.236	0.057*	6.848	0.335	7.726	0.259
Household Size	0.745	0.946	3.995	0.407	11.618	0.020**
Occupation	3.461	0.968	11.431	0.325	6.141	0.803
Household Income	18.127	0.112	8.564	0.740	14.223	0.287
Marital Status	4.032	0.672	6.743	0.345	11.638	0.071*

*** Significant at 5% probability level*
** Significant at 10% probability level*

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, findings of this study indicate that mothers are already knowledgeable in complementary feeding practices. This, however, was not translated into appropriate complementary feeding practices. Complementary foods were introduced earlier than six months old by almost half of the mothers and majority were commercially prepared baby foods. This fell short of the WHO/UNICEF recommendation of introducing complementary foods at the age of six months.

Results support the high prevalence of malnutrition among mothers and their 6 to 24-month old children which could be attributed to improper complementary feeding practices resulting to inadequate food intake among children. The dietary intake of children for micronutrients was much lower than the recommended amount per day except for the iron intake of 12 to 24 months old.

Vitamin A was the least supplied of all the micronutrients while protein was found to be the most supplied nutrient providing at least three-fourths of the RENI. The energy intake of the respondents' children, regardless of age category, barely provided 70% of the recommended amount.

The factor found to be associated with mothers' knowledge was the household size. Factors associated with attitude were the mother's age and educational attainment. The respondents' marital status, mother's education, and household size were found to be significantly related to the nutritional status of children. The findings of this study indicate that there is a high prevalence of malnutrition among mothers and their 6 to 24 months old children which could be attributed to the improper complementary feeding practices resulting from inadequate food intake among children.

Realizing the importance of appropriate complementary feeding practices, the research results emphasizes the need for an intensified promotion on the global guidelines for complementary feeding for the breastfed child with emphasis on:

1. the introduction of complementary foods at six (6) months of age;
2. continued breastfeeding to two (2) years of age or beyond;
3. responsive feeding practices;
4. safe, hygienic preparation, and feeding of complementary foods;
5. amounts of complementary foods needed at each age interval;
6. food consistency;
7. meal frequency and energy density;
8. assuring adequate nutrient intake from complementary foods;
9. use of fortified foods or nutrient supplements; and
10. feeding during and after illness.

Mass media can be utilized for the promotion of global guidelines for complementary feeding as it catches interest of the audience. Follow-up home visits can also be conducted to reinforce behavior of mother towards proper complementary feeding practices. These visits could be complemented with the establishment of home food production despite limited space to provide sources of food for the family. The provision of a more sustainable livelihood projects be intensified to augment family income and thereby increasing household food accessibility or the ability to purchase food for the family.

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