ASSESSING THE INFANT & YOUNG CHILD FEEDING PRACTICES AMONG CHILDRENS IN SELECTED SLUM AREAS OF BANGLADESH ACCORDING TO THE INDICATORS & STANDARD OF WORLD HEALTH ORGANIZATION (WHO)

Submitted by
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PREFACE

This dissertation entitled "**ASSESSING THE INFANT & YOUNG CHILD FEEDING PRACTICES AMONG CHILDRENS IN SELECTED SLUM AREAS OF BANGLADESH ACCORDING TO THE INDICATORS & STANDARD OF WORLD HEALTH ORGANIZATION (WHO)**" is submitted to the Logos University of USA in partial fulfillment of the requirements for the degree of PhD in Public Health. This study was carried out at Bangladesh during the session 2012-2015 in Slum areas of Bangladesh.

Dated: February 19, 2015 **Md. Safiul Alam**

Dhaka, Bangladesh

TO WHOM IT MAY CONCERN

This is to certify that Md. Safiul Alam has completed his dissertation work titled "**ASSESSING THE INFANT & YOUNG CHILD FEEDING PRACTICES AMONG CHILDRENS IN SELECTED SLUM AREAS OF BANGLADESH ACCORDING TO THE INDICATORS & STANDARD OF WORLD HEALTH ORGANIZATION (WHO)**" in Logos University, USA under my guidance and supervision.

(Professor Dr. GABRIEL CÉSAR DIAS LOPES, TEcN, BEL, MBA, Esp., Dh.C E, PhD)
Director & CEO
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The undersigned certify that they have read and recommended to Logos University, for acceptance of this dissertation entitled "**ASSESSING THE INFANT & YOUNG CHILD FEEDING PRACTICES AMONG CHILDRENS IN SELECTED SLUM AREAS OF BANGLADESH ACCORDING TO THE INDICATORS & STANDARD OF WORLD HEALTH ORGANIZATION (WHO)**" submitted by Md. Safiul Alam, Bangladesh in partial fulfillment of the requirements for the degree of PhD in Public Health. The study was carried out at Bangladesh during the session 2012-2015.

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DEDICATED

TO

MY BELOVED PARENTS

& TEACHERS

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In the name of Allah, the Beneficent, the Merciful for creating me and sustaining ourselves in this beautiful world.

I feel immensely proud in expressing my profound gratitude, indebtedness and deep appreciation to my respected supervisor **(Professor Dr. GABRIEL CÉSAR DIAS LOPES, TEcN, BEL, MBA, Esp., Dh.C E, PhD)**, **Director & CEO Logos University, USA** for his perceptive guidance, active encouragement, keen interest, treasured suggestions, valuable criticism and sagacious advice through the course of work and in the preparation of this dissertation which have major contribution in successful completion of the work. His amiable dealings and affectionate gesture highly inspired me to accomplish this work and preparation of manuscript. I ever grateful to him.

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Dhaka, Bangladesh

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List of Abbreviations

WHO- World Health Organization

UNICEF- United Nations Children's Fund

USAID- United States Agency of International Development

US- United States

FAO- Food and Agriculture Organization of the United Nations

MDG- Millennium Development Goal

IYCF- Infant and Young Child Feeding

BDHS- Bangladesh Demographic and Health Survey

CF- Complementary Feeding

IFP- Infant Feeding Practice

Hb- Hemoglobin

Abstract

Background and Objective: Moderate and severe malnutrition under two years children remain a major public health problem in Bangladesh. Improper Infant & Young Child feeding thought to be the main reason for this incident. The objective of the study was to assess the Infant feeding practices among young childrens according to WHO guidelines in selected slum areas of Dhaka city, Bangladesh.

Methods: A cross sectional study was conducted among 120 children (male 53% and female 47%, age 14± 5.55; months, mean ± SD) of 6- 23 months of age were collected purposively from three slum areas of Dhaka city, Bangladesh. Dietary information was obtained by 24 hours recall method and by food frequency questionnaire. Infant feeding practice was assessed by WHO indicators.

Results: Majority (mother- 77%, father- 69%) of the parents were not educated. About 79% of the mothers were housewife and 54% fathers were daylabour. Starting age of complementary feeding (months, mean ± SD) was found 4.77 ± 2.38. Only 22% of the children were given EBF upto completion of 6 months. According to WHO guideline, only 22% started complementary feeding in appropriate time, early and late complementary feeding rates were 53% and 25% respectively. Suji was mainly consumed more then one times per day in 70% children of 6-8 months age group. Rice was the major food items taken by 9-11 months (46%) and 12-23 months of age group (74%) more then one times per day. Egg, fish, green leafy vegetables and fruits were the foods which consumed in least amount among different age groups of the study subjects. In different age groups (6-8 months, 9-11 months and 12-23 months) only 7 (30%), 1 (4%) and 18 (25%) were found to receive appropriate frequency of meal and snacks according to WHO recommendation. Among the caregiver 85% wash their hands before toilet use and 77% wash their hands & utensils before feeding. Caregiver of 98% children discarded foods after the safe period. Greater than half (52%) of the respondent didn’t talk and help their children during feeding.

Conclusions: Complementary feeding was started too early or too late among the children of slum areas of Dhaka city. Exclusive breastfeeding as well as the meal frequency were found to be very poor according to WHO recommendations. There were found huge gap between calorie and macro nutrient intake of the study subjects and WHO recommendations. Effective nutrition education and communication program for behavioral change should be taken for ensuring optimal infant feeding.

1.1 Introduction

The period of complementary feeding defined as the time when any nutrient containing foods or liquids are offered to young children in addition to breast milk. It is the most critical and vulnerable time for the growth and development of the children[1]. World Health Organization and UNICEF recommend that infants should be exclusively breastfed for the first 6 months of life and thereafter should receive adequate complementary foods in addition to continued breastfeeding until 2 years of age or beyond[2]. Foods should be prepared and given in a safe manner with appropriate texture and sufficient quantity and measures should be taken to minimize the risk of contamination with pathogens [3].

Appropriate complementary feeding is essential for the achievement of healthy growth and development and mere survival of young children[2]. Worldwide, it was estimated that only 34.8% of infants were exclusively breastfed for the first 6 months of life. Complementary foods and are often introduced too early or too late and are often nutritionally inadequate and unsafe[4]. Optimal complementary feeding depends not only on what is fed but also on how, when, where and by whom a child is fed. Eating is a learning process and the children learn gradually. The food should be small in volume but high in density. During complementary feeding its better to start with liquid, than gradually introduce semi solid to solid foods[3].

In 2006 globally 9.5 million children died before their fifth birthday and two thirds of these deaths occurred during their first year of life. Under-nutrition is associated with at least 35% of this death. Because of poor infant feeding practices every day about 5500 children die and in addition, many children suffer long-term effects like impaired development, malnutrition, increased infectious and chronic illness[5]. As a result, in developing countries around 32% of children less than 5 years of age are found to be stunted and 10% are wasted[6].

If appropriate complementary feeding is not introduced, the energy gap would be 200 kcal per day in infants 6–8 months, 300 kcal per day in infants 9–11 months and 550 kcal per day in children 12–23 months of age[5]. It is also a

major disabler preventing children who survive from reaching their full developmental potential.

According to UNICEF, in Bangladesh children (6-9 months) who are breastfed with complementary food is 74 % but the foods given to infants and young children are often nutritionally inadequate and unsafe which leads to malnutrition (ref). A nutritional survey conducted by Helen Keller International showed that growth faltering mainly arises when complementary foods are introduced to the children. Findings of this survey also suggested that transition from breast milk to family-food is very slow and infants are usually given rice instate of foods containing micronutrients and protein, About 60% of childhood deaths are caused by malnutrition[7]. It has been shown that the prevalence of underweight rises nearly three-fold from 22% at 6 months to 60% at 12 months and this sharp increase between 6 and 12 months took place with the introduction of complementary feeding[8].

Based on evidence of the effectiveness of interventions, achievement of universal coverage of optimal breastfeeding could prevent 13% of deaths in children less than 5 years of age, while appropriate complementary feeding practices would result in an additional 6% reduction in under five mortality[5]. Ministry of Health and Family Welfare initiated the development of the National Strategy for Infant and Young Child Feeding. One of the specific objective of the National Strategy for Infant and Young Child Feeding is to increase the percentage of children aged 6-9 months who are breastfed and receive appropriate complementary foods (rice or starch plus foods from animal sources and one other item of fruit, pulses or vegetable) to 50% (complementary feeding)[8].

1.2 Justification of the study

Complementary feeding practice is very important in the perspective of developing country like Bangladesh. The children of slum areas are the most vulnerable part of this population who were always been neglected in the field of research regarding complementary feeding. However no published information is available on the actual complementary feeding practice among Bangladeshi slum children which can reflect the initiation, nutritional value, frequency and preparation of complementary foods according to WHO guidelines principles. The present study has been undertaken to gather information on complementary feeding practice of this vulnerable children of Bangladesh. It is expected that the result of this study may identify the present state of complementary feeding practice in slum of Bangladesh. This study may also be helpful to suggest guidelines for the policy makers to design proper intervention strategies.

1.3 Research Questions

- What is the practice of exclusive breast feeding?
- What is the starting age of complementary feeding?
- What are the types of food given among different age group?
- What are the energy and macronutrient intake of the study subjects?
- What is the frequency of complementary feeding?
- What are the food hygienic practices during complementary age?
- What are the psychosocial cares of the children during feeding period?

1.4 Objectives of the study

1.4.1 General objective:

To assess the Infant & Young child Feeding Practices among Young children's according to WHO guideline in selected slum areas of Bangladesh.

1.4.2 Specific Objectives:

- To assess the exclusive breast feeding practice.
- To find out the starting age of complementary feeding.
- To assess the types of complementary food given among different age group.
- To measure the energy and macronutrient intake.
- To assess the meal frequency of the children.
- To observe the food hygienic practices during complementary age.
- To observe the psychosocial cares of the children during feeding period.

1.5 Operational definition:

- **Complementary feeding:** The process starting when breastmilk alone or infant formula alone is no longer sufficient to meet the nutritional requirements of an infant, and therefore other foods and liquids are needed along with breastmilk or a breastmilk substitute. The target range for complementary feeding is generally considered to be 6–23 months. (UNICEF 2009)
- **Complementary food:** Complementary feeding means giving other foods in addition to breast milk. These other foods are called complementary foods. (WHO)
- **Supplementary feeding:** Additional foods provided to vulnerable groups, including moderately malnourished children. (UNICEF 2009)
- **Early initiation of breastfeeding:** Proportion of children born in the last 24 months who were put to the breast within one hour of birth. (WHO 2008)
- **Exclusive breastfeeding:** Exclusive breastfeeding means giving a baby only breast milk, and no other liquids or solids, not even water. Drops or syrups consisting of vitamins, mineral supplements or medicines are permitted. (WHO)
- **Minimum dietary diversity:** Proportion of children 6–23 months of age who receive foods from 4 or more food groups. (WHO 2008)
- **Minimum meal frequency:** Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. (WHO 2008)
- **Malnutrition:** A broad term commonly used as an alternative to undernutrition, but technically it also refers to overnutrition. People are malnourished if their diet does not provide adequate nutrients for growth and maintenance or they are unable to fully utilize the food they eat due to illness (undernutrition). They are also malnourished if they consume too many calories (overnutrition). (UNICEF 2009)

2. Literature review

2.1 Complementary feeding:

Complementary feeding means giving other foods in addition to breast milk. These additional foods and liquids are called complementary foods, as they are additional or complementary to breastfeeding, rather than adequate on their own as the diet. Complementary foods must be nutritious foods and in adequate amounts so the child can continue to grow. The term 'complementary feeding' is used to emphasize that this feeding complements breast milk rather than replacing it. Effective complementary feeding activities include support to continue breastfeeding. During the period of complementary feeding, the young child gradually becomes accustomed to eating family foods. Feeding includes more than just the foods provided. How the child is fed can be as important as what the child is fed. [1]

2.2 Introduction of complementary foods:

If complementary foods are not introduced at the proper age or if they are given inappropriately, an infant's growth may falter. In many countries, the period of complementary feeding from 6–23 months is the time of peak incidence of growth faltering, micronutrient deficiencies and infectious illnesses.[2] In Bangladesh complementary feeding generally starts too early or too late, and foods that are offered are often inappropriate. One longitudinal study of 110 infants investigated infant-feeding practices in a rural area from birth to one year of age was found that 100% of mothers breastfed their infants from birth to one year, almost every day, but bottles containing various kinds of milk and starchy food were added to 60% of diets of infants by three months and 80% by five months of age even when nutritious foods are available in the household. This suggests that there is the potential to improve diets of infants by encouraging households to give family-foods to infants.[3]

2.3 Type and frequency of complementary foods:

In the transition to eating the family diet, children from the age of about 6 months are fed small quantities of solid and semi-solid foods throughout the day. During this transition period (ages 6-23 months), the prevalence of malnutrition increases substantially in many countries because of increased infections and poor feeding practices.[4]

The most suitable consistency for an infant's or young child's food depends on age and neuromuscular development. Beginning at 6 months, an infant can eat pureed, mashed or semi-solid foods. By 8 months most infants can also eat finger foods. By 12 months, most children can eat the same types of foods as consumed by the rest of the family**.** The quantity of complementary food increases gradually month by month, as the child grows and develops. The actual amount (weight or volume) of food required depends on the energy density of the food offered. This means the number of kilocalories per ml, or per gram. Breast milk contains about 0.7 kcal per ml. Complementary foods are more variable, and usually contain between 0.6 and 1.0 kcal per gram. Foods that are watery and dilute may contain only about 0.3 kcal per gram. For complementary foods to have 1.0 kcal per gram, it is necessary for them to be quite thick and to contain fat or oil, which are the most energy-rich foods. Complementary foods should have a greater energy density than breast milk, that is, at least 0.8 kcal per gram.

According to WHO, the frequency of meal/d should be:

6-8 months: 2-3 meals +1-2 snacks offered (200 kcal) per day

9-11 months: 3-4 meals +1-2 snacks offered (300 kcal) per day

12-23 months: 3-4 meals +1-2 snacks offered (550 kcal/d) per day

Complementary foods should provide sufficient energy, protein and micronutrients to cover a child's energy and nutrient gaps, so that together with breast milk, they meet all his or her needs.

<u>Good complementary foods are:</u>

Rich in energy, protein and micronutrients (particularly iron, zinc, calcium, vitamin A, vitamin C and folate);

Not spicy or salty;

Easy for the child to eat;

Liked by the child;

Locally available and affordable. [2]

According to BDHS 2007, in Bangladesh eighteen %t of breastfeeding children under the age of six months consume animal milk, while 13 %t consume liquids other than water, and 9 % consume infant formula. Consumption of animal milk and other liquids peaks at age 8-9 months (37 percent and 27 %, respectively) and then stays more or less steady thereafter. Consumption of infant formula also peaks at 8-9 months (16 percent) and then decreases. One in five breastfeeding children under age 6 months are fed solid or semisolid foods. The percentage of breastfeeding children receiving solid or semisolid food increases with the age of the child. By age 4-5 months, 39 % of breastfeeding children receive solid or semisolid foods. At age 6- 7 months, 68 % of breastfeeding children receive solid or semisolid foods. This increase is consistent with the recommendation that solid or semisolid food should be introduced around six months of age. Nevertheless, it is disconcerting to note that even at age 6-7 months, about three in ten breastfeeding children are not given any solid or semisolid food. Foods made from grains quickly become the primary complementary food for a majority of children (51%) at age 6-7 months. Consumption of fruits and vegetables that are rich in vitamin A (such as banana, mango, papaya, and dark green leafy vegetables) generally begins at age 4-5 months. At that age, 9 percent of children eat fruit and vegetables that are rich in vitamin A; this proportion rises to 47% by the end of the first year of life and then increases rapidly. Consumption of other fruits and vegetables begins at about the same age. Meat, fish, poultry, and eggs have bodybuilding substances essential to good health, and they are important for balanced physical and mental development. These foods are introduced at a somewhat later age than fruits and vegetables. Only about one in ten children are given meat, fish, poultry, and eggs when they are age 6-7 months, and the proportion receiving these foods increases with age.

Overall, 42% of children age 6-23 months is fed appropriately according to recommended IYCF practices; that is, they are given milk or milk products and foods from the recommended number of food groups and are fed at least the recommended minimum number of times. Nearly all children age 6-23 months are breastfed or given milk products. More than two in five breastfed children (44 percent) in this age group are given the recommended number of food groups (three or more food groups for breastfed children). About four in five breastfed children (81 %) are fed at least the minimum number of times. [5]

2.4 Complementary feeding and child growth & development:

Nutrition and child development interventions have a synergistic effect on growth and development outcomes. Nutrition in early childhood has a lasting impact on health and well-being in adulthood. Children with deficient growth before age 2 are at an increased risk of chronic disease as adults if they gain weight rapidly in later stages of childhood. Height at 2 years of age is clearly associated with enhanced productivity and human capital in adulthood, so early nutrition is also an important contributor to economic development. There is evidence that improving growth through adequate complementary feeding can have a significant effect on adult wages. An evaluation of one programme in Latin America that provided good-quality complementary food to infant and young boys found their wages in adulthood increased by 46 per cent compared to peers who did not participate in the programme.[6]

Child development refers to the changes that occur as a child grows and develops in relation to being physically healthy, mentally alert, emotionally sound, socially competent and ready to learn. Recent research confirms that the first five years are particularly important for the development of the child's brain, and the first three years are the most critical in shaping the child's brain architecture. Early experiences provide the base for the brain's organizational development and functioning throughout life. Babies and young children grow, learn and develop rapidly when they receive love and affection, attention, encouragement and mental stimulation, as well as nutritious meals and good health care. Weight gain is the most important sign that a child is healthy and is growing and developing well. From birth to 1 year of age, infants should be weighed at least once every month. From 1–2 years of age they should be

weighed at least once every three months. Whenever a child visits a health centre, he or she should be weighed. This can help early detection of faltering growth so appropriate actions can be taken. A health check-up can also detect if a child is gaining weight too fast for his or her age. This requires examining a child's weight in relation to his or her height, which can determine if the child is overweight. If the child is underweight or overweight, it is important to examine the child's diet and provide the parents or other caregiver with advice on good nutrition. A child who is not gaining enough weight over one or two months may need larger servings, more nutritious food or more frequent meals.[7]

A study conducted in Bangladesh found that, infant feeding practices and growth in weight and length during 1–12 months as expected, more appropriate IFPs were significantly ($P < 0.001$) associated with gain in weight and length during 1–12 mo of age. Our results suggest that following the recommended IFPs had positive effects on gain in weight and length during infancy. These findings underscore the importance of following the current infant feeding recommendations to ensure better growth during infancy, particularly in developing countries such as Bangladesh**.**[8]

2.5 Disadvantages of early or late complementary feeding:

Several studies carried out in developing countries, including Brazil, and in industrialized countries showed that the early introduction of complementary foods increases infant morbidity and mortality, as a result of the reduced ingestion of protective factors present in breast milk in addition to the fact that complementary foods are an important source of contamination for infants. More recently, the early introduction of complementary foods has been associated with the development of atopic diseases. The late introduction of complementary foods also is disadvantageous, because infant growth stops or slows down and the risk of malnutrition and micronutrient deficiency increases.[9]

2.6 Characteristics of proper complementary feeding

A proper complementary feeding consists of foods that are rich in energy and in micronutrients (especially iron, zinc, calcium, vitamin A, vitamin C and

folates), free of contamination (pathogens, toxins or harmful chemicals), without much salt or spices, easy to eat and easily accepted by the infant, in an appropriate amount, easy to prepare from family foods, and at a cost that is acceptable by most families.[9]

2.7 Mothers education and complementary feeding practice:

Significant disparity in nutritional status also exists in terms of mothers' education and literacy. A number of studies and analyses have found a significant association between low maternal literacy and poor nutrition status of young children. An analysis of survey data from 17 developing countries, for example, confirms a positive association between maternal education and nutritional status in children 3–23 months old, although a large part of these associations is the result of education's strong link to household economics. A study in Pakistan revealed that the majority of infants with signs of under nutrition had mothers with virtually no schooling. The study also observed that the introduction of complementary foods for infants at an appropriate age (6 months) improved when mothers were educated.[6]

Anju Aggarwal and other conducted a study in India among 200 children found that, only 35 (17.5%) received CF from 6 months. Of the 168 who were started CF, mean age of starting feeds was 13.37 months. Only 7(3.5%) mothers started CF at proper time, in adequate quantity and with proper consistency. Knowledge of proper timing was present in 46% of children, Only 16(8%) mothers had proper knowledge of all three aspects of CF. Knowledge regarding appropriate timing and consistency varied significantly with maternal education and paternal education (Chi-square $P<0.05$). [10]

Another study results show that educated women started complementary feeding of their infants at appropriate ages as compared to those who were uneducated ($P < 0.001$). Of these 394 mothers, 2% had started early complementary feeding (and all were in the educated category). Less than half (46%) of the mothers had started complementary feeding at the appropriate age (6 months) and the majority of these were in the educated category. Out of group of mothers who started late complementary feeding, 24% mothers were educated and 28% were uneducated. In addition, 28%

mothers started very late complementary feeding out of which 7% were educated and 64% were uneducated mothers.[11]

2.8 Psychosocial care of the child during complementary feeding:

Care is an important determinant of nutritional status. It determines the delivery of food and health care resources to the child by optimizing the existing resources to promote good health and nutrition in children. There has been concern amongst nutritionists that food intake be understood as not only a matter of food availability, but also as the interaction between caregiver and the young child. The relationship of growth and food intake is critical. However, growth can also be influenced by how well a child is developing socially and psychologically and how the child and the caregiver are freed from stress. In other words, growth is influenced by the social and psychological health of the caregiver and child. Good psychosocial care in the first three years of life has a positive effect on nutritional status of the child and its cognitive performance. Psychosocial care is delivered through the provision of affection and attention to the child, and responsiveness to the child's cues. Cultural variation is also an important consideration for care practices because care giving practices and resources are substantially different in different culture and care behavior is likely to be determined by society perception on their goals toward the children. A study in two ethnic groups of Karo (patrilineal) and Minangkabau (matrilineal) had shown that the type of kinship system (as one indicator of culture) did influence family support to the caregivers and decision-making process of the caregivers in child feeding practices. [12]

Behavioural studies have revealed that a casual style of feeding predominates in some populations. Young children are left to feed themselves, and encouragement to eat is rarely observed. In such settings, a more active style of feeding can improve dietary intake. The term "*responsive feeding*" is used to describe care giving that applies the principles of psychosocial care. *Responsive feeding* means that:

Feed infants directly and assist older children when they feed themselves. Feed slowly and patiently, and encourage children to eat, but do not force them.

If children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement.

Minimize distractions during meals if the child loses interest easily.

Remember that feeding times are periods of learning and love – talk to children during feeding, with eye-to-eye contact**.**[2]

In a study in Bangladesh, fifty-four mother-child pairs were observed during one feeding episode, and behaviours were coded for 5 categories namely self-feeding, responsive, active, social and distracting behaviours. Children were aged between 8 and 24 months. The results indicated that the 5 behaviours could be observed and reliably coded. Two-thirds of the mothers had an active feeding style, but only a third were responsive; the 2 styles did not overlap. Child self-feeding was associated with more mouthfuls eaten, but there was no association between self-feeding and child age. Older children were more negatively responsive (refusing offered food). The positively responsive mothers tended to have active children who signaled their desire for food and who ate more mouthfuls. The positively active mothers adopted different strategies to encourage eating, such as verbally directing the child to eat and diverting the child's attention. These mothers tended to have children who were negatively responsive and refused food.[13]

A cross-sectional study was carried out in Osun State of Nigeria within Sub-Saharan Africa, and 450 mothers were interviewed of which 337 were from the urban and 113 from the rural communities. Results revealed that 77% care for their children all the time while only 23.1% used care alternatives. About 75.1% of children cried before they were fed while mothers observed refusal of food as a sign of fullness when children were fed. The number of mothers who pet children to eat was only 58.7% while the number who force-feeds their children was 23.6%. About 76.2% of mothers claimed that their children have their own separate bowls for eating; 76.4% sit with their children while feeding; and 5.3% talk with their children when they are eating. The

study revealed that the psychology and culture of people influenced the respective care in complementary feeding for children. [14]

2.9 Hygiene and sanitation practices and proper food handling during complementary feeding:

Microbial contamination of complementary foods is a major cause of diarrhoeal disease, which is particularly common in children 6 to 12 months old .Safe preparation and storage of complementary foods can prevent contamination and reduce the risk of diarrhoea. The use of bottles with teats to feed liquids is more likely to result in transmission of infection than the use of cups, and should be avoided. All utensils, such as cups, bowls and spoons, used for an infant or young child's food should be washed thoroughly. Eating by hand is common in many cultures, and children may be given solid pieces of food to hold and chew on, sometimes called "finger foods". It is important for both the caregiver's and the child's hands to be washed thoroughly before eating. Bacteria multiply rapidly in hot weather and more slowly if food is refrigerated. Larger numbers of bacteria produced in hot weather increase the risk of illness. When food cannot be refrigerated it should be eaten soon after it has been prepared (no more than 2 hours), before bacteria have time to multiply.[2]

WHO has a specific mandate for the protection of public health. Its mission is '*the attainment by all people of the highest possible level of health'*. WHO's role in food safety is to reduce the burden of foodborne illness by advising and assisting Member States to reduce exposure to unacceptable levels of chemicals or microorganisms in food. [15]

Foodborne disease is a serious public health problem in both developed and developing countries. More than 200 diseases are transmitted through food. These diseases may last a couple of days or a lifetime. Both microorganisms and chemicals cause foodborne disease. Fortunately, most foodborne diseases can be prevented by using proper food handling behaviours. In 2001, WHO introduced the Five keys to Safe food poster. Each key contains a simple message that, when practiced, help prevent foodborne disease.

The Five Keys are:

1. Keep Clean

2. Separate Raw and Cooked Foods

3. Cook Food Thoroughly,

4. Keep Food at Safe Temperatures

5. Use Safe Water and Raw Materials.[16]

Diarrhoea is the second most common cause of death in young children, after pneumonia. About 4 billion cases of diarrhoea are estimated to occur every year among children under 5. It kills more than 1.5 million children under 5 years of age every year, representing 17 per cent of all deaths in children under 5. Children are more likely than adults to die from diarrhoea because they become dehydrated and malnourished more quickly. Diarrhoea is caused by germs that are swallowed, especially germs from faeces. This happens most often where there is unsafe disposal of faeces, poor hygiene practices, lack of clean drinking water, or when infants are not breastfed. To prevent diarrhoea, all faeces, including those of infants and young children, should be disposed of in a latrine or toilet or buried. Good hygiene practices and use of safe drinking water protect against diarrhoea. Hands should be thoroughly washed with soap and water or a substitute, such as ash and water, after defecating and after contact with faeces, and before touching or preparing food or feeding children. Parents and caregivers should wash their hands with soap and water at these critical moments: (1) after cleaning the infant or young child who has defecated, (2) after helping the child use the toilet or latrine, (3) after going to the latrine or toilet themselves, (4) before touching food and feeding young children, and (5) after dealing with refuse. Parents and caregivers need to help children develop the habit of washing their hands with soap before eating and after using the latrine or toilet. Where soap is not available hands can be washed with ash and water. The use of latrines and toilets together with good hygiene practices – specifically hand washing with soap – are essential public health tools. Everyone in the community needs to work together to build and use toilets or latrines, practise good hygiene, protect water sources, and safely dispose of waste water and refuse. It is important for governments to support communities by providing information on

how to design and build latrines and toilets that all families can afford. In urban areas particularly, government support is also needed for low-cost sanitation and drainage systems, safe drinking water and refuse collection.[7]

In Bangladesh one of the main causes of water borne diseases are faecal-oral transmission routes. The people have a poor understanding about the link between poor hygiene and disease. Only 26.7% of people wash their hands with water, soap or ashes after defecation (only 7% use soap), 3% wash their hands with soap and water before having a meal, feeding children and preparing food. Together with minimal safe hygiene behaviour and environmental sanitation, the negative impact on health is considerable. In 40 of the 50 diseases prevalent in Bangladesh, including diarrhoea, dysentery, typhoid, parasitic worm infestation, measles and polio, unsafe water and human excreta are the main elements of transmission. Hygiene-related disease in Bangladesh costs 5 billion taka (US$ 80 million) each year, for treatment alone. The nutritional status of under-fives is strongly related to sanitation conditions, suggesting longer-term impacts beyond immediate illness.[17]

Ten studies of handwashing were included in a review of interventions to prevent diarrhea (Huttly et al. 1997). All reported a positive relation between improved handwashing and diarrheal prevention, with a median reduction of 33 percent (range 11-89 percent). The finding that improved handwashing can prevent diarrhea was remarkably consistent in a variety of settings. For example, Black et al. (1981) cited reductions of 43 percent in diarrhea among day-care center children in the United States resulting from a simple handwashing intervention. In Indonesia, improved handwashing behavior by 65 mothers (who received soap and explanations of the fecal-oral route of diarrhea transmission) reduced diarrhea incidence in their children by 89 percent (Wilson et al. 1991). Similarly, handwashing and hygiene behavior interventions reduced diarrheal disease by up to 39 percent in rural Thai villages (Pinfold and Horan 1996).

Handwashing interventions in urban Bangladesh reduced dysentery (shigella) by 35 percent and non-dysenteric diarrhea by 37 percent among all age groups (Khan 1982). In Myanmar, childhood diarrhea was reduced by 30

percent in urban households where the mother was given soap and handwashing education (Han and Hlaing 1989). In more recent studies not included in the 1997 review, soap distribution with handwashing education was associated with a 33 percent decrease in childhood diarrhea in urban Bangladesh (Shahid et al. 1996) and soap distribution alone was associated with a 27 percent reduction in diarrhea in a refugee camp in Malawi (Peterson et al. 1998).[18]

A study result showed significant associations with the prevalence of diarrhea and food-hygiene practices, were: separation of utensils for raw and cooked food and the place of preparing foods for cooking in a bivariate analysis. The risk of diarrhoea was significantly higher among children whose mothers did not separate utensils for raw and cooked food compared to children whose mothers did separate the utensils (OR=2.03, 95% CI 1.04-3.94). The risk of diarrhea was also significantly higher among children whose mothers did not prepare foods for cooking on the table compared to children whose mothers did prepare foods for cooking on the table (OR=2.50, 95% CI 1.25-4.97). Children aged less than two years were more vulnerable to suffer from diarrhoea than children aged 2-4 years.[19]

Another study finding suggest that a four-hour time lapse between food preparation and food consumption can result in significantly-increased coliform and Enterobacteriaceae numbers in both LB and SRP and significant aerobic bacteria numbers in LB. Two studies in Bangladesh have reported increases in bacterial numbers in complementary foods at the household level with duration of storage. In particular, Henry *et al*. observed an increase in coliform counts when there was a more-than-four-hour delay between preparation and consumption of the weaning food. [20]

2.10 Counseling on complementary feeding:

Every mother faces unique challenges in meeting her infant and young child's needs for food during the first two years of life. Mothers need access, within their communities, to a reliable and accessible source of information, guidance and counseling to overcome the day-to-day challenges they face in practicing exclusive breastfeeding, continued breastfeeding and appropriate

complementary feeding. This requires that support for breastfeeding and complementary feeding be extended from health facilities to the communities where mothers live and work. The need for community base support is particularly high in communities that are remote, where health care is less accessible, poverty and food security are greater problems and misinformation on appropriate infant and young child feeding practices is more widespread. The National Strategy calls for much greater attention to community-based support of infant and young child feeding in Bangladesh. Community-based support mechanisms have the potential to vastly improve infant and young child practices by increasing access to information, guidance and counseling. Behaviour change counseling is a key intervention and can be delivered by a peer, family member, community health worker or volunteer. Home visits, group meetings, growth monitoring sessions, and cooking sessions are all good opportunities for sharing information and counseling. The counselor needs to have accurate knowledge and skills about infant and young child feeding, be equipped to negotiate feasible actions, and be able to inspire the mother with confidence in her abilities. The challenge is to identify which individuals or groups are most appropriate for promoting infant and young child feeding in the community. More than one type of individual or group will be necessary to cover the all target groups and all areas of the country effectively. Health service providers, nutritionists and allied professionals who care for mothers need up-to-date knowledge on infant and young child feeding legislation, policies and guidelines, and skills training for interpersonal communication, counseling and community mobilization. [21]

In order to meet the Millennium Development Goals, there is need to strengthen nutrition education among mothers/caregivers focusing on the importance of proper techniques of breastfeeding, proper timing of complementary foods, economic empowerment of caregivers and other intra-household factors.[22]

A comprehensive programme approach to improving complementary feeding includes counseling for caregivers on feeding and care practices and on the optimal use of locally available foods, improving access to quality foods for

poor families through social protection schemes and safety nets, and the provision of micronutrients and fortified food supplements when needed.[6]

In Bangladesh a prospective randomized trial showed that intensive nutrition education significantly improves the status of moderately-malnourished children with or without supplementary feeding. [23]

2.11 Millennium Development Goals (MDGs) and complementary feeding:

The consequences of inappropriate feeding practices in early childhood are major obstacles to the government's efforts towards sustainable socioeconomic development and poverty reduction. In addition, the Millennium Development Goals (MDGs) will not be achieved without action to reduce the rate of malnutrition in infants and young children. Appropriate feeding contributes directly to achievement of MDG 1 (eradicate extreme poverty and hunger), MDG 4 (reduce child mortality), and to the six other MDGs. Recent research has shown that under-five mortality can be reduced by 13% with optimal breastfeeding and a further 6% with optimal complementary feeding (Jones et al, 2003).[21] Progress for children lies at the heart of all Millennium Development Goals (MDGs). Along with cognitive and physical development, proper nutrition contributes significantly to declines in under-five mortality rates, reductions of disease and poverty, improvements in maternal health and gender equality– thus, it is essential for achieving most of the MDGs. [6]

2.12 Indicators for assessing infant and young child feeding practices:

In 2008 WHO published “Indicators for assessing infant and young child feeding practices”. This document was developed with inputs from many institutions and experts. Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is therefore critical to improved nutrition, health and development of children. However, until now, indicators that can be used in population-based surveys to measure infant and young child feeding practices have focused mostly on breastfeeding practices. The lack of evidence and

consensus on simple indicators of appropriate feeding practices in children 6–23 months of age has hampered progress in measuring and improving feeding practices, thereby constraining improvements in infant and young child nutritional outcomes. The indicators described in the document are the result of a 5-year effort to develop a set of simple, valid and reliable indicators to assess infant and young child feeding practices. They focus on selected food-related aspects of child feeding, amenable to population-level measurement.

Core indicators are:

1. Early initiation of breastfeeding: Proportion of children born in the last 24 months who were put to the breast within one hour of birth.

$$\frac{\text{Children born in the last 24 months who were put to the breast within one hour of birth}}{\text{Children born in the last 24 months}}$$

Notes:

- This indicator is based on historic recall. The denominator and numerator include living children and deceased children who were born within the past 24 months.
- It is recommended that the indicator be further disaggregated and reported for (i) live births occurring in the last 12 months; and (ii) live births occurring between the last 12 and 24

2. . Minimum dietary diversity: Proportion of children 6–23 months of age who receive foods from 4 or more food groups

$$\frac{\text{Children 6–23 months of age who received foods from ≥4 food groups during the previous day}}{\text{Children 6–23 months of age}}$$

Notes:

• The 7 foods groups used for tabulation of this indicator are:

— grains, roots and tubers

— legumes and nuts

— dairy products (milk, yogurt, cheese)

— flesh foods (meat, fish, poultry and liver/organ meats)

— eggs

— vitamin-A rich fruits and vegetables

— other fruits and vegetables

• Consumption of any amount of food from each food group is sufficient to "count", i.e., there is no minimum quantity, except if an item is only used as a condiment.

• The cut-off of at least 4 of the above 7 food groups above was selected because it is associated with better quality diets for both breastfed and non-breastfed children. Consumption of foods from at least 4 food groups on the previous day would mean that in most populations the child had a high likelihood of consuming at least one animal-source food and at least one fruit or vegetable that day, in addition to a staple food (grain, root or tuber).

3. Minimum meal frequency: Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.

The indicator is calculated from the following fraction:

Breastfed children 6–23 months of age who received solid, semi-solid or soft foods the minimum number of times or more during the previous day/ Breastfed children 6–23 months of age

Notes:

• Minimum is defined as:

— 2 times for breastfed infants 6–8 months

— 3 times for breastfed children 9–23 months

— 4 times for non-breastfed children 6–23 months

— "Meals" include both meals and snacks (other than trivial amounts[1]), and frequency is based on caregiver report. [24]

2.13 Importance of breast milk:

According to BFHI, Human milk:

- Provides ideal nutrition to meet the infant's needs for growth and development.

- Protects against many infections, and may prevent some infant deaths.

- Reduces risk of allergies and of conditions such as juvenile-onset diabetes, in families with a history of these conditions.

- Programmes body systems that may assist in blood pressure regulation and reduction of obesity risk in later life.

- Is readily available, needing no preparation.

• A mother's own milk is best suited to the individual child, changing to meet the baby's changing needs.

• Many of the effects of breastfeeding are 'dose responsive'. This means that longer and exclusive breastfeeding shows a greater benefit.

• Children who do not breastfeed or receive breast milk may be at increased risk of the followings:

- Infections such as diarrhoea and gastrointestinal infections, respiratory infections, and urinary tract infections.

- Eczema and other atopic conditions.

- Necrotising enterocolitis, in preterm infants.

- Lower developmental performance and educational achievement, thus reducing earning potential.

- Developing juvenile onset insulin dependant diabetes mellitus, higher blood pressure and obesity in childhood, all markers of later heart disease.

- Dying in infancy and early childhood.

• The dangers of not breastfeeding occur with all social and economic circumstances. Many studies indicate that a non-breastfed child living in disease-ridden and unhygienic conditions is between six and 25 times more

likely to die of diarrhoea and four times more likely to die of pneumonia than breastfed infants. These risks even lower with exclusive breastfeeding.

• If every baby were exclusively breastfed from birth for six months, an estimated 1.3 million additional lives would be saved world wide and millions more lives enhanced every year.[25]

Regarding intelligence, a meta-analysis of 20 studies showed scores of cognitive function on average 3.2 points higher among children who were breastfed compared with those who were formula fed. For the mother, breastfeeding also has both short- and long-term benefits. The risk of postpartum haemorrhage may be reduced by breastfeeding immediately after delivery, and there is increasing evidence that the risk of breast and ovarian cancer is less among women who breastfed.[2]

2.14 Initiation of breastfeeding:

Although the prevalence of breastfeeding is very high in Bangladesh, appropriate breastfeeding is rarely practiced. Infants are introduced to other foods either too early or too late. In some families, colostrum is discarded, and it is quite common to give prelacteal foods to the newborns and even to delay the onset of breastfeeding by more than 24 hours**.** [26]

So according to BFHI:

• Encourage the mother to breastfeed when the baby shows that she or he is ready (usually within an hour). It is unnecessary to hurry and force babies to the breast. A mother and her baby should be quietly kept in skin-to-skin contact until they are both ready to breastfeed. This may be a few minutes or an hour or more.

• Early touch of the nipple and areola results in a release of the hormone oxytocin. Oxytocin helps:

- The uterus to contract more quickly which may control bleeding. Routine use of synthetic oxytocin and ergometrine are not necessary when a mother is breastfeeding after birth.

- The mother to feel more loving and attached to her baby.

• Prelacteal feeds are any fluid or feed given before breastfeeding starts. They might include water, formula, traditional feeds such as honey, dates or banana, herbal drinks or other substances. Even a few spoonfuls of these fluids or feeds can increase the risk of infection and allergy to the infant.

• Newborn infants do not need water or other artificial feeds to 'test' their ability to suck or swallow. In the rare situation where a baby has an abnormality of swallowing, colostrum (a natural physiological substance) is less risk to a baby's lungs than a foreign substance such as water or artificial formula. [25]

Only 39 per cent of newborns in the developing world are put to the breast within one hour of birth. The rate is especially low in Asia, at 31 per cent. There is growing evidence of the benefits to mother and child of early initiation of breastfeeding, preferably within the first hour after birth. Early initiation of breastfeeding contributes to reducing overall neonatal mortality. It ensures that skin-to-skin contact is made early on, an important factor in preventing hypothermia and establishing the bond between mother and child. Early initiation of breastfeeding also reduces a mother's risk of post-partum haemorrhage, one of the leading causes of maternal mortality. Colostrum, the milk produced by the mother during the first post-partum days, provides protective antibodies and essential nutrients, acting as a first immunization for newborns, strengthening their immune system and reducing the chances of death in the neonatal period. In a subset of countries with available data, the low proportions of early initiation of breastfeeding contrast with substantially higher proportions of infants who are delivered by a skilled health professional and of infants whose mothers received antenatal care at least once from a skilled health professional. This gap constitutes a lost opportunity and highlights the critical need to improve the content and quality of counselling by health-care providers.[6]

According to UNICEF in Bangladesh percentage of early initiation of breastfeeding (2003-2008) is 43%.[27]

2.15 Exclusive breastfeeding for the first six months:

In the developing world, less than 40 per cent of infants under 6 months old receive the benefits of exclusive breastfeeding. The rate is particularly low in Africa, where less than one third of infants under 6 months old are exclusively breastfed. Over the past 10–15 years exclusive breastfeeding rates have increased in many countries of Africa and Asia. In the developing world as a whole, however, progress has been modest, from 33 per cent around 1995 to 37 per cent around 2008. Evidence from a variety of countries indicates that marked improvements in exclusive breastfeeding are possible if supported by effective regulatory frameworks and guidelines, and when comprehensive programmatic approaches are at scale. Exclusive breastfeeding rates are very low and stunting prevalence is high in several countries that have experienced emergencies and longer-term challenges, such as Chad, Côte d'Ivoire, Djibouti and the Niger. In these countries, urgent actions are needed to promote and support exclusive breastfeeding in order to reduce the rate of infectious diseases and ensure optimal infant nutrition. [6]

Exclusive breastfeeding provides all the nutrients and water that a baby needs to grow and develop in the first six months. This means to the end of six completed months – 26 weeks or 180 days, not the start of the sixth month. Exclusive breastfeeding means that no drinks or foods other than breast milk are given to a baby. Vitamins, mineral supplements or medicines can be given, if needed. Most exclusively breastfed young infants feed at least eight to twelve times in 24 hours, including night feeds.

• Any of the following interferes with exclusive breastfeeding:

- A baby is given any drinks or foods other than breast milk.

- A baby is given a pacifier/dummy/soother.

- Limits are placed on the number of breastfeeds.

- Limits are placed on suckling time or the length of a breastfeed.

• After six months, children should receive complementary foods in addition to breast milk. Breast milk continues to be important, often providing one-third to

one-half the calories for the child at twelve months of age, and should be continued up to 2 years of age and beyond. [25]

The advantages of exclusive breastfeeding compared to partial breastfeeding were recognised in 1984, when a review of available studies found that the risk of death from diarrhoea of partially breastfed infants 0–6 months of age was 8.6 times the risk for exclusively breastfed children. For those who received no breast milk the risk was 25 times that of those who were exclusively breastfed. A study in Brazil in 1987 found that compared with exclusive breastfeeding, partial breastfeeding was associated with 4.2 times the risk of death, while no breastfeeding had 14.2 times the risk. More recently, a study in Dhaka, Bangladesh found that deaths from diarrhoea and pneumonia could be reduced by one third if infants were exclusively instead of partially breastfed for the first 4 months of life. Exclusive breastfeeding for 6 months has been found to reduce the risk of diarrhoea and respiratory illness compared with exclusive breastfeeding for 3 and 4 months respectively. For the mother, exclusive breastfeeding can delay the return of fertility , and accelerate recovery of pre-pregnancy weight . Mothers who breastfeed exclusively and frequently have less than a 2% risk of becoming pregnant in the first 6 months postpartum, provided that they still have amenorrhea. Worldwide, it is estimated that only 34.8% of infants are exclusively breastfed for the first 6 months of life, the majority receiving some other food or fluid in the early months.[2]

According to UNICEF in Bangladesh percentage of children (2003-2008) who are exclusively breastfed (<6 months) is 43%.[27]

Since the 1980s, a number of global initiatives have been undertaken to increase the rate of exclusive breastfeeding, including the child-survival resolution by UNICEF, the World Declaration on Children, International Code of WHO for Marketing of Breast Milk Substitutes, the Baby-Friendly Hospital Initiative (BFHI), and the International Conferences on Nutrition. However, these global breastfeeding promotional activities are focused on improving practices in hospitals and other facilities. In Bangladesh, most mothers deliver at home, and these strategies are unlikely to have the desired impact. [26]

A study result in Bangladesh found that, The prevalence of diarrhoea and acute respiratory infection was significantly associated with lack of exclusive breastfeeding.[28]

2.16 Rating on breastfeeding practices:

WHO guidelines for rating of exclusive breastfeeding [29]

Percentage of babies 0–<6 months of age exclusively breastfed in the last 24 hours:	
Percentage	***Rating***
0 – 11%	Poor
12 – 49%	Fair
50 – 89%	Good
90 – 100%	Very good
Rating on exclusive breastfeeding:	……

3. Subjects and Methods

3.1 Place of the study:

This study was conducted under Logos University, USA during the period of 2012-2015 and the subjects were collected from three slum areas namely Tejgoan slum, Rayer bazaar beribad slum, Jafrabad slum of Dhaka city, Bangladesh.

3.2 Study subjects:

A total of 120 children of 6- 23 months of age were collected.

3.3 Inclusion criteria-

- Children of 6-23 month and their mother or caregiver.
- Children of both sex.
- Children who are given breast milk.
- Children who were taking any complementary food.
- Those mothers or caregivers who were willing to participate in interview.

3.4 Exclusion criteria-

- Children less then 6 & above 23 month of age.
- Children who were not given breast milk.
- Children who were not taking any complementary food.
- Those mother or caregiver who refused to participate in interview.

Methods

3.5 Study design:

The study was a descriptive cross sectional study.

3.6 Determination of sample size:

Proportion of children with complementary feeding in Bangladesh is 74%[4]

$\therefore$ P = 0.74

Proportion of children without complementary feeding,

q = (1-P)

= (1-0.74) = 0.26

we know t hat,

$$n = \frac{z^2 pq}{d^2}$$

$$= \frac{(1.96)^2 \times 0.74 \times 0.26}{(0.05)^2}$$

$$= \frac{3.841 \times 0.74 \times 0.26}{0.0025}$$

= 295.60 or

= 296 (Approximately)

But in this study due to constraint of time and resources the number of sample was reduced to one hundred and twenty.

3.7 Sampling technique: Subjects were selected purposively on the basis of availability.

3.8 Data collection materials:

- A structured questionnaire.
- Food models (Picture and house hold measuring equipments)

3.9 Data collection procedure:

Data were collected by face-to-face interview technique using a questionnaire which was developed by following the guideline principles of WHO Infant feeding. Before starting questioning the title and purpose of the study was clearly explained (according to their level of understanding) to the respondents. They were also explained that their participation wouldn't create any risk to them and they were free to deny or withdraw the consent. The interviews were conducted in a relaxed environment so that the respondents answered the questions confidently and without any hesitation.

3.10 Dietary Assessment:

All respondent were asked to recall the name and the amount of all foods given to their baby during the previous 24 hours. Food frequencies of several foods during per day and per week were also listed. Tableware items such as bowl, spoons and cup of commonly-used sizes, food models and pictures of common foods were used to assess food intake. Daily energy and macronutrient intakes were determined with computer software using the conversion factor and nutritional value of different foods. The means of these values were used in the analysis.

3.11 Determination of the practice of Infant feeding:

Practice of Infant feeding was assessed by “Indicators for assessing infant and young child feeding practices” published by World Health Organization (WHO) at 2008.

3.12 Data analysis:

Collected data were analyzed according to the objective of the study and variables were expressed in the form of frequency and percentage. Statistical methods like central tendency (mean), median (range) and to measure dispersion SD was done. One way ANOVA (Post Hoc Bonferroni) and Chi-square test were carried out to measure significance. All statistical analyses were performed with the software SPSS 11.5 for windows (SPSS, Ic. Chicago, IL, USA).

3.13 Variables:

- Age
- Sex
- Number of children
- Family size
- Education
- Occupation
- Income
- Dietary diversity
- Meal Frequency
- Food intake pattern
- Milk feeding frequency
- Starting age of complementary food

3.14 Ethical Issue:

All ethical issues, which are related to the research involving human subject was followed according to the guideline of BADAS ethical review committee and the ethical review committee of WHO.

3.15 Quality assurance

For quality assurance following points was done-

- Before going for data collection pre test was done.

- Supervision during data collection.

- Recheck of the data before analysis.

3.16 Limitations

- The study has limitation of being representative of only the population of slum area and hence cannot be generalized for the entire population of Bangladesh.
- Due to time constraint and financial limitations, it was not possible to collect data as required sample.
- Another major limitation of the study was no observation by the researcher was taken place to identify the hygiene practice during complementary feeding. So the information provided by the respondents might not be accurate

4. Results

4.1 Characteristics of the study subjects and their respondents (Table 1)

The above table shows the socio demographic characteristics of the study subjects and the respondents. Age of mothers (years, mean ± SD) of the study subjects was 14.68 ± 5.55. Among the study subjects 64(53%) were boys and 56(47%) were girls. Only 2(2%) mothers had received secondary education where as 26(22%) mothers had completed primary education and the majority 92(77%) of them were illiterate. Among the fathers 2(2%) had completed S.S.C where as 2(2%) had completed secondary education and 33(28%) received primary education and most 83(69%) of them were illiterate. According to the occupation of mothers, majority 95(79%) of them were house wife, 20(17%) worked as day labour and others occupation 5(4%). Among the fathers most of them 66(54%) were day labour while 19(16%) were shop keeper, 18(15%) were driver and others 17(15%). The monthly income of the family showed, 72(60%) were belongs to the group of >5000 Tk, 42(35%) family 4000-5000 Tk and 6(5%) were in the group of 3000-4000 Tk respectively. In terms of housing arrangement it showed that, only 2(2%) family had own house, 96(80%) had rented house and others 21(18%).

Table 1: Characteristics of the study subjects and their respondents (n=120)

Parameters	
Age (months) of the study subjects	14.68±5.55
Sex of the study subjects	
Male	64 (53%)
Female	56 (47%)
Education of mother	
Illiterate	92 (77%)
Primary	26 (22%)
Secondary	2 (2%)
Education of father	
Illiterate	83 (69%)
Primary	33 (28%)
Secondary	4 (4%)
Occupation of mother	
Day labour	20 (17%)
House wife	95 (79%)
Others	5 (4%)
Occupation of father	
Day labour	66 (54%)
Driver	18 (15%)
Shop keeper	19 (16%)
Others	17 (15%)
Monthly income (BDT)	
3000-4000	6 (5%)
4000-5000	42 (35%)
>5000	72 (60%)
Household ownership	
Own house	2 (2%)
Rented house	96 (80%)
Others	22(18%)

Results are expressed as mean± SD and number (%)

4.2 Distribution of the mothers by EBF practice (Fig 1)

The figure indicates the practice of exclusive breast feeding among the study subjects. Only 22% of the children were given breast milk exclusively and rest of 78% didn't maintain this practice.

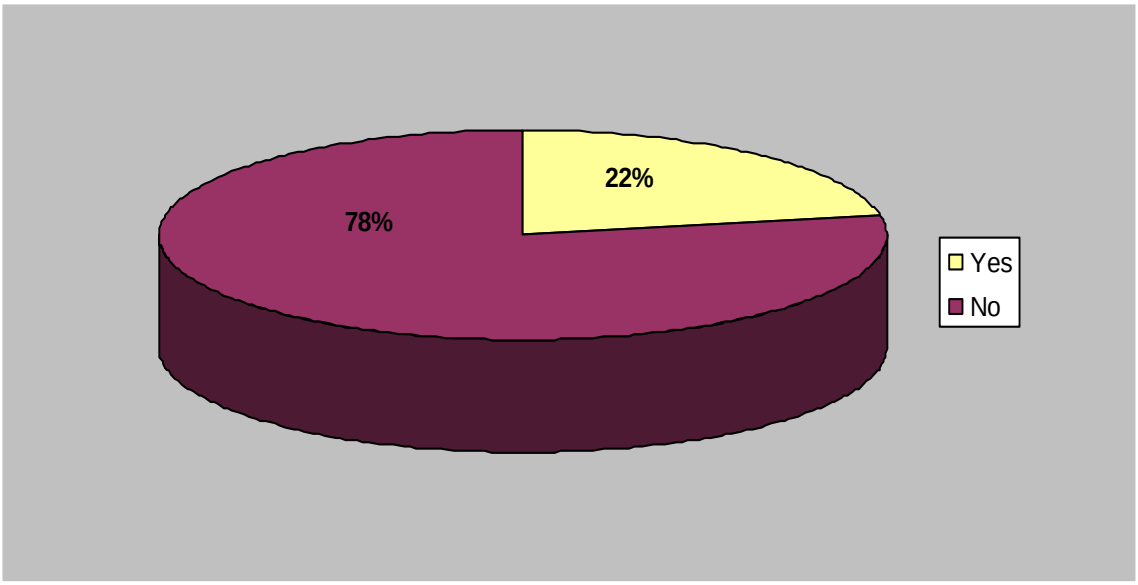

Fig 1: Distribution of the mothers by EBF practice (n=120)

4.3 Distribution of the study subjects according to the starting age of CF (Fig 2)

The graph shows that, more than half of the children (64%) who were not given exclusive breast feeding were found to start complementary feeding < 4 months, 25% were started from >6 months and rest of 11% during 4-5 months.

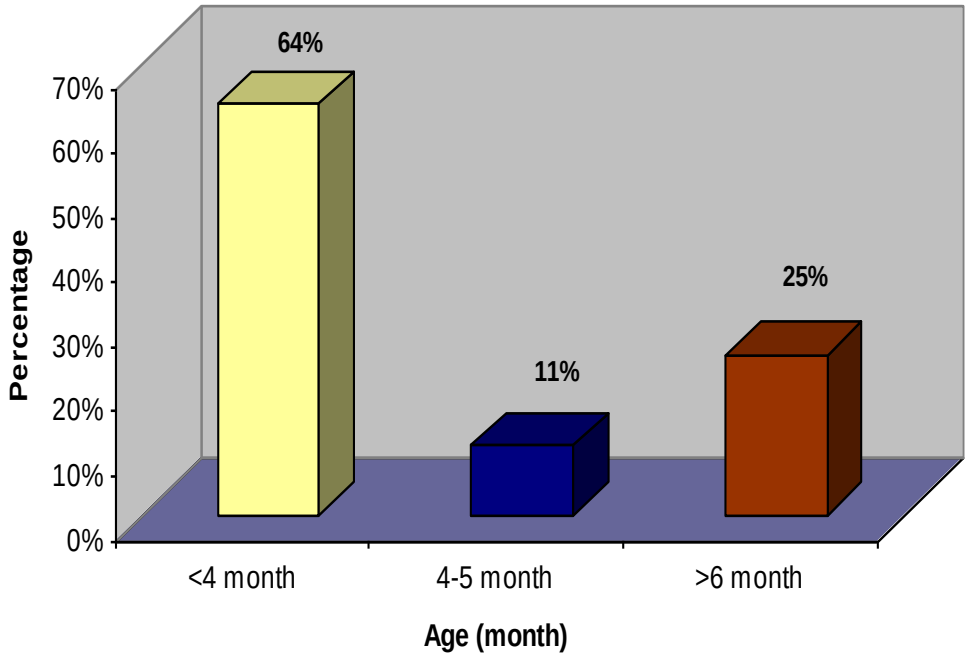

Fig 2: Distribution of the study subjects according to the starting age of CF (n = 93)

4.4 Consumption of different food items among the children of 6-8 month of age (Table 2)

The frequency of consumption of different food items among the children of 6-8 month of age during times/day and times/week is shown in this table. Only 1 (4%) and 2 (9%) of the children were taken rice > 1 times/day and 1 times/day, 4 (17%) and 15 (65%) were taken rice 3 to 6 times/ week and 1-2 times/ week. Rice gruel were taken 1 (4%) of the children in 1 to 2 times per week and 22 (96%) never taken rice gruel in a week. About 3 (13%) and 11 (48%) of the children were taken khichuri for 1 times/ day and 3 to 6 times/ week, 7 (30%) were taken khichuri for 1 to 2 times/ week and 2 (9%) never taken khichuri in a week. Suji were taken by 16 (70%) and 2 (9%) of the children in > 1 times/ day and 1 time/day, 3 (6%) were taken suji for 3 to 6 times/ week and 2 (9%) never taken suji in a week. About 3 (13%) and 6 (26%) of the children were taken egg for 3 to 6 times/ week and 1 to 2 times/ week and 14 (61%) never taken egg in a week. Fish were taken 4 (17%) of the children 1 to 2 times/ week and 19 (83%) children were never taken fish in a week. All 23 (100%) of the children were never taken meat and liver in a week. Green leafy vegetable were taken by 1 (4%) and 6 (26%) of the children for 3 to 6 times/ week and 1 to 2 times/ week. Most of them 16 (70%) never taken green leafy vegetable in a week. About 2 (9%) and 8 (35%) of the children were taken fruits 3 to 6 times /week and 1 to 2 times/ week and 13 (56%) of them never taken fruits in a week. Oil were taken by 1 (4%) and 6 (26%) for 1 time/ day and 3 to 6 times/ week, 12 (52%) were never taken oil in a week.

Table 2: Consumption of different food items among the children of 6-8 month of age (n=23)

Food Items	Times/ day		Times/ week		Never
	>1 time	1 time	3-6/week	1-2/week	
Rice	1 (4%)	2 (9%)	4 (17%)	0 (0%)	15 (65%)
Rice gruel	0 (0%)	0 (0%)	0 (0%)	1 (4%)	22 (96%)
Khichuri	0 (0%)	3 (13%)	11 (48%)	7 (30%)	2(9%)
Suji	16 (70%)	2 (9%)	3 (13%)	0 (0%)	2 (9%)
Egg	0 (0%)	0 (0%)	3 (13%)	6 (26%)	14 (61%)
Fish	0 (0%)	0 (0%)	0 (0%)	4 (17%)	19 (83%)
Meat	0 (0%)	0 (0%)	0 (0%)	0 (0%)	23 (100%)
Liver	0 (0%)	0 (0%)	0 (0%)	0 (0%)	23 (100%)
Green leafy vegetables	0 (0%)	0 (0%)	1 (4%)	6 (26%)	16 (70%)
Fruits	0 (0%)	0 (0%)	2 (9%)	8 (35%)	13 (56%)
Oil	0 (0%)	1 (4%)	6 (26%)	4 (17%)	12 (52%)

Results are expressed as number (%)

4.5 Consumption of different food items among the children of 9-11 month of age (Table 3)
The frequency of consumption of different food items among the children of 9-11 months is shown according to times/day and times/week. About 11 (46%) and 7 (29%) were taken rice for > 1 times/ day and 1 times/day, 2 (8%) and 2 (8%) were taken rice for 3 to 6 times/ week and 1 to 2 times/ week and 2 (8%) never in a week. Rice gruel were taken by 1 (4%) of the children in both 3 to 6 times/ week and 1 to 2 times/ week and 22 (92%) never taken rice gruel in a week. Khichuri were taken 1 (4%) and 8 (33%) of the children for 1 times/ day and 3 to 6 times/ week on the other hand 9 (37%) and 6 (25%) were taken khichuri for 1 to 2 times/ week and never in a week. Suji were taken 7 (29%) and 7 (29%) for > 1 times/ day and 1 times/day, 3 (12%) and 2 (8%) were taken suji for 3 to 6 times/ week and 1 to 2 times/ week, 5 (21%) of them never taken suji in a week. About 5 (21%) were taken egg for 1 to 2 times/ week and 19 (79%) never in a week. Fish were taken by 4 (17%) for 1 to 2 times/ week and 20 (83%) of them never taken fish in a week. Meat were taken by 2 (8%) for 1 to 2 times/ week and 22 (92%) never taken meat in a week. Nobody was taken liver in a week. Green leafy vegetable were taken by 5 (21%) of children for 1 to 2 times/

week and 19 (79%) of them never taken in a week. Fruits were taken by 1 (4%) and 6 (25%) for 3 to 6 times/ week and 1 to 2 times/ week and 17 (71%) never taken fruits in a week. Oil were taken by 2 (8%) and 10 (42%) for3 to 6 times/ week and 1 to 2 times /week and 12 (50%) never taken oil in a week.

Table 3: Consumption of different food items among the children of 9-11 month of age (n=24)

Food Items	**Times/ day**		**Times/ week**		**Never**
	>1 time	**1 time**	**3-6/week**	**1-2/week**	
Rice	11 (46%)	7 (29%)	2 (8%)	2 (8%)	2 (8%)
Rice gruel	0 (0%)	0 (0%)	1 (4%)	1 (4%)	22 (92%)
Khichuri	0 (0%)	1 (4%)	8 (33%)	9 (37%)	6 (25%)
Suji	7 (29%)	7 (29%)	3 (12%)	2 (8%)	5 (21%)
Egg	0 (0%)	0 (0%)	0 (0%)	5 (21%)	19 (79%)
Fish	0 (0%)	0 (0%)	0 (0%)	4 (17%)	20 (83%)
Meat	0 (0%)	0 (0%)	0 (0%)	2 (8%)	22 (92%)
Liver	0 (0%)	0 (0%)	0 (0%)	0 (0%)	24 (100%)
Green leafy vegetables	0 (0%)	0 (0%)	0 (0%)	5 (21%)	19 (79%)
Fruits	0 (0%)	0 (0%)	1 (4%)	6 (25%)	17 (71%)
Oil	0 (0%)	0 (0%)	2 (8%)	10 (42%)	12 (50%)

Results are expressed as number (%)

4.6 Consumption of different food items among the children of 12- 23 month of age (Table 4)

Among the children of 12- 23 months of age 54 (74%) and 5 (7%) were taken rice > 1 times/ day and 1 time/day, 10 (14%) and 1 (1%) were taken rice for 3 to 6 times/ week and 1-2 times/ week and 3 (4%) of them never taken rice in a week. About 2 (3%) and 9 (12%) of them were taken rice gruel in 3 to 6 times/ week and 1 to 2 times/ week, 62 (85%) were never taken rice gruel in a week. About 1 (1%) and 6 (8%) were taken khichuri for 1 time/ day and 3 to 6 times/ week, 60 (82%) of them didn't take khichuri in a week. Suji were taken by 2 (3%) and 4 (5%) of the children for > 1 times /day and 1 time/day, 1 (1%) and 3 (4%) taken suji for 3 to 6 times/ week and 1 to 2 times/ week and 63 (86%) didn't taken suji in a week. About 9 (12%) and 31 (42%) were taken egg for 3 to 6 times/ week and 1 to 2 times/ week and 33 (45%) didn't take egg in a week. Fish were taken 5 (7%) and 40

(55%) in 3 to 6 times and 1 to 2 times/ week and 28 (38%) didn't take fish in a week. About 7 (9%) of the children took meat for 1 to 2 times/ week and 66 (90%) didn't take meat in a week. Only 1 (1%) of the children were taken liver for 1 to 2 times/ week. Green leafy vegetable were taken by 5 (7%) and 9 (12%) in 1 time/day and 3 to 6 times/ week, 21 (29%) took 1 to 2 times/ week and 38 (52%) didn't take it in a week. Fruits were taken by 8 (11%) and 35 (48%) of the children for 3 to 6 for 1 to 2 times/ week and 30 (41%) of them didn't take fruits in a week. Oil were taken by 18 (25%) for 1 time/day and 37 (51%) for 3 to 6 times/ week and 12 (16%) didn't take oil in a week.

Table 4: Consumption of different food items among the children of 12- 23 month of age (n=73)

Food Items	**Times/ day**		**Times/ week**		**Never**
	>1 time	**1 time**	**3-6/week**	**1-2/week**	
Rice	54 (74%)	5 (7%)	10 (14%)	1 (1%)	3 (4%)
Rice gruel	0 (0%)	0 (0%)	2 (3%)	9 (12%)	62 (85%)
Khichuri	0 (0%)	1 (1%)	6 (8%)	6 (8%)	60 (82%)
Suji	2 (3%)	4 (5%)	1 (1%)	3 (4%)	63 (86%)
Egg	0 (0%)	0 (0%)	9 (12%)	31 (42%)	33 (45%)
Fish	0 (0%)	0 (0%)	5 (7%)	40 (55%)	28 (38%)
Meat	0 (0%)	0 (0%)	0 (0%)	7 (9%)	66 (90%)
Liver	0 (0%)	0 (0%)	0 (0%)	1 (1%)	72 (99%)
Green leafy vegetable	0 (0%)	5 (7%)	9 (12%)	21 (29%)	38 (52%)
Fruits	0 (0%)	0 (0%)	8 (11%)	35 (48%)	30 (41%)
Oil	1 (1%)	18 (25%)	37 (51%)	5 (7%)	12 (16%)

Results are expressed as number (%)

4.7 Dietary intake of the children according to age group (Table 5)

The average dietary intake according to age group is shown in the table. The intake of carbohydrate, protein, fat and energy were 20 (4-68) g/day, 3 (.5-11) g/day, 0.2 (.04-11) g/day and 96 (17-337) kcal/ day respectively. Children in the age group between 9 to 11 months were taken carbohydrate, protein, fat and energy 234 (3-68) g/ day, 4 (.6-8) g/ per day, 0.3 (.03-3) g/ day and 166(17-320) kcal/day respectively. In the age group between 12 to 23 months were taken carbohydrate, protein, fat and energy 60 (6-104) g/ day, 8 (.8-20) g/ day, 0.9 (.07-10) g/ day and 317 (30-557) kcal/ day respectively. All of the three age groups were differ significantly.

Table 5: Dietary intake of the children according to age group (n=120)

Age (month)	**CHO intake (g/day)**	**Protein intake (g/day)**	**Fat intake (g/day)**	**Energy intake (Kcal/day)**
6-8 (n=23)	20 (4- 68)	3(0.5- 11)	0.2(0.04- 11)	96 (17- 337)
9-11(n=24)	34 (3- 68)	4(0.6- 8)	0.3 (0.03- 3)	166 (17- 320)
12-23(n=73)	60 (6- 104)	8 (0.8- 20)	0.9 (0.07- 10)	317 (30- 557)
F/P	32.64/0.0001*	20.50/ 0.0001*	3.86/ 0.024*	33.62/ 0.0001*
p value				
a vs b	0.0001	0.0001	ns	0.0001
b vs c	0.0001	0.0001	0.02	0.0001
c vs a	0.0001	0.0001	ns	0.0001

Results were expressed as mediun (range). One way ANOVA (Post Hoc Bonferroni) was performed as the test of significance, P< 0.05 was taken as level of significance, a=6-8 months children; b= 9-11 months children; c= 12-23 months children.

4.8 Types of food groups given to the child in previous day **(**Fig 3**)**

It was found that 5% of the children were received food from 1 food group, 31% from 2 food groups, 46% received food from 3 food groups, 15% and 3% were received food from 4 and 5 food groups respectively.

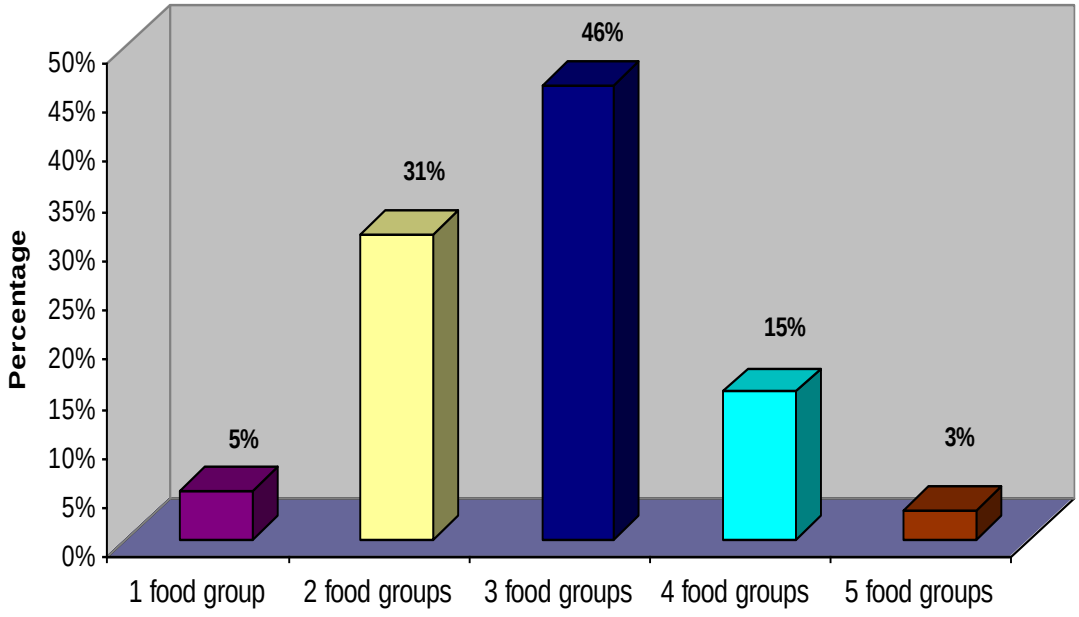

Fig 3: Types of food groups given to the child in previous day

4.9 Meal frequency pattern of the children according WHO guideline (Table 6)

Among the age group between 6 to 8 month, 14 (12%) of the children were received meal 2 times/ day, 9 (7%) were received meal 3 times/ day, 6 (5%) were received snacks 1 times /day and 17 (14%) of them didn't receive any snacks in a day. In the age group between 9 to 11 month, 17 (14%) of the children were received meal 2 times/ day, 7 (6%) received meal for 3 times/ day, 8 (7%) were received snacks 1 times/ day and 16 (13%) of the children didn't receive any snacks in a day. In the age group between 12 to 23 month, 28 (23%) of the children were received meal 2 times/ day, 45 (38%) were received meal 3 times/ day, 37 (31%) were received snacks 1 times/ day, 1 (1%) were received snacks 2 times/ day and 35 (29%) of the children didn't receive any snacks in a day.

Table 6: Meal frequency pattern of the children according WHO guideline (n=120)

Age (month)	**Meal frequency**		**Snacks frequency**		
	2 times/day	**3 times/day**	**1 time/day**	**2times/ day**	**Never**
68 (n=23)	14 (61%)	9 (39%)	6 (26%)	0 (0%)	17 (74%)
9-11 (n=24)	17 (71%)	7 (29%)	8 (33%)	0 (0%)	16 (67%)
12-23 (n=73)	28 (38%)	45 (62%)	37 (51%)	1 (1%)	35 (48%)

Results are expressed as number (%).

4.10 Meal frequency status of the children according WHO guideline (Fig 4)

According to WHO guideline, it was found that in the age group between 6 to 8 month, 30% of the children were received meal and snacks appropriately were as only 4% from the age 9 to 11 month and 25% in the age group between 12 to 23 month were given meal according to WHO recommendation.

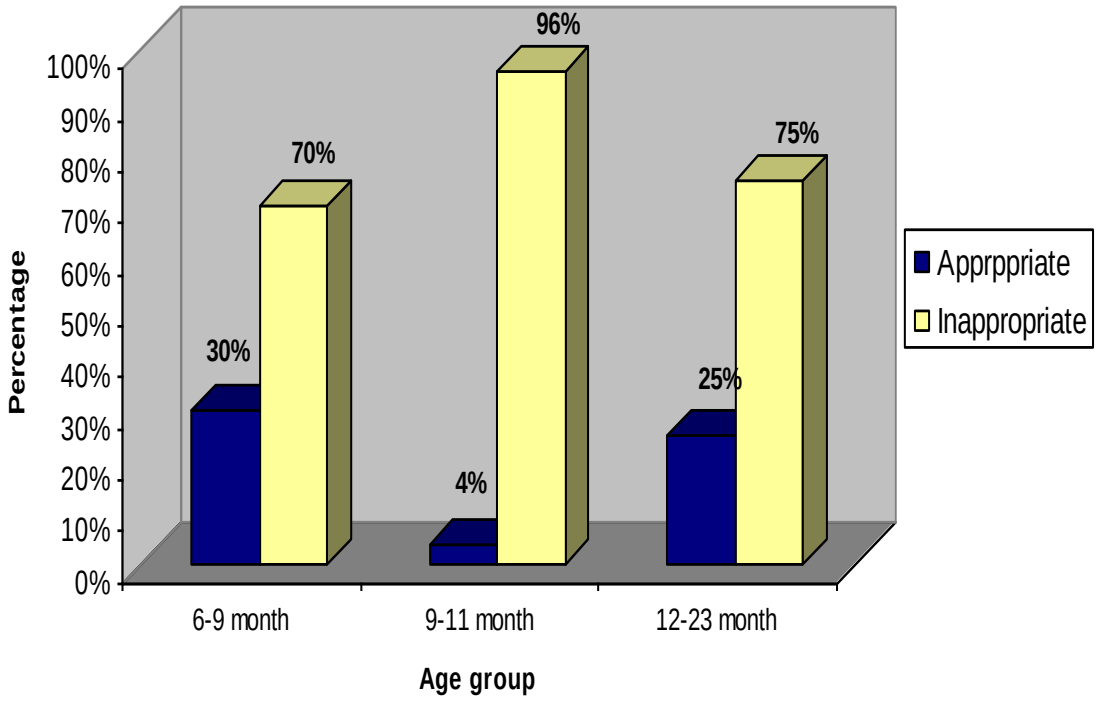

Fig 4: Meal frequency status of the children according WHO guideline

4.11 Energy consumption of the study subjects and WHO recommendation (Fig 5)

The figure graphically represents the energy consumption of the study subjects and the WHO recommendation for different age group.

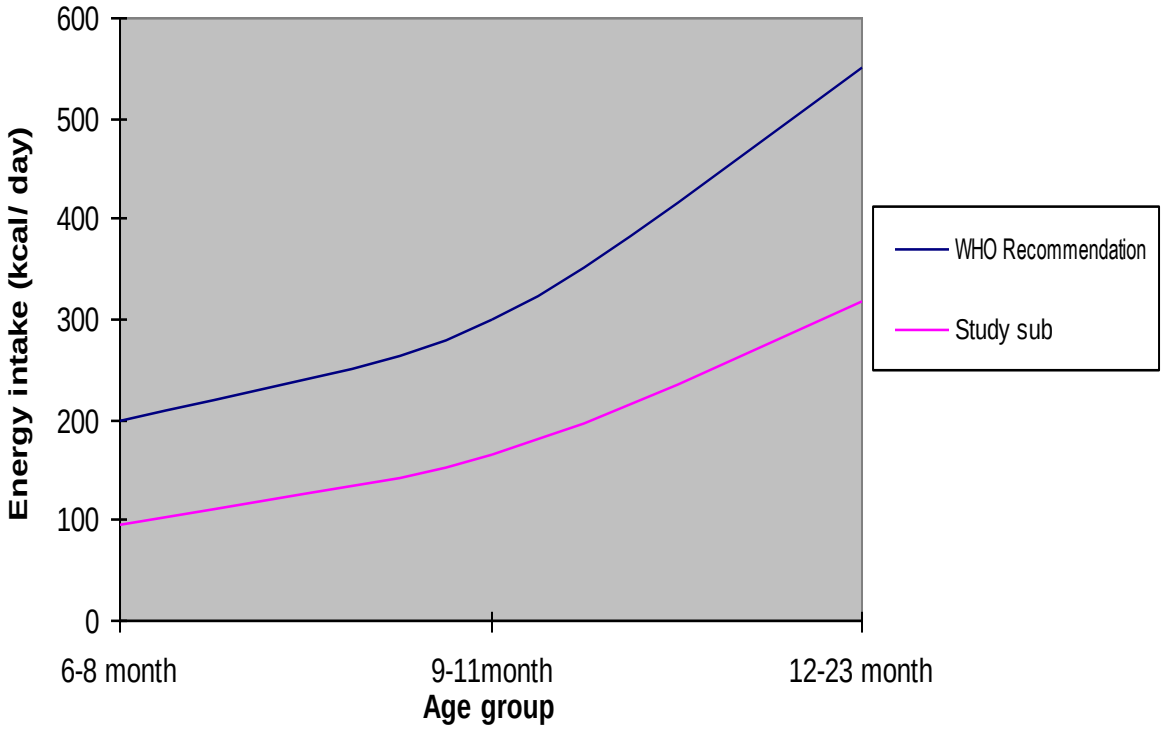

Fig 5; Energy consumption of the study subjects and WHO recommendation

4.12 Hygienic practice during complementary feeding (Table 7)

The table shows that 102 (85%) caregiver were washed their hand after toilet use and 18 (15%) were not, 93 (77%) caregiver were washed their hands and utensils before feeding their child and 27 (23%) didn't do this, 61 (51%) of the children were washed hands before feeding and 59 (49%) were not. It was also found that 61 (51%) caregiver were covered the cooked food and 59 (49%) were not, 82 (68%) caregiver were heat the food before serving it and 38 (32%) caregiver didn't do so. Only 3 (2%) caregiver were discard cooked foods before the danger period (not more than 2 hours **(ref)**) and the rest 117 (98%) didn't do it.

Table 7: Hygienic practice during complementary feeding (n=120)

Procedures	**Yes**	**No**
Hand washing practice of the caregiver after toilet use	102 (85%)	18 (15%)
Washing hands and utensils before feeding	93 (77%)	27(23%)
Washing hands of the children before feeding	61 (51%)	59 (49%)
Covering status of the cooked food	61 (51%)	59 (49%)
Heating before serving foods	82 (68%)	38 (32%)
Following appropriate discard period of cooked food	3 (2%)	117 (98%)

Results are expressed as number (%)

4.13 Distribution of the respondent having psychosocial care during CF (Fig 6)

This figure shows the psychosocial care of the subjects during complementary feeding. About 48% caregiver used to talk with their children during feeding and 52% didn't do so, 13% of the caregiver was forced their children during feeding and 87% did not do this. It was also found that 48% of the caregiver was help their children during feeding and 52% were not help their children during feeding.

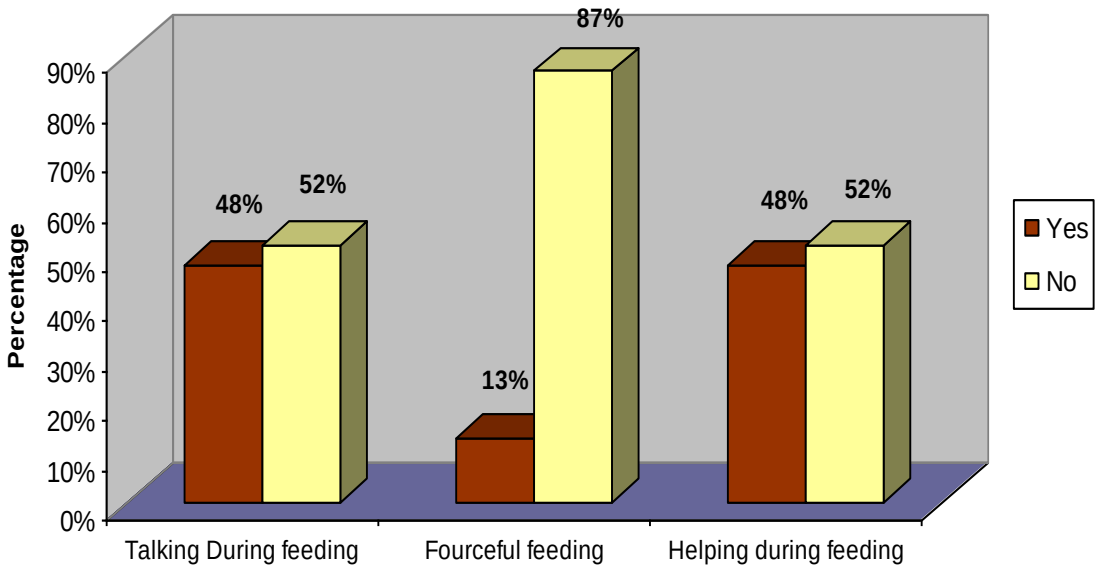

Fig 6: Distribution of the respondent having psychosocial care during CF

4.14 Feeding practices of the study subjects according to WHO indicator (Table 8)

Results of the important indicators for assessing infant and young child feeding practices of the study subjects (n=120) according to WHO guidelines is shown in this table. It was found that exclusive breast feeding was 22%, minimum dietary diversity was 18% and minimum meal frequency was 21%.

Table 8: Feeding practices of the study subjects according to WHO indicator (n=120)

Practices	Percentage (%)
Exclusive breast feeding	22%
Minimum dietary diversity	18%
Minimum meal frequency	21%

Results are expressed as percentage

4.15 Difference between the educational level of mother and the starting age of complementary feeding (Table 9)

The above table shows that there was no statistically significant (X2/ p =10.18/ 0.65) difference between the educational level of the mother and the starting age of complementary feeding.

Table 9: Difference between the educational level of mother and the starting age of complementary feeding.

Educational level	< 6 month	6 month	> 6 month
Illiterate	62 (52%)	18 (15%)	12 (10%)
Primary	15 (12%)	8 (7%)	3 (3%)
Secondary	1 (1%)	1 (1%)	0 (0%)
$X^2/ p = 10.18/ 0.65$			

4.16 Difference between the occupation of mother and the starting age of complementary feeding (Table 10)

There were found no significant ($X^2/ p = 4.62/ 0.32$) difference between occupation of the mother and the starting age of complementary feeding.

Table 10: Difference between the occupation of mother and the starting age of complementary feeding.

Occupation	< 6 month	6 month	> 6 month
Day labour	15 (12%)	3 (2%)	2 (2%)
Housewife	61 (51%)	23 (19.2%)	11 (9%)
Others	2 (2%)	1 (1%)	2 (2%)
$X^2/ p = 4.62/ 0.32$			

5. Discussion

Adequate nutrition during infancy and early childhood is fundamental for the development of each child. The link between malnutrition and infant-feeding practices has been well-established. Incidence of malnutrition rises sharply during 6-8 months of age in most countries, which match with the period of CF, and deficits acquired at this age are difficult to compensate later in childhood[1]. Inappropriate CF practices include discontinuation of exclusive breast feeding, starting CF too early or too late with foods that are often nutritionally inadequate. The present study was taken to assess the CF practice among 6-23 months of children according to WHO guideline in selected slum areas of Dhaka city.

Exclusive Breast Feeding (EBF) for 6 months confers several benefits to the infant and the mother. According to WHO[2] growth standards, children who are exclusively breastfed have more rapid growth in the first 6 months of life than other infants. In the study in Dhaka slum area only 22% mothers were practiced EBF though in UNICEF[3] study among Bangladeshi children it was found that 43% mothers practiced EBF. About 28% children received EBF for 6 months in Kolkata urban slum area which was similar to our result. However, in Delhi urban slum area, it was found that 35% children received EBF[4] .

By the age of 6 months, a baby has usually at least doubled his or her birth weight and is becoming more active. EBF is no longer sufficient to meet all energy and nutrient needs by itself and complementary foods should be introduced to make up the difference. According to WHO,[2] CF should be started at the age of 6 months. In present study mean age for starting CF was (months, mean ±SD) 4.77 ±2.38 and only 22% children started CF at appropriate age and 64% children started their CF before 4 months. In NIPSOM study[5] the age of starting CF was found similar with our study. This is an alarming situation for developing country like Bangladesh. Similar picture was found in other developing countries like India[6] and Pakistan[7]. In India only 18% children received CF from 6 months and 46% children in Pakistan.

Breastfeeding should continue with CF up to 2 years of age because it continues to provide higher quality nutrients than CF and also protective factors. Breast milk can provide 1/2 or more of a child's energy needs between 6-12 months of age, and 1/3 of energy needs and other high quality nutrients between 12 and 24 months[2] In present study breastfeeding were continued beyond 6 months of age by 25% mothers of the infants.

Good complementary foods should provide sufficient energy, protein and micronutrients to cover a child's energy and nutrient gaps. The basic ingredient of CF is usually the local staples like cereals, roots and starchy fruits that consist mainly carbohydrate and provide energy. A variety of other foods like animals, fish, dairy products, pulses, green leafy vegetables and oil should be added for providing other nutrients. In the present study commonly consumed complementary food items among different age groups were rice, rice gruel, khichuri, suji, egg, fish, green leafy vegetables and fruits. About 70% mothers reported feeding 'suji' more than 1times/day and 48% mothers reported feeding 'khichuri' 3-6 times/ week respectively among 6-8 months of age group. Rice was the major food items which took more than 1 times/day among 9-11 months of age group (46%) and 12-23 months age group (74%) respectively. The low frequency of consumption of egg, fish, green leafy vegetables and fruits among different age groups was found in present study.

As per WHO/UNICEF[2] recommendation, the energy needs from complementary foods for infants are approximately 200 kcal/day at 6-8 months of age, 300 kcal/day at 9-11 months of age and 550 kcal/day at 12-23 months of age in developing countries. In the present study mean energy intake of the children in different age groups {(Kcal/day, median (range)}, {96 (17- 337) vs. 166 (17- 320) vs. 317 (30- 557) respectively} were not adequate.

The appropriate number of feedings depends on the energy density of local foods and the usual amounts consumed at each feeding. According to WHO[8] guideline, CF should be provided 2 to 3 times/day at 6-8 months of age, 3-4 times/day at 9-11 and 12-24 months of age. In the study only 26% and 4%

infants at 6-8 months and 9-11 months of age and 26% infants at 12-23 months of age respectively did appropriate practice.

Failure to give adequate and different food items as CF, not getting adequate energy and less frequency of meal intake may be due to financial problem, babies did not accept, poor appetite and lack of awareness of the caregivers.

Microbial contamination of CF is a major cause of diarrhoeal disease, which is particularly common in infants. The hygienic practice of the caregivers in the present study was found to be satisfactory. Most of the caregiver (85%) washed their hands after toilet and 77% washed their hands and utensils before feeding children. Half of the respondents (51%) washed hands of the children before feed and covered food after cooking. About 68% knew that food should be heat before serving though only 2% had idea that food should be eaten within 2 hours if it cannot be refrigerated.

Practice responsive feeding, applying the principle of psychosocial care during feeding is one of important issue. From several intervention studies, it was found that responsive feeding behavior had positive effect on child growth[8]. However, the findings of the present study in Dhaka slum area were not sound. Half of the caregivers (52%) did not talk in feeding time with infant and even did not help elder children during feeding.

6.1 Conclusion

- Most of the infants (78%) in the present study are deprived from exclusive breast feeding (EBF).
- The mean age for starting CF is (months, mean ±SD) 4.77 ±2.38 and only 22% children start CF at appropriate age and 64% children start their CF before 4 months.
- About 70% mothers report feeding ‘suji’ more than 1times/day and 48% mothers report feeding ‘khichuri’ 3-6 times/ week respectively among 6-8 months of age group. Around 46% infants among 9-11 months of age group and 74% infants 12-23 months age group feed rice more than 1 times/day.
- In the present study mean energy intake of the children in different age groups {(Kcal/day, median (range)}, {96 (17- 337) vs. 166 (17- 320) vs. 317 (30- 557) respectively} are not meet the WHO guideline.
- Only 26% and 4% infants at 6-8 months and 9-11 months of age and 26% infants at 12-23 months of age respectively are followed proper meal frequency.
- Most of the caregivers (85%) wash their hands after toilet and 77% wash their hands and utensils before feeding children. Half of the respondents (51%) wash hands of the children before feed and covered food after cooking. About 68% know that food should be heat before serving.
- About 52% caregivers do not talk in feeding time with infant.

6.2 Recommendations

- Effective nutrition education and communication program for behavioral change should be taken for ensuring optimal infant feeding.
- Health planners and providers should provide assistance and essential information to mother and caregiver about infant and young child feeding (IYCF) throughout the country.
- Research activities should be emphasized and encouraged in all aspect of IYCF.

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QUESTIONNAIRE

(Household Information)

Strictly Confidential

ID No: .....

Name of the Respondent: .....

Relationship to the Child: .....

Date: .....

Present Address: .....

Permanent Address:……

Phone No:……

1.0 GENERAL INFORMATION:

1.1 Name of the child.....

1.2 Date of birth…….

1.3 Age (In completed months).....

1.4 Sex: ☐ Male ☐ Female

1.5 Religion: ☐ Muslim ☐ Hindu ☐ Christian ☐ Buddhist

2.0 HOUSEHOLD INFORMATION:

2.1 Household members.....

2.2 Number of children.....

2.3 Birth order of the child…….

2.4 Who is the family head?.....

2.5 Education level of the mother. (Please write code only) ☐

2.6 Education level of the father. (Please write code only) ☐

2.7 Occupation of the father. (Please write code only) ☐

2.8 Occupation of the mother. (Please write code only) ☐

3.0 SOCIO-ECONOMIC INFORMATION:

3.1 What is the monthly income of the family? Tk.....

3.2 What types of latrines you use? ☐ Sanitary ☐ Non-Sanitary ☐Open ☐ Others, specify.....

3.3 What is your housing arrangement? ☐ Own house ☐ Government house

☐ Rented house☐ Non-rented house☐ Others, specify.....

3.4 What is housing condition? ☐ Tin wall with tin roof ☐ Brick wall with tin roof ☐ Thatched

☐ Timber wall with tin roof ☐ Bamboo wall with tin roof ☐ Others, specify.....

4.0 HEALTH RELATED INFORMATION OF THE CHILDREN :

4.1 Have your child faced any illness in last one month? ☐ Yes ☐ No

4.2 If yes, how many times? .....

4.3 If yes, what are those?.....

4.4 Where do you get general health care facilities?.....

4.5 Have you measured the weight of your children in every month? ☐ Yes ☐ No

4.6 If yes, what's the last measuring weight? (In Kg) ☐

4.7 Did you immunize your children? ☐ Yes ☐ No

4.8 If yes, what are those?.....

5.0 INFORMATION ON BREAST FEEDING:

5.1 Do you ever breast feed your children? ☐ Yes ☐ No

5.2 If yes, what is the time of initiation of breast feeding? ☐ Less than 1 hour of birth

☐ Less than half hour of birth ☐ More than 1 hour of birth ☐ Others, specify……..

5.3 If yes, what is the duration of Exclusive Breast Feeding? (In months) .....

5.4 If duration of Exclusive Breast Feeding is not appropriate, why?.....

5.5 Did you feed your child with a bottle before 6 months of age? ☐ Yes ☐ No

6.0 INFORMATION ON COMPLEMENTARY FEEDING:

6.1 Do you know appropriate starting age of complementary food? ☐ Yes ☐ No

6.2 If yes, from which age? (In months) ☐

6.3 From which age (in months) have you started complementary food for your child? .....

6.4 What types of food you giving to your children as complementary food?

(Please fill the food frequency form and the 24 hours recall form)

6.5 Complementary food prepared from ☐ Family food ☐ Prepared separately ☐ Mixed

☐ Others, Specify……

6.6 Quantity of spices in complementary food ☐ High ☐ Medium ☐ Low

☐ Other, specify……

6.7 What is the frequency of breast feeding yesterday?.....

6.8 Did you give more food and drink during your child illness? ☐ Yes ☐ No

6.9 Did you give an extra meal or snack each day after your child recovery from an illness?

☐ Yes ☐ No

6.10 If yes, what was the frequency?……

6.11 Who helps the child to eat? ☐ Mother ☐ Caregiver, Specify……..

☐ No body

6.12 If no body, from which age you don't assist your children? (in months).....

6.13 Do you force your children to eat? ☐ Yes ☐ No

6.14 Do you talk with your children during feeding? ☐ Yes ☐ No

7.0 INFORMATION ON HEALTH AND NUTRITION EDUCATION:

7.1 Have you received any advice regarding complementary feeding from others? ☐ Yes ☐ No

7.2 If yes, please mention from whom?……

7.3 Did you get any health advice during the last 6 months? ☐ Yes ☐ No

7.4 If yes, please mention from whom?.....

8.0 INFORMATION ON HYGIENE PRACTICE:

8.1 Before feeding do you wash your hands and utensils properly? ☐ Yes ☐ No

8.2 What is the source of water to prepare food? ☐ Tube-well ☐ Supply water ☐ Pond water ☐ Other, specify…….

8.3 Once you prepare the food, after how long you discard those without refrigeration? (In hours) .....

8.4 Do you hot the discarded food before serving it? ☐ Yes ☐ No

8.5 Does the caregiver wash her hand after toilet use? ☐ Yes ☐ No

8.6 If yes, how? ☐Soap☐ Ash ☐ Nothing ☐Other, specify…….

8.7 After preparing the food, do you keep those covered? ☐ Yes ☐ No

8.8 Does your child wash hands before taking food? ☐ Yes ☐ No

8.9 If yes, how? ☐Soap☐ Ash ☐ Nothing ☐Other, specify……..

8.10 Which type of utensil you use to feed liquid? ☐ Bottles ☐ Cups ☐ Other, specify.....

8.11 Washing procedure of utensil ☐washing powder ☐Soap ☐Ash ☐Boil water ☐ Nothing ☐Other, specify……

Code of Education	Code of Occupation	
1. Illiterate	1. Student	7. Tailor
2. Primary	2. Labour	8.Craftsman
3. Secondary	3. Agriculture	9.Housewife
4. SSC	4. Driver	10.House worker
5. HSC	5. Shop Keeper	11. None
6. Graduate	6. Rickshaw Puller	12. Other, specify……..

THANK YOU FOR YOUR CO-OPERATION**.**

…….
……

Investigator signature

9.0 FORM FOR 24 HOURS RECALL:

Meal & Snacks	Food Item	Descriptions of foods	Cooking method	Unit (household measurement)	Weight (gm)
1st Meal: Time:					
2nd Meal: Time:					
3rd Meal: Time:					
4th Meal:					

Time:					
Meal & Snacks	**Food Items**	**Descriptions of Foods**	**Cooking method**	**Unit (household measurement)**	**Weight (gm)**
1st Snacks: Time:					
2nd Snacks: Time:					
3rd Snacks: Time:					
Other: Time:					

10.0 FOOD FREQUENCY FORM:

Food Items	Description of food	> 1 per day	1 per day	3-6 times per week	1 or 2 per week
Any drink or juice					
Infant Formula milk					
Cow/Goat Milk					
Rice					
Rice Gruel					
Khichuri					
Suji					
Infant Formula Cereals					
Liver					
Meat					
Fish					
Eggs					
Spinach					
Broccoli					
Carrots					
Pumpkins					
Potatoes					
Taro Arum leaves					
Cauli Flower leaves					
Gram leaves					
Amaranth (data) leaves					
Dal					
Cow Peas					
Beans					
Oils, Butter					
Fruits					
Bread					

Chapati					
Chira, Muri, Khoi					
Others					

10. FOOD FREQUENCY FORM :

How many times the following food items did you feed your child in the last week?

Food Items	1 Time	2 -3 Times	4-7 Times	> 7 Times
Breast Milk				
Infant Formula milk				
Cow/Goat Milk				
Rice				
Rice Gruel				
Khichuri				
Suji				
Infant Formula Cereals				
Liver				
Meat				
Fish				
Eggs				
Spinach				
Broccoli				
Carrots				
Primpkins				
Potatoes				
Taro Arum leaves				
Cauli Flower leaves				
Gram leaves				
Amaranth (data) leaves				
Lentils				
Cow Peas				
Beans				
Oils, Butter				

Fruits				
Bread				
Chapati				
Chira, Muri, Khoi				
Any Drink/Juice				
Others				