



Bangladesh Breastfeeding Foundation

GUIDELINES FOR COMPLEMENTARY FEEDING IN BANGLADESH



With the support of



National Food Policy Capacity Strengthening Programme



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FOREWORD



Bangladesh has a background of high prevalence of malnutrition especially among young children. This has been detected as one of the major causes of child mortality. Although the picture has improved in last 4 years (according to BDHS 2011), a further improvement is necessary to attain the MDG goals. Inappropriate IYCF practice and high prevalence of infectious diseases during the age of 6-23 months have been perceived as one of the major concern behind the high malnutrition rate.

Inappropriate complementary feeding during this age set off a weaker development path, both physically and mentally for children. Undernourished children have lower resistance to infection and are more likely to die from common childhood ailments as diarrhoeal diseases and respiratory infections. Those who survive may be locked into a vicious cycle of recurring sickness and faltering growth, often with irreversible damage to their cognitive and social development. Thereafter, an improved practice of complementary feeding along with disease control and appropriate caring practices will ultimately help to break the vicious cycle and improve.

According to BDHS 2011 the stunting, wasting and underweight rate has been decreased to 41, 16 and 36 percent respectively. The Government of Bangladesh is committed to reduce the rate much more and practice of appropriate complementary feeding.

I am pleased to know Bangladesh Breastfeeding Foundation and NFPCSP-FAO has developed a 'Guideline for complementary feeding in Bangladesh'. This has demonstrated an excellent point of view on how to introduce appropriate complementary food to children according to their nutritional requirements and what to introduce. This book will also help the mothers to choice a verity of complementary foods, adequate for nutritional need for their children to develop health of the children.

I would like to congratulate Bangladesh Breastfeeding Foundation and NFPCSP-FAO for developing this document. I am sure this useful resource will be utilized by policy makers, planners, project managers, researchers and development partners from all relevant sectors for tracking progress and for stimulating action towards the alleviation of malnutrition in Bangladesh.

A handwritten signature in black ink, followed by the date '09/06/13' written in the same ink.

Professor Khandoker Md. Shefayet Ullah
Director General
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Ministry of Health and Family Welfare (MOHFW)

MESSAGE

Malnutrition in young children is attributed to various factors including female illiteracy, ignorance about nutritional needs of infants and young children and poor access to health care. Popularization of low cost nutritious foods particularly for infants and young children is therefore an effective approach.

To improve the overall situation, it is necessary to emphasize the practice of introduction of appropriate complementary foods from nutritional standpoint considering different age groups. Although Bangladesh has a strong culture of breastfeeding, appropriate practices of complementary feeding is very low, only 21% leading to high level of stunting. Mothers are often unaware that they are capable to feed their children nutritionally adequate, easily prepared, cost effective home-based complementary foods.

The guideline exhibits a detailed document on appropriate complementary feeding practices developed considering the recommendations contained in the internationally accepted Guiding Principles on the Complementary Feeding of the Breastfed children. The work has been based on TIPs (Trials of improved Practices) in seven divisions of Bangladesh.

I congratulate Bangladesh Breastfeeding Foundation (BBF) and NFPCSP, FAO Representation in Bangladesh for developing this Guideline for complementary feeding practices in Bangladesh. I wish successful implementation of the guidelines and hope that this will play an effective role in establishing a new era for appropriate complementary feeding practices in Bangladesh.



Naser Farid
Director General
Food Planning and Monitoring Unit (FPMU)
Ministry of Food

MESSAGE



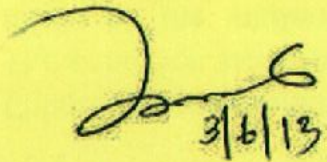
Child malnutrition is one of major concern and obstacle in the development of nutrition and health status of the children of Bangladesh. Although Bangladesh has achieved many successes in improving health and food security indicators in the past decade, major improvements are still needed in order to free all children from malnutrition.

In a proactive response to the situation, the Government of Bangladesh has been accelerated progress by mainstreaming nutrition interventions into health and family planning services with NNS from 2011-2016. The provision of community-based services has been scaled up, and the food and nutrition policies and plans are in the way of finalization. To achieve these goals, nutrition with a top priority on Infant and young child feeding (IYCF) the Health, Population and Nutrition Sector Development Programme (HPNSDP) and several key sectors are working together with development partner.

Children become malnourished if they are fed with inadequate foods compared to their energy and nutrient requirements. The condition worsens in presence of increased disease frequency and lack of caring practices. The main obstacle here might be the inadequate knowledge on preparation and hygiene of appropriate complementary food and feeding practices. Besides majority of our population live under the poverty line. Where, mothers' are completely unaware that they can prepare a healthy nutritious food for their children with minimum cost or using the foods available in their households.

I am pleased that Bangladesh Breastfeeding Foundation in support of NFPCSP-FAO has developed a 'Guideline for Complementary Feeding in Bangladesh'. This will help them to keep using appropriate complementary feeding to meet the nutritional requirement of their children and growth optimally.

I am confident that all nutrition practitioners will find this material useful to improve Complementary feeding practice in Bangladesh. NNS would consider the best use of this development.



3/6/13

Prof. Dr. Md. Ekhlashur Rahman
Director
Institute of Public Health Nutrition (IPHN)
&
Line director
National Nutrition Services (NNS)

PREFACE

The promotion of optimal growth and development of infants and young children points out as a priority goal for global public health and nutrition. Promotion of exclusive breastfeeding accompanied by age appropriate complementary foods after six months of life is crucial to achieve millennium development goal. It is recognized that the critical importance of growth during the 1,000 days of life. 6-23 months is a critical window of opportunity to achieve optimal health and mental development for young children to improve nutritional status and reduce mortality.

Appropriate Infant and Young Children Feeding (IYCF) practice is a challenge in Bangladesh. It needs urgent attention as under 5 mortality and morbidity rates are closely associated with child nutrition. Beginning in 1989, Bangladesh Breastfeeding Foundation is not only striving for protection, promotion and support of breastfeeding but is also concerned to introduce age appropriate complementary foods for infants with appropriate time and quality.

It has been revealed that, early or late initiation of complementary feeding, type and quality of feed, quantity, frequency and the feeding method can cause many health hazards among the young children. Children may suffer from diarrhea, pneumonia, allergy and childhood diabetes due to inappropriate complementary feeding. The consequences of inadequate growth during this period are documented and difficult to fully reverse later on and have major implications for child survival, lifelong health and for the human and socio-economic development of nations.

It is well recognized that, healthy children are important assets of the country and the nation. Caretakers need to have adequate knowledge and skills on complementary feeding. This CF Guideline will help the health professionals to guide on "Complementary Feeding" issues so that mothers in the community can be supported practically and in an appropriate way.

This Complementary Feeding Guideline will fill an important gap. It takes into account the CF practices by mothers in 7 divisions of Bangladesh. It provides information and guidance on the selection and preparation of locally available, nutritionally sound and safe complementary foods which are easy to prepare for feeding infants and young children, aged 6 to 23 months. The CF guideline is targeted to assist the community nutrition promoters, peer educators and other development partners from the Health, Social welfare, Local Government and Rural Development (LGRD) and Food and Agricultural sectors working with family and community groups.

All possible efforts were taken to make this guideline best of its kind. But, still it might have important omissions. Any suggestions, recommendation or comments relevant to this guideline will be highly appreciated and valuable feedback will be helpful for further improvement of this CF guidelines.

A handwritten signature in black ink, appearing to read 'S.K. Roy', with a long horizontal stroke extending to the right.

Dr.S.K. Roy
Chairperson
Bangladesh Breastfeeding Foundation (BBF)

ACKNOWLEDGEMENTS

This manual was produced by the Bangladesh Breastfeeding Foundation with the technical support of the National Food Policy Capacity Strengthening Programme (NFPCSP) of the Food and Agriculture Organization (FAO) of the United Nations. These guidelines provide key complementary feeding messages and provides guidance on how to overcome common feeding problems of complementary feeding. These guidelines will be useful for all levels of health care providers, community nutrition workers, agriculture extension workers, development organizations, social welfare and who work for health, agriculture and food sectors. These guidelines provide an understanding of the basic principles of promoting good dietary practices for complementary feeding using a variety of locally available foods and focusing on the preparation of safe and nutritious complementary foods for children aged 6 to 23 months of age. It also highlights the importance of using appropriate food combinations and preparation and processing methods to improve the dietary diversity of complementary feeding.

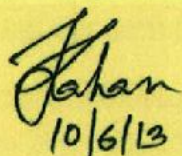
We are thankful to Mr. Naser Farid, Director General, FPMU and Mr. Mostafa Faruq Al Banna, Associate Research Director, Food Consumption and Nutrition Wing, FPMU for their insights and cooperation. We are grateful to Mr. Mike Robson, FAO Representative in Bangladesh and Dr. Ciro Fiorillo, Chief Technical Advisor, NFPCSP–FAO for their encouragement and support. We also thank Dr. Nur Ahamed Khondaker for his overall guidance on the research process and logistics. We are particularly indebted to the Technical Assistance Team of NFPCSP–FAO, Dr. Lalita Bhattacharjee, Nutritionist and Dr. Mohammad Abdul Mannan, National Food Utilization & Nutrition Advisor, for their technical support throughout the study. Their valuable advice, suggestions, direction, guidance and careful review of the guidelines are gratefully acknowledged. Special thanks are also due to the FAO Consultants, Ms. Barbara Stadmayr and Ms. Bhami Vora for their valuable support. Our deepest thanks go to the mothers and caregivers of children who generously shared their knowledge, views, and experience and actively participated in preparing and tasting the complementary foods.

Our gratitude goes to the Government authorities (Civil Surgeon, UNO, TNO, UHFPO, THFPO) in seven divisions of Bangladesh who facilitated introductions and supported the field work. Special thanks are due to the HI, HW and HA who were involved in the Trails of Improved Practices (TIPS) on Infant and Young Child Feeding, who helped to test thirty five recipes and provided valuable comments and inputs.

My special thanks are due to the technical committee members of this project (Development of a complementary feeding manual for Bangladesh) FAO, IPHN, UNICEF, A & T, HKI, DFID, USAID, INFS, USAID, BRAC, ICDDR, B for their valuable information, suggestions and advice.

I express my sincere thanks and gratitude to the team and all the members of BBF for their keen interest and extended support towards finalizing the guideline in time.

Finally, I hope that the guideline of complementary feeding will be useful to the health and nutrition practitioners towards improvement of infant and young child feeding practices, a long cherished better health and nutritional status of the children of 6 to 23 months of age.



10/6/13

Ms. Khurshid Jahan

Director

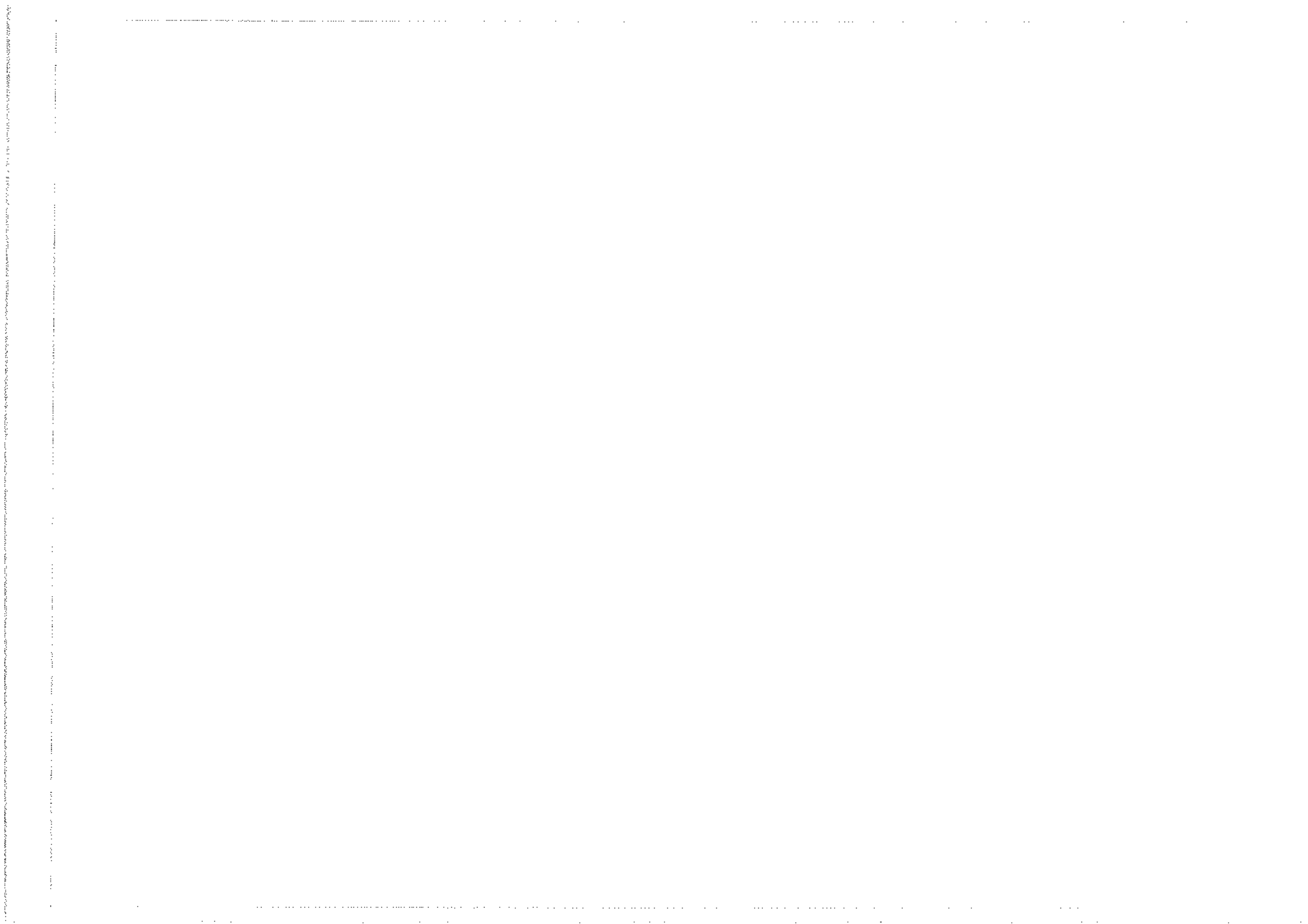
Bangladesh Breastfeeding Foundation (BBF)

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Part -1



Infant and Young Child feeding in Bangladesh

Overall, 21 percent of children aged 6-23 months are fed appropriately according to recommended IYCF practices. 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. Feeding according to IYCF recommendations is quite low during ages 6-8 months (6 percent), with an increase to 31 percent among 18-23 months old children. There is no difference between boys and girls. IYCF practices are better in urban areas than in rural areas (28 versus 19 percent). Recommended IYCF practices are lowest in Sylhet (11 percent) and highest in Khulna (28 percent). IYCF practices improve with increasing education levels and wealth score¹.

1.1 Current Strategy for Infant and Young Child Feeding in Bangladesh

Appropriate feeding practices are essential for the nutrition, growth, development and survival of infants and young children. These feeding practices, known collectively as infant and young child feeding (IYCF) practices include breastfeeding and complementary feeding. Infants should be breastfed within one hour of birth and should be exclusively breastfed for the first six months of life and thereafter should receive age appropriate, nutritionally adequate and safe complementary foods while breastfeeding continues up to two years and beyond.

The National IYCF Strategy builds on the existing achievements in Bangladesh and provides a framework for actions to protect, promote and support the optimal infant and young child feeding. The overall goal of the National Strategy is to improve the nutritional status, growth and development, health, and survival of infants and young children in Bangladesh through optimal infant and young child feeding practices.

The specific objective of the National Strategy, to have been achieved by 2010 on Complementary feeding includes:

“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)”

¹Bangladesh Demographic and Health Survey (BDHS) 2011

Strategies

The priority strategies for infant and young child feeding in Bangladesh fall into four categories: legislation, policy and standards; health system support; and community-based support; and support in exceptionally difficult circumstances.

Legislation, policy and standards

Strategy 1: Code of marketing of breast milk substitutes

Strategy 2: Maternity protection in the workplace

Strategy 3: Codex standards

Strategy 4: National policies and plans

Health system support

Strategy 5: Baby-friendly hospital Initiative

Strategy 6: Mainstreaming and prioritization of IYCF activities

Strategy 7: Knowledge and skills of health service providers

Community based support

Strategy 8: Community based support for IYCF

IYCF in exceptionally difficult circumstances

Strategy 9: IYCF in exceptionally difficult circumstances



The National IYCF Strategy builds on past and continuing achievements in infant and young child feeding in Bangladesh, and has been developed in the context of national policies, strategies and programs. It is consistent with the Global Strategy for Infant and Young Child Feeding by WHO, 2002 and is based on accumulated evidence on interventions with proven positive impact. It identifies comprehensive actions that will be taken to improve legislation, policies and standards to protect optimum infant and young child feeding practices, and to strengthen the capacity of health services and communities to promote and support the nutritional needs of infants and young children. The role of the critical partners - government, international organizations, non-government organizations, community-based organizations, media and other concerned parties - are also identified to ensure that collective action contributes to the full attainment of the National Strategy's goal and objectives.

1.2 Country policy and practices

Appropriate IYCF was identified as an important strategy under the National Food and Nutrition Policy and the National Plan of Action for Nutrition 1997. Subsequently, protection and promotion of breast feeding and complementary feeding has been outlined as one of the areas of intervention under the National Food Policy Plan of Action 2008 -2015 and an output under the Country Investment Plan 2011 -2015 being covered under the Programme Community based nutrition programmes and services. These programmes are being monitored on an annual basis as part of policy monitoring by the government.

Bangladesh has a strong culture of breastfeeding. Bangladeshi babies are breastfed for the first year of life. According to BDHS 2011, the recommendation to exclusively breastfeed for the first six months of life is met by 64 percent of children under two years. Complementary foods are introduced at an early age. Among infants less than two months, 85 percent are being exclusively breastfed, while other infants are given water (6 percent), other milk (7 percent), and complementary foods (2 percent) in addition to breast milk. Bottle-feeding is not uncommon in Bangladesh; around one in five infants (6-9 months) is bottle fed.

Complementary foods given to infants and young children in Bangladesh are often nutritionally inadequate and are not safe and hygienic. The common complementary foods include khichuri (rice cooked with lentils and oil), bhaat dal (rice and lentils cooked separately), suji (wheat semolina or rice flour with sugar), bhaat (rice alone) and muri (puffed rice).

Since non-breastfed children are very uncommon in this age group, this indicator is largely dependent on the breastfed babies. One in four of breastfed children (24 percent) age 6-23 months are given the recommended number of food groups (four or more food groups). About two-thirds of the breastfed children (64 percent) are fed at least the minimum number of times.

Inappropriate feeding practices in early childhood is one of major obstacles to the government's efforts towards sustainable socioeconomic development and poverty reduction. In addition, the Millennium Development Goals (MDGs) specially MDG 1 and MDG 4 will not be achieved without action to reduce the rate of malnutrition in infants and young children.²

1.3 Review of training manual and tools on CF

IPHN training manual on IYCF

A training manual on IYCF has been developed by IPHN for the organizations who work on IYCF in this country. This manual is intended for use as a handbook for program managers, nutritionists, doctors and all health practitioners from different levels. It can serve as a tool for behavior change communication to improve awareness among mothers on IYCF. The main purpose is to acknowledge everyone's role in promoting appropriate IYCF to improve knowledge and ability through providing necessary and updated information, and also to develop skills and scientific knowledge of mothers to ensure breastfeeding and complementary feeding through training management. The present manual has already been used in field trials for 1 year.

This manual has been developed considering different training manuals of government and non government organizations and programs. Results of different research programs on child nutrition in Bangladesh and follow up discussions with practitioners and trainers in the field have been considered in preparing the manual.

²National Strategy for Infant and Young Child Feeding in Bangladesh

BBF training manual on Complementary Feeding

Bangladesh Breastfeeding Foundation has developed a brief comprehensive training curriculum on complementary feeding. It was an adapted version of the relevant Complementary Feeding Curriculums developed by the ICMH, Dhaka; Breastfeeding Promotion Network of India; WHO and the IYCF Strategy of Bangladesh. This curriculum contains 20 (twenty) learning sessions. Each session has a lesson plan, to make the training more effective. The course provided the opportunity to learn by practical demonstration. The curriculum helped to conduct exclusive course on complementary feeding and had been used by health and nutrition care providers involved in different levels of IYCF activities.

1.4 Guiding Principles for Complementary Feeding for Breastfed Child (WHO-UNICEF)

WHO-UNICEF guidelines have been considered as reference for complementary feeding practices all around the world. Ten principles for appropriate IYCF practices have been included here as summarized below:

Duration of Exclusive Breastfeeding and Age of Introduction of Complementary Foods

Practice exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age (180 days) while continuing to breastfeed.

Maintenance of Breastfeeding

Continue frequent, on-demand breastfeeding until 2 years of age or beyond.

Responsive Feeding

Practice responsive feeding, applying the principles of psychosocial care. Specifically: a) feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues; b) feed slowly and patiently, and encourage children to eat, but do not force them; c) if children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement; d) minimize distractions during meals if the child loses interest easily; e) remember that feeding times are periods of learning and love - talk to children during feeding, with eye to eye contact.

Safe Preparation and Storage of Complementary Foods

Practice good hygiene and proper food handling by a) washing caregivers' and children's hands before food preparation and eating, b) storing foods safely and serving foods immediately after preparation, c) using clean utensils to prepare and serve food, d) using clean cups and bowls when feeding children, and e) avoid the use of feeding bottles, which are difficult to keep clean.

Amount of Complementary Food Needed

CF should be started at 6 months of age with small amounts of food and increasing the quantity as the child gets older, while maintaining frequent breastfeeding. The energy needs from complementary foods for infants with "average" breast milk intake in developing countries are approximately 200 kcal per day at 6-8 months of age, 300 kcal per day at 9-11 months of age, and 550 kcal per day at 12-23 months of age.

Food Consistency

Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities. Infants can eat pureed, mashed and semi-solid foods beginning at six months. By 8 months most infants can also eat "finger

foods" (snacks that can be eaten by children alone). By 12 months, most children can eat the same types of foods as consumed by the rest of the family (keeping in mind the need for nutrient-dense foods). Avoid foods that may cause choking (i.e., items that have a shape and/or consistency that may cause them to become lodged in the trachea, such as nuts, grapes, raw carrots).

Meal Frequency and Energy Density

The care takers need to increase the number of times that the child is fed complementary foods as he/she gets older. The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy breastfed infant, meals of complementary foods should be provided 2-3 times per day at 6-8 months of age and 3-4 times per day at 9-11 and 12-23 months of age, with additional nutritious snacks (such as a piece of fruit or bread or chapatti with nut paste) offered 1-2 times per day, as desired. Snacks are defined as foods eaten between meals-usually self-fed, convenient and easy to prepare. If energy density or amount of food per meal is low, or the child is no longer breastfed, more frequent meals may be required.

Nutrient Content of Complementary Foods

Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used. Vitamin A-rich fruits and vegetables should be eaten daily. Provide diets with adequate fat content. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered so as to avoid displacing more nutrient-rich foods.

Use of Vitamin-Mineral Supplements or Fortified Products for Infant and Mother

Fortified complementary foods or vitamin-mineral supplements for the infant are recommended, as needed. In some populations, breastfeeding mothers may also need vitamin-mineral supplements or fortified products, both for their own

health and to ensure normal concentration of certain nutrients (particularly vitamins) in their breast milk. Such products may also be beneficial for pre-pregnant and pregnant women.

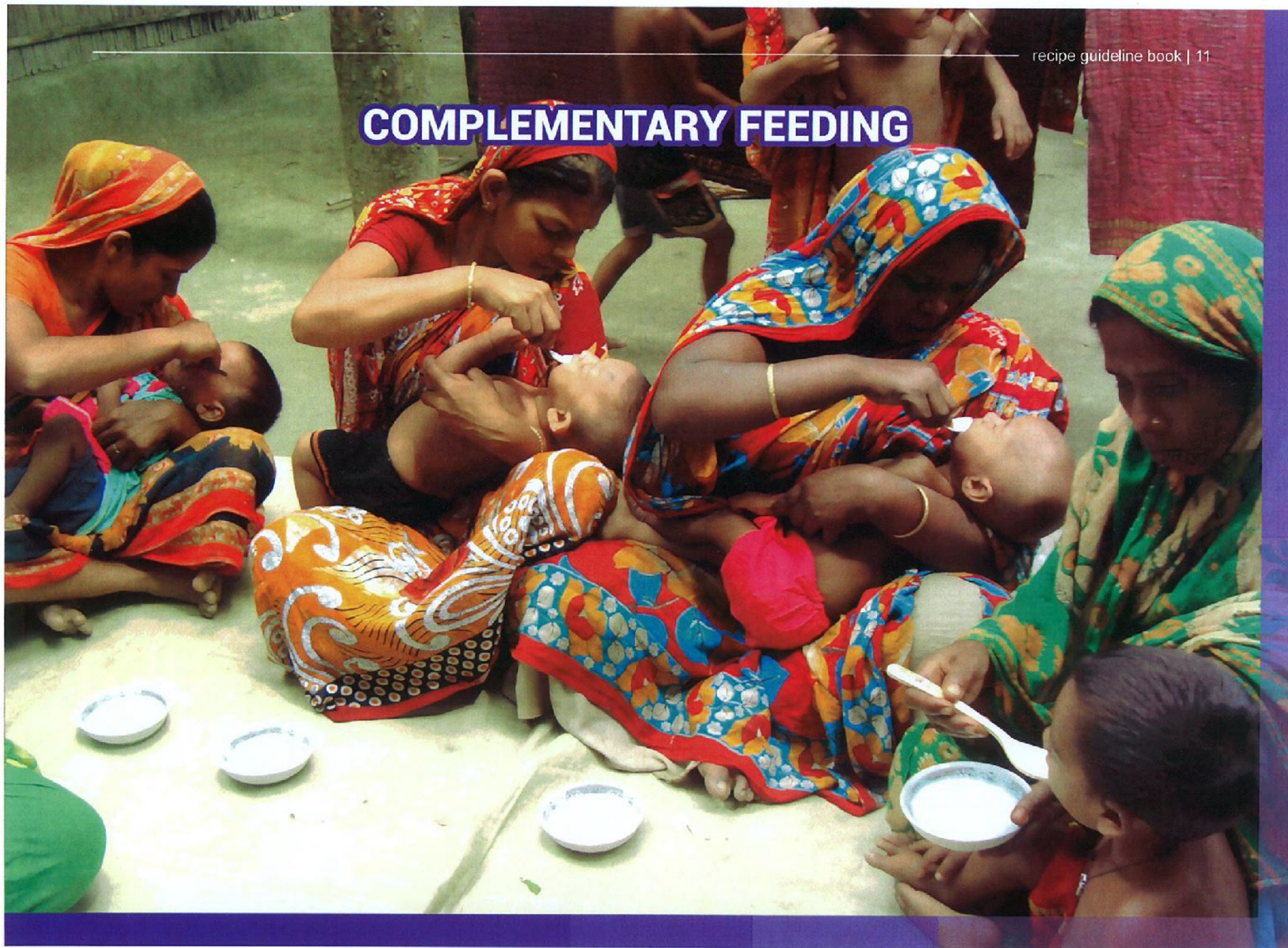
Feeding During and After Illness

There is need to increase fluid intake during illness, including more frequent breastfeeding, encourage the child to eat soft, varied, appetizing, favorite foods. After illness, give food more often than usual and encourage the child to eat more.

Part -2



COMPLEMENTARY FEEDING



Complementary Feeding

Appropriate feeding practices help promote growth, prevent stunting and increase a child's chances of a healthy productive life as an adult. These feeding practices, known collectively as infant and young child feeding (IYCF) practices, include breastfeeding and complementary feeding. Infants should be breastfed within half an hour of birth, exclusively breastfed for the first six months of life, and thereafter should receive nutritionally adequate and safe complementary foods while breastfeeding continues up to two years and beyond.

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. As a global public health recommendation, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond.

Early initiation of breastfeeding, within one hour of birth, protects the newborn from acquiring infections and reduces newborn mortality. Breast milk is also an important source of energy and nutrients in children 6 to 23 months of age. It can provide one half or more of a child's energy needs between 6 and 12 months of age, and one third of energy needs between 12 and 23 months.

2.1 Definitions

Complementary feeding refers to the period when other foods or liquids are provided along with breast milk. Complementary feeding is defined as the process that begins when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, at six months of age, when other foods and liquids are needed. These other foods are called complementary foods. Complementary foods are any non-breast milk foods given to young children during this period. Complementary foods are the first foods that complement breast milk but do not replace it. Some examples of good complementary foods include Egg suji, Khichuri and Fruit payesh.

During the period of complementary feeding a baby gradually becomes adapted to eating family foods. At the end of this time (usually at around the age of 24 months of age) breast milk is entirely replaced by family foods, although a child may still sometimes suckle for comfort.

Appropriate complementary feeding depends on accurate information and skilled support from the family, community and health care system. Providing appropriate nutrition counseling to mothers of young children and recommending the widest possible use of locally available food sources will help ensure that local foods are prepared and fed safely in the home.

Households and communities need to be encouraged to develop and promote utilization of improved complementary foods in order to prevent and address moderate child malnutrition, using locally available and affordable foods. This is done through a participatory research methodology known as Trials of Improved Practices (TIPs). This methodology relies on testing the acceptability and feasibility, within families, of the recommendations for improved feeding and food-related practices before their finalisation and dissemination³. Agricultural extension services and health care systems can work in an integrated manner to train mothers and communities on nutrition and optimal child feeding practices.

TIPs can be facilitated by trained extension workers (community nutrition promoters, community health promotion and agricultural extension workers), NGOs and/or government structures, once the improved complementary feeding options are approved by National Committees on Infant and Young Child Feeding.

Since the mother does not always have the ability to take decisions that affect what and how her child is fed, other family members also need to be targeted with information and counseling, particularly husbands and mothers-in-law.

IYCF practices include following components:

- Continued breastfeeding.
- Feeding (solid/semi-solid foods) a minimum number of times per day according to age and breastfeeding status
- Feeding the minimum number of food groups per day according to breastfeeding status

³FAO (2012) Briefing note on Complementary Feeding :Support to Joint Programme, FAO Rome.

Characteristics of appropriate complementary foods

Complementary foods should be rich in energy, protein and micro and macro nutrients (particularly iron, zinc, calcium, vitamin A, vitamin C and folate), clean and safe: (no harmful chemicals or toxins; no bones or hard bits that may choke a child) not too spicy or salty; easy for the child to eat; liked by the child; locally available and affordable; easy to prepare.

Statement on optimal infant and young child feeding practices complementary feeding

Good complementary feeding practices are essential to protect infants and children from both under nutrition and over nutrition. Infants are particularly vulnerable during the transition period when complementary feeding begins. In order to ensure that their nutritional needs are met, complementary feeding should be guided by the following principles⁴:

- **Timeliness:** They should be introduced when the child has completed 6 months (180 days) of life, when the need for energy and nutrients exceeds what can be provided through exclusive and frequent breastfeeding.
- **Safe and hygienic:** They should be clean and safe, hygienically prepared and stored, fed with clean hands using clean utensils and not with bottles and teats.
- **Adequacy:** They should provide sufficient energy, protein and micronutrients from different types of foods in the right proportions. Complementary foods should contain the minimum dietary diversity (≥ 4 food groups) to meet a growing child's nutritional needs. Young children have small stomachs and foods should therefore be frequently fed to the child according to the WHO Guidelines on complementary feeding practices. A frequently breast fed child should be given complementary foods as follows – 2 meals a day, starting with 2 to 3 tablespoons per meal; 3 meals a day at ages 7-8 months; 3 meals a day plus 1 snack at ages 9 to 11 months; 3 meals a day plus 2 snacks at ages 12 to 24 months⁵.
- **Responsively fed:** They should be given consistent with a child's signals of appetite and satiety, and that meal frequency and feeding method (actively encouraging the child, even during illness, to consume sufficient food using fingers, spoon or self-feeding) are suitable for the age of the child.

⁴National Strategy for Infant and Young Child Feeding in Bangladesh, April 2007.

⁵FAO/EU FFP (2011) Trials of Improved Practices (TIPS) Reference Notes and Tools, FAO Rome.

2.2 Why are complementary foods important?

It is well recognized that the period from birth to two years of age is a "critical window" for the promotion of optimal growth, health and behavioral development. Poor breastfeeding and complementary feeding practices, coupled with high rates of infectious diseases, are the principal proximate causes of malnutrition during the first two years of life. It is essential to provide small children with adequate amounts of essential nutrients, consumed in appropriate quantities of diverse foods to promote proper growth and development of their full potential and future capacities. From 6 months onwards, breastmilk alone is no longer adequate and children must be given complementary foods made from mixtures of foods which provide the much needed energy and nutrients.

Longitudinal studies have consistently shown that this is the peak age for growth faltering, deficiencies of certain micronutrients, and common childhood illnesses such as diarrhea. After a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier (Martorell et al, 1994)

After 6 months as a baby grows and becomes more active, additional foods from the nutritional stand point are required to FILL THE GAP between the total nutritional needs and the amounts provided by breast milk.

What are the energy and nutrient gaps?

Earlier we have explained that after 6 months onward a child requires more energy and other nutrients than they get from breastmilk alone. If this requirement is not met from appropriate complementary foods an energy GAP starts. With time and continued inappropriate feeding practices along with frequent infections and disease, the GAP between the energy and nutrient requirement of children and their supply from breast milk gradually increases.

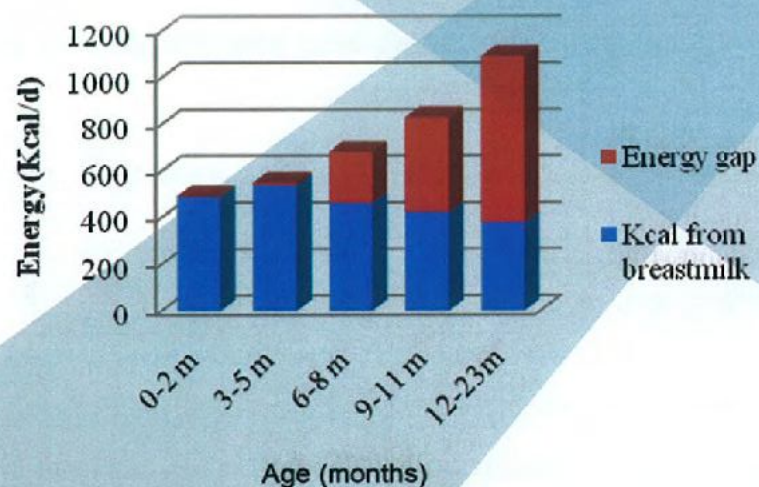
In the following figure the energy, iron and vitamin A gaps for children aged 6-23 months have been compiled and later we have shown why it is necessary to fill the gaps by giving a mixture of complementary foods and also few examples on how a good mixture of different food groups can meet those gaps.

The lower sections at the bottom of each column show how much energy and nutrients are supplied by breast milk if the child is breastfed frequently. Notice that: breast milk provides important amounts of energy and nutrients even in the second year of life. But after completion of 6 months, there are gaps to be filled for energy and all the nutrients the biggest gaps are for energy and iron, and the smallest is for vitamin A.

Energy Gap

In Figure 1 the amount of energy that children need and the amount supplied by breastmilk at different ages has been showed. The difference between the amounts children need and the amounts from breast milk is called the energy gap.

Figure 1: Energy required (top line) and the amount from breastmilk



Source: Adapted from WHO (2000) Guidelines on Complementary Feeding: Family Foods for Breastfed Children.

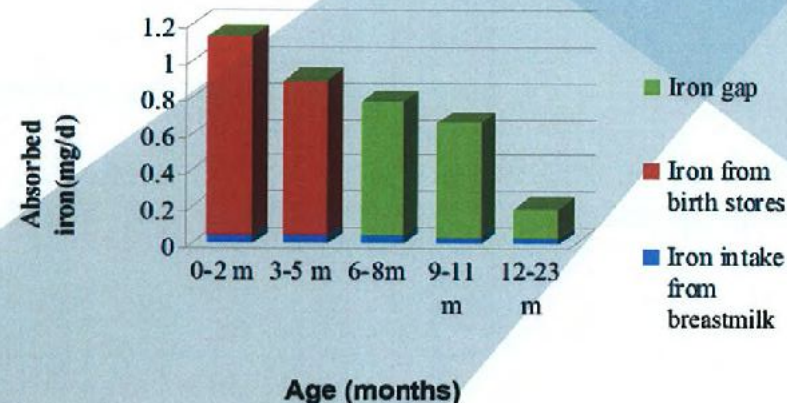
The above figure shows that upto six months a child gets all the required energy from breastmilk, but from 6 months onward there is a gap between the total energy needs and the energy provided from breastmilk. This means that-

- To fill the energy gap and meet a greater proportion of the energy requirements children from 6 months onward should be fed with a good combination of energy dense complementary foods.
(A short description of preparation of energy dense complementary food has been depicted in part 3)
- Provide an increased quantity of food as the child grows. This can be met by increasing consistency and feeding frequency of complementary foods.

Iron Gap

Similarly figure 2 illustrates the iron gap (difference between the amount children need and the amount supplied from breast milk).

Fig 2: Absorbed iron needed and the amount supplied from breastmilk and body stores at birth



Source: Adapted from WHO (2000) Guidelines on Complementary Feeding: Family Foods for Breastfed Children.

The red line in Figure 2 shows the daily amount of iron a child requires at different ages. We can see that this gradually becomes less. This is because the requirement is proportional to the amount of new blood a child's body has to make. More new blood is made in the first year (when growth is faster) than in the second year.

As we know, the amount of iron that a child receives from breast milk is small. So there remains a large gap between what the child needs and what is provided by breast milk, especially in the first year. Full-term babies are born with enough iron stores to cover their needs in the early months and they use their iron store to fill the gap. But this store is used up by about 6 months and from 6 months onward a gap starts between the iron needed and the amount provided by breast milk. This means that-

- From about 6 months of age if the iron gap is not filled through iron rich complementary foods, the child will become deficient in iron.
- The iron gap is biggest from 6-12 months, so the risk of iron deficiency is highest in this age group.
- Pre-term and low-birth-weight babies are at increased risk of anaemia because they are born with smaller body stores of iron. So the iron gap starts earlier.
- Appropriate food combinations need to be used in CF for young children to meet the iron requirements of the rapidly growing young child.

Iron comes in two forms from diet, that is heme (iron from animal sources) and non-heme (iron from plant sources). Good sources of non-heme iron include- green leafy vegetables, legumes, dried fruits etc. And good sources of heme iron include animal proteins e.g. red meat, organ meat etc. But iron bio-availability is poor from plant foods but is good from animal foods.

Vitamin A gap

Vitamin A is another important nutrient needed for healthy eyes and skin and to help the body to fight against infections. Similar to the iron and energy gaps shown above, there is a gap for vitamin A.

This means that-

- Complementary foods rich in vitamin A such as yellow fruits and vegetables, dark green leafy vegetables, flesh foods (fish, poultry and meat, especially liver/organ meats), eggs, and milk are needed to fill the gap.
- The quantity needed increases as the child grows. This can be met by increasing the vitamin A rich foods in complementary foods.
- To the extent possible, at least one food of animal origin, even in small amounts, should be part of the daily diet. If it is not available and too expensive, consuming food of animal origin 2 to 3 times a week can also have health benefits.

(How vitamin A rich fruits and vegetables can contribute to this gap has been explained in section 2.4)

2.3 Why is it necessary to start complementary food at the appropriate time?

Most children are ready to be fed complementary foods when they are six months of age. This is also the age when nerves and muscles in the mouth develop sufficiently to let the baby eat (WHO). Besides at 6 months of age the following developmental changes occur that allow the infant to tolerate complementary foods -

- The infant's intestinal tract develops immunologically with defense mechanisms to protect the infant from foreign proteins (thus, the risk of hypersensitive (allergic) reactions to the proteins in complementary foods is reduced).
- The infant's ability to digest and absorb protein, fat, and carbohydrate, other than that in breast milk, increases rapidly.
- The infant's kidneys develop the ability to excrete the waste products from foods with a high renal solute load, such as meat.
- The infant develops the neuromuscular mechanisms needed for recognizing and accepting a spoon, masticating, swallowing non liquid foods, and appreciating variation in the taste and color of foods.

If a mother introduces complementary food too early (before 6 months) it is likely to cause undesirable effects. Firstly, the child's gastro intestinal tract is not yet ready to digest and absorb the foods; secondly, given the child's sensitive gastro intestinal tract, even the slightest failure of hygiene in preparation of complementary foods is likely to cause diarrhoea. With the early onset of CF, the child is deprived of protective factors in breast milk as there will now be less supply of breast milk by the mother. Further, too early an introduction of CF may merely help to fill the stomach but will not be nutritionally adequate to meet the infants growing nutritional needs.

On the other hand, if CF are introduced too late in an infant's diet, it is likely to lead to failure to gain appropriate weight. It also becomes more difficult to persuade the baby to start eating solid foods at a later stage. Babies who do not begin eating CF at the right time, may want nothing but breast milk or other milk including liquid foods even after the age of one year. The risk of malnutrition and micronutrient deficiencies consequently increases.

2.4 Why a mixture of foods is necessary to fill that gap

A mixture of foods from different food groups enhances the availability of different nutrients. For example, preparation of complementary food using different food groups will help as follows:

Cereals, roots and tubers

- They are staple foods and are a major source of energy, providing 55-65 % of daily energy requirement, hence they help to fill energy gap.
- They also help to fill the protein gap but need to be combined with pulses or legumes in order to improve the protein quality of the complementary food. .
- They provide some calcium, iron and B complex vitamins (particularly whole grains) to the diet . However, they have a small effect on the iron gap.
- They have no effect on vitamin A gap.
- Tubers and roots are good sources of carbohydrate and hence aid to fill energy gap.

Legumes, nuts and Oilseeds

- Addition of pulses to diet has a small effect on energy gap.
- If pulses, nuts or oil seeds are used, it would provide more energy, thus more of the energy gap would be filled.
- Pulses and legumes are also rich source of protein, therefore they almost fill the protein gap. The protein of /legumes are of low quality but when mixed with cereals in proportions of 1: 5 they mutually supplement each other and improve the protein quality of the CF.
- Pulses are good sources of B complex vitamins. However, they do not contain vitamin A and C. If legumes are germinated, they contribute to some vitamin C. However, they have no effect on vitamin A gap.
- They also have a very small effect on iron gap.
- Nuts and oilseeds are rich in protein and in addition they contain high level of fat. They aid to fill the protein gap.
- As a concentrated source of energy, they help to fill energy gap.

Milk and Milk products

- Milk is an excellent source of good quality protein, but is also a good source of calcium, riboflavin, vitamin A and other nutrients.
- Milk helps fill the energy and protein gap.

Eggs

- Egg protein is referred to as complete protein. It fills the protein gap completely.
- Egg also provides sufficient energy to the diet, thus fills the energy gap.
- Egg fat is an excellent source of Docosahexaenoic acid (DHA), required for brain development of children.

Fish and flesh foods

- Fish and flesh food contain high amount of phosphorus, calcium, iron and zinc.
- They play a small role on energy gap.
- They provide good quality protein and also provide B complex vitamins.
- Besides, flesh foods are the only source of B₁₂ vitamin which is absent in plant foods.
- Flesh foods are also source of iron and vitamin A. Even a little liver helps to meet protein, vitamin A and iron gaps, besides providing energy.
- Fish is a good source of calcium, ω -3 fatty acid (poly unsaturated fatty acid).

Vitamin A rich fruits and vegetables

Dark green leafy vegetables

- Has very little effect on the energy gap.
- Provides some protein.
- Provides some iron.
- Provides pro vitamin A and completely fills the gap.
- Green leafy vegetables also provide vitamin C, riboflavin, folic acid and dietary fibre.

Yellow-orange colored vegetables

- Fills part of the energy gap.
- Yellow-orange colored vegetables are excellent source of β carotene, or pro vitamin A and helps fill the vitamin A gap.

Other Fruits and Vegetables

- Fruits and vegetables are excellent sources of micronutrients, and have a small effect on the energy and protein gap.
- Dried fruits however, are good source of protein and iron.

- Fruits especially citrus fruits are good sources of vitamin C. Fruits when taken after a meal help improve the absorption of iron from the other foods.
- They help to fill part of the iron gap.

Sugars and jaggery

- They supply energy.
- Jaggery helps fill part of the iron gap.

Fats and Oils

- Fats and oils are a concentrated source of energy, increase the energy density and help to fill the energy gap.
- Fats and oils provide essential fatty acids to the diet.

Therefore, a good mixture of above food groups will help to meet the energy and nutrient requirements and accordingly fill the nutrient gaps.

Part -3



COMPLEMENTARY FEEDING GUIDELINES FOR CHILDREN OF DIFFERENT AGE GROUPS (6 TO 23 MONTHS)



Complementary Feeding Guidelines for children aged 6 to 23 months



3.1 Why improve complementary feeding?

Children need good food to grow and develop properly. Until 6 months of age, children need breastmilk only. Breast milk provides all the nutrients an infant needs for appropriate growth and brain development during this period. There should be no prelacteal feeds such as water, other liquids or ritual foods. Exclusively breast fed children are at a much lower risk of infection from diarrhoea and acute respiratory infections than infants who receive other foods. Offering foods to infants before six months reduces breastmilk intake and interferes with full absorption of breastmilk nutrients.

From 6 months onwards, breast milk is no longer enough. There is need to introduce complementary foods beginning around six months of age. If complementary foods are started too early it will possibly take the place of breast milk, resulting in a

nutritionally inadequate diet and increasing the risk of illness. Besides before 6 months of age, a child's stomach is not fully developed and has less protective factors. Young children may find it difficult to digest foods leading to diarrhea. On the other hand, if complementary foods are introduced later than 6 months, the child may not meet the nutritional needs, thereby slowing down growth and development. This will also increase the risk of deficiencies, malnutrition and ill health.

3.2 Common feeding problems

Many mothers are not fully aware of the food needs of infant and young child feeding. There are some common feeding problems faced by mothers. Despite mothers' awareness, children are sometimes not exclusively breast fed during the first 6 months. Giving children plain rice or sago porridge as complementary foods, is not enough to meet the child's nutrient requirements, support growth and development and this contributes to high levels of malnutrition. Mothers sometimes cook complementary foods in bulk i.e. 3 daily meals once a day, resulting in children eating left overs at lunch and dinner time. If the food is improperly stored and not well heated before feeding, it becomes unsafe- especially in summer and hot months, and can make the children sick. There is misconception among mothers which prevents mothers from introducing vegetables, fish, meat and boiled or soft cooked eggs into the child's diet. Mothers begin giving these foods late, at around one year because they are considered difficult to chew or swallow, which is not the case. These are nutritious foods and should be introduced much earlier.

This dietary guideline gives emphasis on scientific and practical instructions to help clearly understand about the nutritive value of complementary foods available and to provide advice and counselling to families on appropriate child feeding practices. The guideline is for everyone responsible for the health and nutrition of young children, particularly health, nutrition and agriculture workers and their trainers. The general guiding principles and recommendations for young child feeding are applicable throughout Bangladesh. The recipes developed and included in the recipe book, can easily be adapted for use in regional areas to fit in with local food and eating patterns and the seasonal availability of foods.

A. Dietary Diversity

Dietary diversity is a key element for high quality diets. Increasing the variety of foods across and within food groups has been long recommended by dietary guidelines across the world⁶ as well as in Bangladesh. Intake of a diverse diet helps to ensure adequate intake of energy and essential nutrients and thus promotes good health. Additionally, with the current recognition that dietary factors are associated with increased risks of chronic diseases, dietary recommendations promote increased dietary diversity along with reducing intake of fat, refined sugars and salt.

The rationale for emphasizing dietary diversity stems from the fact that optimal feeding requires adequate protein and micronutrient intake as well as energy intake to ensure growth and proper metabolic functions of the body. Lack of dietary diversity is a severe problem in Bangladesh, as diets are predominantly based on starchy staples and include little or no animal products and few fresh fruits and vegetables. Such plant-based diets tend to be low in a number of micronutrients, and the micronutrients they contain are often in a form that is not easily absorbed. In spite of the well-recognized importance of dietary diversity in both developed and developing countries, there is still a lack of consensus about what dietary diversity really is and what it reflects. There is also a lack of uniformity in methods to measure dietary diversity and in approaches to develop and validate indicators.

Dietary diversity is defined as the number of individual food items or food groups consumed over a given period of time.

Dietary diversity is classified as follows:

- Low dietary diversity (<4 food groups)
- Minimum dietary diversity (4 food groups)
- High dietary diversity (>4 food groups)

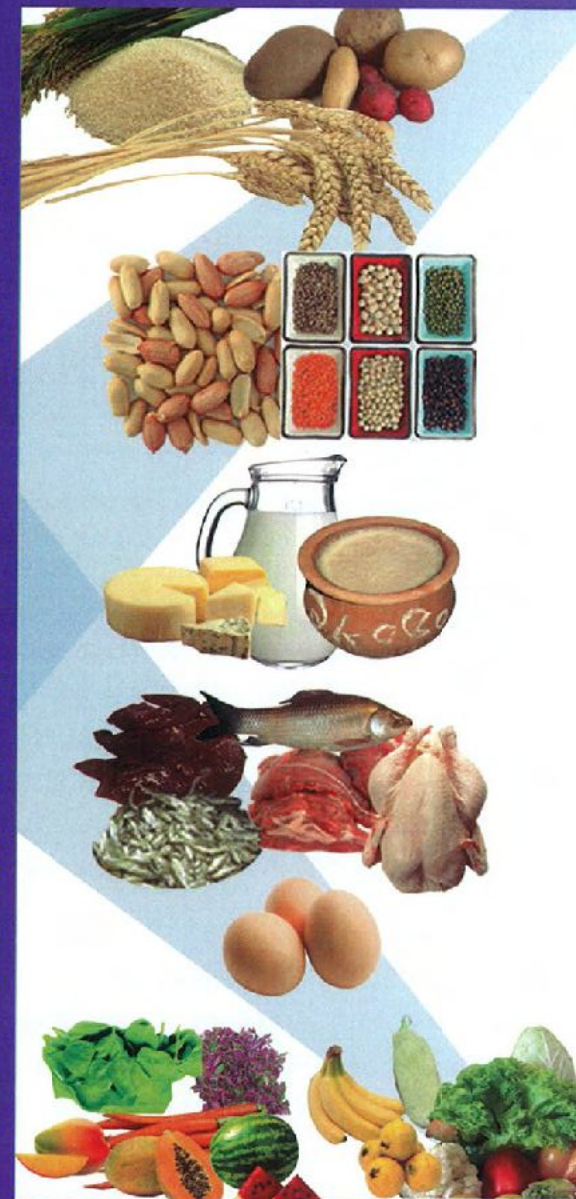
Feeding children a variety of foods is important for healthy growth and development. Complementary food should come from different food groups so that it contains all the required nutrients.

⁶U.S. Department of Agriculture Human Nutrition Information Service 1992; WHO/FAO 1996

FOOD GROUPS

1. Grains, roots and tubers
2. Legumes and nuts
3. Dairy products (milk, yogurt, cheese)
4. Flesh foods (meat, fish, poultry and liver/ organ meats)
5. Eggs
6. Vitamin-A rich fruits and vegetables
7. Other fruits and vegetables

THE 7 FOOD GROUPS USED FOR TABULATION OF DIETARY DIVERSITY



Source: WHO/UNICEF/USAID/AED/UCDavis/IFPRI (2007), Indicators for assessing infant and young child feeding practices, Part -1 , definitions.

To assess IYCF practices, minimum dietary diversity can be measured as follows-

Children 6-23 months of age who received foods from ≥ 4 food groups during the previous day.

Children 6-23 months of age

Source: WHO/UNICEF/USAID/AED/UCDavis/IFPRI (2007), Indicators for assessing infant and young child feeding practices, Part -1, definitions.

B. Energy (%) from different nutrients

Due consideration should be given to translate nutrient intake goals into dietary guidelines. This is the percent of energy recommended. The major energy giving nutrients are-

- energy from CHO should be 55-75%
- energy from protein should be from 10 to 15%
- energy from fat should be from 15 to 30%

(Source: FAO/WHO 2003)

C. Energy Density

Energy density is the number of kilocalories per gram of preparation. It is calculated using the following formula:

Total kilocalories of preparation (kcal)

Total weight of preparation (g)

Children should be fed with high energy dense food to meet their energy requirements. Energy density of foods given to infants and young children can be increased in different ways:

- I. By adding a tea spoon of oil, ghee or cream in every feed. Fat is a concentrated source of energy and substantially increases energy content of food without increasing the bulk.
- II. By adding a little sugar or jaggery but not too much to the child's food. Children need more energy and hence just enough amounts of sugar or jaggery should be added to child's food to increase the energy content of a meal without increasing its volume.
- III. By giving malted foods. Malting reduces the bulk and viscosity of foods and hence a child can eat more at a time. Malting is germinating whole grain cereals or legumes, drying it after germination, roasting and then grinding.
- IV. Increasing thickness of the food. The foods consumed should change in consistency and composition, becoming thicker and more energy dense.
- V. Enhancing variety and consistency. Initially porridge and other semi solid foods are suitable first foods because infants are physiologically ready to accept them. They are also more energy dense than liquids, such as soups.
- VI. Adapting the diet. When infants are capable to eating thicker semi solid foods, such as mashed banana, such foods should be introduced because they tend to be more calorically dense than purees. The young infant should then be served with thick but smooth mixtures as hard pieces in the semi-solid food may cause difficulty if swallowed.

D. Nutrient density

Nutrient density refers to the amount of essential nutrients for the given volume of food.

Nutrient density is defined as the amount of different nutrients per 100 kilocalories of preparation. It is calculated using the following formula:

$$\frac{100 \text{ kcal} \times \text{total amount of nutrient in the preparation}}{\text{Total kilocalories in final preparation}}$$

Nutrient density helps in the closing of the nutrient gap in relation to the infant and young child's expanding nutrient needs⁷.

A diet prepared using different food groups (e.g. cereal+legumes and oil seeds/flesh foods/milk/eggs +vegetables prepared with adequate amount of oil/sugar/jaggery) will enhance both energy and nutrient density (e.g. protein, iron, vitamin A), thus will help to meet both macro and micro nutrient requirements of the children for appropriate growth and development.

E. Frequency

According to WHO guiding principles, for the average healthy breastfed infant, meals of complementary foods should be provided-

- 2-3 times per day at 6 to 8 months of age.
- 3-4 times per day at 9 to 11 months of age.
- 3-4 times per day at 12 to 23 months of age.

Additional nutritious snacks (such as piece of fruit or bread or chapatti with nut paste) may be offered 1 to 2 times per day as desired.

If energy density or amount of food per meal is low, or the child is no longer breastfed, more frequent meals may be required.

This is one of the indicators used to assess the IYCF practice in a specific population. 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 two fractions:

$$\frac{\text{Breastfed children 6-23 months of age who received solid, semi-solid or soft foods the minimum number of times or more during the previous day}}{\text{Breastfed children 6-23 months of age.}}$$

⁷Solomons NW, Vossenaar M (2013) . Nutrient density in complementary feeding of infants and toddlers, J Clin Nutr, Feb 27. 10: 1038 - 46

Or,

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

Breastfed children 6-23 months of age.

This indicator is intended as a proxy for energy intake from foods other than breast milk.

F. Portion size

Serving size or portion size is defined as the recommended amount of a food or drink that is generally served. It refers to the portion of food used as a reference on the nutrition label of that food.

According to WHO guidelines, if a child is fed with complementary foods which have a composite energy density ranging from 1.07 to 1.46 kcal/g, the approximate portion size to meet the energy needs will be-

Age group (months)	Energy density (kcal/g)	Portion size in g (approximate)	Frequency of feeding per day
6 to 8	1.07 to 1.46	45 to 62	2 to 3 times
9 to 11		51 to 70	3 to 4 times
12 to 23		95 to 129	3 to 4 times

Example⁸ : For 6-8 month old children - ½ cup rice, 1 ½ tablespoons mung dal (lentils), 3 tablespoons dark green leafy vegetables and 1 teaspoon oil; 9-11 month old children – 1 ½ cups cooked cereal, ½ banana, ½ cup rice and beans, 1 serving spoon tomato –vegetable stew with 1 teaspoon oil, 1 ½ tablespoons chopped cooked chicken and 1 piece halwa/bean cake; 12 to 24 months – 1 cup rice, 3 Tablespoons dal (lentil), 1 teaspoon oil, a small piece of fish, ½ cup boiled potato, 2 pieces halwa (coconut, sweet potato/pumpkin, jaggery and fat) and 1 small mango. These examples provide, in addition to breast milk, sufficient energy, protein and vitamin A for the specific age group.

⁸Adapted from AED/USAID (1999) Recommended feeding and dietary practices to improve infant and maternal nutrition

G. Acceptability

The mother/caregiver should not face any barrier in choosing foods for cultural or social reasons. Complementary foods should be acceptable by both mothers and her children. An understanding of the local diets is needed to determine the best combination of foods and practices to achieve the desired levels of energy and nutrient intake. The TIPs methodology and score card can be used to evaluate the acceptability of developed complementary foods.

H. Feasibility

Ingredients of complementary foods should be easily available and accessible. Complementary foods should be cost effective, affordable and easy to prepare. There is need to identify current good practices that can be strengthened and promote options that improving the traditional diets and change child-feeding behaviors to promote increased food intake, meal frequency, energy density, and micronutrient consumption. Besides, the mothers or care givers or family members should have adequate time, knowledge, skills, resources, and support to prepare complementary foods appropriately. Behaviour change strategies and training should provide emphasis on cooking skills and appropriate processing and storage technologies based on local context and feasibility.

I. Preparation time and cooking process

Preparation time is the approximate time required to prepare a meal prior to cooking. To prepare complementary foods easily in a short time it is necessary for the mothers/caregivers to have knowledge on basic cooking techniques. Additionally simple processing technologies building on local practices would be helpful. Possessing this knowledge and skill not only increases the ease and feasibility of preparing complementary foods, it also gives the mother a sense of satisfaction of learning something new and an enjoyment of cooking.

Traditionally, in Bangladesh several cooking methods and technologies are used to prepare daily meals and foods on special occasions. These household methods and technologies need to be strengthened and promoted so as to contribute to improving the quality and safety of complementary foods.

Dry cooking methods

Roasting

Roasting is a dry heat cooking method that uses hot, dry air to cook food. Roasting results in browning of the ingredients or surface of the food which helps develop acceptable flavors and aromas. Roasting of grains, namely rice, green gram and nuts improves the flavor and digestibility by reducing moisture content, volume and helps prepare a complementary food pre mix that provides a concentrated source of nutrients. It also helps to increase the shelf life of the complementary food.

Sauteing

Sauteing is a form of dry-heat cooking that uses a very hot pan and a small amount of fat to cook the food very quickly. Like other dry-heat cooking methods, sautéing browns the food's surface as it cooks and develops complex flavors and aromas

Shallow frying

Shallow frying is the cooking of food in a small quantity of pre-heated fat or oil or butter in a shallow pan or on a flat surface (griddle plate/tawa). Browning the outside quickly may help to prevent the absorption of too much fat.

Frying

Deep frying is a cooking method in which food is submerged in hot fat or oil. This is normally performed using a frying pan. All fat used in frying must be clean and hot and light in color. Temperatures are much higher than the other cooking methods listed above typically reaching between 175 - 225°C. The outside of the food will brown quickly and care will be needed to ensure that the inside is cooked properly. A coating of breadcrumbs or batter, semolina (suji), puffed rice and rice flakes helps to protect the outside of the food product from too much browning and produces a pleasant taste.

Wet cooking methods

Boiling

Boiling is cooking of foods in a liquid at boiling point. In this method, food is cooked in a boiling liquid that is usually water, but may also include stock or milk.

Blanching

Blanching is a process in which the food substances usually a vegetable or fruit is plunged into boiling water, removed after a brief, timed interval, and finally plunged into iced water or placed under cold running water to halt the cooking process. Blanching helps to enhance the colour of the vegetables or fruit, serves to keep the food for extended periods and preserves and adds value to the product.

Steaming

Steaming is a method of cooking using steam. Steaming is considered a healthy cooking technique and capable of cooking almost all kinds of food. This is cooking in water vapour - usually over boiling water. The steaming equipment comprises a pan with one or more steaming baskets (perforated dish) with a close fitting lid.

A colander or sieve may also be used, For example, in the preparation of mixed vegetable pitha, the pithas were steamed over a colander.

J. Cost

Good complementary foods should be affordable and cost effective. They should be within the reach of communities of different economical levels. The nutrient return for the money spent should be a factor to be considered in the planning and preparing complementary foods.

K. Safety, hygiene and storage of CF

It is important that the complementary food is clean, hygienic and safe. If cleanliness is not observed, complementary feeding may do more harm than good to the child by introducing infections to the infant and make them sick, e.g. diarrhea; or vomiting. It is therefore important that all foods prepared for infant and young child are handled in a way that they are free from any germs.

Safe and hygienic handling and preparation

- Hands should be washed with soap before preparing foods and feeding child. They should also be thoroughly washed after using the toilet and also after touching animals and pets in the household or community (because of risk of contamination with human and animal waste).
- Foods used should be those that appear fresh and smell good. After cooking, food should be kept in a covered container protected from dust and flies.
- Dry ingredients such as rice and legumes (beans) should be processed properly to prevent the mould from growing on them.
- Vegetables and fruits should be thoroughly washed with clean water and peeled if possible/necessary. Meat should be washed with clean water before cooking it, since butchers often rinse it in dirty water or leave it out hanging, exposed to dirt and flies.
- Surfaces of any wooden chopping boards and utensils touched by raw foods should be washed with hot water and soap, before using them again.
- Meat, offal, poultry and fish should be cooked well. Eggs should be boiled hard and should not be eaten raw. Cracked eggs should be avoided.
- Children's hands should be washed before meals. The mother's hands should be thoroughly washed before feeding the child. Feeding should be done with a clean spoon or cup, never a feeding bottle.

For safe storage

- The dry foods should be kept in a dry, cool place protected from insects, rodents and other pests.
- Raw meat, offal, poultry and fish should be kept aside from touching other foods, as these animal foods often contain germs.
- Perishable foods such as meat and milk and cooked food should be kept in cool place e.g. refrigerator, otherwise the food should be covered and kept over water in a meat safe. On the whole, cooked food should be eaten within 2 hours. If kept longer, the food should be reheated throughly to a boiling hot temperature so all pathogens will be killed.
- All utensils used for cooking and feeding should be scrubbed, washed well, dried and kept covered.
- The house and outside areas should be kept clean so that rats, mice and insects do not breed. Animals should always be kept outside the house. Children's feces should be disposed safely.
- Dangerous chemicals should be kept away from the kitchen, food and water as well as children. e.g. insecticides, repellants, fertilizers and pesticides.

L. Responsive feeding

Responsive feeding means, feeding a child according to his/her desire. A child should be encouraged to have a variety of food to meet the daily nutrient requirement and should not be force-fed. How, when, where, and by whom a child is fed are important factors to ensure optimal complementary feeding.

Mothers/caregivers should prepare nutritionally adequate complementary foods considering their children's preferences, likes and dislikes. They may not like new foods at first. It should be offered several times slowly and patiently, and should be encouraged to eat. Talking with children, playing with them, and maintaining eye-to-eye contact during feeding is one way of encouraging them to eat more. If children refuse foods, mothers/caregiver should try different food combinations, tastes, textures, and methods of encouragement. Distractions during meals should be minimized.

Older children should be encouraged to feed by themselves with other family members, in this case his/her hands should be cleaned carefully before feeding.

M. Trials of improved practices in Bangladesh

In Bangladesh, most traditional foods given to infants in different parts of the country are mixed foods like khichuri, suji, payesh, family foods and bhaat-bhaji. Using the Trials of Improved Practices (TIPs) methodology, feeding and food-related practices can be improved.

Traditional foods can be modified a little to make it more nutritious and appropriate for children's optimal growth. For example suji or payesh can be made more nutritious by adding vitamin A rich fruits and vegetables or other fruits and vegetables. This will increase the micronutrient density. Similarly a traditional porridge should be modified using a little amount of oil or adding some nuts. Khichuri can be improved by adding liver or flesh food (e.g. chicken/fish/beef) or egg and little amount of seasonal dark green and yellow-orange colored vegetables. These modifications should be culturally acceptable as well as nutritionally adequate for children. The improved complementary foods and practices should be tested for acceptability and feasibility before wider dissemination.

N. Household weights and measures

Household measurements are useful tools for mothers/caregivers to prepare complementary foods and to ensure that they prepare adequate quantities for each meal. Common household measurements are teaspoon (g), tablespoon (g), bowl (250ml) or tin (300ml) and any other containers (utensils) or ways of measuring food, commonly used in the area or homes when purchasing, preparing and eating food. It is very important to use the right proportions of the main ingredients.

Depending on the quantity, it is convenient to express household weights and measures as :

- Bowl, tablespoon and teaspoon.
- Other measures may be expressed in $\frac{1}{2}$ or $\frac{3}{4}$ of a bowl or $\frac{1}{2}$ tablespoon or $\frac{1}{2}$ teaspoon.

Measurements smaller than these fractions are difficult for most rural caregivers to understand, particularly for people who are semi-literate or illiterate.

O. Geographical areas and feeding pattern

Regional availability of different ingredients and feeding patterns widely influence complementary feeding practices in different areas of Bangladesh.

In Bangladesh, many foods are locally available. For example in Chittagong division, sweet potato, small fish, potato, tomato, dry fish are more accessible compared to other divisions. On the other hand, in Khulna and Barisal divisions' soya chunk is more readily used in different food preparation. Besides a varieties of different ethnic foods are fed to children in different regions of Bangladesh. Therefore complementary feeding pattern will vary within these regions.

But mothers or caregivers need to be provided with sufficient knowledge on basic techniques of modification and preparation of a nutritionally adequate complementary food for her children using locally available ingredients.

P. Recommended CF practices for breast fed children 6-23 months

Recommendation for CF practices for exclusively breastfed children are as follows-

AGE GROUP	ENERGY REQUIRED FROM CF	FREQUENCY OF FEEDING PER DAY	ENERGY DENSITY	DIETARY DIVERSITY
6-8 mo	200	2-3 times	1.07-1.47	≥ 4 food groups
9-11 mo	300	3-4 times	1.07-1.47	≥ 4 food groups
12-23 mo	550	3-4 times	1.07-1.47	≥ 4 food groups

Source: Adapted from WHO (2000) Guidelines on Complementary Feeding: Family Foods for Breastfed Children.

Conclusion

Appropriate breastfeeding and complementary feeding practices are essential for optimal infant nutrition. The period from birth to 2 years is widely recognized as the critical period, during which growth faltering and nutrient deficiencies can occur. Nutritional vulnerability during this period results from poor breastfeeding and complementary feeding practices, coupled with high rates of infectious diseases. Traditionally, in Bangladesh the nutritional quality of foods offered is inadequate relative to nutritional requirements. Inadequate knowledge of appropriate foods and feeding practices is often a greater determinant of malnutrition than lack of foods. Identification of inappropriate infant feeding practices can assist in the development of appropriate strategies to address childhood malnutrition in Bangladesh.

These guidelines have been developed to address these existing feeding problems. It is intended that use of this tool can help address the constraints and problems of complementary feeding guide trainers and users in promoting appropriate complementary feeding practices.

Annexure

i. Geographical Map



Fig: Geographical Map of Bangladesh.

ii Research team

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