

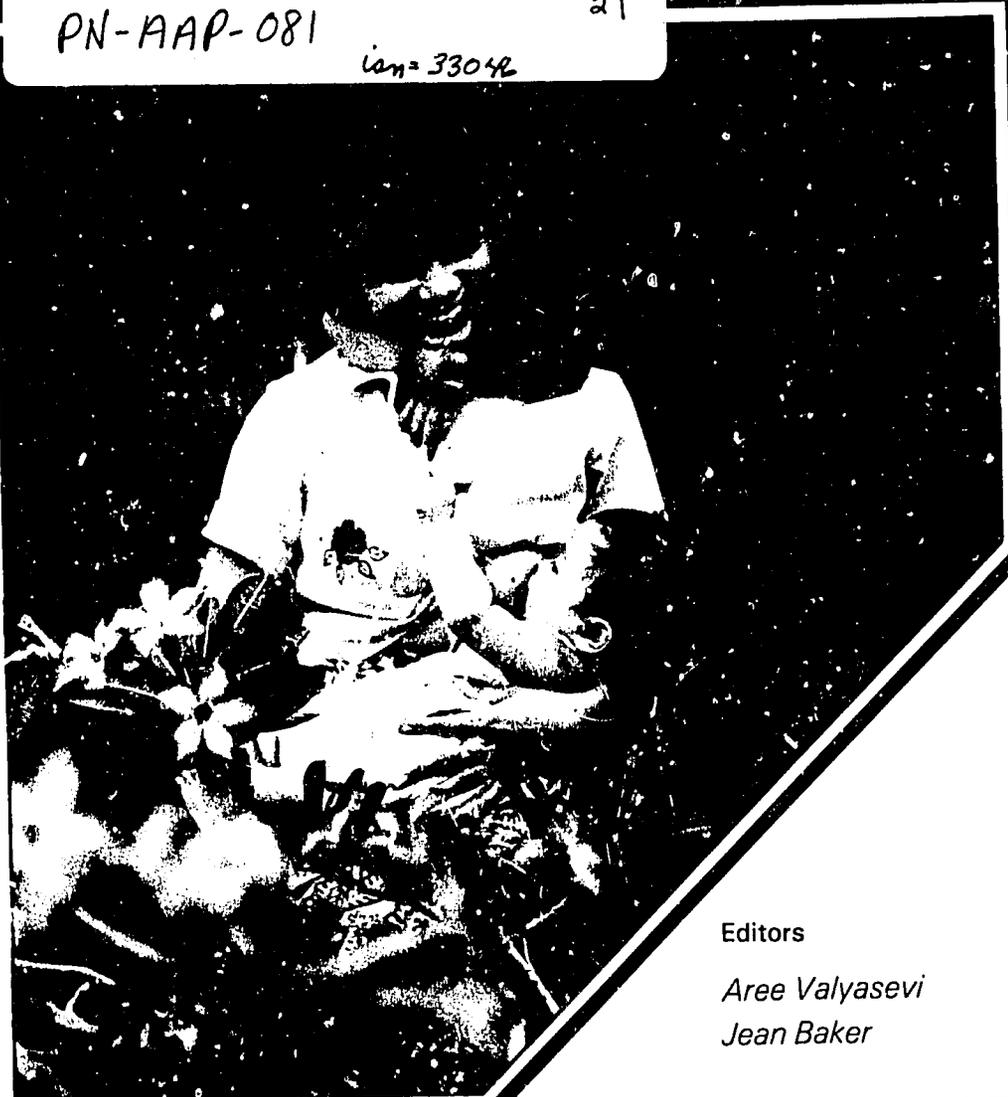
**PROCEEDINGS  
OF  
WORKSHOP ON BREASTFEEDING  
AND SUPPLEMENTARY FOODS**

*BANGKOK, THAILAND.*

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Editors

*Aree Valyasevi  
Jean Baker*

*Proceedings of the*  
**Workshop on Breastfeeding  
and  
Supplementary Foods**

*Editors*  
**Aree Valyasevi  
Jean Baker**

*Organized by*  
**The Institute of Nutrition and Department of Pediatrics  
Ramathibodi Hospital  
Mahidol University, Bangkok, Thailand**

*17 - 18 November 1979*  
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# *Proceedings of the* **Workshop on Breastfeeding and Supplementary Foods**

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*Dr. Aree Valyasevi*

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## **Objectives of the Workshop**

- 1) To exchange information and ideas and to derive new insights regarding breast supplementation and weaning practices as well as activities to promote proper infant-young child feeding practices in various Asian countries.
- 2) To formulate a basis for strategic plans for promotion of proper infant and young child feeding practices and to define the role of pediatricians as well as National Pediatric Societies in these efforts.

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# WORKSHOP PROGRAM

## Program

**Saturday, 17 November 1979**

- 08:30** Registration  
**09:00** Opening ceremony  
- Welcome and report by Organizer - Dr. Aree Valyasevi  
- Opening address - H.E. Dr. Bunsom Martin  
Minister of Public Health  
**09:30 - 09:45** Coffee break

**Chairman :** *Dr. Aree Valyasevi*

**Secretary :** *Dr. Wandee Varavithya*

- 09:45 - 10:15** Breastfeeding and infant's health - Dr. Joe D. Wray  
**10:15 - 10:45** Present status of knowledge on breastfeeding - Dr. D.B. Jelliffe  
**10:45 - 11:05** Immunological aspects of breastfeeding - Dr. R.K. Chandra  
**11:05 - 11:20** Questions and comments  
**11:20 - 11:40** Pitfalls in the promotion of breastfeeding in developing countries -  
Dr. Fe del Mundo  
**11:40 - 12:00** Report of Thailand experience in the promotion of breastfeeding -  
Dr. S. Dhanamitta  
**12:00 - 13:00** Lunch

**Chairman :** *Mrs. E.F. Patrice Jelliffe*

**Secretary :** *Dr. Kraisd Tontisirin*

Country report by representatives of each country - 15 minutes each

- 13:00 - 13:15** Country report from Bangladesh  
**13:15 - 13:30** Country report from Burma  
**13:30 - 13:45** Country report from India  
**13:45 - 14:00** Country report from Indonesia  
**14:00 - 14:15** Country report from Malaysia  
**14:15 - 14:30** Country report from Nepal  
**14:30 - 14:45** Country report from Pakistan  
**14:45 - 15:00** Questions and comments  
**15:00 - 15:15** Coffee break  
**15:15 - 15:30** Country report from Papua New Guinea  
**15:30 - 15:45** Country report from Philippines  
**15:45 - 16:00** Country report from Sri Lanka  
**16:00 - 16:15** General discussions  
**16:15 - 17:00** Summary of country reports  
**19:00** Reception at Ploenchit Room, Erawan Hotel Hosted by  
Professor Kasarn Chartkavanij, Rector of Mahidol University

**Sunday, 18 November 1979**

**Chairman : *Dr. Joe D. Wray***

**Secretary : *Dr. Sakorn Dhanamitta***

**09:00 - 09:20** Report on Geneva meeting - Dr. D.B. Jelliffe

**09:20 - 09:45** New techniques to promote breastfeeding - Mrs. E.F. Patrice Jelliffe

**09:45 - 10:00** Coffee break

**10:00 - 12:30** Small group discussions

- Action program to promote breastfeeding practice

- Role of pediatricians and pediatric societies

**12:30**

Lunch

**Chairman : *Dr. D.B. Jelliffe***

**Secretary : *Dr. Wandee Varavithya***

**13:30 - 14:30** Report and discussions

**14:30 - 15:00** Summary and recommendations

**15:00 - 15:15** Coffee break

**Chairman : *Dr. Priyani Soysa***

**Secretary : *Dr. Sakorn Dhanamitta***

**15:15 - 16:45** Panel discussion on supplementary foods

- Supplementary feeding and infant's health - Dr. P. Soysa

- Home and community based supplementary foods - Dr. S. Ghosh

- Formulation of supplementary foods - Dr. K. Tontisirin

**16:45 - 17:30** Discussions and summary

**17:30 - 17:40** Closing remarks by Dr. Aree Valyasevi

**17:45 - 19:00** Cocktails

#### **Acknowledgement**

We would like to acknowledge with thanks the assistance of the Dean, Faculty of Medicine, Ramathibodi Hospital and the staff of the Institute of Nutrition, Mahidol University.

We would like to acknowledge the support of USAID, especially the USAID Mission to Thailand, and the Office of Nutrition, USAID, Washington, D.C.

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## ***Message from H.E. Bunsom Martin***

### **Ministry of Public Health**

It is my very great pleasure to be here at this Pre-Congress Workshop on "Breastfeeding and Supplementary Foods". It is timely since this year is the International Year of the Child. The Congress is part of our response in an effort to seek various ways and means to stimulate activities for the benefit of infants and children in our Asian region.

We all know that the first years of life are crucial in laying the foundation of good health and improving the quality of life. Nature has provided breast milk for nourishment of human infants, and human milk is the perfect food for babies. It is nature's way of ensuring a sound, healthy start to life, and it meets all the nutritional needs of the baby, safely and adequately. There is no better food.

Unfortunately, the practice of breastfeeding is rapidly declining, particularly in the poor urban areas. In most parts of rural areas in developing countries, infants are still breastfed after birth, but the poor nutritional status of mothers has reduced milk production. This in turn retards the physical growth and possible mental development of infants and may have long lasting effects throughout life. Therefore, ways and means must be found to promote breastfeeding practices. At the same time, the nutritional status of the mothers should be improved to the greatest extent possible.

The objectives which have been laid out for this workshop are very sound indeed. I am very pleased to know that this workshop has included the topic "Supplementary Foods" for discussion, since it is generally agreed that breastfeeding can adequately meet all the nutritional needs of the baby up to four or six months of age. After that, it is essential for mothers to give supplementary foods in addition to breastfeeding. This period is critical in the child's life. Through cultural practices, ignorance, or economic and other reasons, children are

very often deprived of the additional foods they need, either qualitatively or quantitatively. They will become malnourished, apathetic and be susceptible to infectious diseases.

Supplementary feeding programmes relying on donated food face tremendous problems. For logistic reasons, mainly related to easier distribution, it is only children over three years and those at school who receive these foods. The age group most in need, those one to three years of age, are neglected. Furthermore, the donated food cannot possibly serve to improve dietary habits of the people. In fact, it may produce unfavorable results by making the families or countries dependent on donors. Therefore, solutions should be found to promote proper infant and young child feeding practices in our Asian region. That is why we have to stand on our own feet.

As I stated earlier the United Nations declared 1979 the International Year of the Child in recognition of the fundamental importance of programmes benefiting children. Your deliberation during this workshop is vital for the exploration of the needs and problems of Asian children now and for many years to come.

I wish you great success during these two days of the workshop and a happy stay in Thailand. May I end my speech by reminding you of the theme of WHO for this year :

“A healthy child, a sure future”.

Thank you.

**H.E. Bunsom Martin**

## ***Report from Dr. Aree Valyasevi***

**His Excellency, distinguished participants, ladies and gentlemen,**

On behalf of the Faculty of Medicine, Ramathibodi Hospital and the Institute of Nutrition, Mahidol University, I should like to welcome all participants, observers and guests to this workshop on "Breastfeeding and Supplementary Foods".

We have taken the opportunity to organize this workshop since, as you all know, Bangkok has the honour of hosting the Third Asian Congress of Pediatrics, which will begin next week. There will be approximately 300 pediatricians from Asia, Europe and America, and another 400 from Thailand in attendance. It is certainly a big gathering of pediatricians in Asia participating in this Congress, and we in Thailand are very happy about this.

The theme of this Congress is "Better Health for Rural Children". We are all fully aware that approximately 80 percent of our population live in rural areas, and that the leading cause of child deaths is malnutrition coupled with infections of various kinds. Both malnutrition and infection are mutually reinforcing components of a vicious cycle. Therefore, improving nutrition is an essential part of health care for our rural children.

The subject of breastfeeding and supplementary foods is vital to the nutrition and health status of the majority of our rural children. As such, we have organized this workshop with two main objectives :

1. To exchange information and ideas; to derive new insights regarding breastfeeding and food supplementation practices and activities which promote proper infant and young child feeding practices.

2. To formulate a basis for strategic plans for promotion of these activities in our region and to define the role of pediatricians and pediatric societies.

It is our hope that we will be able to succeed in our objectives most fully during these two days of our deliberations.

I should like to take this opportunity to thank USAID for its support in bringing many of the participants to this workshop. Special thanks are given to the staff of the Bangkok office, especially to Mr. Henry D. Merrill.

Last but not least, it is certainly an honour that H.E. the Minister of Health is with us at the opening ceremony of our workshop. I should like to take this opportunity to ask His Excellency to give the opening address.

Thank you.

Dr. Aree Valyasevi

# Feeding and Survival : Historical and Contemporary Studies of Infant Morbidity and Mortality

Joe D. Wray

This paper compares the effects of different infant feeding practices on morbidity and mortality, and reviews the evidence available from studies which attempted to examine the actual effects on infants of various methods of feeding. As early as a century ago physicians were aware that mortality rates were markedly higher among infants fed artificially.

Since the beginning of time human infants have been dependent on species-appropriate milk for nutrition in the early months of life. (Jelliffe and Jelliffe, 1978). Until about 100 years ago, the only effective alternative to biological mother's milk was that of another human female or "wet nurse". This has been used with varying success throughout history. In England in the 17-19th centuries sending an infant to a wet nurse in the countryside amounted to infanticide because of irresponsible and unhealthy practices on the part of the mother surrogates (Wickes, 1953). By the 19th century and probably earlier, alternatives to wet nurses were known and available for feeding infants, in the form of animal milks or cereal paps (Knodel and Van de Walle, 1967). As the use of these artificial feeds increased from 1850 onwards, differences in mortality rates between breast fed and artificially fed infants became apparent. Several studies from Europe prior to 1900 confirmed the same finding, that breast feeding for at least six months substantially improved an infant's chances of survival (Rollet, 1978; Knodel and Van de Walle, 1967; Thiemich and Bessau, 1930). Howarth in 1905 published a study of almost 10,000 infants in England followed through the first year of life. He found that mortality rates were significantly different depending on whether the child was "breast fed", "mixed fed",

or "hand fed". Among the artificially fed group, mortality was higher not only from gastroenteritis (as expected), but also from respiratory infections. He suggested that nutrition per se must be a factor affecting resistance to infection. Among the artificially fed group, Howarth's analysis of the type of artificial milk used showed mortality was lowest among infants fed diluted cow's milk, highest when sweetened condensed milk was used.

Howarth's study was one of the first to follow infants prospectively, but other large scale attempts ensued. A U.S. Department of Labor Children's Bureau Study in 1922 reported on 22,000 infants. The author, Woodbury (1922) concluded that in each month of life the mortality rate was higher the longer the prior period of artificial feeding. These data suggest that something more than the issue of contamination of an artificial feed was at work to explain the striking differences in mortality. Another aspect of Woodbury's data of interest showed that the probability of survival was closely related to the introduction of solid or supplementary food and that after six months, the exclusively breast fed child lost his earlier advantage unless some other food was also provided.

Another major study carried out in Chicago by Grulee and colleagues in the late 1920s looked not only at mortality but also at morbidity by type of feeding. This and a similar study in England (Robinson, 1951) concluded that breast fed babies are more likely to survive regardless of the diagnosis.

An important study by Mannheimer in Stockholm in the 1940s analyzed the risk of death per 1000 infants by type of feed according to birth weight. His data on the impact of social class on infant mortality were also revealing. Regardless of birth weight or parental income the death risk was substantially higher among the bottle fed infants.

In recent years a number of studies, frequently hospital based and from affluent countries, have been carried out relating type of feeding to several types of morbidity, obesity, allergy, heart disease and developmental benefits. The evidence from these studies suggests that it is at least possible that mothers who choose to feed their infants artificially can protect them reasonably well from infection, but also suggests that even today, more morbidity is found among artificially fed infants than among breast fed infants.

In traditional cultures the importance of breast feeding to infant survival has long been recognized. The term "kwashiorkor", used to describe severe malnutrition, comes from Africa and means the disease of the child deposed from the breast by another child (Williams, 1963). Yet in developing countries, artificial feeding has been used for decades. The findings of studies in these countries are consistent with those from affluent societies, that diarrheal disease is less likely in breast fed infants.

A study from Guatemala by Mata (1978) found that in a village where the majority of infants were breast fed, there were essentially no pathogens to be found in the gastrointestinal tract of the infants as long as they were exclusively breast fed.

The impact of breast feeding on growth with respect to height, weight and arm circumference is well known. Infants in both affluent and poor societies who are successfully breast fed grow at essentially the same rate for the first few months of life. It is only after the infant outgrows the mother's milk production capacity that growth rates begin to slow and produce the faltering so commonly found in the latter part of the first year of life in children of developing societies (Ramos Galvan, et al, 1962). A number of studies reviewed indicate that unless supplementary food is provided in sufficient quantity, under hygienic conditions, normal growth cannot be sustained.

Infant mortality is certainly the most significant indicator of the health status of infants. Yet data by Gwatkin (1978) indicate that infant mortality is falling in some countries, stagnant or fluctuating in others, and rising in still others. Mortality rates seem to be declining in smaller countries and rising in larger countries. There is little specific data from developing countries to shed light on whether this is related to the decline in breast feeding and the rise in artificial feeding, promoted in many places by the availability of commercially produced foods for infants. However, data from recent studies from a number of locations show that the risk of death in bottle fed babies is several times higher than that in breast fed babies, just as was shown so clearly in the many studies carried out in Europe and the U.S.A. years ago (Plank and Milanesi, 1973; Puffer and Serrano, 1939).

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# Present Status of Knowledge on Breastfeeding

Derrick B. Jelliffe

## INTRODUCTION

Breastfeeding is dyadic in nature, it is a nutritional, psychological and biological interaction between mother and offspring with each affecting the other. (Jelliffe, 1978). The paper considers the nature of this relationship and three early stages of the young human organism. They are as a fetus, extero-gestate fetus (up to 6-9 months postnatally) and at a transitional stage (9 months to 2 or 3 years). (Bostock, 1962).

Infant feeding begins in the uterus. Maternal nutrition during pregnancy affects both the newborn and the extero-gestate fetus through the birth weight, level of fetal stores of nutrients and by laying down adequate lactation reserves. For the first 6-9 months of life the baby can best be considered an extero-gestate fetus, or external fetus, with the breast taking the place of the placenta. The child's nutrient needs can be obtained through fetal stores and a diet of milk, given either as breastfeeding or bottle feeding.

### Adaptive Suckling

Man has existed for about a million years, and of this vast period has kept cattle for only some 10,000 years. The widespread use of cow's milk for feeding the extero-gestate fetus has only been in vogue for about 50 years.

Species specific patterns of "adaptive suckling" have occurred during evolution, and the composition of milk, the mechanism for administering it and the lactatory apparatus specifically modified for the need. Appropriate adaptive suckling is found in many animal species and man is no exception.

### Psychophysiology

Practical approaches to successful lactation have been clarified by modern, endocrinological research, mostly the prolactin and let-down

reflexes. Human prolactin was isolated only about ten years ago. (Hwang, 1971). This discovery paralleled the clinical observation that the more the sucking stimulus, the more the milk secreted. In other words, prolactin secretion is proportional to the sucking stimulus. Also, recent studies have shown the polyvalent hormonal role of prolactin, in the mammary-alveoli with milk secretion, in the kidneys with a water-conserving antidiuretic affect, in the ovaries with anovulatory lactation amenorrhea, and possibly in the brain with increased maternal behavior ("motherliness"). (Jelliffe, 1978).

The psychosomatic let-down reflex is the key to the success or failure of breastfeeding. Confidence enhances while anxiety inhibits. It is now clear as well that the *doula*, or female assistant, who supplies physical and emotional support and information, and above all, generates confidence, is an important element in encouraging successful breastfeeding.

Knowledge and research of the last two decades has clarified the differences between human and cow's milk. (Gopalan, 1958). Human milk has the lowest solute load of all mammals, with low sodium and protein (and hence urea). In fact, man is a low-solute, continuous contact species with breast milk as the main source of water as well as nutrients, and with a biologically normal pattern of frequent feeds throughout the 24 hours. Recent work has shown the protein of human milk (as opposed to its nitrogen containing components) is only 0.8-0.9 grams/100 ml. in well nourished women. (Jelliffe & Jelliffe, 1978). These results will have wide repercussions, including reconsideration of the Recommended Daily Allowances. Analysis of the proteins in human and cow's milk show great differences. For example, the amino acid profiles are quite dissimilar; in human milk there are much higher levels of cystine and lower concentrations of tyrosine, phenylalanine, and tryptophan. Also, cow's milk has a high content of Beta-lactoglobulin, which is completely absent in breast milk. By contrast, human milk contains substantial lactoferrin and lysozyme, which are not found in bovine secretion. (Jelliffe & Jelliffe, 1978).

That "man is what he eats" is substantiated by the dissimilarities in young infants fed by breast or cow's milk. Subcutaneous fat has a different fatty acid composition and in normal babies fed on cow's milk there is greater water retention and higher serum levels of sodium and urea.

## MATERNAL MALNUTRITION

Maternal nutrition affects milk composition, and recent studies of malnourished mothers in different parts of the world show some variation, presumably related to diet and nutritional status. (Jelliffe & Jel-

liffe, 1978). However, as a generalization, the lactose is remarkably unchanged; the pattern of fatty acids varies considerably with the mother's past and present diet; the water soluble vitamins and also vitamin A are decreased with inadequate maternal intakes; the protein, using older methods, often was found in lower limits of normal values.

Studies of the volume of breast milk are difficult to undertake, because of problems of measurement and the emotional aspects of the let-down reflex. Recent literature suggests that 850/ml per day as a standard is too high, so the effect of malnutrition on breast milk production may have been overestimated. (Jelliffe & Jelliffe, 1978). However, recent research has shown that the adequacy of breast milk of poorly nourished mothers as the sole food for babies, as judged by weight gain, may extend only to 3 or 4 months rather than the six months usually known to be the case with well nourished mothers. Supplementation of poorly nourished lactating mothers has shown significant changes, especially in volume with relatively unchanged protein levels. (Gyorgy, 1953). Calories seem to be the major need.

### **Declines in Breastfeeding**

The reasons for the overall decline of the prevalence of breastfeeding are complex and vary by area. They may be related to insufficient emphasis by the health sector, changes in the role of women, commercial advertising and so on. Most disturbing is the trend for bottle feeding to be attempted by increasing numbers of poor women in developing countries. This leads to disastrous results for the child in diarrheal disease and marasmus. (Jelliffe & Jelliffe, 1978). Bottle feeding cannot be undertaken safely without sufficient funds for adequate formula, reasonable home hygiene and parental literacy and knowledge of "domestic mathematics".

### **Anti-infective Factors of Human Milk**

Human milk has a protective effect against infections, especially diarrhea, in areas with low levels of environmental hygiene. Human milk contains positive and host-resistant factors, both cellular and humoral. In fact, the cellular content of human milk is almost as great as in blood, with a hierarchy of cells, ranging from mobile, ameboid macrophages to interferon-producing lymphocytes. The humoral constituents include secretory immunoglobulin A (IgA), lactoferrin, lysozyme (3,000 to 4,000 times the concentration found in cow's milk), and the bifidus factors. (Gyorgy, 1953). The last, together with the differing buffering action of human milk and more acid stools, are responsible for the dominance of *Lactobacillus bifidus* in the intestinal flora, as opposed to the largely gram-negative flora in babies fed on cow's milk.

Research on the host-resistance properties of breast milk indicates that their main effect is against common alimentary pathogens of early childhood such as *E. coli* and enteroviruses, both causes of diarrhea. Besides the evident advantages for communities with poor standards of hygiene, colostrum and breast milk have been used for low birth weight babies in developed countries, where the results have been strikingly successful. (Jelliffe & Jelliffe, 1978).

### Anti-Allergic Considerations

Cow's milk is the commonest food responsible for allergy in infants in bottle feeding communities. The most frequent allergens are Beta-lactoglobulin and serum bovine albumin, neither of which is found in breast milk. (Goldman, 1976). In a young baby, the secretory IgA of human milk acts as an "intestinal paint" and prevents absorption of foreign protein macromolecules (and also bacteria). (Jelliffe and Jelliffe, 1978). Formula fed babies lack this protective effect.

### Contraceptive Effect

Breastfeeding has a contraceptive effect in that the prolactin secreted by the anterior pituitary in response to the baby's sucking has an anovulatory effect, with lactation amenorrhea. (Jelliffe and Jelliffe, 1978). The effectiveness and length of lactation amenorrhea is related to the amount of sucking stimulus and hence prolactin secreted. The contraceptive effect occurs most effectively when feeding is essentially on demand during a 24 hour period.

### Economics

From the perspective of economics, the differences in financial costs of breast versus bottle feeding are large. At the individual level this is represented by the cost of formula compared to the cost of extra nutrients for the lactating woman (approximately 500 calories and 20 grams of protein). (Gopalan, 1958). At the macro-level, declines in breastfeeding represent loss of a specialized food which must be replaced by cow's milk-based formula or imported products. The magnitude of such losses can be great.

### Emotional Aspects

The emotional considerations of breastfeeding are only recently being understood, but it is increasingly clear that the face to face close contact of a breast feeding mother and her child facilitates the "bond" between the two. (Klaus, 1970). Bottle feeding by an affectionate mother is plainly not an equivalent. Although much remains to be learned about the consequences of mother-infant interaction, current evidence suggests that the present day apparent increase in child abuse

in some countries is often a "disorder of mothering", relating among other factors, to insufficient mother-neonate interactions. (Lynch, 1975).

### **Importance of the Transitional Period**

The transitional period is characteristically difficult for all mammals and in traditional communities is the time of maximal nutritional stress for the child. In fact, because of the emotional effects of an inadequate diet and infection, a special name, that of "secotrant" has been suggested for the second year transitional. (Jelliffe, 1969). At this period, the diet in poorer communities should consist of as wide a variety of local foods as possible, based on the concept of complementary "multimixes". (Jelliffe, 1971). The role of commercial weaning foods will vary by situation, but in rural communities in developing countries they have little relevance. In urban areas, they are convenient, but frequently poor in nutrients and often expensive.

The consequences of current patterns of infant feeding are universal, but vary in importance in different parts of the world, notably with the prevalence and success of breastfeeding, and the availability and use of suitable foods for the transitional. A contrasting pattern of nutritional problems is also found in poorer and better-to-do communities--the former dominated by "early" marasmus and infantile diarrheas and/or by kwashiorkor and "late" marasmus; the latter by young child obesity, by cow's milk allergy and by increasingly prevalent metabolic abnormalities in the early months of life.

### **CONCLUSIONS**

Universally there are three main planks of scientifically-guided, biological infant feeding. These are : (1) to feed the pregnant and lactating mother with a mixed diet of locally available foods (2) to breast feed alone for 4 to 6 months and (3) to introduce least cost weaning foods, based on the concept of "multimixes" from 4 to 6 months onward, preferably prepared from locally available foods but with continuing lactation into the second year of life, particularly in less well to do circumstances.

Such a regime would have a preventive effect of great dimensions. Such a regime also fits the need to use local resources and aims at national nutritional self-sufficiency.

Present day practices of infant feeding urgently require reappraisal. The need is a system based on a blend of modern scientific knowledge, on awareness of successful traditional time-tested adaptations and on man's ancient biological mammalian heritage. Equally, breast feeding must be recognized as a key aspect in the development of primary health care services now universally recognized as a major necessity.

ty if health care is to be extended to cover the currently unserved majority of the world's population.

The unique value of human milk and of breastfeeding has become increasingly clear for the extero-gestate fetus in all parts of the world. The basic issue is to try to devise practical programs to improve the pattern of breastfeeding or, at least decelerate the decline, and to optimize the quantity and quality of milk production, particularly by maternal feeding.

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# Immunology of Human Milk

**R.K. Chandra**

## INTRODUCTION

Recent research has activated a new surge of interest in the unique properties and composition of breast milk. Human milk constituents are present in concentrations and in a mix that is optimally suited to the nutritional needs of the young infant. This allows the healthy young neonate to thrive and develop at an ideal pace for the first few months of life. However, there is some question about the period for which exclusive breast feeding is adequate for all infants. For the majority of newborn, breast milk provides enough nutrition to permit more than average growth for the first three months of life. Subsequently a proportion of infants may have energy and protein needs that may not be met by breast milk. In our prospective studies, approximately one out of five infants exclusively breast fed beyond four months of life may show a reduction in growth velocity.

A major reason for the recent interest in breast feeding has focused on the anti-infective properties of human milk. This is provided by soluble protein constituents, other small-molecular weight factors and immunocompetent cells. Several epidemiological studies have documented that breast fed infants have fewer infections, particularly respiratory and gastrointestinal. However, many of the reports were based on retrospective analyses and inadequate controls. It has been suggested that breast feeding protects against septicemia in the immediate postnatal period and that the administration of colostrum halts otherwise

uncontrollable epidemics of newborn *Escherichia coli* diarrhea. In this review, the many immunologically significant components of human milk are briefly discussed. More complete information is available in the several original articles and interpretative reports listed in the Bibliography.

## CELLULAR CONTENT

Human milk has a high number of several types of cells. These include lymphocytes, neutrophils, macrophages and epithelial cells. Colostrum contains approximately eight million cells per ml. This number declines rapidly over the next few days after delivery but is more than compensated for by the increase in volume of milk produced per day. Macrophages can phagocytize particles and produce lysozyme, lactoferrin and complement components. Immunofluorescent studies have documented a high content of IgA within breast milk macrophages. B. lymphocytes on stimulation and interaction with other cells produce large quantities of immunoglobulins, particularly IgA. Hanson's group has documented that sIgA present in milk has specificity directed against enteric antigens, thus supporting the concept of an enteromammary axis. This is obviously of practical significance since the young infant is most often infected with enteric organisms from the lower gut of the mother. Specific antitoxin activity has been found in colostrum and breast milk; this can neutralize the toxins of *E. coli*, *V. cholerae* and other organisms and prevent their attachment to the epithelial cell surface receptor, a process which is a prerequisite to the activation of cAMP system and pouring out of water and electrolytes constituting

**Table 1** Infection-related morbidity in breast fed and artificially fed infants in India

| Disorder              | India                |                            | Canada               |                            |
|-----------------------|----------------------|----------------------------|----------------------|----------------------------|
|                       | Breast fed<br>(n=35) | Artificially<br>fed (n=35) | Breast fed<br>(n=35) | Artificially<br>fed (n=35) |
| Respiratory infection | 57                   | 109                        | 42                   | 98                         |
| Otitis                | 21                   | 52                         | 9                    | 86                         |
| Diarrhea              | 70                   | 211                        | 5                    | 16                         |
| Dehydration           | 3                    | 14                         | 0                    | 3                          |
| Pneumonia             | 2                    | 8                          | 0                    | 0                          |

The data are expressed as number of episodes of illness for the group over a 12-month period (India) or over a 24-hour period (Canada). From Chandra RK : *Acta Paediat Scand* 68:691, 1979.

**Table 2 Incidence of Allergic Disorders**

| Parameter   | Breast fed<br>(n=37) | Formula fed<br>(n=37) |
|---|----------------------|-----------------------|
| Eczema  | 4                    | 21                    |
| Recurrent wheezing                                    | 1                    | 8                     |
| Serum IgE > IU/ml                                     | 6                    | 29                    |
| IgE-antibodies to cow's milk                          | 1                    | 15                    |
| Complement activation in vivo<br>after milk challenge | 0                    | 6                     |
| Haemagglutinating antibodies<br>to beta-lactoglobulin | 3                    | 31                    |
| Eosinophilia > 400 per mm <sup>3</sup>                | 0                    | 5                     |

Figures refer to the number of infants affected or showing a positive test. From Chandra R.K. : *Acta Paediat Scand* 68:691, 1979.

a diarrheal stool. These sIgA antibodies have been detected in functionally active form in the feces of breast fed infants. In addition, it has been suggested that breast milk immunoglobulins may change the properties, agglutinating and virulence, of *E. coli* resident in the infant's gut. Neutrophils present in the colostrum and milk can phagocytose particles and digest them. Their bacteriocidal activity is almost equivalent to that of neutrophils derived from the peripheral blood. In animal models, it has been demonstrated that the cellular content of colostrum is protective against hypoxia-induced necrotizing enterocolitis; the functional element in this protection is the macrophage.

The role of T lymphocytes present in large numbers in the colostrum and the milk is not entirely clear. The suggestion that these cells may passively transmit delayed cellular hypersensitivity to the infant is not supported by data. Certainly, there is no evidence that immunocompetent T cells can cross intact the intestinal barrier in man. There has been no documentation of graft-versus-host disease in immunodeficient infants who have been fed on breast milk.

We have observed that the secretory IgA in the saliva of breast fed infants is higher than in the formula fed group (Chandra, 1977). This suggests that human milk may contain an immunostimulatory factor. More work is needed in this important area. A variety of regulatory factors are released by lymphocytes, macrophages and other cells. These include prostaglandins, nucleic acids, cyclic nucleotides, antigen-antibody complexes, and cell membrane components with or without complexed antigen.

## IMMUNOGLOBULINS

All five major classes of immunoglobulins have been detected in breast milk. The concentrations of IgA are higher and that of IgG and IgM are lower in the breast milk compared with the serum. This is true for as long as six months after the initiation of lactation. Secretory IgA consists of two molecules of IgA together with binding J chain and secretory components, the latter produced by mucosal epithelial cells. There are two binding sites for antigen on each molecule. The secretory component probably gives stability to the molecule preventing its breakdown by enzymic proteolysis in the gut and other body fluids. The functional significance of sIgA in the colostrum and milk has been discussed above.

The concentrations of immunoglobulins measured in the colostrum and milk of women of different socioeconomic, geographic and ethnic backgrounds is similar and remains fairly constant for several months. Maternal malnutrition, however, may significantly decrease the total output of milk, rendering the infant vulnerable to under-nutrition unless complementary foods are provided.

There is some evidence that immunoglobulin molecules may cross the intestinal mucosal barrier in the first 2-3 days of life in healthy neonates. In the case of low birth weight infants, both preterm and small-for-gestation, such transfer may continue to take place for several weeks (Chandra, 1977).

Attempts at banking human milk for use in nurseries have been less than successful. There is evidence that most of these procedures severely deplete the anti-infective properties of breast milk.

## OTHER PROTECTIVE FACTORS

Human milk contains large amounts of iron-binding *lactoferrin*. It exerts its bacteriostatic effect by chelating available iron and leaving little or none for bacterial multiplication. Lactoferrin has a very high association constant for  $Fe^{3+}$  of  $10^{36}$  and binds ferric iron. Specific antibody potentiates the action of lactoferrin and blocks the secretion of the bacterial siderophores. Furthermore, bacteria cultured in an iron-deficient environment develop abnormal aminoacyl tRNAs.

Breast fed infants develop gut microflora consisting predominantly of *Lactobacillus bifidus*. The ability of breast milk to promote the growth of this organism is linked to the presence of *Bifidus factor*. Gyorigi's *antistaphylococcal factor* inhibits the growth of *S. aureus*. The exact nature of this factor has not been characterized. *Lactoperoxidase* acts in conjunction with halides and hydrogen peroxide to form a

potent antibacterial system. It is resistant to the action of gastric and intestinal enzymes.

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# Pitfalls in the Promotion of Breastfeeding

Fe del Mundo

The superiority of human milk over any other milk for the nourishment of the human newborn and infant can hardly be challenged, and over the years it has become more and more evident that it is the most ideal, safe and complete food for our young ones. Regrettably, despite all known facts on the value of human milk, the decline of breastfeeding persists in many areas.

In the past five years, vigorous campaigns to promote its use have been encouraging and noteworthy. Nevertheless, while the pendulum has swung back to breastfeeding in a number of developed countries, artificial feeding continues to take a firm hold in many localities. Paradoxically enough, this unfavorable trend is noticeable in developing countries which have to import artificial milk for lack of dairy farms. It is difficult to predict when this decline of breastfeeding may be abated or curtailed.

Current deterrents in the promotion of breastfeeding need to be reevaluated and analyzed for effective and even aggressive corrective measures.

## *Pitfalls in the Promotion of Breastfeeding*

### I. Education, Information and Motivation

- not started early enough
- usually inadequate
- lacking in emphasis or impact; not aggressive
- does not reach enough target groups, such as fathers and young people
- not persistent, not well-planned

## II. Role of Medical and Health Professionals

- not motivated to the need for breastfeeding
- no time to inform or convince mothers to breastfeed
- no cooperation from obstetricians and nurses
- no follow-up
- no other measures taken to compensate for what obstetricians or pediatricians should do

## III. Influence of Nursery Procedures in Hospitals or Maternity Clinics

- bottlefeeding is started, as more convenient for staff or mother
- rooming-in procedures are not accepted by the administration or by nurses or obstetricians
- breastfeeding is started late, if at all
- not enough personnel
- sophisticated formula rooms and displays of proprietary foods are impressive

## IV. The Influence of "Trend-Setters"

- the elite, personalities, the sophisticated, are not utilized

## V. Pressure of Promotion and Advertisements for Artificial Milk

- preparations
- detailing in nurseries
- detailing to mothers
- opportunities given and concessions to physicians and paramedicals
- no one speaks or spends money for promoting breastfeeding : calendars, posters, TV, press, and so on

## VI. Local Studies Intended to be Convincing are not Adequate

The information and education of parents and of the population in general on the subject of breastfeeding leaves much to be desired. Campaigns for the return of breastfeeding are limited and in practice are insignificant compared to those for artificial milk preparations. Not surprisingly, as communities became flooded with advertisements on artificial preparations, while breastfeeding was silently taken for granted, it did not take long for proprietary milk preparations to assume a status and acceptance that is difficult to counteract. Even now, very little of the needed time, effort or expense is put into breastfeeding promotion.

The majority of parents have never heard about the composition of breast milk or the importance of colostrum (which is often discarded) and its immunologic properties. Even enlightened mothers claim that neither obstetrician nor pediatrician has explained this subject or the "let-down" reflex. Unfortunately, the concept of La Leche League International has not reached enough countries.

The role of the medical and paramedical professions in stepping up and increasing momentum in breastfeeding should be significant and vi-

tal. Yet despite recent information now available as a consequence of conferences, seminars, and research efforts, physicians, pediatricians, nurses and midwives are complacent and almost indifferent. Inadequate training on the value and use of human milk is part of the problem. Students use western medical textbooks and obtain postgraduate education in developed countries where breastfeeding may not be a serious concern.

It is encouraging that some nursery procedures have been altered in recent years. The detailing and display of "chubby baby" photographs have diminished. Although rooming-in is recognized as a major step toward early success in breastfeeding, it remains a controversial topic in many hospitals. As yet, attractive, sophisticated, easily viewed nurseries are the rule, particularly in renowned leading hospitals and medical centers.

To date no campaign for breastfeeding has ever reached the proportion and steadiness which artificial preparations have enjoyed. It is regrettable that lack of preparedness and understanding of breastfeeding, ignorance and noninvolvement of parents have been frequent causes for abandoning breastfeeding.

In most localities, the influence of trend-setters has not been availed. Perhaps more than a personality, a mother who has breastfed her young is of immeasurable help in carrying out promotion campaigns.

That "artificial feeding allows the possibility for a breakdown in hygiene, errors in dilution and inappropriately administered nutrition", is a noteworthy observation which is pertinent but often overlooked. This fact is all the more important in rural and disadvantaged areas.

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# Breast Feeding Promotion Around the World : Newer Approaches and Innovative Programs

**E.F.P. Jelliffe**

In many countries the erosion of traditional breast feeding has been noted with much concern in the past decades by health professionals. In Third World countries, because of the high cost of proprietary formulas, inappropriate dilution of milk powder is undertaken by mothers of low socioeconomic status. The use of polluted water and unsanitary utensils precipitates gastroenteritis in infants often leading to the syndrome of marasmus which accounts for a high death rate among these children. Although many diseases have been associated with bottle feeding, marasmus remains the most important nutrition problem among young children in developing countries (Jelliffe and Jelliffe, 1978).

In order to counteract and decelerate these trends away from breast feeding, measures must be instituted at the national level and appropriate programs initiated for each country. A practical program specifically designed to meet the requirements of each individual community will need to be devised based on information obtained by a community diagnosis (Table I). The information to be collected in a community diagnosis may vary according to the situation, but should include information concerning current methods of infant feeding, and community influences on breast feeding in that particular society. The latter enables at-risk factors in a community to be identified, and especially vulnerable communities to be selected.

The existing pattern of infant feeding needs to be investigated, in relation to relevant aspects of the social background and, if feasible, to the major outcomes as regards health and nutrition in early childhood. Knowledge and attitude studies need to be undertaken among young women, older women, school girls, husbands, and health service personnel. The success of methods of infant feeding used can be roughly gauged by growth, minimally by weight gain compared with appropriate standards, but optimally with other anthropometric parameters included, such as length and subcutaneous fat, and by the prevalence of the more important local forms of malnutrition.

**Table I** Representative data to be collected in a community diagnosis

---

***Pattern of Infant Feeding***

|  |   |
|--|---|
| <b>Maternal diet :</b>                 | pregnancy and lactation (especially cultural food restrictions)   |
| <b>Breast feeding :</b>                | when commenced; prelacteal feeds; frequency (including night feeds); scheduled or not; customs interfering with lactation (traditional or modern) |
| <b>Introduction of semi-solids :</b>   |   |
| <b>Use of pacifiers (dummies) :</b>    |   |
| <b>Removal from breast (sevrage) :</b> | when, how, compensatory actions   |

**(1) Health services**

***Community Influences***

|                                   |   |
|-----------------------------------|---|
| <b>Prenatal care :</b>            | information; breast preparation; dietary advice   |
| <b>Puerperal care :</b>           | practices interfering with lactation reflex ; cultural dietary practices; routine inhibition of lactation (e.g. oestrogens); cutting umbilical cord (at once or delayed)                                |
| <b>Premature unit :</b>           | use of breast milk (especially colostrum) ; breast-milk bank; mother-baby contact; nearby accommodation for mothers   |
| <b>Children's ward :</b>          | opportunity for breast feeding; admission of mothers; hospital policy of formula purchasing and distribution  |
| <b>Health centres :</b>           | supplementary food distribution policy  |
| <b>Health education :</b>         | formal and informal; "ill-health education" (advertising etc.)  |
| <b>Family Planning services :</b> | methods advised (in relation to lactation)  |
| <b>Staff training :</b>           | curriculum content (nutrition, infant feeding, psychophysiology, modern knowledge on properties of human vs. cow's milk, practical management in theory and practice, relationships with food industry) |

**(2) Food industry**

|  |  |
|--|--|
| <b>Advertising : (shops, press, radio, television) :</b> | coverage (time space) : motivation; relevance (income, domestic hygiene, present infant feeding practices) |
|--|--|

Promotion (via health services) : direct (posters, calendars, brochures, free samples, professional journals)  
indirect (funding of meetings, hospitality, prizes, research)

### (3) Role of women

Working women : percentage working for wage out of home; types of jobs; facilities for breast feeding; cost-benefit to family

Voluntary groups : name, size, activities, and methods (concerned with breast feeding)

Legislation : maternity protection laws (with special reference to lactation)

Attitudes to breast and breast feeding : information from women, husbands, young girls, grandmothers and health workers; status, modernness, acceptability to public.

Jelliffe, D.B. and Jelliffe, E.F.P. (1978)

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Community programs need to vary greatly in different parts of the world. In some rural areas of Asia and Africa, traditional breast feeding and weaning practices are still the norm and programs should be aimed at preventing deterioration. In other developing countries the decline may be attributable to one particular cause, such as public advertising of powdered milks. All preventive programs need to have certain characteristics. They should be based on a community diagnosis, and should provide education, both to professional groups and to the public, which informs, persuades and motivates. In general they need to be concerned with strengthening enhancing influences and minimizing inhibiting forces.

The educational component of the program should be aimed at supplying information about breast feeding to a wide audience ranging from government planners and policy makers to health workers and to women themselves. The information should be up-to-date and practical. Additional information should be supplied on related topics of child rearing, especially infant feeding.

The motivational approach used to promote breast feeding should have the same appeal as commercial advertisements, that is, motivation through modernness, wealth, health, nutritional advantages and so on. In some cases, traditional religious sanctions or nationalism may be an extra motivation. The message with regard to breast feeding is both specific and yet paradoxical. It is not a new practice to be introduced,

but an ancient one to be endorsed by modern science and given a fashionable image.

The channels through which information may flow depend on the target population to be reached but would include mass media, health services, schools and women's groups. Mass media sources are the radio, newspapers, magazines, films and perhaps in some places, television. In countries where revenue to finance the media comes from commercial advertising, it may be necessary (but difficult) to introduce critical scrutiny of the advertising. In general the media exists as a largely unexploited medium for health education.

There are three main influences that have promoted the decline in breast feeding. They are : (1) the health services (2) the food industry and (3) the new role of women, who in many countries are increasingly entering the labor force. In the past the health sector has not maximized its potential for providing education and information about breast feeding (Table II). Prenatal care affords an opportunity to give essential information about breast feeding and engender confidence in both husband and wife. Priority attention should be given to the maternal diet, both in pregnancy and lactation, especially in developing countries. During and after childbirth, numerous procedures may interfere with initiation of lactation, such as withholding food and water in labor, routine estrogen suppression and prelacteal bottle feeds. Often important adaptations that encourage breast feeding can be introduced without much difficulty or cost. The concept of a hospital "doula", one who supplies information, gives physical and emotional support and engenders confidence, should be encouraged. A nurse, female physician or midwife who has breastfed her own children can ideally fill this role.

The hospital's function as a focal point for health and nutrition education is rarely developed or even considered. Hospitals should make provision for nursing mothers to be admitted with their sick children since this is a perfect opportunity to provide education to the mother of a malnourished child. The establishment of breast milk banks in pediatric centers should be considered, given the findings of research into the metabolic and anti-infective significance of human milk for premature babies. Lactation units concerned with reestablishing, reinforcing or initiating lactation, and demonstrating the effectiveness of breast feeding can play a role in various circumstances. Units for premature, low birth weight babies and "special care" babies deserve additional attention, with provision of breast milk, especially given the commonness of low birth weight neonates in many areas of the world.

There is a great need for modern information on human lactation in training schools and in refresher courses for those in practice in various health fields, including physicians (especially pediatricians and obstetri-

**Table II Content of primary health care : influence of the mode of feeding on major aspects**

| Major feature of Primary health care            | Breast feeding  | Artificial feeding   |
|---|---|--|
| "Promotion of food supply"                      | Available and produced in community, with no problems of distribution.  | Usually imported formulas. Triple negative effects : (1) loss of breast milk, (2) cost (foreign currency) for imported formula, (3) unaffordability of products. |
| "Promotion of proper nutrition"                 | Growth usually satisfactory (5-6 mos.) with exclusive breast feeding.   | Growth usually inadequate (dilute, contaminated feeds).  |
| "Adequate supply of safe water"                 | Assured with human milk as source of water.   | Bottle feeding <i>increases</i> chances of contamination, water ("bottle disease").  |
| "Family planning"                               | Child spacing from breast feeding ("lactation amenorrhoea") numerically main form of family planning.   | Anti-family planning effect, because of low lactation amenorrhoea, increasing population pressure.   |
| "Immunization against major infectious disease" | Immunity acquired from human milk against infectious diarrhoea, <i>Esch. coli</i> , cholera, viruses, respiratory infection (syncytial virus), mixed infections, etc. | No protection. Increased risk of diarrhoea disease from contaminated feeds and bottle.   |
| "Promotion of mental health"                    | Mother-baby interaction different from bottle fed, possible consequences for mother-child relationships and to subsequent personality development.                    | Different interaction and possibility of emotional consequences to mother and to child.  |

cians), nurses, nutritionists, midwives and public health nurses. The educational program should be adapted to local needs and based on current information.

The infant food industry has been a major factor in the trend

away from breast feeding in many countries. Especially in resource poor countries, the actual and potential impact of processed infant food should be reconsidered, in the light of real nutritional requirements, available socioeconomic resources and existing cultural practices. Policy needs to be related to the following principles : (1) processed infant foods need to be geared to the real nutritional needs of young children, (2) processed infant foods should be promoted (or not) with regard to economic feasibility, at both family and national levels, and (3) processed infant foods should not be advertised and promoted if they will lead to deterioration of breast feeding or other satisfactory infant feeding, which the substitutes cannot replace. Information should be obtained on infant food availability, its composition, cost and the methods of advertising and promotion used.

The scope of information obtained can include the range, format, and content of direct advertising (including labelling), of indirect advertising (via non dietary promotional devices, such as competitions, free gifts, lotteries, baby shows, etc), and of motivational methods used to persuade and influence health personnel and others giving advice on infant feeding or making decisions on policy concerning food imports or food purchasing for health and welfare, or other services.

Another aspect of a community diagnosis should include information on legislation, primarily laws concerning advertising (labelling), specifically for milk products, and the legal apparatus for dealing with legislative abuses. The situation will vary by country. Legislation concerned with importation and promotion of infant foods may be difficult to prepare and implement, particularly so in countries where large, multi-national infant food companies are influential.

The role of women in society greatly influences the breast feeding norms and practices. In traditional societies where agriculture is most common, breast feeding is traditionally practised. In more urban circumstances, where women are more apt to work outside the home, provision for breast feeding is more difficult. Although it is often assumed that breast feeding is impossible for women working in an urbanized society, this is not necessarily so. Modifications can be made to allow mothers to evolve a breast feeding regimen.

In doing a community survey, legislation for maternity protection and maternity benefits should be explored. Facilities for nursing at employment sites can be developed in some situations through provision of creches and nursing breaks. A recent International Labor Organization Convention report (1975) notes certain world wide trends for maternity protection, including : (1) extension of maternity protection schemes to new categories of women workers, (2) prolongation of the period of statutory or prescribed maternity leave (or flexibility as to how much is taken before or after birth), (3) more liberal provision of

extended or extra leave during the child's infancy, (4) higher rates of maternity benefits, (5) more effective protection against dismissal during pregnancy and after confinement, (6) greater encouragement of breast feeding and wider provision of nursing breaks for mothers, (7) more adequate attention to the safety and health of women during pregnancy and lactation, and (8) establishment of social security schemes or public bodies of day nurseries to care for infants and children of working parents.

The cost benefit analysis of women breast feeding should be considered from the point of view of the family, industry and the nation. Family concerns may center on income foregone if the mother is not able to work versus the cost of infant formula. Industrial concerns will include the cost of provision of extra facilities for breast feeding and "time lost" for nursing. Nationally the provision of legislation, resources and organization to facilitate breast feeding will have to be considered, based on the need for women in the labor force.

Data obtained from various sources, particularly from the community survey, will enable plans to be made by the Ministry group, committee, or other similar body to whom this information can be supplied in a suitable, brief, nonscientific form to initiate and further promote a breast feeding program. Although it has been difficult to make the mental leap needed to consider human milk both as a national economic resource and as a locally processed convenience food, this has now occurred in many places.

Breast feeding needs to figure prominently in the health segment of national development plans. "Self-help", the best use of available resources, the prevention of infection and malnutrition in young children, and child spacing are all major concerns. Breast feeding plays an important role in all of these, and its importance needs to be emphasized as a major component of primary health care (Table II).

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Jelliffe, D.B. and E.F.P. Jelliffe, Human Milk in the Modern World. Oxford University Press : Oxford, 1978.

# Country Reports

## *Bangladesh - M.A. Quader*

In rural areas of Bangladesh babies are still traditionally breast fed for the first six months of life. In the urban areas, the bottle is fast replacing the breast. The result is disastrous for babies, particularly in urban slums. Among the reasons mothers give for the discontinuation of breastfeeding are : a subsequent pregnancy, the mother works, illness of the mother or baby, the appeal of powdered milk advertisements, or "drying up" of breast milk.

A hospital study of 500 poor urban mothers showed that half gave up breastfeeding in the first six months. A subsequent pregnancy was the most common reason given for the termination of natural feeding. The paper recommends that health workers rather than mothers need education about breastfeeding. Education that is given to mothers should begin in the prenatal period and stress the simplicity and advantages of breastfeeding. Mass media should be used to promote breastfeeding.

## *Burma - Myo Min*

The incidence of protein energy malnutrition in Burma ranges from 57-64 percent (as indicated by weight for age) in rural areas and from 64-79 percent in urban areas. The peak incidence is seen at 2-3 years. A 1957 rural study showed that 13-37 percent of mothers had insufficient lactation. A 1971 study of breastfeeding in Rangoon showed that the average period of breastfeeding was 13 months, but a quarter of the infants had already been weaned by 4-6 months. By far the most common reason given for termination of breastfeeding was the next pregnancy, although insufficient milk flow and illness of the mother were also cited. It was found that supplementary feeding of infants is usually begun early enough (at 4-6 months), but that the type of food, density and frequency of feeding were unsatisfactory. Rice pastes and gruels were the most common first foods.

A 1975 rural community survey revealed that 100 percent of babies were being breast fed under six months, out of which 69 percent were totally breast fed and 11 percent were given other milk in addition to breast milk. Prolonged lactation was noted in some rural areas where 11 percent of children were still being breast fed at three years.

### ***India - R.S.Dayal***

The importance of human milk has been immortalized in traditional Indian literature, "may four oceans, full of milk constantly abide in both your breasts, you blessed one, for the increase of the strength of the child. Drinking of the milk, whose sap is the sap of immortal life divine, may your boy gain long life, as do the Gods by feeding on the beverage of immortality." In spite of western influences breastfeeding still holds an important place in India. Practices of feeding vary however, depending on the region of the country.

Data from all over the country reveal that nearly 100 percent of mothers breast feed their babies at birth; by six months, 89-100 percent are still breastfeeding; and by twelve months, 70-98 percent are still breastfeeding. Long term lactation up to 2-3 years is not uncommon. A longer duration of breastfeeding is generally practised in rural areas than in urban areas. The educational status of the mother affects the duration of breastfeeding, as only one-third of graduate mothers breast feed beyond one year. The reasons most commonly given for discontinuation or failure of breastfeeding are : "insufficient milk", maternal illness and subsequent pregnancy.

The paper concludes that what is needed to encourage breastfeeding in India is the promotion of the traditional value of breastfeeding, reinforced by a sustained program of education based on scientific reasoning and utilizing all the modern methods of communication.

### ***India - Bansri M. Maniar***

A country wide survey carried out by the National Nutritional Monitoring Bureau in 1974-1976 revealed that only 11 percent of pre-school children were nutritionally normal, according to the Gomez classification. A primary reason is the late introduction of weaning food, especially in poor families. Mothers rely solely on breastfeeding and do not introduce supplementary food early enough. A large segment of rural mothers (90 percent) and poor urban mothers (65 percent) nurse their infants through the second year. In these cases the author recommends prolonged breastfeeding be allowed only if there is an

adequate diet such as will prevent nutritional deprivation in the mother.

Dietary surveys show that it is a deficiency of calories rather than protein intake among children that accounts for their malnutrition. Government measures have been taken in the form of encouraging the use of inexpensive weaning foods. Stress is put on nutrition education for mothers.

### *Indonesia - Moh. Sugiono*

In general breastfeeding is still traditionally practised in Indonesia although it varies from place to place. The majority of mothers in rural areas of Java, Bali and South Sumatra nurse their babies until 1-2 years. In nearly all other rural areas the weaning age is over two years. In urban areas about a third of infants are not breastfed beyond 10-12 months. Indonesian infants show a normal pattern of growth until the age of five months, but then the growth curve begins to decline due to inadequate production of breast milk with insufficient supplementary food. The socioeconomic level of mothers is related to the duration of breastfeeding, with higher level mothers feeding a shorter time. The same is true with respect to the educational level of mothers.

The reasons given for cessation of breastfeeding vary. In Central Java the main reasons are the next pregnancy and the child's refusal to take milk. Low income mothers in Jakarta report that production of breast milk stopped or that the baby did not want to take the breast anymore. High and middle income mothers say there was no breast milk or they were busy or working.

Changing attitudes related to the trend away from breastfeeding are taking place in Indonesia. Among these are changes in the social-cultural dynamics, urbanisation, including an increasing number of working mothers, a breakdown of the tradition of breastfeeding, especially among young women in cities, and the influence of marketing, mass media and advertising.

A number of formal and informal activities have been undertaken to promote breastfeeding in the country. These include recommendations from the Fourth Congress of the Indonesian Pediatric Association in 1978 calling for information and educational programs about the advantages of breastfeeding, research on breastfeeding practices, legislation against artificial milks, and the promotion of breastfeeding through the medical profession.

Since June 1979 the program for the promotion of breastfeeding has been taken over by the Government as a nationwide program. The Working Unit on the Promotion and Dissemination of the Use of Breast-milk gives assistance to this program.

## *Malaysia* - A.M. Abdullah and S.C.E. Abraham

In Malaysia there is a significant difference in the incidence of breastfeeding between rural and urban areas, the decline in practice being mainly seen in the cities. A 1978 study showed only 30 percent of mothers wholly breastfeed their children in urban areas, and by three months, only half still suckle their infants. Lower income mothers tend to breastfeed longer than higher income mothers so that by six months the percentages are 47 percent and 10 percent respectively. Several authors have noted breastfeeding practices rapidly falling off after three months, especially among Indian and Chinese populations.

In rural areas, the numbers of mothers who breastfeed are much higher than in the cities. 85-95 percent of mothers begin breastfeeding, although even in rural areas there is a significant decline after six months. The Malays tend to continue the practice longer than the Chinese or Indians. Among those mothers who do breastfeed, the reasons given for continuing the practice are that it is cheap, convenient and traditional. Reasons for not breastfeeding were insufficient milk, babies prefer bottle milk, social inconvenience and a working mother.

Three factors stand out as primary causes for the decline in breastfeeding. They are (1) a change in the socio-cultural pattern of living, (2) aggressive and subtle advertising by milk companies and (3) inadequate advice given to mothers by health workers.

In 1976 a National Breastfeeding Campaign was launched to promote breastfeeding. Objectives of the campaign were to encourage breastfeeding for at least six months, mobilise mass media and communications support in promotion of lactation, to facilitate breastfeeding among working mothers and to get the milk industry's participation in encouraging breastfeeding. An outcome of the campaign was a code of ethics and professional standards for advertising to regulate the promotional activities of the milk industry. Guidelines were also developed for use by health personnel, mothers and voluntary organizations to make them more aware of the advantages of breastfeeding.

## *Nepal* - R. Thapa

Breast milk has been traditionally described as "heavenly nector" in Nepal. By custom breast milk is the principal source of food for infants up to 5-6 months, when the local rice feeding ceremony is celebrated. Breastfeeding continues after the ceremony as well, but varies with the condition of the mother.

According to the 1975 National Nutrition Survey, 55 percent of rural children between 6 and 71 months show stunting, wasting or both.

Inadequate diet and acute diarrhoeal diseases are the most common factors responsible.

Nepal's Fertility Survey of 1976 revealed that 82 percent of the women breastfed for 24 months or more. This proportion, however, was found to be lower among the 15-24 age group by 8 percent than in the 45-49 age group of women. The proportion who breastfed for 24 months or more was found to be significantly lower among women with some schooling than those having none.

In 1975 the Ministry of Health developed twelve nutrition education messages which were disseminated through Radio Nepal. Three such health education messages were focused on promotion of prolonged breastfeeding practices. A recent survey has indicated that satisfactory progress has been made by mobile basic health workers in increasing community awareness of these nutrition messages.

### *Pakistan - H.A. Khan*

Data on the feeding habits of children in Pakistan were collected by the Diarrhea Research Program carried out in Karachi, of infants under two years from lower-middle and lower socioeconomic groups. Of the children surveyed, 20 percent were breast fed alone, 45 percent were mixed fed and 34 percent were artificially fed. Of those infants who were well nourished, 80 percent were fully or partly breast fed. As the incidence of breastfeeding declined, the incidence and degree of malnutrition increased. The conclusions from the study were : the overall incidence of breastfeeding in the survey group is very low, varying from 15-23 percent; about 40 percent of infants below the age of six months were already weaned from the breast; beyond the age of one year, both the incidence and severity of malnutrition was most common in the mixed fed group, showing that the supplementary food given was inadequate in quantity or quality or both.

Another study carried out in 1976-1978 in a semi-rural population showed that 75 percent of mothers were breastfeeding their children under six months of age, but there was a sharp decline in breastfeeding after six months. The introduction of supplementary food was delayed beyond six months. Children over two years were given an adult diet and only 23 percent were given some milk.

### *Papua New Guinea - J. Biddulph*

Since independence in 1975 the Government of Papua New Guinea has been increasingly concerned about the rising incidence of gastro-

enteritis and malnutrition in young children. Paralleling this trend was a marked decline in breastfeeding. A survey in 1976 in Port Moresby showed that one-third of the sample children under two years were being artificially fed. 69 percent of these artificially fed children were malnourished.

The Government acted to halt the decline in breastfeeding through a two pronged approach : education and legislation. Nutrition and health education stressing the advantages of breastfeeding was aimed at school children, health personnel and the community in general. The advertising of feeding bottles, breast milk substitutes and infant formulas was banned. Feeding bottles may only be purchased by a prescription signed by a registered health worker. Health workers who do not follow the regulations are fined, as are shopkeepers who illegally sell feeding bottles.

A repeat survey in 1979, twenty months after the new legislation, showed that only 12 percent of the sample children under two years were being artificially fed, compared with the earlier 35 percent.

### *Philippines - P.D. Santos Ocampo*

A number of studies on breastfeeding patterns have been carried out in the last twenty years. Findings concerning the incidence of breastfeeding in urban areas vary, with 90 percent of mothers in an urban low income group in 1955 indicating that they breastfeed, while a 1978 WHO study showed that 66 percent of urban poor, and 27 percent of elite mothers breastfeed. Rural studies show more consistency and generally higher percentages of women who breastfeed, between 66-80 percent in most rural groups.

Different studies have all documented a decline in breastfeeding as a result of urbanization. Breastfeeding duration has been shown to be shorter among the more educated and mothers who work.

Weaning from the breast is as early as three weeks or as late as 1½ years. From studies of weaning practices, the general conclusion is that the main reason for weaning is inadequate milk flow.

The paper presents a number of socioeconomic, educational, professional and commercial factors that have led to the decline in breastfeeding. Measures to counteract these factors are recommended including the utilization of mass media to promote breastfeeding, motivation for health workers to campaign for breastfeeding, formulation of a code of ethics for the food industry, and research into the causes of the decline in breastfeeding.

**Thailand - S. Dhanamitta, D. Tontisirin, P. Kanjanasthiti  
and A. Valyasevi**

A study of breastfeeding trends was carried out by the Department of Pediatrics, Ramathibodi Hospital during 1971-1976 in various communities. A high rate of breastfeeding (81-95 percent) was found in rural areas, during the first year of life. In a semi-rural area breastfeeding in the first six months was approximately 60 percent, reduced to about 40 percent by the time the child was weaned at 1½ years. In urban areas around Bangkok, approximately 75 percent of infants were breast fed at birth, but by one month the percent of mothers breast feeding had dropped to 46 percent, and by one year was only 6 percent.

Most mothers in rural areas who breast fed did so because of economic reasons and convenience. Health personnel played no role in advising mothers about breastfeeding either in rural or urban areas, they did however influence mothers to use powdered milk in some cases.

The conclusions of the 5-year Ramathibodi study relating to causes for the decline in breastfeeding were : (1) a lack of appreciation of the value of breastfeeding by the general public, (2) undernourishment and poor health of mothers during pregnancy, making lactation difficult, (3) increasing numbers of working mothers.

A number of activities have been undertaken to encourage breastfeeding including several national workshops to identify strategies related to infant feeding practices. The Nutrition Society of Thailand, a private organization, held national slogan and photographic contests to obtain the best picture of a nursing mother. A local folk song and radio and television programs were developed to promote breastfeeding.

# Summary of Country Reports

**E.F.P. Jelliffe**

Activities in the field of breast feeding were reported from 10 countries in Asia and the Western Pacific, namely Bangladesh, Burma, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines and Sri Lanka.

The papers presented blended very harmoniously in their approach to solving the problem of the decline in breast feeding in the area.

## **Causes of the Decline in Breast Feeding**

All participants specified multifactoral causes which included among others, the death of the mother, the working mother, urbanization, the nuclear family, divorce, that breast milk was "insufficient" or "not suitable", doctor's advice to bottle feed, social activities, lack of transport for the mother to the day care centre, and so on.

Other factors also mentioned included the traditional use of pre-lacteal feeds (honey foggery, castor oil purges etc.), pre-lacteal feeds given in hospital, separation of the mother-child dyad, indifference of hospital staff who were unaware of the importance of early mother/child contact and unnecessary anaesthesia during labour.

## **Prevalence Surveys**

Most countries had attempted to identify the status of breast feeding specifically among lower socio economic groups, although data were also obtained in some instances from upper and middle socioeconomic groups of mothers. Although erosion in the pattern of breast feeding among rural mothers was noted, it was noticeably higher in the city dwellers.

## **Suggested Changes**

Representatives from the different countries seemed unanimous in recommending changes in three major areas.

1. *Education* - this included education of all categories of health professionals : physicians (obstetricians, paediatricians), nurses, midwives, as well as teachers in teacher training colleges, school children and individuals in the community at large. It was agreed that curricula for health personnel needed revision, so as to include education in the physiology and management of lactation, and the preparation and timely introduction of appropriate weaning foods.

2. *Nutritional Measures* - to be implemented with regard to improving :

a) maternal nutrition (maternal channelled infant feeding).

b) child feeding - avoiding the early introduction of semi solids below the age of three months. Ensuring that the breast fed infant receives nutritious multimixes from the age of 4 months onwards which should consist of locally available, culturally acceptable, inexpensive dishes, suitable for the feeding of young infants, with an adequate blend of protein of good quality and sufficient calorics, as well as needed vitamins and minerals. Mention of donated foods was made, but these should be used judiciously as an interim, short term measure, so that they do not compete with the production of locally grown foods which are culturally acceptable

3. *Legislation* - regarding :

a) maternity and lactation benefits, which need implementing in some countries or extending in others.

b) the availability of creches and day care centres for the working woman, and means of transport for the mothers to be able to take the children to these centres.

c) no discrimination by employers against women workers (for the example, loss of pension rights, upward mobility in jobs, sudden dismissal).

## **Other Activities Should Include**

1. Monitoring of the activities of the food companies, regarding sales, promotional activities.

2. The need for mothers' groups or associations to act as support mechanisms (doulas, hilots, etc.) for the mothers who wished to breast feed, but needed advice and renewed confidence in their ability to use this biological method of feeding.

## **Breast Feeding Programmes**

These activities were found to be at different levels of development depending on the support of the government, political structure and en-

vironmental difficulties. Representatives attending the workshop were unanimous in their desire to promote an appropriate climate to improve the breast feeding situation in their own countries.

Some representatives recommended research and promotion of :

1. Local weaning foods (e.g. kheer-rice & dahl) (Pakistan).
2. Mass media campaigns; revision of school curricula (Philippines).
3. Increasing maternity benefits and using locally packaged milk products (Sri Lanka).
4. The need to improve the quality of weaning foods (both protein and calorie density) for infants (Burma).
5. Improved training of health workers in the management of breast feeding and increasing awareness of the public via the use of mass media (Bangladesh).
6. In Thailand, the 4th National Food and Nutrition Development Plan included the promotion of breast feeding. Promotion of breast feeding has been encouraged through contests for slogans and posters as well as three seminars for two kinds of personnel, including representatives from the food industry. Other features have included exhibitions, group discussions, lecture tours, use of mass media, distribution of relevant literature, visual aids (T shirts) and records on breast feeding.
7. Some specific recommendations made by the delegates from India included the use of mass media, motivation of future mothers, legislation regarding sales of tinned milks, and maternity benefits.
8. In other countries programmes seem to have reached a more advanced stage. In Indonesia for example, through the impetus of the Paediatric Association since 1973, activities have included training in breast feeding of medical cadres, the formation of a "working unit" on the promotion of breast milk through the use of mass media, symposia and group discussions. Since 1978 several recommendations have been made, such as dissemination of information through all sectors, monitoring of the activities of the milk companies, quality control of artificial milk and recording of the amounts of milk produced in the country. More research programmes have been recommended as well as legislative measures for working women who wish to breast feed, changes in hospital routine (rooming-in) and a new look at methods of contraception.
9. In Nepal the use of the radio has proved an effective means of disseminating knowledge and the "12 Child Care Messages", devised for the protection of children, forms part of an excellent "Primary Health Care" programme.
10. In Malaysia a National Breast Feeding Campaign was launched in 1976 aimed at encouraging mothers to breast feed their infants for at least six months, using mass media and community support. Considera-

tions were given to working women who wished to breast feed and co-operation of the milk industry was sought to encourage breast feeding, to adopt a code of ethics and to stop their promotional activities. Education on infant feeding is given to health professionals, mothers and community groups. Maternity leave has been increased from 6 to 8 weeks by some private firms. The breast feeding campaign has been implemented by committees formed at the national, regional and district levels with assistance from voluntary organizations.

11. Strong action has been taken by the government of New Guinea through :

A. An active education campaign aimed at health workers, school children and the community.

B. Legislation regarding,

1.) advertising by milk companies, which is now banned

2.) the "Baby Feeds Supplies (Control) Act" (1977) passed by Parliament has become law. Feeding bottles, teats (nipples), and dummies can now only be acquired on a prescription signed by a registered health worker who must instruct the mother or guardian on the correct dilution of the formula and hygienic use of the bottle.

3.) Lactation breaks (30 minutes twice a day) for working women.

Further information on programmes will be found in the detailed papers presented by participants in the Workshop.

In conclusion, all participants stressed the need to improve the pattern of breast feeding in their countries. There appears to be uniformity and agreement on methods to achieve desired results. Although programmes at this stage are at different levels of implementation, the enthusiasm of the participants and their knowledge augurs well for an improvement in the quality of life of infants and children.

# Timing for Complementary Feeding

**Priyani Soysa**

The cornerstone for preschool malnutrition in Southeast Asia is late weaning, that is, the late introduction of foods other than milk. The term "weaning" refers to the introduction of food other than milk to the infant. But its use has led to much confusion and the term "complementary feeding" is more acceptable, as we would expect mother's milk to feature largely in the infant's diet even up to one year.

Surveys referred to in the earlier paper on breastfeeding patterns in Sri Lanka also covered the area of foods other than milk. It showed (as the WHO collaborative study did in India) that complementary feeding occurred as late as one year.

There are two aspects to the question of the timing for complementary feeding. First is the cultural situation. In Sri Lanka, the delay is often due to a ritual rice eating ceremony which is traditionally arranged around the eleventh month. There is therefore reluctance to offer rice earlier.

Second, mothers in the rural setting breastfeed up to one year or more because they think it is best. Although formula feeding may be introduced earlier, semisolids and solids are delayed because mothers think that teeth must appear before these foods are offered. However in the urban areas, mothers have accepted our advice and offer a cereal/legume/leafy gruel. There is a great need for education of mothers to highlight this very necessary programme in their feeding of infants. But the question of the moment is the timing of this introduction of semi-

**solids. Much has been written in the West and circulated for general guidance without taking into consideration variations in local conditions.**

**Too early introduction can lead to diarrhoea and marasmus where pure water is not universally available and where other hygienic conditions and adequate utensils are lacking.**

**Follow-up of babies born at the De Soysa Maternity Hospital in Columbo shows that babies grow well up to six months. The growth curve plateaus from then on and by the preschool years 40 percent suffer from chronic undernutrition and incremental nutritional dwarfing.**

**The data presented in this paper demonstrate that it is not necessary to start complementary feeding earlier than the fourth month. Also, that breast milk is adequate for the majority of infants to double their birth weight by 3-5 months. (The average birth weight in Sri Lanka is 6½ pounds or 2.9 kilos.)**

**The total number of infants analysed in the series was 722. The number of babies seen at six weeks was 372. The findings were :**

**Number of breast fed babies - 168/350**

**Doubled birth weight at 6/12 - 19**

**Doubled birth weight at 3/12 - 111**

**Doubled birth weight at 5/12 - 33**

**Doubled birth weight > 6/12 - 5**

**Number on breast milk and formula - 135/350**

**Doubled birth weight at 6/12 - 3**

**Doubled birth weight at 3/12 - 91**

**Doubled birth weight at 5/12 - 33**

**Doubled birth weight > 6/12 - 8**

**Number on formula alone - 47/350**

**Doubled birth weight at 6/12 - 14**

**Doubled birth weight at 3/12 - 2/5**

**Doubled birth weight at 5/12 - 8**

**There is a need for information from many countries in Southeast Asia, not merely to measure mother's milk output (with its associated variations), but also to document this plateauing of the growth curve in infancy.**

**In Sri Lanka the output of breast milk by the average woman is 500 ml. Supplementary feeding of pregnant and lactating mothers has been in the form of wheat soya blend distributed through MCH clinics for over eight years. The logistics of such a programme can be difficult and mothers participation in it poor. Participation has been assessed to be about 50 percent among the most vulnerable group of anaemic women. There is also a concern whether such supplementation reaches the mother or whether it is shared with the family. No mother in any culture will eat an extra item when her family has a limited choice and quality of food.**

Therefore we have to turn back to complementary feeding to prop up the failing growth in mid infancy. Our experience shows that it is necessary between five and six months. But how does the mother know when exactly she should do this feeding?

Where an infant is followed up at an MCH clinic with serial recordings of weight, minor deviation from the growth gradient indicate the need for complementary feeding. In Sri Lanka, it has been documented that in spite of a health facility being available within three miles of the average home, only one third of the population utilise health facilities at the rural level. Programmes to improve this utilization through community health workers have been initiated. Until the growth chart is universally available, I feel that we will have to guide our mothers by timing the introduction of a cereal/legume/leafy gruel at four months.

I have no doubt that this question needs wider consideration and should provide food for thought.

# Home Based Supplementary Foods

**Shanti Ghosh**

The nutritional status of a community depends on various socio-economic factors like income, education, living conditions, family size, and knowledge regarding their requirements of foods. With adverse socioeconomic conditions, the brunt of malnutrition falls more on the mother and the young children, because the mother is the last to eat in the family, and the young children are entirely dependent on her for their food.

While low income plays a vital role in undernutrition, ignorance about nutrition is equally, if not more, important. As Cecily Williams has said, "Malnutrition is not due to economic poverty, but to poverty of knowledge of the nutritional needs of a child, to defective personal and domestic hygiene and a fatalism which produces poverty of imagination". To this can be added taboos and prejudices, so that even when good quality foods are available, they are considered harmful for the young child and hence withheld. Most of the deaths due to malnutrition occur under the age of 3 years. Once the child crosses the age of 3-4 years and learns to fend for himself, and grab food when he is hungry, the incidence of malnutrition becomes much less.

A few studies have shown that income of the family does not play a major role in the incidence of malnutrition up to 2 years of age. The mother's attitude towards the child's food is much more important. Often money is spent on expensive prestigious foods rather than on staples like cereals and pulses. Obviously there is need for much more data collection and research in this aspect.

Extensive interviews with the mothers of malnourished children have shown that in 55 percent of children, solids were introduced after the age of 1 year. In only 4 percent were these introduced before the age of 6 months. The amount of supplementary solids was grossly inadequate in all cases. The children were mainly being sustained on a combination of breast milk and diluted animal milk using unclean bottles resulting in a high incidence of infections. Breast feeding, which has been our greatest asset in infant feeding, is also being replaced gradually by the bottle, particularly in the urban slum areas. In any nutrition education programme therefore, the following points have to be emphasized :

1. Advantages of breast feeding.
2. Introduction of semisolids from about 4 months of age, when the breast milk begins to decline in quantity and the growth begins to falter.
3. Quantifying the food at different ages and gradual switch over to the family food by 1 year.
4. Emphasis on the basic family food rather than special food for the young child.
5. Emphasis on frequent feeding because of the bulky nature of the diet.

Nutrition advice is given to the mothers as follows :

The basic principle of the nutrition advice is to recommend diets based on the normal dietary pattern of the family and within their economic reach. As a mere verbal explanation of the quantity of food to be given to the child is not sufficient, the commonly consumed family foods are displayed in commonly used household utensils. These models are used in order to explain the quantity of food that the child needs. The quantities of raw material needed to make the amount of cooked food displayed are also shown to the mother. In addition posters are displayed which represent pictorially and in words the amount of food required, distributed over several small meals. (Fig. 1-3 for mothers, Fig. 4 for health personnel). Thus the mother gets a concrete visual picture of the amount of food her child should be getting at each meal during the day.

The mother is advised to feed the child using a separate bowl, and a spoon. Hand feeding is perfectly alright if the hands are clean and washed before feeding.

The mother is not advised to make any special food for the child except for a short while initially, but instead, is taught to modify the family food depending on the child's age. She is advised against making the food too thin, which will increase the bulk and reduce the energy density. She is dissuaded from buying expensive, prestige foods. Instead the advantages of cheap nutritious foods like roasted gram, pea-

|            |  |   |   |    |   |
|------------|--|---|---|----|---|
| Morning    | 125g <br>Milk           | <br>1 Sugar      | <br>1 Slice          | or | <br>½ Chapati              |
| 10 O'Clock | <br>1 Banana            | or  | <br>1 Chapati        | or | <br>½ Katori<br>Atta Halwa |
| Noon       | <br>1½ Chapati          | <br>½ Katori Dal | <br>Green Vegetables |    |   |
| 2 O'Clock  | <br>½ Katori Atta Halwa | or  | <br>1 Slice          |    |   |
| 4 O'Clock  | 125g <br>Milk           | <br>1 Sugar      | <br>1 Slice          | or | <br>1½ Chapati             |
| Night      | <br>1 Chapati           |   | <br>½ Katori Dal     |    |   |

Fig. 1 For One Year Old Child

nuts and bananas, in addition to the basic family diet are explained to her.

Hygiene also forms an important part of the advice. The mothers are told about the importance of clean hands, clean utensils, protected food and clean drinking water.

Emphasis is given to better cooking methods, for example not cutting vegetables too fine, not to throw away the water in which rice or vegetables are soaked or boiled, to wash the vegetables before cutting and not after, using the leaves and stalks of the vegetables, enhancing the food value by sprouting or fermentation.

|            |  |  |  |   |  |
|------------|--|--|--|---|--|
| Morning    | 125g <br>Milk           | <br>1 Sugar |  or  or <br>1 Slice ½ Katori Rice Kheer |   |  |
| 10 O'Clock | <br>1 Banana            | or   | <br>1 Katori Khichri  | or  | <br>½ Katori Suji Halwa |
| Noon       | <br>1½ Katori Khichri   | or   |  + <br>½ Katori Rice ½ Katori Dal  | <br>Green Vegetables |  |
| 2 O'Clock  | <br>½ Katori Suji Halwa | or   | <br>½ Katori Khichri  | or  | <br>1 Slice             |
| 4 O'Clock  | 125g <br>Milk           | <br>1 Sugar |  1 Slice  |  1 Katori Rice       |  ½ Katori               |
| Night      | <br>1 Katori Khichri    | or   |  ½ Katori Rice  | +  ½ Katori Dal      |  |

Fig. 2 For One Year Old Child

The belief that home cooking for the very young takes time need not be true. The mother can be taught to cook simple and yet nutritious foods which take very little time. A perfectly good porridge can be made using household flour, pounded rice, or gram with milk and sugar. Or mixtures of rice and lentils can be made, adding some leafy vegetables, and a little oil. These foods are often eaten by the older members of the family also. Egg is a useful food and can be added whenever feasible. Some basic ingredients like cereals or gram, can be roasted and ground in bulk to last a few days and a little of it can be cooked every day. I believe that too much obsession with recipes is not rewarding. Women do know how to cook simple weaning foods. The

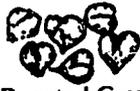
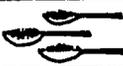
|             |  |  |   |  |   |
|-------------|--|--|---|--|---|
| Morning     | 125g <br>Milk         | <br>1 Sugar | <br>1 Slice      | <br>½ Chapati           |   |
| 10 O' Clock | <br>1 Banana          | or   | <br>1 Chapati    | or <br>½ Katori Khichri |   |
| Noon        | <br>1 Katori Khichart | or   | <br>1 Chapati    | + <br>½ Katori Dal      |   |
| 8 O' Clock  | <br>Groundnuts        | or   | <br>Roasted Gram |  |   |
| 4 O'Clock   | 125 g <br>Milk        | <br>1 Sugar | <br>2 Slices     | <br>1 Chapati           |   |
| Night       | <br>1 Katori Rice     | or   | <br>2 Chapatis   | <br>½ Katori Dal        | <br>Green Vegetables |

Fig. 3 For Two Year Old Child

problem is that they do not realise that the young child needs these and in what quantity.

Where the constraints are more, the family food can be satisfactorily modified, even for the very young, for instance cooking of rice, using vegetables without spices and mashing them, even soaking family bread in milk or gravy to soften it. There are innumerable such traditional foods in every community. Many fruits are suitable for babies and do not need cooking e.g., banana, mango, papaya. In some parts of India, mothers dry the banana and use the powder with milk for supplementary feeding.

| Name of food           | Dry wt (g)                           | Quantity  |   | Calories | Proteins (g) | Nutrients Supplied   |
|------------------------|--------------------------------------|---|---|----------|--------------|--|
|                        |                                      | Dry   | Cooked  |          |              |  |
| RICE                   | 60                                   |  |  | 206      | 4.1          | Carbohydrates, proteins  |
| WHEAT                  | 88                                   |  |  | 300      | 10.6         | B <sub>1</sub> , B <sub>2</sub> , Niacin, B <sub>6</sub> , Carbohydrates, Proteins |
| PULSE                  | 50                                   |  |  | 167      | 11.1         | B <sub>1</sub> , Niacin, Carbohydrates, Proteins                                   |
| MILK                   | 250                                  |  |   | 168      | 8.0          | A, D, B <sub>2</sub> , B <sub>6</sub> , Calcium                                    |
| SUGAR OR JAGGERY       | 15                                   |  |   | 60       | —            | Carbohydrates  |
| GREEN LEAFY VEGETABLES | 50                                   |  |   | —        | —            | Carotene, B <sub>2</sub> , B <sub>6</sub> , Iron, Calcium                          |
| OIL                    | 11                                   |  |   | 99       | —            | Fat (essential fatty acids)  |
| VEGETABLES & FRUITS    | Recommended if economically feasible |   |   | —        | —            | —  |

1 Katori Rice = 2 Chapatis

1 Chapati = ½ Katori Rice = 1 Banana = 2 small slices of bread

1 Katori = 200 ml.

Requirements of one year old child, Calories 100:Proteins 17 g.

Fig. 4 Recommended Food Intake for One to Two Year Old Child

Home prepared food mixtures need to be recognized as a most economic and scientific approach to weaning in the developing countries. A mixture of cereals and legumes raises the chemical score to 60 by improving the balance of amino acids, while individually both cereals and legumes have a chemical score of 40 each. The addition of the common household vegetables, with leaves that are often just thrown away, will further improve the quality of food.

Fat in the form of vegetable oil is useful in increasing energy density and reducing bulk. Unsaturated fatty acids are essential to our basic metabolism and are vehicles of fat soluble vitamins A, D and E. A breast fed baby receives 50-60 percent of energy through fat. When weaned, the energy intake drops unless fat is added to the diet.

Nationally produced weaning foods can have their uses. However, although their production is directed towards the low income groups, their cost and unavailability for most slum neighbourhoods and rural areas, stand in the way of their widespread use. Those packaged in a modern attractive package are ultimately used by the urban elite. The simple polythene bags remain stacked on the shelves of the few retailers chosen by governments to channel the distribution.

A better alternative is to prepare the weaning food at the village level using local foods such as cereals, pulses, peanuts and jaggery in various combinations, (tapioca with dry fish is used in some parts of India) using village technology and with the help of the village women. This will increase their involvement in the nutritional problems of their children and act as a vehicle of nutrition education. Traditional methods of food processing, such as hand pounding, parboiling and evaporating, destroy much less of the nutritional value, compared with industrial products.

In conclusion, home prepared food mixtures and modification of the family food can be perfectly suitable as weaning foods. Where the basic staples are poor in nutritive value, mothers will have to be educated to add some protein food to the weaning food. Nutrition education should emphasize the quantity of food a child needs and the need to give semisolids and not thin, watery gruels, because usually the child is fed an inadequate amount with these, even though the constituents of the gruel are high quality. Knowledge regarding a child's requirements, once he is on family food, is equally important.

# Formulation of Supplementary Foods for Infants

**Kraisid Tontisirin**  
**Benjawan Moaleekoonpairoj**  
**Sakorn Dhanamitta**  
**Aree Valyasevi**

During the last 20 years, great efforts have been made to develop, produce and distribute protein rich foods to alleviate protein malnutrition in developing countries. Most of the food mixtures were high in protein but relatively low in fat content. However, these food mixtures played very little role in solving protein malnutrition since they were usually unavailable to low income groups either in urban slums or poor rural sectors.

In a recent effort to eradicate protein energy malnutrition in infants in Thailand, several supplementary food mixtures were developed and tested. These are low cost, high protein and energy supplementary foods, available for use at the village level. The formulation of these supplementary foods was based on the Thai standard for infant food. (Thai Standard for Infant Food, 1979). According to the standard, the protein should not be less than 2.5 g. per 100 available kcal of standard protein. The amino acid score should not be less than 70 percent of the FAO/WHO reference pattern of protein. (Joint FAO/WHO Report). The food should contain linoleic acid at a level not less than 300 mg. per 100 available kcal, and fat not less than 2 g. and not more than 6 g. per 100 available kcal

Since rice is the staple food it was the major portion of the food, mixed with soybean, mung bean or fish meal for protein, and groundnut and sesame to add fat. All can be made available locally.

**Table 1 Composition of Supplementary Foods**

| Formula | Ingredients                                | Composition per 100 g |         |               |
|---------|--|-----------------------|---------|---------------|
|         |  | Protein (g)           | Fat (g) | Energy (kcal) |
| I       | Rice:Soybean:Groundnut<br>(70 : 15 : 15)*  | 16.5                  | 10.6    | 437           |
| II      | Rice:Soybean:Sesame<br>(70 : 15 : 15)      | 14.8                  | 11.0    | 448           |
| III     | Rice:Mung Bean:Groundnut<br>(60 : 15 : 20) | 14.5                  | 11.9    | 443           |
| IV      | Rice:Mung bean:Sesame<br>(60 : 20 : 15)    | 13.2                  | 13.2    | 451           |
| V       | Rice:Fish meal:Groundnut<br>(70 : 10 : 20) | 18.5                  | 11.8    | 454           |
| VI      | Rice:Fish meal:Sesame<br>(70 : 10 : 15)    | 17.2                  | 10.4    | 444           |
| VII     | Rice:Fish meal:Oil<br>(70 : 10 : 8)        | 14.4                  | 9.2     | 437           |

\*Numbers in the parenthesis indicate the proportion of the individual ingredients, respectively.

**Table 2 Nutrient compositions per 100 kcal of supplementary foods**

| Formula | Protein (g) | Fat (g) | Linoleic acid (mg) |
|---------|-------------|---------|--------------------|
| I       | 3.77        | 2.43    | 1216               |
| II      | 3.30        | 2.46    | 1232               |
| III     | 3.34        | 2.69    | 1340               |
| IV      | 2.92        | 2.22    | 1108               |
| V       | 4.01        | 2.59    | 1300               |
| VI      | 3.87        | 2.34    | 1171               |
| VII     | 3.41        | 2.11    | 1054               |

The nutrient composition of the food mixtures is shown in Tables 1 and 2.

If a child of 10 kg. body weight consumes 250 g. daily of one of these supplements, he will receive more than 1000 kcal and 30-40 g. of protein, which is considered adequate.

The formulation of these supplementary food mixtures was completed manually by calculating the proportion of the ingredients to be used in the formulas to meet the standard for protein, fat and linoleic acid content. In order to obtain the least cost product, the amount and

cost of individual ingredients was considered.

The preparation of the supplementary food mixtures was as follows: the beans, groundnuts and sesame were roasted for 5-10 minutes first in order to ensure that all ingredients were well cooked at the same time. The rice was also roasted for a period of 3-5 minutes to kill organisms that may contaminate the food later. Roasting the rice also reduced the moisture, thereby improving keeping quality. The grinder used was simple to operate and efficient. The mixtures were packed in small plastic bags of 100-500 grams.

Evaluation and testing for acceptability and tolerance of the supplementary food mixtures was based on the guidelines for preclinical and human testing of the Protein Advisory Group of the United Nations System. (Protein Advisory Group, Guidelines 6 and 7). The general guidelines are as follows :

1. Chemical analysis for moisture, ash, crude fiber, nitrogen, amino acids, fat, certain vitamins and minerals.
2. Tests for safety and possible toxicity including :
  - a. microbial analysis for the number and types of microorganisms of the raw materials, sampling at various stages of processing and at different times to design an optimum sterilization process. Microbial contamination is usually indicative of unsanitary conditions of production or processing.
  - b. contamination of reagents or solvents used in food production.
  - c. levels of food additives.
  - d. insecticide or pesticide residues such as the chlorinated or organophosphate compounds.
  - e. certain fungal toxins, especially the aflatoxin.
  - f. contamination of heavy metals such as manganese, mercury and arsenic.
  - g. any other harmful substance.
  - h. animal studies, both short and long term.
3. Nutritional evaluation can be done by :
  - a. chemical analysis to determine the composition of the food. Nitrogen and amino acid content of the food will be used to estimate the protein content and the amino acid score. Periodic analysis of the food can be useful as a quality control and to provide guidelines for further improvement of the product.
  - b. animal studies in rats will provide the value of protein efficiency ratio (PER), biological value (BV) and the net protein utilization (NPU).
  - c. human studies are essential since the food product will be eventually consumed by man, and the utilization by man may be different from animals. The age group of the subjects will be dependent on the product's intended use, ie., for

**weaning food with weaning age infants. Information from studies will provide data on acceptability, tolerance, effect on growth, digestibility, nitrogen balance data, BV and NPU.**

Since the supplementary food mixtures in this study were prepared from common food sources and the steps involved in producing the mixtures were simple, these foods were tested directly with infants and young children. However careful evaluation in terms of chemical analysis for composition and microbial contamination was done with satisfactory results. The food mixtures may be kept 5-8 weeks without spoilage or overgrowth of microorganisms.

Some preliminary tests for acceptability and tolerance of Formula I-IV have been conducted with young children in Ubol province and showed good acceptability and tolerance. However, tests with these products for digestibility, nitrogen balance and effect on growth are still required to confirm that these foods are really suitable for infants and young children, and to provide data for improvement of the product.

#### REFERENCES

- Thai Standard for Infants Food. Ministry of Public Health, 1979.
- Report of the Joint FAO/WHO Ad Hoc Expert Committee on Energy and Protein Requirements. WHO Technical Report Series. Number 522. World Health Organization. Geneva, Switzerland.
- Protein Advisory Group. Guideline Number Six.
- Protein Advisory Group. Guideline Number Seven.

# **Pre-Congress Workshop on Breast Feeding and Supplementary Foods : Reports and Recommendations for Breast Feeding**

Recent objective scientific evidence indicates clearly that breast feeding has overwhelming advantages for infant nutrition, protection against infections and natural child spacing. It supplies a source of uncontaminated water for the young infant, and represents self-reliance in local food production. Breast feeding, therefore, is a vital component of health care of infants, including primary health care services.

Since malnutrition is the single most important problem in the developing world, the feeding of the vulnerable mother-young child dyad is crucial, and emphasis needs to be given to maternal nutrition in pregnancy and lactation, to breast feeding, and to the use of appropriate semi-solid food mixtures based on local foods for young children. These three approaches are indispensable and interrelated.

In view of the key role of breast feeding, the Conference recommended that :

1. Pediatricians give the utmost attention to encouraging and promoting breast feeding. (see A).
2. Pediatricians incorporate breast feeding into training activities at all levels and into all services (see B).
3. Pediatric societies focus their attention on key issues related to breast feeding, including the organisation of seminars, the role of mass media for education, and the development of a code of ethics.

## **A. Encouraging and Promoting Breast Feeding**

In order to implement these goals the conference delegates agreed that this important subject should be considered under six specific areas. The attendant problems and constraints should be examined, as well as the objectives, targets, strategies, project formulation and built-in evaluation in all these areas.

### **Problem Area Number 1 : Consciousness raising and motivation**

#### *Objectives*

Increase awareness and appreciation of the value of breast feeding. Do not interfere but maintain the traditional pattern of breast feeding in areas in which breast feeding is the preferred method of child nutrition.

#### *Targets*

The community at large, such as the feeding unit, school children, religious leaders, all health workers and support groups (for example, mother's clubs, breast feeding groups such as La Leche League, Susu Mamma, and so on).

#### *Strategies*

- Need for a multisectoral approach
- Need to influence decision makers
- Optimum use of relevant culturally acceptable mass media

### **Problem Area Number 2 : Education**

#### *Objectives*

Promotion of both maternal-foetal and infant nutrition and overall breast feeding in the community.

#### *Targets*

The community at large including all health professionals, e.g. obstetricians, pediatricians, nurses, midwives, hospital administrators, nutritionists, and private practitioners, among others.

#### *Strategies*

They must be consistent, basic and derived from locally adapted information which can be integrated with existing programmes such as family planning and agricultural extension. Produce a manual with the help of a multidisciplinary team of professionals.

Health professionals should receive practical instruction and appropriate training, and a dialogue should be maintained among all groups concerned.

#### *Project formulation and activities*

Strengthening and implementing all curricula with up-to-date knowledge on maternal and child nutrition, as well as the physiology and management of lactation. Forums to be held on these important subjects.

### **Problem Area Number 3 : Legislation**

#### ***Objectives***

Implement or suitably modify existing laws.

#### ***Targets***

They should include working mothers, and employers in the labour market. Possible use of disincentives should be considered.

#### ***Strategies***

- The influence of pressure groups.
- Educate the fathers to assist and share in some of the domestic chores to alleviate the mother's burden of work.
- Incentives.

#### ***Project formulation and activities***

Existence of day care centers and creches. Maternity benefits (leave, lactation breaks at work), government subsidies for private corporations.

### **Problem Area Number 4 : The health services**

#### ***Objectives***

To improve maternal and infant and child health services.

#### ***Targets***

All health personnel, including all categories of physicians and traditional birth attendants.

#### ***Strategies***

- Use of colostrum. Give no prelacteal feeds (glucose water, formula, etc.)
- Initiate early maternal/infant contact and early breast feeding.

#### ***Project formulation and activities***

Rooming-in for mothers and infants in maternity wards, and in pediatric wards, permitting mothers to continue breast feeding their infants. Modify if necessary some hospital routines which are a deterrent to breast feeding, which should be allowed on demand. Establish milk banks where culturally feasible. If bottle feeding is necessary give one to one instruction to individual mothers. Encourage mothers to provide milk for their premature babies and to initiate handling of their babies as soon as possible.

### **Problem Area Number 5 : Commercial firms (Infant food industry)**

#### ***Objectives***

Minimize advertising by firms. This should not be permitted in the health services.

Sensitize health personnel to subtle pressure by commercial firms, and educate them to monitor the activities of these firms.

Monitoring of advertisements in medical journals for infant formulas and processed foods.

### ***Targets***

The infant food industry.

Health workers, consumer groups, medical societies.

### ***Strategies***

Formulation of a code of ethics for the food industry.

### ***Project formulation and activities***

Licensing by trade and commerce boards.

## **Problem Area Number 6 : The mass media**

### ***Objectives***

Maximum use. Messages given must be consistent with general agreed upon policies. No sponsoring by the infant food industry. Counteract adverse advertising which detracts from breast feeding. Mass media should be devised within an appropriate cultural context.

### ***Target***

The general public as well as health professionals.

### ***Strategies***

As effective as possible.

### ***Project formulation and activities***

Through all relevant avenues.

## **B. The Role of the Pediatrician**

The pediatrician should act as a catalyst in all circumstances and activities concerned with improving maternal nutrition, breast feeding and the development of appropriate weaning foods. In addition, the pediatrician has major roles in training, in service and as an organizer, planner and team leader.

In view of the above, the pediatric content of undergraduate and postgraduate training must be expanded. If a doctor is to be suitably trained, the content of the training program must be relevant, practical and appropriate. Therefore, the pediatric curriculum should include normal growth, development and nutrition. In particular, emphasis must be given to "dyadic nutrition", so that antenatal aspects of preparation of breast feeding by obstetricians should be given full attention. Training should be supported by practice, for example, by an anti-bottle policy in hospitals.

The pediatrician's role as a trainer would include both undergraduate and postgraduate coverage, including in-service courses for nursing and paramedical personnel, primary health workers, traditional birth attendants and practitioners of traditional medicine, and community outreach to the public and schools via seminars and mass media.

The pediatrician also has a role as an organizer, planner and team leader in promoting the philosophy and practice of dyadic nutrition of mother-fetus-young child, needed to establish optimal lactation.

The service role of the pediatrician is through the hospital, MCH clinics and outreach to the community. Once again an anti-bottle policy in hospitals must be practised. To ensure the successful establishment of lactation there must be a confident, supportive atmosphere. A review of puerperal practices is needed to avoid procedures which interfere with breast feeding and to include those which minimize the chances of failure, including early initiation of suckling, no prelacteal feeds, minimal maternal anaesthesia, avoidance of unnecessary episiotomies, routine test weighing, institution of breast milk banks where feasible, and the availability of wet nurses, when culturally appropriate. Hospitals should themselves have creches for the babies of medical and nursing staff.

For postnatal visits, both in hospital and at MCH clinics, further support and encouragement of breast feeding, maternal nutrition and appropriate semi-solid feeding for infants must continue.

Pediatricians must extend this service to the community, both in the public and private sectors.

Research must be sustained in relation to the scientific aspects of human milk and breast feeding, and into analysis of the effectiveness of programs designed to promote breast feeding.

### **C. Pediatric Societies**

National and international societies must give priority attention to breast feeding because of its obvious and scientifically proven advantages.

Specifically, pediatric societies should :

a. Organize seminars for medical personnel, including obstetricians, pediatricians and general practitioners, nursing and paramedical personnel, nutritionists and the general public (including women's clubs, school teachers, and so on).

b. Revise the curricular coverage for undergraduates in medicine and nursing concerning "biological feeding" (see Annex).

c. Organize information for the general public via the mass media and pamphlets, booklets, and comment on and review current information.

d. Establish links with policy makers in government, NGO's (including consumer societies) and industry on breast feeding promotion, on development of a code of ethics for industry, on maternity/lactation benefits and on food and nutrition policy planning.

e. To change the policy of the country's health care system, both in the public and private sectors, through :

i) rooming-in procedures

ii) anti-bottle policy

iii) institution of creches for nursing mothers.

f. Follow-up of activities engaged in this field.

g. Develop guidelines for ethical practice in relation to the infant food industry.

The above topics could constitute important subjects for future national and international forums and working conferences, particularly those including mixed participants from the fields of obstetrics, nursing and pediatrics.

## ANNEX

### Suggested basis for curricular coverage on "biological infant feeding"

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*Foetus* : Nutritional requirements  
Maternal diet, cultural factors, optimal growth

*Extero* Nutritional requirements

*Gestate* Breast feeding: anatomy and physiology of breast

*Foetus* : Development. Psychophysiology of lactation. Information and support for parents. Recent knowledge concerning biochemical, anti-infective, contraceptive, anti-allergic, emotional, economic comparisons with cow's-milk formulas. Community influences on lactation (health services, infant-food industry, working women, cultural attitudes, women's groups), methods and techniques of successful breast feeding.  
Management of common problems.  
Bottle feeding : least-cost formula. Safest techniques.  
Risks in different ecologies.

*Transitional* : Nutritional requirements.

Duration of breast-feeding for different situations.

Semi-solids : age of introduction, composition.

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# WHO FEATURES

*October 1979*  
*No. 49*

## **WHO/UNICEF MEETING ON INFANT AND YOUNG CHILD FEEDING**

**Urgent action to promote the health and nutrition of infants and young children by governments, international agencies, nongovernmental organizations and the infant-food industry was called for by the WHO/UNICEF meeting on infant and young child feeding which met at the Geneva headquarters of the World Health Organization (WHO) from 9 to 12 October 1979.**

*The full texts of the Statement and Recommendations approved by the Meeting are on the following pages.*

# Statement on Infant and Young Child Feeding

The joint WHO/UNICEF Meeting on Infant and Young Child Feeding, which was held at WHO in Geneva from 9 to 12 October 1979, in expressing the need for urgent action by governments, international agencies, nongovernmental organizations and the infant-food industry and health and development workers to promote the health and nutrition of infants and young children, made the following statement :

1. Poor infant feeding practices and their consequences are one of the world's major problems and a serious obstacle to social and economic development. Being to a great extent a man-made problem it must be considered a reproach to our science and technology and our social and economic structures, and a blot on our so-called development achievements. It is not only a problem of the developing world ; it occurs in many parts of the developed world as well.

2. The question of adequate nutrition for mankind has been exercising international and national bodies for the last three decades, but the problem of malnutrition is not becoming less. It is taking a heavy toll in deaths and in long-term mental and physical disability. Women, with infants and young children, are its chief sufferers. This is socially, economically and politically unacceptable.

3. In this International Year of the Child, national governments and the international community are being called upon to focus on this complex problem and to take steps to ensure that children everywhere get a proper start in life on the basis of, *inter alia*, adequate nutrition. Governments and local communities have a major role to play in supporting action aimed at mothers and children to ensure sound infant

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and young child feeding practices.

4. Malnutrition in infants and young children cannot be separated from malnutrition and poor health in women. The mother and her infant form a biological unit; they share also the problems of malnutrition and ill health, and whatever is done to solve these problems must concern them both together.

5. The problem is part of the wider issues of poverty, lack of resources, social injustice and ecological degradation; it cannot be considered apart from social and economic development and the need for a new international economic order. It is also a basic issue for health care systems and its solution must be seen in the context of Health for All by the Year 2000.

6. The WHO/UNICEF Meeting on Infant and Young Child Feeding affirms the right of every child and every pregnant and lactating mother to be adequately nourished as a means of attaining and maintaining physical and psychological health. It stresses the responsibility of every society to ensure the effective enjoyment of this right so that children may develop to their full potential.

7. Breastfeeding is an integral part of the reproductive process, the natural and ideal way of feeding the infant and a unique biological and emotional basis for child development. This, together with its other important effects, on the prevention of infections, on the health and well-being of the mother, on child spacing, on family health, on family and national economics, and on food production, makes it a key aspect of self-reliance, primary health care and current development approaches. It is therefore a responsibility of society to promote breastfeeding and to protect pregnant and lactating mothers from any influence that could disrupt it.

8. The period of weaning from the breast is a critical stage which often results in malnutrition and disease if the child does not have a diet that is adequate in quantity and quality, hygienically prepared and culturally, socially and economically acceptable.

9. The health of infants and young children cannot be isolated from the status of women and their roles as mothers and as partners in social and economic development. In poor urban and rural communities where the health and socioeconomic status of women is deteriorating, a corresponding deterioration is taking place in the health of infants and young children.

10. Health for all cannot be attained unless there is a substantial improvement in the socioeconomic condition of women, the particular needs of mothers and their infants and young children are recognized and met, and conditions are provided that promote and sustain the well-being of the family. These conditions include the right of women to information and education that will enable them to improve their

own health and that of their families and to take an active part in decision-making on matters that affect their own and their children's health. They include also attention to the role of fathers in providing for the needs of their families.

11. The production, preservation, processing and distribution of food are essential components of any approach to ensuring the proper feeding of families and children. Emphasis should be placed on fresh local foods and traditional practices, complemented only when necessary, and under the guidance of government, by industrially processed products.

12. The WHO/UNICEF Meeting on Infant and Young Child Feeding affirms the need for sustained national and international action, and for the active participation of families, and especially mothers, in the elimination of malnutrition and the promotion of health. This is a challenge to all social and economic development strategies and to the world community as a whole. In the International Year of the Child it is fitting that national and international efforts be intensified, and that the enthusiasm it has generated in the cause of child health be sustained, to respond to this challenge.

*Concurrently with this Statement, the Geneva meeting adopted the following recommendations :*

## ***The Encouragement and Support of Breastfeeding***

### **HEALTH CARE SYSTEM**

Because of the fundamental importance of the health of the mother for breastfeeding, which in turn is essential for the health and development of the infant, and because health services through the primary health care approach, especially where they relate to the health of mothers and children, have an important preventive role to play, it is recommended :

#### **During Pregnancy**

Every attempt should be made to ensure the sound nutritional status of women and that their nutritional and health needs are met, especially during pregnancy. The health care system in collaboration with other sectors, should help in identifying and utilizing existing local resources so as to ensure that the nutritional needs of mothers are met.

The health care system in general should ensure that all mothers,

particularly during the period of pregnancy, are systematically provided with the type of breastfeeding education that is in keeping with their life situations and presented in practical ways that are likely to enhance their understanding and acceptance of it.

Emphasis should be given to the fact that lactation is a natural biological process but that to some extent breastfeeding is an act which must be anticipated and reinforced. With adequate teaching and support almost all mothers are capable of breastfeeding and solving any problems which may arise. The best teachers will be breastfeeding mothers.

During pregnancy, information and guidance should be provided to all mothers concerning preparation for breastfeeding and ways in which they can establish and maintain breastfeeding. The full cooperation of women's groups and other bodies working for the promotion of breastfeeding should be sought and supported by the health care system.

Attention should be given to ensuring that, wherever possible, all health workers in a position to provide adequate information to the mother on breastfeeding should be committed to the promotion of breastfeeding and have a thorough knowledge of its management.

Care should be given during the pregnancy period to identifying those mothers who are likely to be, because of their special social, economic or health condition, at high risk of not breastfeeding and special care should be given to them so as to enhance improvement of their situation and the establishment of breastfeeding.

### **Delivery**

Obstetrical procedures and practices should be consistent with the policy of promoting and supporting breastfeeding. In this respect, unnecessary sedation, routine use of episiotomy, and routine use of lactation suppressants should be avoided.

Breastfeeding should be initiated as soon after birth as possible, normally during the first ½ hour and, in order to facilitate breastfeeding, mothers should be encouraged and permitted to keep their infants with them in the same room or close to them and to practise on-demand feeding; maternity routines and structures should be conducive to this practice.

Health related staff, including traditional birth attendants, should seek to provide mothers not only with educational information but also with practical help and should be provided with appropriate information on the preparation for and management of breastfeeding.

The role of the father and other members of the extended family in providing support for the mother should be emphasized in all prenatal, maternity and postnatal care and fathers should be invited to participate actively with the health team in encouraging the mother to breastfeed.

## **After Delivery**

All postnatal health care should be oriented toward ensuring the maintenance of breastfeeding for as long as possible. All babies should receive colostrum. For optimal breastfeeding, the use of supplementary bottle feeding (water and formula) should be avoided. A healthy well-nourished mother who is fully breastfeeding her infant should not need to introduce any complements during the first 4-6 months of life, according to the needs of the infant.

Mothers' nutritional status should be reviewed and, whenever possible, steps taken to ensure that the mother has access to adequate food intake. The contraceptive effect of breastfeeding should be well recognized, although additional family planning methods should be promoted to ensure birthspacing. Preference should be given to contraceptive methods which do not interfere with the normal process of lactation.

All attempts should be made to ensure that in cases where infants need to be hospitalized, facilities should be provided so that the mother can be with the infant and continue breastfeeding or that the baby continue to receive breastmilk.

Where it is not possible for the biological mother to breastfeed, the first alternative, if available, should be the use of human breastmilk from other sources. Human milk banks should be made available in appropriate situations.

The terms "humanized" and "maternalized" milk for infant formula should be avoided.

## **SUPPORT THROUGH THE HEALTH SERVICES**

Health service staff must play a critical role in the initiation, establishment and maintenance of breastfeeding and should ensure that the mother has a source of sustained support for as long as breastfeeding continues, and thus health workers should be well informed and provide consistent information.

A baby who is not breastfed should receive special attention from the health care system. Adequate instructions for the use of infant foods as well as warnings about its problems should be the responsibility of the health care system. Supplies of infant formula would thus be required for distribution only where necessary and not as a routine.

## **EMPLOYED MOTHERS**

Paid maternity leave of not less than 3 months postnatal, job security and economic support should be provided to all mothers whenever possible, and wherever possible, and the responsibility for economic support during maternity leave should be carried by government, the

industry in which the woman is working, and other relevant international and national institutions.

Creches, paid breastfeeding breaks and other facilities should be provided, wherever appropriate, in industry, and in other relevant institutions, or close to the place of work to permit mothers to continue breastfeeding and have close contact with their babies. Financing of creches and other mechanisms that allow for this continued contact of breastfeeding should be carried by government and/or the industry in which the mother is working.

## COMMUNITY AND GOVERNMENT SUPPORT

All channels of communication, including religious leaders, school teachers and other community opinion leaders and voluntary associations, particularly women's organizations, should be actively involved, together with health services and other sectors, in encouraging and supporting breastfeeding and sensitizing the community to the value of breastfeeding and the needs of the mother and baby through home visits, if necessary.

Messages concerning infant and young child feeding should be consistent from one sector to another and from one population group to another and, therefore, the promotion of breastfeeding and appropriate infant and young child feeding practices in general should be set within the context of overall maternal and child health practices, national nutrition policies and primary health care.

Governments should be encouraged to set up national expert groups to advise them on policies about breastfeeding and to establish coordinating offices that can ensure consistency and continuation of supportive activities and implementation of ongoing evaluation and monitoring as well as systematic epidemiological research including social factors.

WHO/UNICEF and other organizations should be responsible for encouraging regional and national workshops for the promotion of appropriate infant and young child feeding.

### ***Promotion and Support of Appropriate and Timely Complementary Feeding (Weaning) Practices with the Use of Local Food Resources***

Food complementary to breast milk will need to be introduced by 4-6 months; when the nutrition of the mother is poor and/or environ-

mental conditions are unfavourable it may often need to be introduced earlier. However, too early introduction of supplements may have a negative effect on breastfeeding and may also increase the risk of infection.

The diet of the young child after cessation of breastfeeding needs special attention because inadequate feeding at this time often leads to clinical forms of malnutrition, particularly when the child is denied the breast as a consequence of a new pregnancy.

In order to guide the mother as to the adequacy of her child's nutrition and the appropriate time to introduce weaning foods, programmes to support her in keeping a graph of her infant's weight and to understand its significance should be extended as widely as possible. The WHO publication on "A Growth Chart for International Use in Maternal and Child Health Care" provides valuable guidance for doing so.

Foods that are locally available in the home can be made suitable for weaning and their use should be strongly emphasized in health, education and agricultural extension programmes. Foods traditionally given to infants and young children in some populations are often deficient in nutritional value and hygiene, and need to be improved in various ways. Mothers need guidance to improve these traditional foods through combinations with other foods available to them locally. Countries should determine the need for subsidizing weaning foods or otherwise helping to ensure their availability to low-income groups.

Governments and relevant private or public organizations should support practical and appropriate initiatives and policies for improving the nutritional value and hygienic standards of traditional and other locally used weaning foods, of achieving a balanced diet for infants, of educating mothers in the proper feeding of children, and of facilitating the exchange of weaning and child-feeding experiences among countries.

To avoid infection and interference with continued breastfeeding, infants during weaning should not be fed by bottle but rather by cup and spoon or other suitable traditional vessels and utensils. When mothers do not initiate breastfeeding or terminate it prematurely so that animal milk or perhaps vegetable milk mixtures or products may need to be fed by bottle, competent guidance should be available to the individual mothers to ensure that the mixture or product fed is nutritionally adequate, both in quantity and quality, and that all possible measures are taken to see that it does not become a vehicle for infection.

Psychological, social and economic factors that constrain breastfeeding should be minimized.

These questions should be the subject of further and subsequent scientific meetings.

## ***Strengthening of Education, Training and Information on Infant and Young Child Feeding***

Every citizen has the right to have access to correct, consistent information and education; therefore, countries must ensure that information and education be provided to all levels and that the messages reach those for whom they are intended at community, intermediate and central levels.

In all educational (formal and non-formal), vocational and professional training programmes, the interrelationship of all knowledge relating to health protection, breastfeeding and adequate nutrition of the mother, infant, and child should be featured.

To ensure maximal effectiveness, educational and informational activities about nutrition must :

- be adapted to local conditions and culture;
- be directed to the target population, viz., school children, youth, pregnant and breastfeeding mothers, men, community leaders, decision makers and planners ;
- be supported by necessary resources from those sectors responsible for peri-urban and rural economic development ;
- be undertaken with the active participation of men, husbands, other family members, and community leaders ;
- be linked to measures for income-generation at family and community level ;
- utilize local cultural methods of communication, such as folk-arts, drama, and music.

To support women and mothers in their efforts to improve their health and nutritional status and that of their infants and children, it is important that nutrition education and information be provided to various other individuals who are influential with the family such as fathers, grandparents, mother-surrogates, community teachers and others who have an impact on the social behaviour and nutritional habits of vulnerable groups, and the education and information should be carried out with their participation.

The Meeting strongly recommends that the governments should provide adequate nutrition training in medical and nursing schools, adequate training to primary health care workers, including midwives particularly in prenatal and perinatal services, school teachers, rural extension workers and others operating at the community level to enable them to undertake functional health and nutrition education in the community based on the priority needs of the people and with their active participation. The outcome of these endeavours should be increased self-reliance at the community and family level.

It is essential that all personnel who will provide nutrition educa-

tion be appropriately trained not only in techniques of communication and education but also in child development and in delivering consistent and coherent nutrition and health concepts and practices based on the local sociocultural conditions.

## TRAINING

Basic and continuing education and upgrading of information on all aspects of breastfeeding is necessary for health service staff at all levels, including administrators, professional leaders at medical and nursing schools, physicians (especially obstetricians and paediatricians), nurses and midwives at all levels, medical assistants, auxiliaries, social and extension workers, and particularly primary health care workers. Training should place particular emphasis on management of breastfeeding and be related to the economic, cultural and social background of the mother and family. Training should consist of the appropriate knowledge on available culturally acceptable, locally grown foodstuffs which are suitable for use as weaning foods for the young infant and supplementary foods for the pregnant and lactating woman. They should also be enlightened about the dangers and hazards of advertising infant foods in clinics.

The use of mass media, which in many countries includes radio, TV, newspapers, advertisements for formula and other infant food products in government and professional journals should be effectively screened by appropriate government ministries to ensure that they do not detract from official nutrition policies designed to protect breastfeeding nor to the health and nutritional status of mothers and children.

There is not enough information about the present state of education/training in the field of maternal, infant and young child nutrition throughout the world. The Meeting strongly recommends that this be reviewed as soon as possible and followed up every five years in order to evaluate the activities in this field and to use it for updating the programmes. International organization especially UNICEF, WHO, FAO, UNESCO and UNIDO should collaborate in this activity. This also implies collaboration in the preparation of guidelines aimed at identifying problems related to health and nutrition status of mothers and children, particularly regarding conditions of breast feeding and weaning practices, and on methods of surveillance.

## *Development of Support for Improved Health and Social Status of Women in Relation to Infant and Young Child Health and Feeding*

### Status of Women

#### *Participation of women*

Women's role and experience in infant feeding is unique and the

importance of women gaining greater control of actions affecting this aspect of their lives must be emphasized. It is recommended, therefore, that women's participation in all related actions be significantly increased through :

(i) increased representation of women in all follow-up meetings and actions as recommended by this meeting, including increased involvement of women in the activities of United Nations agencies, nongovernmental organizations, and other groups, including industry and trade unions;

(ii) the increased recognition and involvement of women's organizations in community, national and international efforts, for the promotion of improved infant and young child feeding and related primary health care efforts;

(iii) the increased involvement of women in policy formulation and decision-making at all stages of planning and implementation of related national programmes.

#### *Health and nutritional status of women*

Improved infant and young child feeding is closely linked with women's enjoying a high status of health throughout all stages of life, especially in the reproductive cycle. It is recommended that measures be taken to ensure good nutrition and health for all women through :

(i) measures directed towards health care, socially and economically available, particularly according to primary health care, including the provision of balanced and sufficient nutritional intake, especially during pregnancy and lactation, and family planning information and services; special attention should be given to reproductive health and education of adolescent girls with specific action for pregnant adolescents.

(ii) the implementation of activities aiming to reduce women's workload both in the home and outside the home, including actions to promote the sharing of tasks within the family and including development programmes related in particular to the provision of plentiful and clean water and the use of appropriate technologies.

#### **Measures to Support Women to Breastfeed**

The woman is pivotal for all action related to breastfeeding. Breastfeeding is best for the health of the young baby, but also for the health of the mother including the physical, emotional, and psychological aspects of her health.

The majority of women living in rural areas and in the urban periphery are not covered by protective or legislative measures; they are either not wage-earners or are workers without adequate security. Very little has been done for these women. It is recommended therefore that government action and community development activities including the help of breastfeeding mothers be taken to support these mothers to

breastfeed. Programmes to develop appropriate technologies (especially regarding food production and handling) to reduce these women's workload and to organize community-based day care of children should be emphasized.

Governments should ratify and apply the ILO conventions through national legislation concerning maternity protection which are to be developed (and which extend existing protective measures to increase the period of time of maternity leave) for facilitating breastfeeding, including facilities for breastfeeding, paid nursing breaks, flexible schedules, day care centres and other measures to ensure the physical closeness of mother and child; these measures should ensure measures are introduced to provide subsidies; and that any discrimination of nursing mothers in employment should be prohibited. Women's groups and trade unions should pressure governments to ensure the ratification and implementation of appropriate legislation. The ILO, together with WHO and UNICEF and other United Nations agencies, should continue its activities in the application of legislation and protection of breastfeeding mothers.

### **Weaning**

Women play important roles in the production, preparation and serving of food within the family. The home preparation of appropriate weaning foods will depend on their knowledge, time, human energy and resources.

(i) in all cases where there is access to local food products, it is necessary to teach women and other family members to use these as weaning foods as part of the family diet ;

(ii) in cases where women do not have easy access to locally available foods, action should be taken for the organization of community efforts, such as cooperatives, to make such local foods available to women;

(iii) educational and other community development programmes related to health and nutrition should be linked with income-generating activities and policies ;

(iv) all food aid programmes in this area should take cognizance of the local food content and habits, and not create a situation of dependency and should be careful not to compete with breastfeeding and local food production.

### **Information, Education and Training**

The importance of an adequate basis on which women can have a true and objective choice emphasizes the need for education and information about infant and young child feeding and for the establishment of measures at government levels to protect women against misinformation. Information and education about infant and young child feeding

should be directed to men as well as women in order to enable them to assume their supportive responsibilities.

Educational materials to be directed to the general public, to school children, and to the training of health and other development workers, should project a positive image of women not only in their roles as mothers but also as workers and citizens of the community. This would refer to the images as seen in books and other written material as well as the mass media.

Women's nongovernmental organizations should organize extensive consciousness-raising campaigns for generating policy actions by governments and launching extensive information dissemination campaigns in support of breastfeeding and good weaning habits. At the local level nongovernmental organizations are urged to organize and carry out women-to-women programmes to promote breast feeding and adequate weaning. In these activities nongovernmental organizations should collaborate with WHO and UNICEF, with the necessary support from national and international agencies.

As in most instances the health care providers to mothers and children are women, special efforts should be directed to strengthen training programmes for these groups of workers to include a comprehensive component of family planning, infant and young child feeding, and other aspects of family health within primary health care.

For all, education of the public, especially of the young generations, should aim at a better acceptance of breastfeeding as the natural and healthiest practice, taking into account cultural specificities, endogenous practices and using all channels of education as well as the media.

In collaboration with all relevant sectors, particularly health, education, agriculture and industry, governments need to ensure that up-to-date, scientific and empirical information on infant and young child feeding be widely disseminated and applied. A government mechanism must be established to ensure that through continuous screening and monitoring, information and publicity relative to maternal, infant and young child feeding are correct and appropriate and that undesirable and inappropriate messages and publicity are eliminated.

A national strategy for communication and education should be formulated to mobilize available resources; this strategy to include training of manpower at all levels to plan, implement, evaluate and conduct research with respect to communication programmes.

### **The Marketing of Infant Formula**

Woman have the right to correct and full information; even objective information, however, can be misleading and harmful if it is given in inappropriate settings or times. Women's organizations should be involved in national councils or government agencies in the monitoring

and enforcement of marketing codes dealing with the regulation of information and publicity. Women in all parts of the world - in developed and developing countries - should express their solidarity in deciding what is best in this unique and important part of their lives.

## ***Appropriate Marketing and Distribution of Infant Formula and Weaning Foods***

The government of each country has the responsibility to promote coherent food and nutrition policies which should give special attention to mothers, infants and children. These policies should emphasize the preservation of breastfeeding and the implementation of appropriate nutritional guidance (calendrier nutritionnel). Governments have a duty to ensure the supply and availability of adequate infant food products to those who need them, in ways that will not discourage breastfeeding. Informed advice should be given at the appropriate time and place to mothers and families about best infant and young child feeding practices.

Breastfeeding is the only natural method of feeding babies and it should be actively protected and encouraged in all countries. Therefore, marketing of breastmilk substitutes and weaning foods should be designed not to discourage breastfeeding.

There should be no sales promotion, including promotional advertising\* to the public of products to be used as breastmilk substitutes. This should be supported by both exporting and importing countries and observed by all manufacturers. WHO/UNICEF are requested to organize the process for its preparation, with the involvement of all concerned parties, in order to reach a conclusion as soon as possible.

Monitoring of marketing practices is recommended. Usually this will be done under government auspices. Advertising councils and industry, consumer and professional groups can make an important contribution.

There should be no marketing or availability of infant formula or weaning foods in a country unless marketing practices are in accord with the national code or legislation, if these exist, or, in their absence, with the spirit of the meeting and the recommendations contained in this report or with any agreed international code.

Facilities of the health care system should never be used for the promotion of artificial feeding. Therefore, advertising or promotional distribution of samples of breastmilk substitutes through health service

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\*This includes the use of mass media and other forms of advertising directly to the mother or general public, designed to increase sales of breastmilk substitutes, to the detriment of breastfeeding.

channels should not be allowed. Artificial feeding should not be openly demonstrated in health facilities.

No personnel paid by companies producing or selling breastmilk substitutes should be allowed to work in the health care system, even if they are assigned more general responsibilities that do not directly include the promotion of formulas, in order to avoid the risk of conflict of interest.

Production and distribution of foods for infants and young children should be governed by strict legal standards. They should be labelled to indicate proper and safe home preparation. Governments should adopt the recommended international standards covering foods for infants and young children developed by the Codex Alimentarius Committee on Foods for Special Dietary Uses and should support the elaboration of standards by this Committee to ensure nutritional value and safety. Governments that have not yet adopted such codes or regulations are urged to do so.

Products that are not suitable alone as weaning foods, such as sweetened condensed milk, cornstarch, cassava flour and cereal flours, should be required by proper regulations not to be packaged, labelled, advertised or otherwise promoted in ways that suggest they should be used as a complement or substitute for breastmilk. Vigorous educational efforts should be made against their misuse for the purpose by mothers.