



The Consultative Group on Early Childhood Care and Development

EARLY INFANT DEVELOPMENT AND IMPLICATIONS FOR FEEDING PRACTICES

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INTRODUCTION...	2
CAPACITIES OF THE NEWBORN...	2
BEFORE SPEECH: EARLY MOTHER-INFANT INTERACTION...	5
THE EFFECT OF FEEDING AND INFANT CARE PRACTICES ON EARLY DEVELOPMENT...	6
INFANT BEHAVIOUR AND EARLY MALNUTRITION...	8
PROGRAMME IMPLICATIONS...	9
TEN STEPS TO BETTER BREASTFEEDING...	10
REFERENCES...	11
ENDNOTES...	11

Over the past two decades, an exciting body of research has begun to inform us about the enormous capacities of the newborn infant. This awareness has forced us to move away from static models of development that perceived the infant as a helpless lump of clay waiting passively to be molded and shaped by both the strengths and weakness in his social and physical environment. Recognition of the newborn's innate capacities during this critical period of development will have an important impact both on caregiver behaviour and on the development of effective intervention programmes for infants and mothers at-risk.

Introduction

This article begins with a brief discussion of the infant's capacities during the first six months of life. The discussion emphasizes the infant's ability to interact and respond to his environment in ways that ensure both survival and healthy development. Equipped with highly developed sensory capacities, and a language consisting of smiles, gestures, eye-to-eye contact, and vocalizations, the infant develops with its mother a reciprocal communication system that sets the stage for all future development. The discussion also explores the enormous adaptability of human infants when confronted with biological and social risks that threaten their development. Through a process known as self-righting, infants are able to return to the path of normal development. The unfolding of this capacity, however, is dependent on appropriate maternal responses and culture-specific childrearing practices.

In spite of the recognition of the newborn's ability to interact and respond to the environment, surprisingly little attention has been paid to the behaviour of the infant in studies of the causation of early infant malnutrition. This article suggests a model that includes infant behaviour and patterns of interaction as factors to consider in the etiology of infant malnutrition. The discussion concludes with a set of programme implications recommending the need to integrate the insights gained from our enhanced understanding of newborn behaviour and mother-infant interaction with existing programmes and policies.

Capacities of the Newborn

From the moment of birth, human infants are born with a wide range of capacities that help to promote healthy development. They have reflexes for the basic biological functions, as well as reflexes that lay the foundation for more complex controlled behaviours that appear later on, such as grasping, crawling and walking. Their basic sensory capacities for seeing, hearing, touching, smelling and tasting are already functioning at birth, and the competence with which most newborns use these capacities is dramatic. The following discussion describes some of these amazing capacities of the newborn and describes how the existing reflex and sensory capacities of the newborn are transformed into skilled voluntary actions during the first six months of life.

■ REFLEXES

The newborn's reflexes enable him to suck, cry, see, hear, and grasp. One of the most important newborn capacities is the ability to suck competently enough to receive adequate nourishment. The sucking ability begins with several closely related reflexes, including rooting and sucking. Rooting is a reflex elicited by lightly touching the infant's cheek. The infant will turn his head in the direction of the touch and open his mouth as if seeking something to suck. As the newborn's mouth is brought into contact with an object, the sucking reflex is elicited. There are great individual variations in the pattern and strength of sucking. Some infants suck forcefully at birth, while others have to exert greater effort to obtain adequate nutrition. It takes several days to coordinate the sucking patterns with the mother's patterns of holding her baby, the flow of milk

from the breast, and the infant's individual tempo. Sucking not only provides a means of obtaining nutrition but also exerts a pleasurable calming effect on infants.

Like the newborn's appearance, some reflexes—crying, for instance—serve the purpose of bringing the adult into close proximity, thereby stimulating care. Crying can be elicited by pain or discomfort, but also can occur spontaneously. For the first several months, the cry is the infant's primary means of communication. Moreover, the quality of the cry seems to vary depending on whether the infant is hungry, in pain, or irritable. A mother is extremely sensitive to her infant's cry and can distinguish it from that of other infants. The cry causes the mother to respond, thereby positively affecting the amount of care and attention received.

■ STATE REGULATION

The infant's state (or level) of arousal is important to consider in attempting to understand the capacities and behaviours of newborns. The infant has several states that range along a continuum from deep sleep to active crying. Each state is characterized by a specific repertoire of behaviours that are often performed together, rather than independently, and are strongly associated with biological changes. The infant "state" is important to note when considering the degree and quality of interaction, as it constitutes a system through which important information is transmitted and received by the infant. During the quiet, alert, and wakeful state, which usually follows feeding, the infant is most receptive to external stimulation. The duration and quality of this state increases during the first month of life and varies tremendously from infant to infant. The frequency and duration of the wakeful state is affected both by the maternal caregiving behaviours and by the infant's capacity to regulate its own state of wakefulness. For example, newborns are equipped with a capacity known as habituation, which helps to shut out disturbing stimulation.

■ TOUCH AND SMELL

At birth, the dermal or touch system is the most mature of all the sensory capacities. The skin sends a multitude of sensory messages to the brain. The skin is the most extensive and basic of all sensory systems and contains receptors for temperature, contact, and pain. Body contact plays a major role in the establishment of relationships. During the first few hours and immediately after birth, the mother's extreme sensitivity to her infant facilitates and favors the development of emotional ties. Direct skin-to-skin contact is advised immediately after birth.

In addition to body contact, which is inseparably linked with movement, smell plays an important role in the establishment of emotional ties. Newborns are extremely sensitive to smell and respond differently to smells as indicated by the different facial expressions that are apparent immediately after birth. Within the first week of life the infant is able to distinguish the mother's breastmilk. Through this capacity, infants are able to elicit and maintain contact with their environment. Infants are attracted to what is familiar and express this comfort through bodily movements and facial expressions. This calm, quiet response of the infant is highly satisfying to the mother. She is reassured that her care has been effective and is encouraged to engage in a series of affectionate mutual exchanges. Although communication by touch and smell is quite

subtle, it occupies a critically important place in the development of emotional ties and sets the stage for more complex mother-infant communication.

■ HEARING

Hearing is a complex inborn ability. The fetus can respond to noise in utero, and this system is fully established at birth. One striking characteristic is the newborn's preference for the human voice, particularly the high-pitched female voice. Research indicates that infants stop sucking briefly in response to a noise and then immediately resume sucking. In response to the human voice, however, sucking is interrupted and then resumed in active sequences supported by regular pauses, as if in anticipation of repeated vocalizations. Observations of infants in the earliest days of life reveal that they react in specific ways to the mother's voice. Babies suck longer and more vigorously when they hear the mother's voice, suggesting that the infant is programmed to respond specifically to the individual who feeds him. Infants also have an inborn reflex to coordinate eye movements with sound, a reflex that enables them to turn towards the source of a sound. In a few months, this reflexive association between sight and sound becomes a skilled action enabling an infant to choose where to focus attention.

By 2 months of age, an infant is able to detect subtle distinctions between such similar sounds as "pa and ba," or "ma and na." Thus, the auditory perception of a 2-month-old infant is identical to that of an adult. Like other aspects of early development, the perception of verbal sound is conditioned by the child's environment and becomes functional only through appropriate stimulation. From perceiving sound to using meaningful language, however, is a long road. The ability to hear is only the first step; in order to formulate a response, a child must be able to receive and process information.

■ SIGHT

The infant is also able to elicit responses from the outside world through the sensory capacity of sight. At the moment of birth, infants are equipped to focus on and follow the well-shaped form of a human face. During the first few hours of life an infant will attend to and follow with eyes and head a picture of the human face. A picture of a scrambled face elicits little interest. Newborns have a limited field of vision and can only see things within a distance of 30 centimeters, but these visual capacities increase dramatically within the first 2 months, when longer periods of awake-states allow for greater periods of mother-infant interaction. By 2 months, the infant is capable of "looking around." Whereas at birth the infant focuses on faces at close range, by 2 months of age, more complex, shaded images are preferred. With maturation of the nervous system and adequate sensory stimulation, the infant's attention span increases, and they remain in the awake state for longer periods. This in turn allows for more complex modes of early communication. These early expressions of emotional ties pave the way for later cognitive and socio-emotional development. In the absence of human contact and appropriate environmental responses, infants will begin to withdraw from their environment.

Before Speech: Early Mother-Infant Interaction

Infants are also equipped with a complex repertoire of communication skills, including smiles, gestures and vocalizations. For example, newborns in the early days of life have a facial expression which suggests a smile that lasts for the first few months. Although the early smile seems to be reflexive and unrelated to specific events, parents react to this expression as if it were an attempt to communicate. At approximately 2-1/2 months, the unexplained smile turns into a social smile that appears regularly at the sight of a face. The maternal response to the smile plays a major role in the development of social communication. This facial expression becomes a tool and a means of communication and paves the way for more complex human interaction. By 3 months of age, the smile is well established and is used systematically to engage in communication.

The smile exemplifies the infant's capacity and need for interaction within the first few months. The infant's smile reassures the mother that her care is appropriate and that her child can distinguish her from other people. The use of the smile is one of the first means of intentional communication. The infant uses it to begin and maintain interactions through repeated smiles and exchanges. It is only through interaction that the child's smiles and other modes of communication become recognized as signals and are interpreted as such.

In addition to exchanging smiles, gazes, and facial expressions, mothers and infants use gesturing as a form of communication. Mothers teach this language to their children by interpreting their gestures as signals and responding to them accordingly. For example, at about 5 months of age an infant holds out its arms as the mother approaches, and the mother interprets this as the infant's desire to be picked up. Thus, this gesture acquires a specific meaning and regularly elicits a specific maternal response.

In progressing from the earliest seeing, hearing, smelling, and tasting to the recognition of faces and deciphering gestures, the infant has obtained the ability to communicate using a complex set of skills. The ability to communicate at a distance has been added to the ability to communicate at close range. Moreover, the language learned through exchanges of gazes, facial expressions, and gestures has introduced the infant to symbolic communication.

By age 3 months, infants communicate by babbling and are increasingly attracted to the human voice. Towards 6 months, they are aware of variations in voice, and by 7 months they use vocal abilities in more complex ways to attract maternal attention. They may intensify their vocalizations and repeat syllables to retain their mother's attention, cry when she goes away, and calm down when she speaks. By 8 months, infants possess the rudiments of speech. They are able to pronounce some syllables, such as "da", which the mother then interprets as words. It is aptitude for communication, which has developed through their entire previous interaction that forms the foundation for language development.

A mother's verbal response to her infant changes in accordance with the newly emerging developmental capacities of the infant. She changes her way of speaking by changing the pitch, tone, length of vowels, and by using repetition and shortened phrases. In this way, mothers help

infants to move along the developmental continuum and slowly introduce infants to the world of thought through the symbolic representation of objects and people.

The Effect of Feeding and Infant Care Practices on Early Development

During the first 4-6 months of life, much of mother-infant interaction is focused on feeding. Feeding provides an opportunity to observe the infant's increasingly complex set of capacities. Mother-child interaction with respect to feeding is a dynamic process that changes continuously over time and is affected by factors intrinsic to both the mother and infant, as well as factors extrinsic to them, factors that are imposed by the social and cultural environment. As discussed, newborns are programmed to elicit from their environments the resources necessary for survival. In addition to the rooting reflex by which they seek and find the breast, the sucking reflex allows them to obtain food. Sucking is then synchronized with swallowing and breathing.

In the earliest days of life, the mother-infant relationship capitalizes on the satisfaction of the physiological need of hunger. The newborn's equilibrium is satisfied, pleasure is felt, and the sensation of fullness replaces the discomfort of hunger. This harmonious relationship develops in the first 4-5 days, during which the infant coordinates the sucking pattern to match that of the mother. Through rapid early maturation, the infant becomes more alert and utilizes his rapidly developing sensory systems to interact with both the animate and inanimate environment. The infant recognizes the smell and taste of milk, discovers the mother's gaze and recognizes her speech. Gradually, feeding is associated with a feeling of pleasure and intense social stimulation.

The establishment of an optimal feeding pattern as described above is dependent on the interplay of infant, maternal, and environmental factors. This adaptability of human infant behaviour is more dramatic when viewed under stressful environmental conditions combined with maternal risk factors that would seemingly jeopardize the development of the infant. It is recognized that the human infant is well adapted to overcome the stress of a harsh environment and develop according to a predetermined path of optimal development. This ability is particularly apparent in the rapid catch-up growth exhibited by low-birth-weight infants. It is argued that although the biological capacity for catch-up growth is inherent in the species, it is dependent on appropriate maternal feeding and caregiving behaviours. For example, through the process of evolution, elaborate anatomic, physiologic, and behavioural adaptations for breastfeeding have developed in both mother and infant. Of all mammalian animals, only humans have protuberant breasts. Although their true physiologic value is unclear, it has been hypothesized that this feature enhances the capacity for mother-infant social exchange by allowing eye contact and the opportunity for the infant to scan the mother's face. The infant's rooting reflex initiates sucking, which triggers the maternal production of prolactin and oxytocin, which stimulates the release of milk. The amount of breastmilk produced is directly related to the quantity of sucking; without sucking, milk production ceases. Moreover, in the lactating woman, an infant's cry stimulates blood flow to the areolar area.

An additional physiologic adaptation concerns the interrelationship between infant feeding and the content of breastmilk. As the infant empties the breast during each feeding, the fat content of milk increases while the water content decreases. The associative changes in the texture and taste, obviously absent in infant formulas, have been suggested as factors in the infant's decreased appetite and the termination of feeding. In addition, the antibodies, lysozymes, lymphocytes, macrophages, and other components of colostrum and transitional breastmilk, serve to defend against infection, which may have been the major human "predator" during evolution. Because of these properties, a significantly enhanced resistance to enteric infection has been observed among breastfed babies.

In addition to having all the above properties, breastmilk has a composition that is particularly well suited to patterns of feeding on demand. In species that nest or cache their infants, breastmilk is high in protein and fat, mother-infant contact is intermittent, and feedings are spaced from 2 to 15 hours apart. By receiving their total nutritional requirements in short periods, these infants are adapted for long separations. In contrast, species that are carried by, hibernate with, or follow their mothers have low-fat, low-protein breastmilk, constant maternal-infant contact, and essentially continuous feeding. Human milk is low in fat and extremely low in proteins. Since human infants are immobile at birth, the insights of comparative physiology have identified the pattern of human care as that of carrying and continuous feeding. Thus the pattern of continuous feeding supports, reinforces, and enhances the biologic pro-adaptability of our species.

In addition to these biological factors, increasingly impressive data indicate the ability of the childrearing environment to influence the capacity of infants to exhibit catch-up growth. It is accepted that highly supportive environments produce patterns of care and handling that enhance the development of highly stressed infants. These strategies are passed down socially rather than biologically and are encoded in customs rather than genes. For example, it is well known that early patterns of infant rearing practices in many parts of the world include a high amount of skin-to-skin and tactile stimulation through elaborate bathing and massage rituals. Recent investigation on the physiology of growth suggests that certain brain chemicals released by touch may affect the rate of metabolism. In some dramatic new findings, premature infants who were massaged for 15 minutes three times a day gained weight 47 percent faster than those left alone. The massaged infants also showed signs of more rapid maturation of the nervous system (see the supplementary article, "The Experience of Touch: Research Points to a Critical Role" attached with this issue).

Evidence from animal models suggests that a particular pattern of touch by a mother rat inhibited the infant's production of beta-endorphins, a chemical that affects the level of insulin and growth hormone. It has been hypothesized that the touch system is part of a primitive survival mechanism found in all mammals. Because mammals depend on maternal care for survival, the prolonged absence of the mother's touch triggers a slowing of the infant's metabolism, thus lowering the demand for nourishment.

Infant Behaviour and Early Malnutrition

The ability of the infant to participate in such a complex set of interactions, and the capacity of the environment to respond to the infant's needs even when his or her survival is at-risk, contributes important and often overlooked insights into the etiology of growth failure in early infancy. Past investigators have appreciated the complex set of causal factors in infant malnutrition, and numerous models have been generated, each attributing differing weights to various combinations of factors. Factors identified in the etiology of malnutrition have included these: poverty, unsatisfactory physical and social environments, low maternal education, poor maternal nutritional status and reproductive history, inappropriate feeding patterns, and weaning to foods in the first 6 months of life. Given the extent of our knowledge on infant behaviour, the lack of specific attention to the behaviour of the infant and patterns of mother-infant interaction in the causation of infant malnutrition is curiously misleading. Static models offering explanations of unilateral causality often leave the impression of a helpless, passive infant adversely affected by the threats of a harsh environment. Moreover, investigations of the determinants of infant feeding patterns have failed to recognize the impact of the infant's condition at birth on the choice of feeding patterns. Illness or inappropriate infant growth patterns as perceived by the mother, culture, or health care provider may lead to a change in the type and quantity of food given. The effect the infant's behaviour has on feeding patterns and on growth deficiencies has not been carefully considered.

With this perspective in mind, a synergistic model that pays particular attention to the behaviour of the infant is proposed (Figure A)¹. As indicated in Figure A the concept of synergism refers to the combined effects of two or more factors being greater than the sum of their individual effects. The application of synergy to the effects of malnutrition indicates some of the major factors that further magnify the nutritional insult. In broad terms, one must recognize the prenatal environment and the ecological-sociological structure of the family. As also suggested, the model recognizes the interaction between the intrauterine environment and the fetus that may compromise the fetus and produce the at-risk infant. These factors act together to produce a stressed, underweight infant whose risk status is reflected in disorganized behaviour patterns. The poor eliciting behaviours of these infants exacerbate the effects of malnutrition. A poorly organized infant who has difficulty interacting with the environment and is unable to elicit the appropriate response from an already over-stressed and nutritionally depleted caregiver, may not receive the kind of attention and care necessary for its development. Thus, the capacity to exhibit catch-up growth is denied and the stage has been set to fuel the cycle of poverty. The lack of recovery in the infant becomes part of a cycle of synergistic forces that capitalize on the stressors inherent in the culture.

This model has particular saliency when one considers the effects of infant feeding on low-birth-weight infants, babies either pre-term or small for their gestational age. Although statistics on rates of low-birthweight infants in low-income countries are not routinely collected, the World Health Organization reports that approximately 25 percent of all babies born in less-developed countries are of low birth weight, compared to 6-9 percent in Europe. Current research indicates that low-birth-weight infants differ from full-sized infants in ways that directly effect a variety of feeding outcomes.

The low-birth-weight infant is likely to be less mature immunologically. Immaturity in other organs and biochemical systems contributes to different nutritional requirements. For instance, fat absorption is lower in pre-term infants, and they require higher levels of nutrients, especially protein and calcium. Evidence indicates that these infants are often irritable, have aversive high-pitched cries, and have lethargic behaviour and poor sucking reflexes that might adversely affect the ability of the infant to stimulate the attention of an already over-stressed caregiver. Given the greater nutritional needs as well as the need for more maternal attention, it is not surprising that infants who are of low birth weight and are small for gestational age have increased rates of morbidity and mortality.

Programme Implications

The implications of this growing body of knowledge with respect to the behaviour and development of the infant are important in the consideration of policies in both nutrition and primary health care programmes. The challenge is to create a process that ensures the integration of this perspective with existing programmes in a way that will enhance and strengthen programme effectiveness. The following recommendations are put forth as suggestions that, if implemented, will contribute to our efforts to break the cycle of early infant malnutrition.

- Development of parental and family education programmes to increase the awareness of mothers and other family members of both the capacities and the needs of infants. Educational messages should be carefully constructed in ways that will reinforce and support caregivers' existing and innate capacities in order to provide optimal care for their infants.
- Identification and reinforcement of traditional, culturally prescribed patterns and practices of childcare that support and enhance the "self-righting" capacities of the newborn.
- Support for the promotion and increased duration of breastfeeding and appropriate weaning practices as well as for the encouragement of hospital practices and policies that favor rooming-in, mother-support groups, and other supportive procedures.
- Development of techniques for the observation of infant behaviour and mother-infant interaction that can be easily integrated with existing growth-monitoring activities.
- Addition of information on early infant behaviour, mother-infant interaction, and feeding problems to primary health care and nutrition education programmes and training manuals.
- Development of screening measurements and techniques that will encourage the early identification of high-risk infants with the potential for feeding problems and subsequent development delay.

Ten Steps to Better Breastfeeding²

Every facility providing maternity services should:

1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff;
2. Train all healthcare staff in skills necessary to implement this policy;
3. Inform all pregnant women about the benefits and management of breastfeeding;
4. Help mothers initiate breastfeeding within 1/2 hour of birth;
5. Show mothers how to breastfeed and how to maintain lactation, even if they have to be separated from their infants;
6. Give infants no other food or drink than breast milk;
7. Practice rooming-in—mothers and infants together—24 hours a day;
8. Encourage breastfeeding on demand;
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants;
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge.

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Endnotes

¹ Figure A not available.

² WHO/UNICEF statement on the "Protection, Promotion, and Support of Breastfeeding: The Special Role of Maternity Services." Presented to the Interagency Workshop on Health Care Practices Related to Breastfeeding, Washington, DC, 7-9 December, 1988.

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The Consultative Group on Early Childhood Care and Development

A DEVELOPMENTAL CLASSIFICATION OF FEEDING DISORDERS IN THE FIRST 6 MONTHS OF LIFE

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This article is adapted from I. Chatoor, S. Schaefer, L. Dickson, and J. Egan, "A Developmental Approach to Feeding Disturbances: Failure to Thrive and Growth Disorders in Young Children." *Pediatric Annals* 13 (11), November 1984.¹

DISORDERS OF HOMEOSTASIS...	1
DISORDERS OF ATTACHMENT...	2
ENDNOTES...	6

A developmental classification system for feeding disorders associated with failure to thrive has recently been developed. In the first six months of life two distinct stages of feeding problems—categorized as disorders of homeostasis and attachment—have been described. A description of each of these disorders will be discussed below.

Disorders of Homeostasis

From birth to two months the task of the infant is to achieve the ability for state regulation, or homeostasis. The infant must be able to form basic cycles and rhythms of sleep, wakefulness, feeding, and elimination. In feeding situations, a progression from reflexive sucking to autonomously motivated oral feedings is observed. Feeding problems of this stage that are directly related to characteristics of the infant include: lability of autonomic nervous system, difficulty in

state regulation, and hypersensitivity to stimulation. Another feeding problem of this early infant period involves a developmental delay in coordination of the oral musculature and in integration of breathing and sucking. Infants with respiratory problems, especially premature infants, may also have difficulty achieving homeostasis. Rapid respiration or intubation frequently prohibits oral feeding. Consequently, such infants do not make the transition from reflexive to autonomously motivated sucking. When introduced to oral feedings, they frequently don't know how to suck or swallow and have little awareness of hunger or satiety. Other infants having difficulty with homeostasis are those with congenital abnormalities of the gastrointestinal tract.

In facilitating the establishment of homeostasis in these infants, the caregiver plays a critical role. She must be able to provide both a physical and emotional environment in which the infant can balance and regulate both internal and external stimuli. Unable to interpret her infant's cues, the mother may under- or over-estimate the infant. More importantly, the mother's anxiety, isolation, and lack of emotional support may intensify the infant's difficulties. It is important to note that too much or too little stimulation during these first two months can disorganize even a healthy infant, and this disorganization in turn can lead to irregular feeding patterns. Table 1 summarizes the diagnostic criteria for disorders of homeostasis.

Disorders of Attachment

Having obtained the capacity for self-regulation or homeostasis, the adaptive infant is able to mobilize and engage in increasingly complex forms of interaction. Between two and six months, the infant sets out to achieve the major psychological task of attachment. Attachment develops within a reciprocal relationship with the mother and includes mutual eye contact, reciprocal vocalizations, and closeness expressed through cuddling and nestling. At this period, factors related to the infant, mother, and environment can inhibit this process.

At this age most of the infant's interactions with the caregiver occurs around feedings. Thus, the regulation of food intake is closely linked to the infant's relationship with the caregiver. Certain feeding disturbances are characteristic of disorders of attachment. Infants failing to thrive as a consequence of impaired attachment frequently present with a history of vomiting, diarrhea, and poor weight gain. Observation of those mothers and babies during feeding reveals a general lack of pleasure in their interactions. The mothers appear listless, detached, and apathetic. They hold their babies loosely on their laps without much physical intimacy. They rarely initiate verbal or visual contact, and seem unaware of the infant's behaviors. A wide range of variables have been considered in describing the maternal characteristics and social environments of these infants, including maternal depression and apathy, under-nutrition, isolation and lack of support, poverty and the resulting stress from the burden of multiple familial and economic responsibilities.

These infants also appear listless and apathetic. They often actively avoid eye contact with the mother. Some engage in rumination, which appears to be either a means of self-stimulation or of relieving tension. Some infants seem to be "hypervigilant" when scanning the environment, a process that has been described as radar gaze. When these babies are picked up they are unable to cuddle and mold to the caregiver's body. They usually show disturbance in body tone and are

floppy or rigid. Many of these infants show evidence of delay in other areas of social, physical, and cognitive development.

Certain individual infant characteristics can contribute to or exacerbate an attachment disorder. Infants who have problems with self-regulation, who are irritable and difficult to calm, and whose temperamental attributes are confusing or upsetting to the mother pose a threat to the attachment process. Infants with hypersensitivity to touch, sound, or change of position are especially vulnerable to an attachment disorder because their avoidant behavior can easily be misinterpreted by the mother as rejection. On the other hand, a depressed mother can easily leave infants who are passive and make few demands on the caregiver alone. Table 2 summarizes the criteria for disorders of attachment.

Table 1
Diagnostic Criteria for Disorders of Homeostasis^{2 3}

Feeding difficulties may stem from primary constitutional characteristics or organic differences of the infant. Mothers are often unable to help the infant because of their inexperience or anxiety. Feeding problems may stem primarily from the mother's inability to read the infant's cues of hunger or satiety and her lack of ability to help the infant establish a regular feeding pattern. In some cases there will be a combination of infant vulnerabilities and maternal factors adding to each other and resulting in severe feeding problems.

INFANT

MOTHER

Age of Onset: Birth to 2 months; beyond the first 2 months of life, if the infant has organic problems that delay the introduction of oral feedings.

Common Contributory Organic Factors: Respiratory distress prohibiting or limiting oral feedings; anatomic problems of the gastrointestinal tract interfering with oral feedings (i.e. esophageal atresia, duplication of the gastrointestinal tract, necrotizing enterocolitis); delayed maturation of the coordination of the oral musculature; delayed integration of sucking and breathing.

Temperamental Vulnerabilities: Hypersensitivity resulting in excitability and irritability; passivity associated with short periods of alert wakefulness.

Common Psychosocial Stressors: No specific outside stressors; frequently stressed by the infant's organic or temperamental difficulties and their impact on her maternal self-esteem.

Development: Primary delay in gross motor area, less in fine motor development; delay in speech development.

Predominant Affect: Hypersensitive and irritable or passive and sleepy dull affect.

Common Interactive Behaviors with Mother: Cries, does not calm or nestle when held; appears sleepy in responses; is difficult to engage.

Common Feeding Behaviors: Has poor suck, tires easily and may fall asleep after short feeding; gags easily, spits up and vomits frequently; cries during feeding; takes inadequate amounts of milk; has irregular and unpredictable feeding pattern.

Predominant Affect: Appears anxious, easily distressed, or depressed and overwhelmed.

Common Interactive Behaviors with Infant: Misses or overrides the infant's signals; responds with under- or over-stimulation and projects negative attributes to the infant's behavior.

Common Feeding Behaviors: Misreads the infant's cues of hunger or satiety; feeds in erratic manner, burps and changes the infant's position frequently; handles the infant excessively; fails to establish a consistent feeding pattern.

Table 2
Diagnostic Criteria for Disorders of Attachment

Feeding difficulties stem from problems in mother-infant reciprocity, a lack of engagement between mother and infant. Since at this point of development much of the infant's interactions with the caretaker occur around feedings, regulation of food intake is closely linked to the infant's affective engagement with the caregiver.

INFANT

MOTHER

Age of Onset: 2 to 6 months.

Common Contributory Organic Factors: Prematurity or any illness requiring prolonged hospitalization and separation from mother; organic illnesses that result in homeostatic difficulties of the infant.

Temperamental Vulnerabilities: Passivity, and low responsiveness; low stimulus barrier resulting in excitability and irritability.

Development: Poor regulation of muscle tone, weak grasp, weak cry; general delay in fine-motor and gross-motor development; delay in speech development.

Predominant Affect: Appears sad, withdrawn, or hypervigilant (radar gaze).

Common Interactive Behaviors With Mother: Avoids eye contact; does not vocalize, does not smile, shows no anticipatory reaching out (in infant older than 5 months) stiffens or arches away when picked up; does not mold or cuddle when held.

Common Feeding Behaviors: Feeds and eats without difficulty as mother; might spit up or vomit frequently; might ruminate; looks away from mother during feeding.

Predominant Affect: Appears detached, depressed or agitated, hostile.

Common Interactive Behaviors w/Infant: Appears detached; fails to engage infant visually or vocally; holds infant loosely without physical closeness; does not respond to the infant's cues or needs; interacts with infant according to her own projected needs.

Common Feeding Behaviors: Drinks milk mechanically or props bottle; holds infant loosely away from her body; does not seek visual engagement and does not talk to infant during feeding; is unaware of infant's nutritional needs.

Table 3
Early Infant Reflexes

<i>Reflex</i>	<i>Description</i>	<i>Disappearance</i>
Rooting	When the infant's cheek is touched she will turn her head in the direction of the touch and open her mouth, as if seeking something to suck on or eat. Rooting is hard to elicit when the infant is satiated.	Disappears by 3 to 6 months
Stepping	When someone holds the baby upright with her feet touching a surface and moves her forward, the baby will make rhythmic stepping movements, as if walking.	Disappears by 1 to 4 months

Sucking	When the baby feels something in her mouth, she sucks on it. This reflex is sometimes hard to elicit when the infant is satiated.	Becomes a sucking skill by 2-3 months
Tonic	When an infant is placed on her back, she will turn her head to one side and extend the arm and leg on that side while flexing the other arm and leg.	Gradually disappears by 2-10 months
Babkin	When the baby is lying on her back and pressure is applied to the palms of both hands, the baby opens her mouth, closes her eyes, and brings her head to face front at the midline of the body.	Weakens after 1 month; disappears by 3 months
Crawling	When an infant is placed on her stomach and pressure is applied to the soles of her feet, she makes rhythmic movements of her arms and legs, as if crawling.	Disappears by 3 to 4 months
Grasping	When something is pressed against the infant's palm—a finger, for example—the infant will tightly grasp the object.	Weakens after 3 months; disappears by 11 months
Moro	When someone holding the baby lets her head drop a few inches, or when there is a sudden loud noise, the at baby first throws her arms out, then brings them back toward her body, with her hands curling, as if to grasp something.	Easily elicited before 3 months; disappears at 7 months

Endnotes

¹ An expanded version of this article appears in Dennis Drotar, (Ed.), *New Directions in Failure to Thrive*. New York: Plenum Press, 1985.

² The characteristics described in Tables 1 and 2 have been derived through clinical observation and are undergoing further investigation by the authors.

³ The tables appearing in this article have been modified from those that appeared in the original text.

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The Consultative Group on Early Childhood Care and Development

PROGRAMME REVIEWS

Coordinators' Notebook No. 7, 1989

HONDURAS: THE PROALMA PROJECT—BREASTFEEDING PROMOTION... 1
KENYA: PROMOTION OF BREASTFEEDING FOR LOW-BIRTH-WEIGHT INFANTS... 2
PHILIPPINES: INTEGRATION OF BREASTFEEDING IN THE MEDICAL CURRICULUM... 3
COLOMBIA: BIENESTAR—AN INNOVATIVE APPROACH TO CHILDCARE... 3
MEXICO: OAXACA WORKSHOP... 4
VIETNAM: AN INFORMAL PROGRAMME OF FAMILY-BASED DAY CARE... 4

Honduras: The PROALMA Project—Breastfeeding Promotion

PROALMA (Proyecto de Apoyo a la Lactancia Materna) is an example of a successful, urban, breastfeeding-promotion project. The primary goal of the project is to change health professionals' knowledge and attitudes about breastfeeding and to encourage hospital policies and practices to promote breastfeeding. Among the objectives of the project are these: adoption of a national breastfeeding promotion policy and maternal/infant nutrition norms by Honduran Government agencies; development and distribution by PROALMA of educational materials for both health professionals and the general public on maternal/infant nutrition and parental bonding; training courses, seminars, and workshops, offered by PROALMA, to teach health workers theory and practice of maternal/infant nutrition; adoption of hospital procedures supportive of breastfeeding and maternal/infant bonding; establishment of a clearinghouse in the national teaching hospital for information concerning breastfeeding and parental/infant bonding; and adoption of plans for the institutionalization of breastfeeding promotion activities in hospitals and health clinics after completion of the project.

With funding from the U.S. Agency for International Development, PROALMA was initiated in 1982 as a joint project involving the Ministry of Public Health, the National Social Security Institute, and the National Social Welfare Agency. The project initially focused its efforts on

three hospitals serving urban populations in two cities. At each hospital, PROALMA staff trained health professionals on breastfeeding management, counseled maternity patients on the benefits of breastfeeding, distributed educational materials, and developed public policies to support breastfeeding.

Results from a pre- and post-implementation survey conducted in 1982 and 1985 indicate the tremendous success of the initial pilot project. Analysis of the surveys found that the knowledge, attitudes, and practices of health professionals about promotion of breastfeeding improved. For example, the proportion of health professionals recommending that women initiate breastfeeding at birth increased from less than 40 percent in 1982 to over 75 percent in 1985. Hospitals surveyed reported an elimination of the routine distribution of infant formula to healthy infants and glucose water and oxytocin to breastfeeding mothers, these having been replaced with the initiation of postpartum breastfeeding. As a result of these changes, the hospitals reported an increase in savings related to the costs of drugs, infant formula, and baby bottles.

Additional USAID funds have been obtained to enable the project to expand its activities to reach a broader target population. The objectives of the second phase was to determine if the PROALMA model can be successfully transported to semi-rural areas of the country. Additional programme goals include efforts to promote the extended duration of breastfeeding into the weaning period.

Kenya: Promotion of Breastfeeding for Low-Birth-Weight Infants

While the majority of low-birth-weight babies are not fed breastmilk, a programme to support feeding low-birth-weight infants with their mothers' breastmilk underscores the advantages for both mother and infant. At the University of Nairobi, Department of Pediatrics, efforts to change hospital practices have met with success. The hospital policy now supports and encourages rooming-in, expression of breastmilk, feeding breastmilk to infants who cannot yet suck or swallow, and education of staff in supporting and teaching mothers to breastfeed. To encourage these practices, mothers of low-birth-weight infants stay within the hospital premises until their infant is discharged. All mothers are taught to manually express their milk. Infants below 1600 grams are tube fed, while infants above that weight are cup fed with the tube in situ. Once the baby is fully established on cup feeding, the tube is removed. At that time mothers are encouraged to put the baby on the breast with supplemental cup feedings as necessary. In addition, supplements of iron, calcium, phosphate, and vitamins are given when needed.

The results of this programme indicated the successful growth of low-birth-weight infants fed with human milk. It was recognized, however, that the continued education of staff is needed to support and encourage this practice.

Also recommended is a videotape describing two hospitals in Kenya that support breastfeeding of low-birth-weight infants, which was developed to train health practitioners. Though produced in Kenya, the programme information presented has wide applicability and is relevant to all regions. This video, titled "Kenya: Feeding Low-Birth-Weight Babies," is in English and is available from UNICEF/ESARO, Communication and Information Services, P.O. Box 44145, Nairobi, Kenya.

Philippines: Integration of Breastfeeding in the Medical Curriculum

As a result of the 1982 International Conference on Action Needed to Improve Maternal and Infant Nutrition in Developing Countries, the need to strengthen the role of physicians in promoting breastfeeding was recognized. As a result of this recognition, the Association of Philippine Medical Colleges (APMC), in collaboration with the Nutrition Center of the Philippines (NCP), embarked on a national breastfeeding promotion programme for medical students.

The main objectives of the joint APMC-NCP project is to strengthen the knowledge, attitudes, and skills of physician-educators on breastfeeding by providing them with accurate and simplified teaching packages to promote breastfeeding among medical students, and ultimately among mothers, thus improving the nutritional status of infants and preschool children.

The specific goals of the project are the following:

- Development of a curriculum for integration of breastfeeding in the medical curriculum.
- Development of the breastfeeding multi-media teaching package.
- Orientation of deans and physician-educators of participating medical schools in the project and the utilization of the package as a tool for integration of breastfeeding in their respective colleges.
- Dissemination of the package to at least 80 percent of the 26 AMPC member medical colleges.
- Monitoring the progress of project implementation.

In addition to the integration of breastfeeding within the medical curriculum, three other critical initiatives have been undertaken in the Philippines to promote breastfeeding, including a national movement for the promotion of breastfeeding with the government health sector taking the lead; a national code for the marketing of breastmilk substitutes; and rooming-in as a requirement in government and eventually in private hospitals.

Colombia: Bienestar—An Innovative Approach to Childcare

Bienestar ("Wellbeing") is an innovative programme designed to reach young children in the poorest sections of Colombia. According to the latest census, seventeen percent of Colombia's population is children under seven years of age. Of these, two million are malnourished. Bienestar, which was initiated in 1987, is a community-level response to the need to provide day care services for working women. Unlike traditional "centres," the Bienestar programme selects mothers within the children's neighborhood community to care for up to fifteen children within their own homes. The programme helps these daycare mothers to obtain funds to upgrade their homes and provide a percentage of their salary. In addition to providing eighty percent of each child's daily nutritional requirements, the programme provides a stimulating environment for

enhanced child development; a source of income for day care mothers; and a relief from childrearing for working mothers of young children.

At present more than 30,000 children have been enrolled in approximately 2,000 homes around the country. Under the supervision of the National Institute for Family Wellbeing, the Colombian Social Service, and the Colombian Institute for Family Health, the programme hopes to increase enrollment by 300,000 each year, until the entire preschool population is covered.

Mexico: Oaxaca Workshop

The State Government of Oaxaca, Mexico, and UNICEF are collaborating in a programme of child survival and development. Seven basic strategies provide the programme with coherence and congruence: multisectoral and inter-institutional coordination; decentralized planning; community participation; training of community members, and the upgrading of institutional staff; strengthening of existing services; promotion of alternative health methods; and educational communication.

The educational communication strategy is conceived as an integrating element in the programme. This communication strategy takes as a fundamental objective the growth of popular awareness about problems and possible actions affecting child survival and development. Rather than persuading people through marketing of preconceived ideas about what should be, this approach emphasizes both the creation of discussion and dialogue leading to the rediscovery and strengthening of traditional knowledge, and the adaptation to local circumstances of new scientific knowledge. Rather than simply transmitting survival and development messages, the programme will include discussion of presented themes.

Within this communication and educational framework, a review was commissioned to examine childrearing practices and beliefs among the sixteen main ethnic groups in Oaxaca. The findings of this review are being used to modify discussion themes and to prepare a variety of radio programmes, games, comic books, and other materials for use in stimulating discussion of child care and development topics.

Vietnam: An Informal Programme of Family-Based Day Care

Vietnam has a long history of programmatic efforts focussed on the health, nutrition, and psychosocial needs of children in the 0-6 age group. Emphasis on this age group has received renewed attention as economic and social factors, including increased rates of maternal employment and school enrollment, as well as changes to the extended family system, have given rise to an increasing number of young children in need of care.

Recognizing this demand, the Ministry of Education has placed early childhood development high on its agenda. A new department has been created with responsibility to provide adequate health, nutrition, and early education services; to increase coverage of both formal and informal

programmes; and to provide parental education programmes focussed on health, education, nutrition, and family planning.

In Vietnam, child-care services for children 0-3 are provided through both formal and informal systems. Approximately thirty percent are enrolled in formal day care programmes. Parallel to this system is an indigenous, informal arrangement of family day care. Family or home-based centres are most often run by elderly retired grandmothers who have raised several children of their own. Capitalizing on this indigenous form of care, UNICEF, in collaboration with the Ministry of Education, has agreed to strengthen this low-cost community-based strategy. In accomplishing this objective, the Ministry of Education with collaboration from UNICEF has agreed to:

- Support the development of a Network of Home Day Care Centres located within the community in an effort to recognize and build on local practices.
- Enable Home Day Care Centres to meet the developmental needs of children through the establishment of governmental standards and regulations.
- Develop an informal training programme that emphasizes the psychomotor, sensory, and emotional stimulation of children.
- Integrate the Home-Based Child-Care Centre with existing social support services, including community and district health centres.

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