ENCYCLOPEDIA
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Development

Feeding skill, Appetite and Feeding Behaviours of Infants and Young Children and Their Impact on Growth and Psychosocial Development

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Introduction

Feeding, like other sensorimotor skills, is a developmental skill that matures during the first two years of life. It is a highly complex sensorimotor process with developmental stages based on neurological maturation and experiential learning.[1] However, feeding, unlike other sensori-motor skills, is heavily reliant on internal incentive or motivation to initiate ingestion, and is essential for survival of the newborn. Thus, the act of feeding is highly charged emotionally for the mother, whose primary responsibility, as viewed by the family, society and culture around her, is to ensure the early growth and well being of her child. Therefore, from the very beginning the mother-infant feeding relationship is influenced by physiologic as well as interactional forces at multiple levels.[2]

Subject

When feeding skills are intact and appetite is robust, feeding times, and later on, mealtimes are a source of pleasant socialisation resulting in adequate nutrient intake and good growth. Demanding food at regular intervals, sucking, eating and drinking with good rhythm, trying new food tastes or textures, and expressing satisfaction at the end of feeding are all considered good feeding behaviours by family and society. These pro-feeding behaviours invite praise and positive feeding interactions and thus reinforce the feeling of self-mastery in the young child and promote continued food acceptance and independent feeding behaviours.

However, when feeding skills are impaired (e.g.: poor oral-motor skills, taste and texture sensitivities) and or poor appetite (inadequate hunger), they manifest themselves in problematic feeding behaviours such as not signalling hunger, sucking or eating excessively slowly, gagging, and not bringing food to the mouth.[3-7] In addition, associative conditioning to painful gastrointestinal cues is particularly powerful in young infants and this conditioning often manifests itself in problematic feeding behaviours.[8,9] Temperamental characteristics and regulatory capacities of the infant may further modulate feeding behaviours.[10,11] Maternal attempts at increasing her infant's nutrient intake by feeding more frequently or longer duration tend to result in stressful feeding experiences for both.[12] While these efforts may work well initially for maintaining good weight gain, they tend to become ineffective and maladjusted mealtime interactions and behavioural mismanagement prevail.[2,13-15] Maternal and family characteristics and societal expectations about the size of the young child and the type of food eaten further influence an already stressful feeding relationship.[16,17]

Problems

Feeding difficulties are one of the most common developmental disturbances in otherwise healthy infants and young children, often resulting in poor growth. Although an estimated 25%-50% of children experience transient feeding problems under two years of age,[18,19] most feeding issues resolve by the end of early childhood. However, an estimated 3-10% of children present with more severe forms of feeding problems which put children at risk for impaired growth, chronic illnesses and behavioural developmental problems.[20] As well, a large percentage of children with special needs, children with developmental disabilities and children born prematurely have severe and chronic feeding problems where families need support in resolving the feeding issues.[21-23] At the clinical level, the mother (and her paediatrician) is often not aware

of the underlying reasons for problematic feeding behaviours. Thus, the mother's reactions to a poor feeder may be exposed to covert or overt family criticism, which often lead to internal doubt about her own ability to nurture.[4] At the policy level, there is a lack of education of professionals and young parents about feeding as a highly complex developmental skill, motivated by hunger and conditioned by parental reactions. Furthermore, professionals are still not trained to recognize that when either feeding skills or motivation or both are impaired, problematic feeding behaviours, stressed mealtime interactions and family conflicts are likely to result.

Research Context

Earlier cross-sectional clinical studies examined the relationship between feeding difficulties and attachment, maternal characteristics, family dynamics[24] and feeding practices.[24-30] These studies were conducted prospectively, that is, after the children were diagnosed with poor growth. Several observational studies focused on feeding interactions and problematic feeding behaviours.[31,32] The development of feeding and patterns of food acceptance have been studied by numerous psychologists.[33-36] More recently, few researchers started to focus on possible pathophysiology (heart rate variability, hormonal balance) of poor growth and problematic feeding behaviours.[37-39] Other studies were conducted in the context of primarily behavioural interventions for problematic feeding behaviours in medically ill and very premature infants.[40-43]

Key Research Questions

The extensive research in the area of feeding problems and poor growth can be divided along the following three research questions:

1. How do maternal (family) characteristics (cognitive abilities, personality disorders, psychological status and early attachment history) influence feeding behaviours and growth?
2. How do infant characteristics (feeding skills, appetite, temperament and other physiological characteristics) influence feeding behaviours, mealtime interactions and growth?
3. How effective are behavioural and other forms of intervention for severe problematic feeding behaviours in medically ill infants?

Recent Research Results

Only questions 2 and 3 will be summarised here. With a focus on infant characteristics, studies have shown that feeding problems often co-occur with sleeping and behavioural disturbances (irritability, poor self-calming and intolerance to change), suggesting that these are symptoms of a common underlying constitutional “regulatory disorder” in infants and young children.[44,45] In a large whole-population survey of children’s growth and development, a significant portion (36%) of the 47 children identified with failure to thrive at one year of age were found to have oral motor difficulties, suggesting that these children were biologically more vulnerable to poor eating from birth.[46] Another study showed that young infants with gastroesophageal reflux were significantly more likely to have delay in their feeding skills and readiness behaviour for solids than controls.[47] In a prospective study of a group of healthy term infants (n=330), infants with inefficient sucking, as measured by tracings on a polygraph, at one week and two months were significantly more likely to have mothers with greater effort at feeding than infants with efficient sucking.[14]

A number of studies have shown that children under 3 to 4 years of age eat primarily in response to appetite or hunger cues, whereas older children’s eating are influenced by a variety of environmental (extra food available) and social factors.[48,49] As well, children with poor growth were observed to refuse offered food more often and fed themselves significantly less often than controls.[50] In terms of the third question, the literature reflects the reality that presently we are better at identifying factors contributing to feeding problems at any level of severity than treating them.[28,51,52] Treating feeding problems at the primary or secondary level, while desirable, is not always available for parents.[53] Treating feeding disorders associated with severe medical illnesses, developmental disabilities and gavage feedings requires the collaboration of multidisciplinary teams for successful outcome.[54-59] Lastly, studies have shown that appetite stimulating medications result in good weight gain, and thus making intervention more efficacious.[60-62]

Conclusions

Understanding feeding behaviours requires the knowledge of feeding as a developmental skill that matures over time and is reliant on hunger (appetite) cues and experiential learning. Whereas feeding skills are well established by two years of age, hunger cues shift from primarily internal to external (family, school and societal) control only by 4-5 years. Thus, although initially problematic feeding behaviours tend to be reactions to internal cues, these behaviours can become conditioned to external (coaxing parents) and societal cues. Medical illnesses,

prematurity and developmental disorders further interfere with the development of normal feeding behaviours.

In order to help identify feeding problem, a number of feeding scales have been devised,[63-65] but rarely used for assessment or treatment outcome. Yet, early behavioural intervention can play an important role in normalizing feeding behaviours and mealtime interactions, which in turn help promote independence and other self-help skills in the child. Most recently, an easy and short screening tool was developed for detecting problematic feeding behaviours in primary care offices, allowing early referral to appropriate feeding clinics.[66]

An example of a Feeding Scale, which takes only 5 minutes to fill and may be filled by a pediatrician or nurse or other professionals, given that they possess the necessary information about infant/child feeding, or know where to refer the child with feeding problems.

Implications for Policy and Services

The major findings from this updated summary continue to be that the physiological make up of the infant, medical illnesses, developmental disabilities and parental responses all play an important role in the dynamic relationship in which problematic feeding behaviours develop. This finding has several implications for policy and services in hospitals where premature infants and infants with medical needs grow poorly, requiring enteral feedings. Thus, intervention with staff specialized in feeding disorders, usually occupational or speech therapists, help initiate oral feedings. As well, doctors or pediatricians following infants and young children need continued education in possible causes of poor growth in otherwise healthy infants.

1. At the primary care level, the use of easy to administer feeding scales for earlier detection and thus, treatment of feeding problems should continue to be advocated. (See an example of the Feeding Scale below).
2. The continuation of mandated multidisciplinary feeding clinics addressing feeding disorders in hospital settings. These feeding programs need to be easily accessible to parents, where effective behavioural intervention and preventive strategies may be implemented in the early stages of reported difficult feeding behaviours.
3. The training of experts in the field of feeding disorders, which should include training in the behavioural, developmental and interactional components of feeding, as well as understanding the physiological, as well as the medical components should be advocated.

The Pediatric Feeding Program' research at The Montreal Children's Hospital:

Feeding infants and young children can be challenging. Initially, the feeding scale was developed to have a common language with the mothers about feeding difficulties they experience with their children, and to assess the intervention. This scale (MCH-FS) has become known word-wide, and as of now, it has been translated and standardized on a healthy children population in Montreal and in several other countries. The author of this article has approved all translations by using back-translations before the translated version could be used in 8 languages. Depicted in the graphic below is only 7 as Canada used the results of the English and French languages combined.[66-77] The scale was later translated and standardized in another four languages: Italian[71], Mexican[70,75] Turkish[76] and Chinese[77].

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See the MCH-FS above: Of note is that other infant/child feeding scales do not take into consideration the variability of infant/child level of appetite, which influences maternal approach to feeding and the child's acceptance of food.[66-77]

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