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Screening Solid Foods Infants 1 (SSFI-1) development of a screening tool to detect problems in the transition from milk to solid food in infants from six to nine months of age

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ABSTRACT

Aim: To establish the psychometric properties of a newly developed screening tool Screening Solid Foods Infants 1 (SSFI-1) used by early childhood professionals, to detect problems in the transition from milk to solid food of smooth consistency in infants 6–9 months of age.
Methods: The SSFI-1 score was filled out by the parents of a subgroup with term infants ($n = 35$); healthy preterm infants ($n = 26$); infants with comorbidity ($n = 17$); infants with feeding problems ($n = 13$). Internal consistency, reproducibility, construct, criterion and related validity was evaluated.
Results: The preterm subgroup differed significantly in age when starting with fruits/vegetables and period of experience ($p \leq 0.01$). The SSFI-1 was sufficiently reliable for the total group and term subgroup ($\alpha = 0.78$ and 0.76), but not for the preterm and comorbidity/feeding problem subgroup ($\alpha = 0.51$ and 0.69). Inter-rater reliability was high for the total score ($n = 25$, ICC $r = 0.93$), and moderate to good for individual items (weighted kappa range 0.55–0.95). Validity was confirmed by significantly higher scores for the comorbidity/feeding problem subgroups and clinically distinguishable subgroups ($p < 0.05$) and area under the curve values ≥ 0.78. The initial 10-item screening tool was modified to a seven item screening tool. A SSFI-1 score of 4, +2 SD of the term subgroup, had 76.9% sensitivity and 82.1% specificity, for detecting the presence of a feeding problem.
Conclusion: The seven-item screening tool Screening Solid Foods 1 may be used as a screening tool for term infants. Further testing of the SSFI-1 in new infants is needed, to confirm reliability and validity both for term, preterm and (risk for) feeding problem infants.

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1. Introduction

The first year of life infants make the transition from milk nutrition, to a nutrition containing all consistencies. The new born infant consumes milk by coordinating sucking, swallowing and breathing, due to oral reflexes. After a few months these oral responses diminish and voluntary oral motor behaviour appears in the feeding situation. Growth in the oral cavity allow for other tongue movements than the initial restricted 'in- and out' suckling. Along with these anatomic changes, the child is able to maintain a more upright position. This makes the child ready for the introduction of solid foods (Arvedson, 2006). In the Netherlands most infants are introduced to solid foods between four and six months, following the guideline 'Nutrition and Feeding behavior' (Lanting, Heerdink-Obenhuijsen, & Schuit-van Raamsdonk, 2013). The child has to get accustomed to new tastes and consistencies. Compared to liquids the consistency of foods requires adaptation in the area of oral control, transport to the pharynx and swallowing (Nicklaus, 2011).

There is evidence that feeding experiences in the first year of life are the important fundament for feeding in the years following (Harris, 2008; Mennella, 2012). In the first year of life, the infant is willing to accept new tastes and consistencies, while during the second year of life the infant enters a period of neophobia, in which the introduction of new food may become difficult (Dovey, Staples, Leigh Gibson, & Halford, 2007). Infants who lack early experience with solid foods, have more difficulty getting used to tastes and consistencies, and they eat fewer types of solid foods after the first year (Coulthard, Harris, & Emmett, 2009; Mason & Harris, 2005). These issues make the first year of life an important period for establishing feeding skills.

When the infant visits the pediatric office or outpatient clinic, the feeding skills during the transition from liquid to solid foods are investigated by the early childhood professional. Questions are asked about nature, quantity and frequency of the intake of solid foods and the relationship between the parents and the infant with regard to the feeding situation. A screening tool can be useful in order to detect feeding problems early.

Recently a quick screening tool on feeding behaviour in toddlers was introduced in the Netherlands (Dijk, Timmermans, Martel, & Ramsay, 2011). This Dutch Screening tool is a translation of the Montreal Children Hospital Feeding Scales. Although this screening tool is developed for infants from six months up to the age of four years, it contains mainly questions focused on children who already acquired early feeding skills. However, infants in their first year of life are still developing these feeding skills, and therefore are incomparable with older children. A screening tool focused on infants in the transition from milk to solid food does not yet exist and can provide added value. The aim of this study was to develop and evaluate the psychometric properties of a screening tool to identify problems in infants 6–9 months of age, who are introduced to solid food of smooth consistency (i.e. without pieces).

2. Participants and methods

2.1. Development of the screening tool

The Screening Solid Foods Infants 1 is intended for use by early childhood professionals, such as caregivers working at community paediatric offices or outpatient clinics for infants.

Based on critical review of the literature on items associated with feeding problems in infants (Engel-Hoek, 2011; Coulthard & Blissett, 2009), and on our own clinical experience, a 10-item questionnaire on the individual feeding situation of the infant was developed. The initial SSFI-1 included two parts, one with general health information, investigating 'comorbidity of the infant', and 'received help for the feeding situation in the past two months'. The other part included 10 specific questions about the feeding situation. A focus group of five speech therapists, specialized in managing feeding problems in young infants, judged and supplemented the SSFI-1. The adapted initial screening tool consisted of ten specific questions, on the following topics:

- parents being concerned about the feeding situation (item 1);
- parents experiencing a stressful feeding situation with the child (item 2);
- growth reported by the parents (item 3);
- coughing during swallowing of milk by breast or bottle feeding (items 4);
- spitting (item 5);
- oral-motor skills and response to oral-sensory properties (i.e. consistency, taste and aromatic properties) (item 6, a composite item);
- gagging when offered smooth consistency (item 7);
- coughing when offered smooth consistency (item 8);
- the frequency of offering fruits/vegetables (item 9);
- number of different types of fruits/vegetables (item 10).

The answers of the 10 specific questions were listed from normal feeding behaviour to abnormal feeding behaviour, except for 'the frequency of offering fruits and/or vegetables', item 9, which scored in the opposite direction. Points were