**METHODS**

This study was approved by the Institutional Review Boards at each of the two participating institutions (University of California, Davis IRB protocol #488680 and Milwaukee Children’s Hospital IRB protocol #442506-5).

Participants: Participants were recruited from university hospital-based clinics at the two participating institutions. Caregivers of children with known feeding problems (FP) were recruited from the interdisciplinary pediatric feeding team at one of the two institutions. Caregivers of children undergoing a comprehensive assessment of feeding concerns at the first of two institutions were recruited to participate in the FP group if their child was between the ages of 0 months and 3 years. In addition, their child was required to be diagnosed with a feeding disorder by the interdisciplinary team (dietitian, speech & language pathologist, pediatric psychologist, and gastroenterologist) using ICD-9 criteria. Caregivers of children with feeding disorders related to pica, rumination, eating disorders, or a lack of food in the home were not included in the present study. A pre-clinic assessment packet was completed by a primary caregiver as part of standard clinical practice prior to attending the initial evaluation. Informed consent was obtained at the feeding team initial assessment appointment.

Caregivers of children without known feeding problems (NFP) were recruited from a community well-child clinic at the second participating institution. To be eligible to participate as part of the NFP group, caregivers were identified as having children between the ages of 0 months and 3 years without a known diagnosis of a feeding disorder or problem as determined by one of the pediatricians (RSB) in advance of their scheduled appointment from their medical record using ICD-9 criteria (e.g. failure to thrive, feeding disorder/problem, and dysphagia). In addition, those in the NFP group did not have a medical history of a medical event or condition with the potential to result in a feeding problem (e.g. surgical or traumatic injury, pneumonia, or chronic dehydration or malnutrition). The medical records of recruited and consented participants were subsequently reviewed by two pediatricians on the research team to confirm eligibility for inclusion in the final data analysis. Three participants originally considered eligible for participation by one of the pediatricians was identified not to meet inclusion criteria by the second pediatrician. After discussion, the pediatricians reached consensus to exclude the three participants in question from final analysis.

Instruments:

*Demographic Questionnaire*. Prior to completion of the ICFQ©, caregivers completed demographic questions regarding their relationship to the child, their level of education, household income, marital status, ethnicity, and the size of the household. This information was compared between research site participants to assess regional differences between study populations.

ICFQ©: This questionnaire was accessed online. The caregivers first entered the child’s due date and birth date resulting in the automatic presentation of the appropriate age-adjusted questionnaire for response. Eleven age-adjusted versions of the ICFQ© are available which deliver age appropriate questions regarding feeding milestones and skills, ranging from birth to 36 months of age. All of the questionnaires contain 12 core questions with responses that are scored according to the child’s adjusted age, based on well-child visit milestones (Question items are shown in Table 1). The core questions tested in this study represent all, or the majority of questions presented within each age-adjusted questionnaire with minor wording modifications for age appropriateness. For example, an infant would be expected to drink from a bottle and toddlers to use a cup (see items in Table 1). The process of questionnaire completion is interactive. A pop-up window offers guidance regarding expected developmental progression of feeding and swallowing skills relevant to each question. This information is presented prior to the caregiver’s response to enhance both the accuracy of their response and their knowledge about feeding and feeding development. Upon completion, a summary of responses, including both red flags (not typical) and blue flags (typical) is displayed which the caregiver can print and use as a guide for discussion with their PCP (see Table 2).

[Insert Table 1 here]

[Insert Table 2 here]

Procedures: Consented participants completed the ICFQ© prior to their appointment for the FP group and after their well-child appointment for the NFP group. The ICFQ© was completed by caregivers using an iPad. Once completed, ICFQ© summaries were printed and provided to the participants. A copy of each participant summary was maintained by each site for comparison to the Feeding Matters®database to confirm and validate data entries.

Data Collection: Caregiver responses to the ICFQ© populated an anonymous database maintained by Feeding Matters®. Caregiver responses for this pilot study were extracted from the general questionnaire database using converging methods of verification. One question on the ICFQ© was used to indicate that the respondent was a research participant and identified the research site location. In addition, the research team verified valid responses within the general database by confirming the date and time of each participant’s ICFQ© response set associated with zip code and general location information provided within the database. Demographic and medical record information associated with caregiver responses were used to code for age group and study group (FP and NFP). To assure consistent comparison of the same questions across all caregiver participants, only the 12 core questions consistently posed across all age-adjusted questionnaire versions were studied.

Statistical Analysis: Demographic data were compared between research groups. Differences between each group’s responses to demographic questions were determined by completing an unpaired two-tailed t-test. An alpha criterion level of p < .05 was used to determine significant differences between variables for each group.

Group-based comparisons were completed to determine how predictive feeding behaviors were of FP. One question on the ICFQ© required caregivers to select all of the itemized behaviors observed when their child eats (see question 11 in Table 1). An odds ratio analysis was completed to determine the likelihood that selected behaviors observed in children while feeding were indicative of a feeding problem. The criterion alpha level for the odds ratios was set at α = .05.

A multivariable stepwise logistical regression analysiswas completed to determine the specificity and sensitivity for each of the “yes/no” response core questions (see Table 1). Additionally, the regression analysis was completed to determine whether an optimum cluster of behaviors distinguished the FP and NFP groups. To determine whether items on the ICFQ could distinguish between the two experimental groups, pilot data were collapsed across all age groups.

**Table 1. Twelve Common Core Questions of the ICFQ © and Associated Red Flag Response.**

|  |  |
| --- | --- |
| **Core Question Item** | **Red Flag Response for all age groups** |
| **1. Does your baby like to be fed?** | NO |
| **2. Do your feed your baby (Does your baby eat) more often than every 2 hours?** | YES |
| **3. Does your baby (child) let you know when he is hungry?** | NO |
| **4. Do you think your baby (child) eats enough?** | NO |
| **5. How long does it utually take to feed your baby (child)?** | < 5min or >30 min |
| **6. Do you often have to do anything special to help your baby(child) eat?** | YES |
| **7. Does your child let you know when he is full?** | NO |
| **8. Do you have concerns about your baby's (child's) weight?** | YES |
| **9. Most of the time, does you child seem content after eating?** | NO |
| **10. Do you enjoy feeding time with your baby (child)?** | NO |
| **11. Does your child often do any of the following when you feed him (he eats)? [check all that apply]:** | >2 of the following with the exception of (s) |
| **a) Gets upset when his face is touched at the start of feeding.** |  |
| **b) Refuses to eat** |  |
| **c) Does not chew** |  |
| **d) Does not swallow** |  |
| **e) Turns away from the breast, bottle, or cup** |  |
| **f) Arches his body** |  |
| **g) Chokes** |  |
| **h) Coughs** |  |
| **i) Gags** |  |
| **J) Cries** |  |
| **k) Makes loud breathing noises** |  |
| **l) Turns blue** |  |
| **m) Becomes limp or worn out before the end of feedings** |  |
| **n) Falls asleep before the end of feeding** |  |
| **o) Vomits after eating** |  |
| **p) Puts hands in front of the face** |  |
| **q) Pushes away food** |  |
| **r) Tantrums** |  |
| **s) None of the above** |  |
| **12. Based on the questions you have answered, do you have concerns about feeding your baby (Child)?** | YES |

**Table 2. Example of the two items from the IFCQ Summary**

**SUGGESTIVE OF POTENTIAL FEEDING CONCERN**

**RED FLAG ITEM**

**Question:** **Does your child like to eat?**

**Parent Response:** No

Children this age let their parents know that they enjoy eating in many ways. They may ask for food or reach for the cup, spoon or fork. Many want to be independent and do not like to be fed by someone else. Some parents still prefer to feed their child all of their meals. If they are still being fed by their parents, they will open their mouth and move toward the food to show when they are ready for the next bite of food. If you feel your child does not seem to like to eat, talk with his doctor.

**SUGGESTIVE OF NORMAL FEEDING DEVELOPMENT**

**BLUE FLAG ITEM**

**Question:** **Does your child let you know when he is hungry?**

**Parent Response:** Yes

Children this age show that they are hungry in many ways. They may still fuss as they did when they were younger. But, they also use hand, eye, and body movements that are easy to understand. For example, they take adults to the refrigerator and point to the food they want. They also reach for the water faucet or try to climb in their high chair if they have one. Some say words such as “up”, “eat”, “more”, or the name of a favorite food such as “juice”. If you feel that your child does not let you know that he is hungry or if you have to initiate feeding your child all the time, talk to your child’s doctor. You can work together to find ways to best feed your child.