

Assessment of behavioral feeding difficulties in young children

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Abstract

Aim: Feeding difficulties are common in typically developing children and the prevalence ranges from 25% to 45%. Although using an assessment tool is the best approach when planning an intervention, assessment of feeding disorders is mostly accomplished by informal parent interviews in clinical practice. This study was designed to assess the mealtime behaviours of young children with 'Feeding Difficulties' (FD) by an instrument and to compare the results with 'Typically Developing' (TD) children.

Material and Methods: A total of 61 children with FDs and 63 TD children aged 6-42 months were included. The Behavioral Pediatric Feeding Assessment Scale (BPFAS) was completed to describe the child's feeding behaviors and the parents' mealtime strategies.

Results: FD group had higher scores than TD group in all BPFAS subtests' scores. The mean 'Total Frequency Score' was 104.6 in FD group whereas 72.9 in TD group ($p=0.0001$). The FD group had more problematic feeding behaviours in comparison to TD group. The mean 'Total Problem Score' of TD group was 6.1 whereas 20.1 in children with FD ($p=0.0001$).

Conclusion: This study supports the BPFAS to be a useful and practical feeding assessment tool and also has the advantage of incorporating parents' feelings about child's feeding behaviors.

Keywords: Behavioral pediatric feeding assessment; scale; feeding difficulty.

INTRODUCTION

Feeding disorders are common in pediatric population, ranging from 25% to 45% in typically developing children and may arise from a broad range of etiologies (1). Organic etiologies are defined as structural or functional abnormalities that affect physiology, while nonorganic etiologies or 'Behavioral Feeding Disorders' (BFDs) arise from psychosocial difficulties (poor environmental stimulation), negative feeding behaviors shaped by internal or external reinforcement (selective food refusal, rumination) or emotionally based difficulties (phobias, depression) (2). Sometimes it is difficult to label feeding issues because most children have multiple components to their feeding disorder. "Feeding Difficulty (FD)" is a

useful umbrella term that simply suggests existence of a feeding problem of some sort. In essence, if the mother says there's a problem, there is a problem (3). FDs may also stem from distorted dynamics around feeding defined as 'dysfunctional feeder-child interaction' which is indicative of mismanaged parent-child interactions (4).

Evaluations of pediatric FDs can be accomplished by interviews, parent-child interaction observations and standardized questionnaires. Although using a standardized assessment tool is the most valuable source to collect information when planning an individualized behavioral feeding intervention, assessment of a FD mostly accomplished by informal parent interviews in clinical practice currently. Using an assessment tool is

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critical not only to establish an effective treatment plan but also to monitor the child's clinical progress throughout the therapy. Many instruments for assessment of childhood BFDs have been reported in the literature (5). Self-report screening instruments have the advantage of being relatively low cost, easy to administer and feasible within clinical settings (6).

In the present study, the 'Behavioral Pediatric Feeding Assessment Scale' (BPFAS) was implemented to gather information about two distinct categories of mealtime behaviors stem from either by the child or the mother. Since "parental misperception" is described as excessive parental concern despite normal child behavior, may be an important underlying cause of the feeding difficulty; it is advantage for a tool to cover parental concerns (3). By this way, having a better understanding of the specific problematic behaviors with FDs allows more specific anticipatory guidance for the families.

Pediatricians should be familiar with the BFDs as well as many other behavioral problems. They should be competent in prevention, detection and management techniques of FDs. This can be achieved by being aware of behavioral approaches to provide guidance about possible methods for prevention of FDs. The clinical implication is that it is critical for pediatricians first to recognize and then to identify BFDs as soon as possible to minimize the devastating effects that can occur on a child physically, mentally, socially, and developmentally. Due to the high prevalence and the essentiality of early detection of FDs, this study was designed to assess the mealtime behaviours in young children referred with FDs by a standardized tool and to compare the results with those of 'Typically Developing' (TD) children.

MATERIAL and METHODS

Study Design

This descriptive and cross-sectional study was performed in an urban university hospital in Turkey. Totally, 63 TD children and 61 children with non-organic FDs aged 6-42 months were participated in the study. The FD group consisted of children who admitted to gastroenterology outpatient clinic with the complaint of FD without any identifiable medical issue and referred for behavioral intervention to the Developmental and Behavioral Pediatrics division. The TD group was randomized from the mothers of children with no complaint of FD during their well-child visits. Children were term singletons with no significant developmental, physical, or health disabilities.

Measures

Sociodemographic Data Form

This form included the basic demographic information such as the child's date of birth, gender, birth order, and medical history along with the parent's age. The feeding history of the children were also recorded from dietetic history, 3-day dietary diary form and the BPFAS.

The BPFAS (Behavioral Pediatric Feeding Assessment Scale)

This scale is a 35-item standardized parent report measure developed by Crist and Napier-Philips used to assess both the child's feeding behaviors and the parent's mealtime strategies (5). In 2013, the United Kingdom study had shown that the BPFAS had sensitivity, specificity and strong predictive validity to be used for screening for feeding disorders (7). Lastly, in 2018, BPFAS was found to be a reliable and valid tool for Greek children (8). The translation and back-translation of the BPFAS were performed by the permission of the developer. The first 25 items of the BPFAS address the child's behavior and the last 10 items address the parent's mealtime strategies. Each item presents a descriptive behavioral phrase that the parent rates on a five-point Likert scale, ranging from 1 (never) to 5 (always) based on how often the behavior occurs. After rating the behavior, the parent is asked to indicate if that behavior is a problem for her. The BPFAS was scored using a computer based scoring program created by the assessment developer. Scoring of this tool involves calculating two main separate scores; overall 'Total Frequency Score' (TFS) and 'Total Problem Score' (TPS), in addition, each of them subtested for child and parent. Higher scores for both frequency and problems considered to be at risk of FDs. The maximum available scores for 'TFS' is 175, for 'TPS' is 35 (7).

Data Analysis

Statistical analysis was performed using 'Statistical Package for Social Sciences (SPSS-17) for Windows. Categorical variables are reported as number (n) and percent (%). Continuous variables are reported as mean \pm standard deviation (SD). The normality for continuous variables in groups was confirmed by the Shapiro-Wilk test. Unpaired t test (for frequency scores) and Mann-Whitney U test (for problem scores) were used for between group comparisons. The Pearson Chi-square was used for categorical variables. P <0.05 value were considered statistically significant.

RESULTS

Demographic characteristics

The mean age of FD group (n=61) was 20.1 months with 55.6 % males and of TD group (n=63) was 23.2 months with

54.1 % males. They were all appropriate for gestational age and term born children. There were no statistically significant difference between two groups with regard to age and gender ratio. Mothers of children who completed the BPFAS measure were of similar age (mean age of mothers: 29 ± 5 years).

Scores of the BPFAS for FD and TD Groups

Descriptive statistics revealed significant differences between the FD and TD groups in frequency of maladaptive mealtime behaviours and the behaviors endorsed as problems. The BPFAS scores for both groups are summarized in Table-1. No significant effects were observed for the child's gender or age on the BPFAS scores. TD group had lower scores than FD group in all subtests of BPFAS scores. The mean 'Total Frequency Score' (TFS) was 104.6 in FD group whereas 72.9 in TD group ($p=0.0001$). The FD group had more problematic feeding behaviours in comparison to TD group. The mean 'Total Problem Score' (TPS) of TD group was 6.1 whereas 20.1 in children with FD ($p=0.0001$).

Comparison of subtest scores of the BPFAS across the three populations from Turkey, Australia (9) and Canada (5) were presented in Table-2. Groups of Turkey had higher scores in all subtests from Australia and Canada. However, results for the BPFAS revealed significant difference for all subtests between both groups from Turkey and Canada and only for 'Parent Problem Score' between TD groups from Turkey and Australia ($p<0.05$).

Description of Children's Mealtime Behaviors

The summed scores of the following six items on the BPFAS were described as "restrictiveness of diet" assesses the child's acceptance of certain food groups and new foods (5). These are; "eats fruit", "drinks milk", "eats meat/fish", "eats vegetables", "eats starches", "will try new foods". Since these items reflect positive feeding attitude; a high score reflects eating a variety of food groups, a low score indicates a narrower diet. In our study mothers of children with FD rated their child's diet as being relatively narrow compared to mothers of typically developing children (FD group; 16.9 ± 4.8 , TD group; 20.6 ± 2.9 , $p=0.0001$). According to descriptive data of the BPFAS items, most commonly occurring child feeding behaviors in the FD and TD groups were shown in Table-3. In the FD group; 100 % of mothers endorsed at least one behavior and 96,8 % of mothers listing four or more behaviors as problematic for them while in TD group; 60, % of mothers described at least one problem and 41.3% of mothers listing multiple problems about child's feeding behaviours ($p=0,0001$).

Table-4 lists the child behaviors considered to be most

problematic by parents in the FD group. In the FD group; 54.1 % of parents reported the meal length was longer than 20 minutes frequently (4 and 5 on the 5 point Likert scale with 5 representing "always"), but in TD group only 174 % of parents reported that it takes longer than 20 minutes to finish a meal frequently ($p=0.0001$).

Three mothers in the FD group reported their child had required supplemental tube feeding to maintain proper nutritional status whereas no child in the TD group had tube feeding history.

Description of Parental Mealtime Behaviors

Most commonly occurring parental feeding behaviors in FD group were documented as "I feel confident my child gets enough to eat (mean frequency score: 4.6)", "I coax my child to get him/her to take a bite (mean frequency score: 4.1)" and "I get frustrated and/or anxious when feeding my child" (mean frequency score: 3.8).

Four questions of the adult section of the BPFAS cover feeding strategies that are generally considered to be problematic (coaxing, using threats, making alternative / multiple meals, and force feeding) (10,11). The summed frequency scores of these items are described as "poor strategies". In our study the mothers of children with FD reported themselves as exhibiting problematic behaviors more frequently so having higher scores in "poor strategies" section than mothers of TD children (FD group; 12.3 ± 2 while in TD group; 8.6 ± 2.6 , $p=0.0001$).

Although making the child something else to eat if the child did not like what was being served (multiple meals) was endorsed as a frequent strategy (4 and 5 on the 5 point Likert scale with 5 representing "always") by 33.8 % of mothers ($n:42/124$) that was considered not to be a problem by 63.7 % of them.

In addition to this result, coaxing was reported by 77 % of mothers of children with feeding difficulty as a frequent strategy while 44.4 % of mothers of healthy children reported that they use this method frequently. Force feeding and threats were comparatively less often used as frequent strategies with 41% of parents reporting force feeding and only 11.5 % using threats frequently in FD group.

DISCUSSION

The current study demonstrated how the child and parent related feeding problems can be identified by applying a standardized assessment tool in early childhood period. Most of the researchers in the literature examine the feeding behaviors of older children (12,13). It is indicated recently that the BPFAS would be the best

Table 1. Comparison of FD and TD groups on the Behavioral Feeding Assessment Scale (BPFAS) scores

BPFAS scores		"TD" group (n=63)	"FD" group (n=61)	Cut-off values*	P-value
Frequency (Mean±SD)	Child	52.4 ± 12.2	75.3 ±14.3	61	0.0001
	Parent	20 ± 5.4	29.3 ± 6.1	20	0.0001
	Total	72.9 ± 16.1	104.6 ± 17.9	84	0.0001
Problem Median (min-max)	Child	3 (0-19)	14 (1-25)	6	0.0001
	Parent	1 (0-10)	6(1-10)	2	0.0001
	Total	3 (0-29)	20 (2-35)	9	0.0001

*Cut-scores for the BPFAS were determined by Dovey et al (ref).

BPFAS: Behavioral Pediatric Feeding Assessment Scale, "FD": Feeding difficulty, "TD": Typically developing, SD: Standard deviation, P<0.005 is significant

Table 1. Comparison of FD and TD groups on the Behavioral Feeding Assessment Scale (BPFAS) scores

Groups	The BPFAS subtests	Turkey (n=63)	Australia (n=54)	Canada (n=96)	
Typically Developing	Frequency (mean ±SD)	Child	52.4 ±12.2	49.7±11.3	46.6±10.2*
		Parent	20±5.4	18.4±5.4	17.3±4.8*
		Total	72.9±16.1	68.1±15.7	63.9±14.2*
	Problem (mean ±SD)	Child	4.3±5.2	3.0±4.4	2.2±3.2 *
		Parent	1.8±2.5	1.1±1.9	0.8±1.6*
		Total	6.1±7.5	4.1±6.2 *	3.0±4.5*
Feeding Difficulties	Frequency (mean ±SD)	Turkey (n=61)	Australia (n=36)	Canada (n=95)	
		Child	75.3±14.3	75.2±12.1	69.9±12.6*
		Parent	29.3±6.1	28.3±5.5	28.5±5.9*
	Total	104.6±7.9	103.5±15.9	98.4±17.1*	
	Problem (mean ±SD)	Child	14.4±5.3	13.7±5.3	10.7±5.6*
		Parent	5.6±2.5	5.2± 2.4	4.7±2.8*
Total		20.1±7.1	18.9±6.6	15.4±7.8*	

* Comparison of results for the BPFAS revealed significant difference for all subtests between both groups from Turkey and Canada and only for 'Parent Problem Score' between TD groups from Turkey and Australia (p<0.05).

Table 3. Most Frequently* Reported Child Feeding Behaviors on the BPFAS in FD and TD groups

Top Five Feeding Behaviors of the Children			
"FD" group	MFS±SD	"TD" group	MFS±SD
"has a poor appetite"	4.3±1.0	"eats fruits"	3.7±0.8
"try to negotiate what s/he will eat or not"	4.1±1.0	"eats starches"	3.6±0.9
"gets up from table during meal"	3.6±1.3	"comes readily to mealtime"	3.5±0.8
"whines or cries at feeding time"	3.5±1.3	"enjoys eating"	3.4±0.9
"would rather drink than eat"	3.5±1.3	"drinks milk"	3.4±1.1

BPFAS: Behavioral Pediatric Feeding Assessment Scale ,MFS: Mean Frequency Score, SD: Standart deviation
*Responses of the items endorsed as "frequent" when reported as "4" or "5" on the 5-point Likert scale with 5 representig "always"

Table 4. Most Commonly Reported Child Behavioral Problems on the BPFAS in FD group

Top Five Feeding Behaviors of the Children	
Child Feeding Behaviors	% of Mothers Perceive the Behavior as Problem
"whines or cries at feeding time"	81.9
"gets up from table during meal"	80.3
"enjoys eating"	76.1
"comes readily to mealtime"	75.4
"will try new foods"	68.8

BPFAS: Behavioral Pediatric Feeding Assessment Scale

candidate for implementation as a measure for screening for feeding disorders, it has shown to consistently discriminate between samples of children with medical and developmental comorbidities and has also shown sensitivity to intervention (14-16). As advocated by the BPFAS researchers, this study agreed the high accuracy of the measure in identifying children as having FD or not by comparing the results with the determined cut off values. In our study, statistically significant differences documented regarding to each subtests of the BPFAS between FD and TD groups Examination of responses to specific items on the BPFAS revealed following most commonly occurring child feeding behaviors in FD group; "has a poor appetite", "try to negotiate what s/he will eat or not", "gets up from table during meal", "whines or cries at feeding time", "would rather drink than eat". These findings are strongly coorelated with the literature knowledge that feeding difficulties, such as selective eating, food refusal, slow eating, and tantrums are commonly faced among young children (17).

Since children, especially at young ages, depend on their

parents for nutrition, mothers play a crucial role in their children's nutrition and appropriate mealtime behaviors. Therefore, the potential influence of mothers on children's feeding attitude may not be minimalized. Differences in parental behavioral management styles would be highlighted on the 'parent section' of the BPFAS. Data about parental feeding behaviors is helpful for understanding the real source of the feeding problem.

Our findings imply that our mothers perceive higher problems about their children feeding behaviors compared to western counties. In our study apart from FD group, it is important to note that nearly 1/3 of the mothers in TD group documented above the cut-levels for 'TFS' and 'TPS'. In our study in TD group; more than half of mothers described at least 1 of the 25 child behaviors representing a problem and 2/5 of mothers listing multiple problems. In a Canadian study using BPFAS, descriptive information of 96 healthy children between the ages of 9 months and 7 years were presented. Of healthy sample, half of them endorsed at least 1 problem and 1/5 reported multiple problems (5).

The result of the present study also showed that mothers who experienced problems at mealtimes were typically more likely to report coaxing, threats, force feeding and making multiple meals. In addition to the result that 'coaxing' was reported as a frequently used strategy by 3/4 of the mothers in FD group, nearly half of the mothers in TD group reported using this method frequently.

The feeding problem of the children may be caused by some parental poor strategies about management of child's mealtime behaviors. These strategies range from being very flexible to very rigid. Turkish mothers are traditionally more likely to try poor strategies to get their children to eat more in quantity and more frequently (during the day even at night) than optimal recommendations. We also observed them having high levels of stress/anxiety and not to encourage their children to self-feed during mealtimes. In practice, a number of studies have recommended providing children with a range of healthy foods and allowing them to eat what and as much as they wish (18,19). It is generally believed that parents should control the quality of food eaten, but toddlers should have control over when and how much they eat.

This study adds important descriptive data about using a tool for feeding assessment in early childhood period. The BPFAS provided useful information regarding the best manner for specific feeding interventions for children with feeding difficulties. Having a better understanding of the particular problem allows efficient therapeutic programs to have more specific anticipatory guidance and targeted interventions for children and families with FDs. In an intervention study, in Canada, 30 children aged 1-3 years with non-organic feeding difficulties attended a 1-month follow up behavioral feeding intervention program consisting of four sessions in 2012 (20). The researchers demonstrated significant lower scores on the BPFAS for both child and parent subscales postintervention compared to preintervention.

Despite the positive findings, several limitations caused some issues to be unclear in this study. First, a larger sample size would allow greater analysis and various interpretation of findings. Thus influences of ages and developmental levels of the children on patterns of feeding behavior is evident in the data, the behavioral feeding issues of younger and older children may be assessed separately by a multicenter study with a larger sample. Second, all the parent respondents in our study were mothers to be the primary care giver of the child in our culture. But fathers or other care givers may have different perceptions regarding children's mealtime behaviors.

CONCLUSION

A collaborative approach with an interprofessional feeding team in order to provide comprehensive feeding assessment is needed for children with FDs. Treatment is often provided by a variety of healthcare professional from medicine, psychology, speech-language pathology,

nutrition and other specialties (21). Since feeding problems are one of the most frequent concerns presented to pediatricians, clinicians should be familiar with the prevention, detection and management of the BFDs. Early prevention of problems and effective mealtime interaction programs improve child as well as family psychosocial health (22). Beyond assessment of children with FDs, future studies on addressing/determining the effectiveness of behavioral feeding interventions should also continue.

Another recommendation for further studies is to design these studies for vulnerable children such as developmental delays/disabilities or medium and high-risk preterms.

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