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# Improving children's problem eating and mealtime behaviours: An evaluative study of a single session parent education programme

Kim Fraser<sup>1</sup>, Marianne Wallis<sup>2</sup> and Winsome St John<sup>3</sup>

## Abstract

**Objective** To evaluate the effectiveness of a 'single session' group, early intervention, multidisciplinary, education programme (entitled the *Fun not Fuss with Food* group programme) designed to improve children's problem eating and mealtime behaviours.

**Design** A quasi-experimental time-series design incorporating data collection, twice before and twice following the intervention.

**Setting** A health district within the southeast region of Queensland, Australia.

**Method** Data were collected using the Children's Eating and Mealtime Behaviour Inventory – Revised (CEBI-R) and the Family Demographic Questionnaire.

**Results** Parents who attended the *Fun not Fuss with Food* group programme reported significant improvements in their child's problem eating and mealtime behaviours and reported reductions in parental concerns regarding their child's eating and mealtime behaviours.

**Conclusion** A single session, early intervention, group education programme for families with children with problem eating and mealtime behaviours is appropriate and effective. Therefore, early intervention group education programmes should be considered as a strategy for this client group.

**Key words:** Evaluation, health education, children, eating and mealtime behaviours, early intervention

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## Introduction

Problem eating and mealtime behaviours are common in children, with an estimated prevalence ranging from 20 to 41 per cent<sup>1-3</sup> leading to up to 35 per cent of referrals to outpatient paediatric and mental health clinics<sup>4</sup>. These behaviours are described as aversive behaviours related to eating and mealtimes<sup>5-7</sup> and may include: gagging, vomiting, inability to progress through developmentally appropriate food textures, spitting out of food, refusal or inability to chew foods, and refusal or reluctance to try new foods, refusal to come to or to stay seated at the table, whining or crying, fighting with siblings during mealtime, and throwing food. Children with problem eating and mealtime behaviours will often exhibit more than one of the above behaviours.

Children who have maladaptive patterns of eating and mealtime behaviours are at risk of developing both short and long-term health related concerns<sup>8</sup>. These health related concerns range from mild nutritional imbalances and constipation<sup>9</sup> to more serious long-term health related concerns such as iron deficiency anaemia<sup>9-11</sup>, failure to thrive<sup>12</sup>, malabsorption, heart disease<sup>13</sup>, deficits in intelligence and aversive behaviours persisting into and beyond adolescence<sup>14</sup>. Children and adults with these conditions have the potential to make significant demands on all levels (primary, secondary and tertiary) of the health care system.

Parents have the major influence in shaping their young children's attitudes to food and types of food consumed<sup>15</sup>. Parents of children who are experiencing feeding difficulties have been reported to have inaccurate beliefs about nutrition, or poor knowledge of nutritional requirements<sup>5</sup>. In addition problem eating and mealtime behaviours are cited as significant parental stressors<sup>16</sup>.

Educational strategies aim to provide parents with information so that they may increase control over the health of their children by building their capacity to make and act upon informed choices for healthy living<sup>17</sup>. Nutrition educators have long recognised the need to focus on parents in the nutrition education of their children<sup>18</sup>. The goal of education is to support parents as they promote their child's development and mastery of new skills. This is achieved by providing parents with knowledge and child-rearing skills, enabling them to mediate or extend intervention with their child<sup>19,20</sup>.

Treatment strategies for children's problem eating and mealtime behaviours include intensive long-term clinical secondary level interventions<sup>7,21</sup>, which often entail multidisciplinary teams<sup>7,22</sup>, providing services within the home<sup>12</sup> or clinical setting<sup>4,16</sup>. These services may be of an individual or group nature<sup>21,23</sup>. Treatment strategies also include long-term, outpatient or hospital tertiary intervention<sup>24</sup>.

When reviewing the published literature, no descriptions or evaluations of primary level, community-based, early intervention and prevention strategies for children's problem eating and mealtime behaviours were found. However, many commentators have supported the need for such strategies<sup>3,12,15,25</sup>.

The aim of this study was to evaluate the effectiveness of a single session parent

education programme in reducing eating and mealtime problems in children aged two to ten.

## Method

This quasi-experimental research study utilised a time series design to evaluate a multidisciplinary community based intervention (the *Fun not Fuss with Food* group programme). A quasi-experimental time series design consists of one experimental group and multiple observations before and after treatment<sup>26</sup>. In this study measurement of the dependent variables occurred at two points of time prior to the intervention and at two points of time after the intervention.

## Sample and setting

A convenience sample of 106 consenting parents were recruited for this study undertaken on the Gold Coast. The city is situated in southern Queensland and is the second largest local government area within Australia with an estimated resident population of over 430,000<sup>27</sup>.

Twelve *Fun not Fuss with Food* group programmes were conducted in community health venues in 2001. The target population was parents with children aged between two and ten years accessing the *Fun not Fuss with Food* group programme. Ethical approval was gained from the appropriate institutional ethics committees and all participants gave informed written consent.

## The intervention

The *Fun not Fuss with Food* group programme is a 'single session', two-and-one-half hour education programme that covers the main content areas of childhood nutrition and behavioural management strategies. There are three routes to access the group programme: referral from a treating doctor, referral from a child health nurse or self-referral by either parents or carers. As an early intervention initiative the *Fun not Fuss with Food* group programme is offered to any parent with a child who has an eating or mealtime problem or is at risk of developing a problem.

The programme has been developed utilising the principles of behavioural family intervention. Behavioural family intervention (BFI) based on social learning principles aims to teach parents strategies that increase positive interaction with children and reduce coercive and inconsistent parenting practices<sup>28</sup>. BFI programmes use procedures such as verbal instructions, role modelling, positive reinforcement and stimulus control techniques.

## Data collection

Data were collected using two questionnaires, the revised Children's Eating and Mealtime Behaviour Inventory (CEBI-R)<sup>29</sup> and the researcher-developed Family Background Questionnaire. The CEBI-R, a 19-item parent self-report questionnaire, was used to assess

children's eating and mealtime behaviours. Archer et al<sup>29</sup> found that the test-retest reliability coefficient for the total problem eating score was 0.87 and 0.84 for the percentage of items perceived to be a problem. Separate Cronbach alphas were calculated for the subscales. Due to the skip pattern employed in the CEBI-R to adjust for single parents and families with one child, separate alpha coefficients were determined and all were above 0.70 except for the single parent with more than one child group, which was markedly lower at 0.58.

The CEBI-R was administered one month before, on the day of, one week following and one month following the intervention. The Family Background Questionnaire was a 19 item demographic survey and was administered at the same time as the first administration of the CEBI-R.

### **Data analysis**

Data gathered from the Family Background Questionnaire and CEBI-R were entered into the Statistical Package for Social Sciences (SPSS) Version 10.0. Descriptive analyses using visual and numerical summaries and measures of central tendency were performed on the demographic data to describe the sample characteristics. Inferential statistics including t-tests, repeated measures ANOVA and chi-square were used to test the research hypotheses that focused on an improvement in children's eating and mealtime behaviours following the intervention.

## **Results**

### **Demographic characteristics**

One hundred and six participants enrolled in the study and completed pre-questionnaires one month before the intervention. Of these, 80 attended the *Fun not Fuss with Food* group programme and 75 completed all four data collection points. A total of 31 (29 per cent) parents completed questionnaires and consent form prior to the intervention, but did not complete the post-tests and were subsequently removed from the study. All noncompleters were sent a total of two reminder notes encouraging completion of the CEBI-R. A comparison of the characteristics of those who both enrolled and completed the study with those who enrolled but did not complete the study revealed no significant differences in the demographic profiles between the two groups. The demographic profile of the sample is provided in *Table 1*.

### **CEBI-R tool**

The CEBI-R is a 19-item parent-report instrument that measures three constructs: maternal attitudes and feelings, child behavioural compliance and manual/oral motor development<sup>29</sup>. The CEBI-R includes two weighted scoring systems related to the 19 items. The first scoring system produces a total problem eating score which identifies the level of the child's problem eating and mealtime behaviours. The second scoring

**TABLE 1** Demographic characteristics of participants

Characteristic		Per cent (n=75)
Gender of child	Female	45.3
	Male	54.7
Age of child	≤ 5 years	84.7
	6 years and over (7,8)	13.2
Marital status of the attending parent	Married/Defacto	82.7
	Other (Single; divorced; widowed; separated)	16.0
	Did not respond	1.3
Country of birth of the parent	Australia	78.7
	Other (New Zealand; United Kingdom; Europe; Philippines)	21.3
Language most often spoken at home	English	98.7
	Other (Filipino; Greek)	1.3
Education level of the participating parent	≤ Year 12	44.1
	Other (TAFE, University)	54.6
	Did not respond	1.3
Participating parent employed in paid workforce	Yes	45.3
	No	53.3
	Did not respond	1.3
Participating parent's hours in paid employment per week	≤ 20 hours or less	25.4
	More than 20 hours	20.0
	Not in paid employment	53.3
	Did not respond	1.3
Total income	≤ \$30,000	32.0
	≥ \$30,001	68.0

system produces a total parent problem score which measures the degree to which the child's behaviour is perceived to be a problem to the parent.

The total problem eating score is obtained by adding the scores of each of the 19 items (with five being the highest score for each item). The greater the total score (range 15–95) the worse the eating and mealtime problem. If the total problem eating score derived from the CEBI-R is 41 or above, the child may have a significant eating and/or mealtime behaviour which might require clinical intervention. Therefore if the score is 41 or greater it is referred to as a clinical score<sup>29</sup>.

The 'total parent problem score' measures the degree to which the child's behaviour is perceived to be a problem to the parent. It is calculated by adding the numbers of 'Yes' responses to the question 'Is this a problem for you?' The greater the number of 'Yes'

responses indicates a high total parent problem score. The lower the number of 'Yes' responses indicates a low total parent problem score.

### **Changes in CEBI-R values – pre-intervention**

A series of paired samples t-tests were conducted to determine if there was a change over time prior to the intervention in terms of total problem eating CEBI-R values, mean subsection CEBI-R values (that is, maternal attitudes and feelings towards mealtimes, behavioural compliance, and manual/oral motor development) and mean parent problem CEBI-R scores.

The differences between pre-intervention mean total problem eating CEBI-R values, mean CEBI-R values within the related subsections and total problem scores, did not reach statistical significance. This indicates that there was no change over the one-month period before the intervention.

Chi-square test for independence was used to determine if the proportion of children with clinical scores was significantly different over time without intervention. Pre-intervention clinical scores decreased slightly over time. Time 1 (73 per cent;  $n=55$ ) and Time 2 (67 per cent;  $n=50$ ) Chi-square = 18.8;  $df = 1$ ;  $p < 0.0001$ . Thus, there was a statistically significant difference between the percentages of participants with clinical scores from Time 1 to Time 2.

### **Changes in CEBI-R values pre- and post-intervention**

Participants reported an overall decrease in mean total problem eating CEBI-R values, the subsections of maternal attitudes and feelings, child behaviour compliance, and manual/oral motor development over the four data collection points (*Figure 1*).

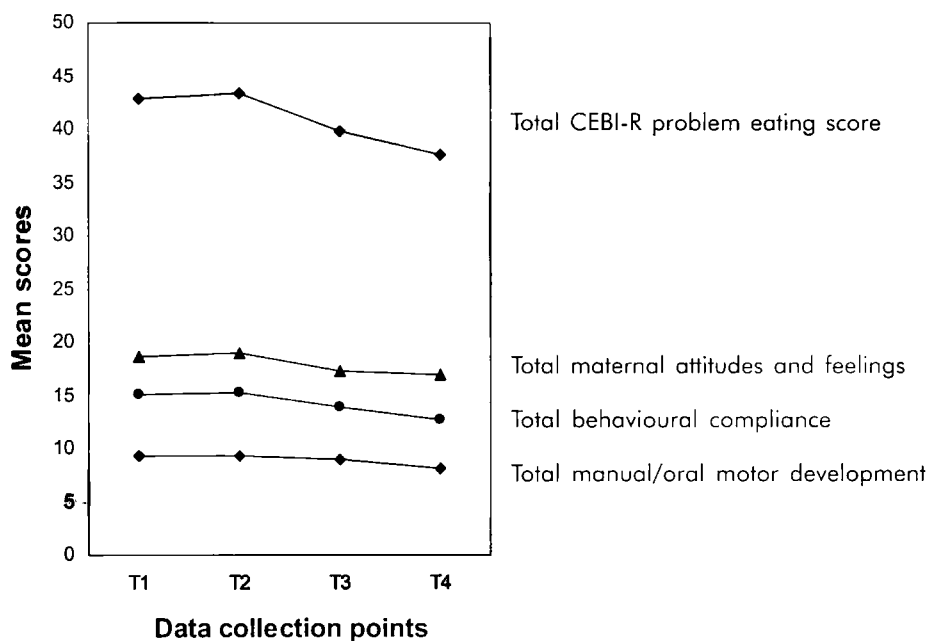
One-way repeated measures ANOVA compared mean total problem eating CEBI-R values and each of the mean subsection values at Time 1, Time 2, Time 3, and Time 4. For the total score and all the subsection scores there was a significant effect for time with a large to moderate effect size. Total score = Wilks' Lambda = .36,  $F(3, 72) = 42.56$ ,  $p < 0.0001$ , multivariate eta squared = .64; Maternal attitudes and feelings = Wilks' Lambda = .50,  $F(3, 72) = 23.9$ ,  $p < .0005$ , multivariate eta squared = .499; Behavioural compliance = Wilks' Lambda = .59,  $F(3, 72) = 16.6$ ,  $p < .0005$ , multivariate eta squared = .409; Manual/oral motor development = Wilks' Lambda = .70,  $F(3, 72) = 10.3$ ,  $p < .0005$ , multivariate eta squared = .299.

### **Changes in clinical scores and total problem scores**

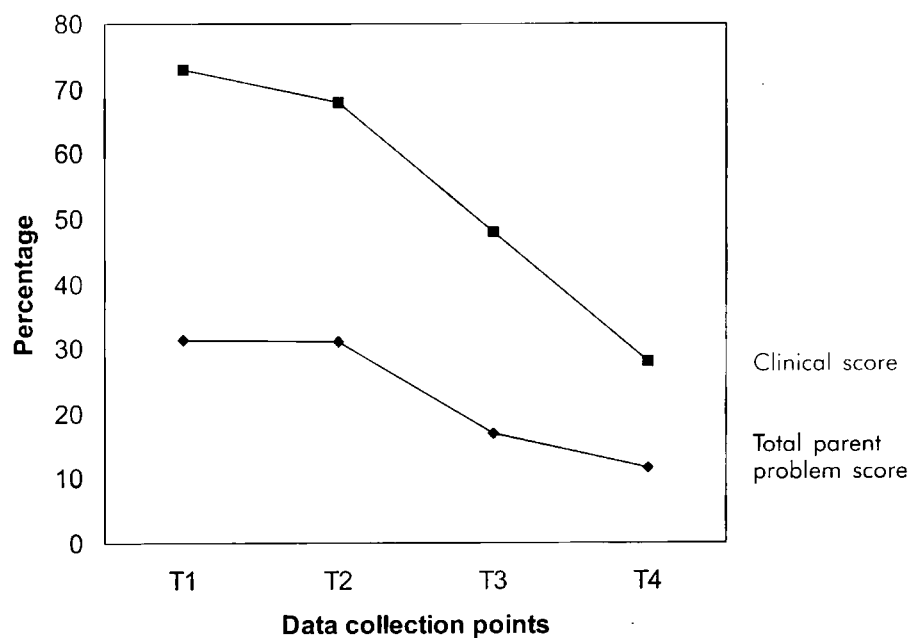
The percentage of participants who reported clinical scores (scores  $\geq 41$ ) decreased over the four data collection points and the mean total problem score also decreased over the four data collection points (*Figure 2*).

Chi-Square test for independence was conducted to explore the relationships between those participants who recorded clinical scores over two data collection points. There is a significant difference between the percentages of participants with clinical

**FIGURE 1** Mean total CEBI-R and subsection CEBI-R values across four data collection points



**FIGURE 2** Changes in percentages of clinical scores and total problem scores over four data collection points





scores from Time 1 (73 per cent;  $n=55$ ) to Time 4 (28 per cent;  $n=21$ ), (Chi-square = 8.7;  $df = 1$ ;  $p=0.003$ ). The results indicate that the percentage of children who recorded clinical eating and mealtime behaviours decreased as a result of the *Fun not Fuss with Food* group programme and continued to improve over time, with 28 per cent of all the study participants recording clinical scores one month after intervention compared to 73 per cent prior to intervention.

A one-way repeated measures ANOVA was conducted to determine if there was a difference in mean total parent problem scores across the four data collection points. The one-way repeated measures ANOVA compared mean parent problem scores at Time 1, Time 2, Time 3, and Time 4. There was a significant effect for time, Wilks' Lambda = .35,  $F(3, 72) = 45.3$ ,  $p<0.0001$ , multivariate eta squared = .654. These results reflect a very large effect post-intervention.

### ***The relationship between demographic variables and changes with mean CEBI-R values***

Repeated measures ANOVA was used to determine if there was a relationship between demographic variables as co-variables and changes in mean CEBI-R values over time. A comparison of participants' demographic variables was made with mean CEBI-R values at Time 2, Time 3, and Time 4. The differences between demographic variables and changes in mean total problem eating CEBI-R values over time did not reach statistical significance.

## **Discussion**

The results of this study indicate that there was a significant improvement (with a large effect size) in children's problem eating and mealtime behaviours following parental attendance at the *Fun not Fuss with Food* group programme. In addition, there was a significant decrease (with a large effect size) in parental concerns regarding their child's problem eating and mealtime behaviours.

Findings from previous case report studies<sup>4,16,21,22,30</sup>, a community nursing intervention descriptive study<sup>12</sup>, a controlled treatment study<sup>7</sup>, and intensive secondary level intervention<sup>4,16</sup> are consistent with the findings of the present study, that children's problem eating and mealtime behaviours improve following intervention. The results of these previous studies were achieved following intensive therapeutic interventions with children who had significant problem eating and mealtime behaviours. This current study provides evidence for the utilisation of a 'single session' group education programme.

Within the construct of behavioural compliance, the current study demonstrated significant improvement (with large effect size) in children's problem eating and mealtime behaviours. The results of the present study build on findings of the previous research<sup>4,7,16,21,22,30</sup> by quantifying the improvements in behavioural compliance in relation to problem eating and mealtime behaviours. The current study also demonstrates the effectiveness of a group education programme as a medium for

providing parents with the knowledge and skills they require so that they may implement behavioural management strategies with their children.

Within the construct of maternal attitudes and feelings towards mealtimes, results of this study indicate that, as a result of parental attendance at the *Fun not Fuss with Food* group programme, there was a significant improvement (with a large effect size) in maternal attitudes and feelings towards their child's mealtimes. Although no studies have described the outcomes of intervention with children's problem eating and mealtime behaviours on maternal attitudes and feelings towards mealtimes, the literature substantiates the link between a child's problem eating and mealtime behaviours and the mother's attitudes and feelings<sup>6,31,32,33</sup>.

Within the construct of manual/oral motor development, results of the current study indicate that as a result of parental attendance at the *Fun not Fuss with Food* group programme there was an overall improvement in children's manual/oral motor development. This is consistent with other findings<sup>21,34</sup> that have identified that as a result of intervention (long term, intensive, one-to-one therapy) children's manual/oral motor development improved. Thus, the findings of the current study add to the body of evidence developed by<sup>21,34</sup> Linscheid et al<sup>34</sup> and Douglas and Harris<sup>21</sup> that have described the link between problem eating and mealtime behaviours and children's manual/oral motor development.

Group education programmes as a strategy for improving children's problem eating and mealtime behaviours have not been described in the literature. However, group education programmes that provide parents with behavioural management strategies that aim to improve children's behavioural problems are well documented, with results indicating improvements in children's behaviour<sup>35-39</sup>.

One of the strengths of the present study is its ability to demonstrate the effectiveness of this 'single session' group intervention programme in decreasing children's problem eating and mealtime behaviours and parental concerns. The findings of this study provide new evidence that single session, group education programmes can be effective in improving problem eating and mealtime behaviours. Following the group intervention programme, children's problem eating and mealtime behaviours improved rapidly (within one week) with a continued improvement over time (one month after the group programme). The results of this study support the efficacy of group intervention programmes, as a credible and effective strategy when working with families.

The study population was relatively heterogenous in nature and was similar in demographic profile to the population of the Gold Coast region. Parental participation in the group programme was not influenced by socioeconomic or demographic variables (for example, income, age of child, marital status, and so on). Neither was the effectiveness of the programme influenced by socioeconomic or demographic factors.

Findings of the current study suggest that there is no relationship between demographic variables and changes in mean CEBI-R values over time. Therefore, the

*Fun not Fuss with Food* group programme worked equally well for all participants regardless of socioeconomic background and participant characteristics. Archer and Streiner<sup>40</sup> in their study found that eating and mealtime problems are independent of demographic factors such as parental education, family size, marital status and the age of the child. However, a number of studies have identified that parent education programmes are most effective with parents who are relatively more educated, have positive attitudes to food choices and intakes, and are less stressed by their social and economic contexts<sup>19</sup>.

Other factors that have been reported to impact on programme outcomes are: maternal attitudes to food<sup>41–42</sup>, parental attitudes and behaviours surrounding eating<sup>43</sup>, and parental education levels<sup>44</sup>. The current study with its relatively heterogeneous population does not support these findings, rather, it appears that problem eating and mealtime behaviours may be more strongly correlated with parent–child interactional factors, rather than purely developmental factors in the child or sociodemographic characteristics of the family.

This study, although small in size, represents an opportunity for health educators to measure the impact of an intervention with families. Health educators are in a prime position to assist families to learn about and develop skills in managing their children's behaviour in a positive and reaffirming way. The current study provides evidence about the effectiveness of group approaches in addressing national and international health concerns, whereby a primary health care strategy (community based early intervention, prevention and education programme) was used to improve children's problem eating and mealtime behaviours.

Further research could extend the findings of this study in various ways. Firstly, the findings of this study identified that mothers with aversive feelings and anxieties regarding mealtimes were less likely to attend the group education programme and/or complete the data collection points. Further research that quantifies maternal depression and anxiety in combination with use of the CEBI-R may help to identify and clarify if there is a relationship between children's problem eating and mealtime behaviours and maternal depression and anxiety<sup>7</sup>. Also, further research would clarify if nonattendance at the *Fun not Fuss with Food* group programme has any relationship to maternal depression and anxiety, and maternal feelings and attitudes to mealtimes.

Maturation trends prior to intervention were identified as a limitation to the current study. A randomised control trial would identify if maturational changes over time decrease children's problem eating and mealtime behaviours. This would test whether threats to validity that have been identified within the current study (maturational changes, statistical regression effects and Hawthorne effect) have an impact on changes.

## Conclusion

Parents who attended the *Fun not Fuss with Food* group programme reported

improvements in their child's problem eating and mealtime behaviours. The results also showed that the group programme worked equally well for all participants regardless of socioeconomic background, marital status and other key demographic variables. The Children's Eating and Mealtime Behaviour Inventory (CEBI-R) that was used within this study to measure children's problem eating and mealtime behaviours, was an effective approach to measuring outcomes of the *Fun not Fuss with Food* group programme. Further larger scale research, with longer follow-up, would be useful to evaluate the effectiveness of the intervention in other settings.

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