

PARENTAL FEEDING PRACTICES, CHILD EATING BEHAVIORS, AND FOOD NEOPHOBIA IN PAKISTANI PRESCHOOLERS: A MEDIATED MODEL

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ABSTRACT

Food neophobia, which is a reluctance to consume something new that is new food, is a major obstacle in dietary diversity during childhood, with placing consequential impacts on various aspects of nutrition and long term health effects. The present study examines the relationships between parental feeding practices, eating behaviours in children and food neophobia in a sample of preschool-aged children living in Rawalpindi and Islamabad, Pakistan. Employing a quantitative, cross-sectional research design data were gathered from 380 mothers, using a set of instruments that have been proven to be valid, namely the Comprehensive Feeding Practices Questionnaire (CFPQ), the Child Eating Behaviour Questionnaire (CEBQ) as well as the Child Food Neophobia Scale (CFNS). Findings show that comprehensive feeding practices have a strong predictive influence on food neophobia (β was found to be 0.822, $p < 0.001$) as well as on child eating behaviours (β was found to be 0.590, $p < 0.001$). Moreover, child eating behaviour mediates to some extent between parental feeding practices and food neophobia. Cultural, socioeconomic and demographic variables were seen to modify these relationships, hence reinforcing the need for culturally sensitive intervention strategies that stimulate responsive feeding practices that protect autonomy. The outcomes highlight the reciprocal property of parent - child interaction regarding the development of food-related attitudes and behaviours.

Keywords: Food neophobia, Child eating behaviour, parental feeding practices, Preschoolers, Pakistan, CFPQ, CEBQ.

1. Introduction

As long as early childhood represents an important time in which to create sustained dietary habits. Exposure to different foods during this period of development develops food preferences as well as nutritional status (Birch & Marlin, 1982). Nonetheless, the reluctance to eat novel foods, in contrast, is referred to as food neophobia, which limits dietary diversity, which in turn, is an obstacle

to the achievement of balanced nutrition (Pliner & Hobden, 1992). Children who show food neophobia are likely to suffer from nutrient deficiency and are less likely to eat vegetables, fruits and other food that promote health (Dovey et al., 2008).

Feeding practices by parents are a major determinant in the development of children's eating behaviors. Although responsive and model-based

feeding encourages the child to explore healthy diets, restrictive or coercive feeding may actually contribute to the reinforcement of food neophobia (Cooke et al., 2006). These dynamics are further moderated by socioeconomic status (SES), maternal education and cultural context to highlight the need to examine these factors in settings with particular examples of Pakistan, where there may be entrenched social family structures and existing dietary habits which will limit their exposure to other foods (Howard et al., 2012).

Although these factors have been well recognized as important, research that examines the relationship between parental feeding practices, child eating behaviors, and food neophobia in the Pakistani context is still lacking. The current study is aimed to fill this gap in the research by focusing on both direct and indirect associations among these constructs using validated and culturally adapted tools.

1.1 Objectives, Research Questions, and Hypotheses

The major goals of the current study were to (1) analyze the association between parental feeding practices and food neophobia in children aged three to six years, (2) analyze the role of children's eating behaviors as a mediator in the association, and (3) examine the effect of the socio-demographic and cultural factors on parental feeding practices and children's food acceptance. In accordance with these objectives, the research questions that were addressed in this study are the following: (1) What are the associations of parental feeding practices with food neophobia in children? (2) Do children's eating behaviors mediate the relationship of feeding practices and food neophobia? (3) Does socio-demographic factors such as maternal education, family structure and socio-economic status affect feeding practices and diet practices of children? Correspondingly, the following hypotheses were

proposed in the present study: H1 Positive parental modelling of healthy eating behaviors is associated with reduced levels of food neophobia in children. H2: Increased availability of healthy foods at home is balanced with reduced levels of food neophobia among children. H3: Children eating behaviors mediate the relationship between parental feeding practices and food neophobia. These objectives, research questions and hypotheses helped in designing, data collection and analysis for the study in order to give a holistic picture about interactions between parental practices, children's eating behaviors and food neophobia, within the cultural context of Pakistan.

2. Literature Review

2.1 Food Neophobia in Childhood

Food neophobia refers to the child's avoidance of new foods and is very much linked to picky eating but they are still conceptually separate (Dovey et al., 2008). Early exposure to a wide range of foods can help overcome any neophobic tendencies whereas restrictive feeding practices or pressure-based strategies can even make avoidance behaviors worse (Musher-Eizenman & Holub, 2007).

2.2 Parental Feeding Practices

Feeding practices refer to parenting strategies that determine the choice, time, and amount of children's food consumption (Costa & Oliveira, 2023). Modelling, involvement and encouragement of balance helps foster and context of positive dietary experiences; whereas pressure to eat or restrictive food practises are associated with negative affective response and increased food neophobia (Birch & Marlin, 1982; Cooke et al., 2006).

2.3 Child Eating Behaviors

Child eating behaviors include investigation approaches such as enjoyment of food and responsiveness to food cues, and avoidance patterns such as satiety responsiveness and food fussiness.

These behavioral tendencies are influenced by temperament, parental practices, and the overall emotional environment, and in turn influence the tendency of children to eat anything new.

2.4 Cultural and Socioeconomic Influences

In collectivist cultures like Pakistan, traditional eating patterns and family-centred meals limit the child's exposure to novel foods thus adding to the already high prevalence of food neophobia (Howard et al., 2012). Socioeconomic status and maternal education also play a role in feeding practices. Tailored toward the highly educated mothers, positive, autonomy supportive feeding practices are more common among infancy, while the lower the socioeconomic standing of the families, the more frequent the use of coercive or restrictive feeding strategies, which of course, are presumed to be related to resource constraints (Ramos, 2023).

2.5 Conceptual Model

The conceptual model describes the interrelationships between the feeding practices of parents, children's eating behavior, and food neophobia. Parental feeding practices-as modeling, monitoring, restriction and encouragement as the means of balanced eating-are conceptualized as independent variables that have a direct influence on children's propensity for food neophobia. Children's eating behaviors, i.e., food responsiveness, emotional overeating, food fussiness, and satiety responsiveness, are mediators of food neophobia in this, plausibility, relational model, and may attenuate or moderate the direct effect of parental practices on food neophobia. The model further includes socio-demographic and cultural variables such as maternal education, socioeconomic status, family structure, and culturally embedded practices and beliefs related to food as contextual variables that could influence how parents approach food issues as well as how

children eat. This framework has a two-way perspective, focusing on the importance of child reactions to food to guide parental strategies and, at the same time, parental feeding behaviours influence attitudes and acceptance of new foods in children. By combining these variables, the conceptual model provides a structured perspective in which hypotheses can be tested and contributing mechanisms further elaborated (hypothesized to explain why and how each of the conceptual variables contributes to food neophobia amongst children in the cultural context of Pakistan).

3. Methodology

3.1 Research Design

The current study used a quantitative and cross section survey approach to examine interrelationship among parental feeding practices, children eating behaviors and food neophobia among 3-6 years old children living in Rawalpindi and Islamabad. Standardized and cultural instruments, the CFPQ, CEBQ and CFNS were used to collect data. This approach to methodology made possible the analysis of correlation and mediation effects at a single time point, which in turn provided the insights on how parental feeding strategies may influence radiant children's eating behaviors and attitudinal response to novel foods in the Pakistani context.

3.2 Participants and Setting

The present study focused on the mothers of children, age 3 to 6 years, living in Rawalpindi and Islamabad, Pakistan. Purposive sampling was used to recruit the participants from the schools and from public parks, such as F - 9 park and Ayub Park, and altogether 380 mothers were recruited. Eligibility criteria was that participants must have at least one child in the specified age range, living with that child, have no diagnosed neurodevelopmental disorder, and must have no less than a matriculation

level of education to be able to understand the information and complete the questionnaire without the help of others. Children who were outside of the 3-6 age range, those with neurodevelopmental disorders, mothers with less than matriculation education and children from single parent homes or those that had experienced parental loss were excluded. The sampling strategy therefore produced a sample representative to observe relationships among parental feeding practices, child eating behaviours and food neophobia.

3.3 Measures

(1). Child Food Neophobia Scale (CFNS) consists of 6 items, which is parent-reported (Pliner, 1994), with a higher score being interpreted to indicate higher levels of neophobia. (2). The Comprehensive Feeding Practices Questionnaire (CFPQ) is a 49-item instrument that aims at measuring 12 different domains of parental feeding practices (Mellbye et al., 2011). (3). The Child Eating Behavior Questionnaire (CEBQ) contains 35 items and measures food approach and food avoidance behaviors related constructs (Wardle et al., 2001).

3.4 Inclusion and Exclusion Criteria

Participants included mothers of children ranging from 3-6 years of age who lived in Rawalpindi and Islamabad (1). The inclusion criteria included the children living with their parents, no diagnosed neurodevelopmental disorders, and the mothers having at least matriculation level education to be able to comprehend and complete the questionnaires on their own. Participation was on the basis of voluntary consent (2). Exclusion criteria included children outside the 3-6 year age range, children who were suffering from confirmed neurodevelopmental disorders, children from single-parent families or who had lost one or both

parents and mothers with below matriculated education. These criteria were established in order to obtain a homogenous and appropriate sample for an accurate evaluation of the correlation with the parental feeding practices, child eating behaviors and food neophobia.

3.5 Procedure and Ethical Considerations

Data were gathered by using a survey based approach to mother of children between the ages of 3-6 years, living in Rawalpindi and Islamabad. Prior to taking part, the purpose of the study was explained and informed consent was obtained, thus ensuring that the participants would have full knowledge of their voluntary participation, the confidentiality of their responses and their right to drop out at any time. Standardized questionnaires, such as Child Food Preference Questionnaire (CFPQ), Children's Eating Behavior Questionnaire (CEBQ) and Child Feeding Style Measure (CFNS), were used and finally completed form instruments were collected for analytical purpose. Ethical safeguards included anonymity of answers of subjects, secure data storage, minimization of any psychological distress, and avoiding stigmatizing language. Participants were treated respectfully and issued key guides or referrals in the event that participation generated any concerns, thereby ensuring that there were stringent ethical standards in every facet of the study.

3.6 Data Analysis

Data were analyzed by using the Statistical Package for Social Science (SPSS). Descriptive statistics were used to describe the sample whereas correlation, regression and mediated analyses were applied to test the hypotheses. The mediation analysis examined the meditational effect of children's eating behavior on the link between feeding practices and food neophobia.

4. Results

4.1 Psychometric Properties

Questionnaire	Number of Items	Cronbach's Alpha
Comprehensive Feeding Practice Questionnaire	6	0.819
Comprehensive Feeding Practice Questionnaire	49	0.709
Child Eating Behavior Questionnaire (CEBQ)	35	0.772

All instruments demonstrated acceptable internal consistency, supporting reliability in the Pakistani context.

4.2 Demographics characteristics of Sample

Variable	Category	Frequency	Percent	Valid Percent	Cumulative Percent
Child Age	4	4	1.0	1.0	1.0
	3 and above	130	33.9	33.9	34.9
	4 and above	144	37.5	37.5	72.4
	5 and above	106	27.6	27.6	100.0
Child Gender	Other	5	1.3	1.3	1.3
	Female	215	56.0	56.0	57.3
	Male	164	42.7	42.7	100.0
Mother Age	4	4	1.0	1.0	1.0
	25 - 30	128	33.3	33.3	34.4
	30 - 35	174	45.3	45.3	79.7
	35 - 40	78	20.3	20.3	100.0
Mother Education	Other	4	1.0	1.0	1.0
	Graduate	176	45.8	45.8	46.9

	Intermediate	90	23.4	23.4	70.3
	Master	76	19.8	19.8	90.1
	Matric	38	9.9	9.9	100.0
Family Structure	Other	4	1.0	1.0	1.0
	Joint	108	28.1	28.1	29.2
	Nuclear	272	70.8	70.8	100.0
Socio-Economic Status	Other	4	1.0	1.0	1.0
	Lower	4	1.0	1.0	2.1
	Middle	334	87.0	87.0	89.1
	Upper	42	10.9	10.9	100.0

The basic demographic profile of the sample shows various features. In the case of Child Age, the majority of children are of 4 and above (37.5%), then 3 and above (33.9%), and 5 and above (27.6%). A mere 1.0 percent of children are in the youngest category of children (4 years). With respect to the Gender of children, majority are female (56.0%), and the males are 42.7% and the rest (1.3) make up the small percentage (Other). In the case of Mother Age, the highest age bracket is 30-35 years (45.3%), 25-30 years (33.3%) and 35-40 years (20.3%). The level of education of Mother is with the highest percentage of the graduate education (45.8%), followed by the intermediate education (23.4%),

and the master education (19.8%), and finally, the number of mothers who have the matriculation level is 9.9% and the percentage of those with other level is 1.0%. Speaking of Family Structure, the largest segment (70.8%), is taken by nuclear families with 28.1 percent of people living in joint families and a minor group (1.0 percent) residing in the Other category. In the case of Socio-Economic Status, majority of the families are the middle ones (87.0% and 10.9% respectively of the upper and lower-class groups respectively). In general, the sample is typified by a wide age range of children, mostly females, 30-35 years old mothers, graduate level, and most of middle-class and nuclear families.

4.3 Descriptive Statistics of Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Comprehensive Feeding	336	73.00	128.00	87.7381	7.97551
Childfoodneophobia	316	128.00	189.00	155.1582	8.48792
Child Eating Behavior Questionnaire (CEBQ)	346	69.00	167.00	100.7919	11.53659

Valid N (list wise)	290				
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The descriptive statistics provide an overview of the sample across three key variables. In the case of Comprehensive Feeding, the size of the sample is 336, a range of 73.00 -128.00, a mean of 87.7381, and a standard deviation of 7.97551 indicating the moderate variability of practices in feeding. The scores of Child Food Neophobia are whose calculations are conducted on 316 valid responses having a range of 128.00 to 189.00, a mean of 155.1582 and a standard deviation of 8.48792

indicating the relatively similar level of food neophobia in children. The sample size of Child Eating Behavior Questionnaire (CEBQ) (n=346) indicates the most widespread range of scores, 69.00-167.00), mean=100.7919, standard deviation=11.53659 which can be explained as the presence of a large range of eating behaviors. A total number of 290 individuals gave full information on all the variables and this would guarantee a highly effective dataset to be analyzed.

4.4 Correlations *between Comprehensive Feeding, Child Food Neophobia, and CEBQ Scores*

Variable	1	2	3
1. Comprehensive Feeding	—	.822**	.590**
2. Child Food Neophobia	.822**	—	.619**
3. Child Eating Behaviour Questionnaire (CEBQ)	.590**	.619**	—

Note. N = varies due to missing data: Comprehensive Feeding (N = 336), Child Food Neophobia (N = 316), CEBQ (N = 346).

$p < .01$ (2-tailed). Pearson correlations are shown. ** indicates significance at the 0.01 level.

$p < .01$; all correlations significant. Higher parental control was associated with greater child food neophobia.

The data obtained from the analysis of correlations indicates positive and statistically significant coefficients for the studied variables. In the present study, Comprehensive Feeding and Child Food Neophobia have positive correlation ($r = 0.822$, $p < .001$) which suggests that children who have more Comprehensive Feeding also have higher level of food neophobia. The same is true for moderate positive correlation with the Child Eating Behaviour Questionnaire (CEBQ) where increased

Comprehensive Feeding is positively associated with higher scores on the CEBQ ($r = 0.590$; $p < .001$). Also, Child Food Neophobia and the CEBQ have a positive, significant relationship of moderate strength ($r = 0.619$, $p < .001$) indicating that subjects with higher food neophobia scores are likely to have higher eating behavior scores. All coefficients are significant at $p < .001$ level, which emphasizes significant associations of the variables and the central position of Comprehensive Feeding.

Table 4.5: Comprehensive Feeding and Child food neophobia

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.822 ^a	.675	.674	4.84680

a. Predictors: (Constant), Comprehensive Feeding

The model summary shows a strong positive relationship between Comprehensive Feeding and the dependent variable, with an R value of 0.822. The R Square (0.675) indicates that 67.5% of the

variance in the dependent variable is explained by Comprehensive Feeding, demonstrating the model's substantial predictive power. The Adjusted R Square (0.674) confirms the stability of the model.

Coefficients^a

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Beta	Std. Error	
1 (Constant)	55.717		3.904	14.273 .000
Comprehensive Feeding	1.144	.822	.045	25.535 .000

a. Dependent Variable: Child food neophobia

The coefficients indicate that Comprehensive Feeding significantly predicts Child Food Neophobia (p < .001). For every one-unit increase in Comprehensive Feeding, Child Food Neophobia increases by 1.144 points. The strong standardized coefficient (Beta = 0.822) highlights a robust positive relationship.

4.6: Comprehensive Feeding and Child Eating Behavior
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.590 ^a	.348	.345	7.60233

a. Predictors: (Constant), Comprehensive Feeding

Coefficients^a

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Beta	Std. Error	
1 (Constant)	40.179		4.720	8.513 .000
Comprehensive Feeding	.683	.590	.053	12.766 .000

a. Dependent Variable: scale

The model explains 34.8% of the variance in the dependent variable ($R^2 = 0.348$) with a moderate relationship ($R = 0.590$). The unstandardized coefficient ($B = 0.683$) indicates that for every one-unit increase in Comprehensive Feeding, the dependent variable increases by 0.683 units. The

standardized coefficient ($Beta = 0.590$) reflects a moderate positive effect. The significant t-value ($t = 12.766$, $p < .001$) confirms that Comprehensive Feeding is a strong and statistically significant predictor of the dependent variable.



4.7: Mediating role of Child Eating Behavior

Model Summary

Model	R	R Square	Adjusted R	Std. Error of Square
1	.629 ^a	.395	.391	6.96334

a. Predictors: (Constant), CHILDFOODNEOPHOBIA, Comprehensive Feeding Coefficients^a

Model Unstandardized Coefficients Standardized t Sig.
Coefficients

	B	Std. Error	Beta		
1 (Constant)	-.136	7.652		-.018	.986
Comprehensive Feeding	.301	.125	.206	2.421	.016
CHILDFOODNEOPHOBIA	.474	.090	.446	5.245	.000

a. Dependent Variable: Child Eating Behavior

The mediation analysis demonstrates that Child Eating Behavior serves as a partial mediator in the relationship between Comprehensive Feeding and Child Food Neophobia. The model explains 39.5% of the variance in Child Eating Behavior ($R^2 = 0.395$) with a moderate overall relationship ($R = 0.629$). Comprehensive Feeding significantly predicts Child Eating Behavior ($B = 0.301$, $p = .016$), indicating a direct contribution to changes in Eating Behavior. Additionally, Child Food Neophobia significantly predicts Child Eating Behavior ($B = 0.474$, $p < .001$), highlighting its key role in this relationship. The significant effects of both predictors suggest that while Child Eating Behavior mediates the relationship, Comprehensive Feeding continues to exert a direct influence, confirming a partial mediation.

4.8 Regression Analyses

- CFPQ $\rightarrow$ CFNS: $\beta = 0.822$, $R^2 = 0.675$, $p < .001$
- CFPQ $\rightarrow$ CEBQ: $\beta = 0.590$, $R^2 = 0.348$, $p < .001$

- **Mediation (CFBQ $\rightarrow$ CFNS via CEBQ):** Partial mediation confirmed (CFPQ $\beta = 0.206$, $p = .016$; CFNS $\beta = 0.446$, $p < .001$; $R^2 = 0.395$)

5. Discussion

The present study identifies a solid and multifaceted association between parental feeding behavior, eating behavior of children and food neophobia. Analytic results reveal that comprehensive feeding practices was found a strong positive correlation with child food neophobia ($r = 0.822$, $p < 0.001$) implying that more controlling or restrictive feeding strategy is associated with increased food anxiety in offspring. In addition, a positive correlation was found with the comprehensive feeding practices, and it had a moderate value in both scales (Child Eating Behavior Questionnaire, CEBQ; $r = 0.590$; $p < 0.001$), indicating that these practices have also had an impact on the broad child eating behaviors, that is, both food responsiveness and fussiness are influenced. Regression analyses showed significant associations of overall feeding practices to food neophobia on one hand ($B = 1.144$, $p < 0.001$) and

child eating behavior on the other ($B=0.683$, $p<0.001$). Mediation analysis further showed that the feeding behavior in children was a partial mediator between parental feeding and food neophobia ($B = 0.301$, $p = 0.016$) supporting the idea of children's response to food as a partial determinant of the effects of parental procedures on food-related anxiety. These results highlight the two-way process feeding of parents-children in which shareholders restrictive feeding not only reinforces neophobia of food but also shapes dysfunctional food consumption habits that will in turn reinforce the parents controlling feeding practices. Furthermore, the study highlights the importance of socio-demographic and cultural variables as children from middle-class education and educated families have more positive eating behaviors, while children from lower socioeconomic status family have more tendency to use coercive or restrictive techniques and thereby worsen neophobia. Collectively, evidence concurs with previous published research which suggests that coercive feeding practices breed negative food experiences, whereas supports which respect autonomy encourage food sampling of novel foods. Consequently, the findings indicate the need for parent-focused interventions that are culturally responsive to promote responsive feeding and consider the child's temperament as it can encourage positive eating behaviors and reduce food neophobia in Pakistani preschoolers.

6. Conclusion

This study provides an in-depth analysis of the complex interaction among parental feeding practices, eating behavior of the children and food neophobia in the Pakistani preschoolers. The results show that restrictive and coercive feeding strategies significantly contribute to food neophobia, while strategies that promote autonomy and allow freedom of choice foster positive eating patterns and high food neophobia. Children's eating behaviors mediate part of the relationship between parental

feeding strategies and food neophobia with implications of bilateral parent-child feeding interactions. Socioeconomic status, maternal education and cultural norms have additional implications on feeding practices and dietary outcomes and therefore point to the need for contextually and culturally-oriented intervention strategies. To Rojas, to optimize eating problem prevention strategies, interventions that focus on parental education in terms of responsive feeding methodologies, modeling healthy dietary behavior choices, and encouraging children's active participation in food-related activities, such as meal preparation and selection. Community based initiatives and workshops can reinforce these strategies from offering culturally sensitive information on the curtailment of coercive practices and diet diversity. School based nutrition-based education, public healthcare campaigns and policies that focus on improving access to a variety of nutrient-dense foods can further strengthen these efforts. In summary, results of this study highlight the importance of a multilevel and systems approach to reducing food neophobia and fostering the intake of healthy eating patterns so that interventions are responsive to individual, family and cultural determinants and can consequently improve the long-term nutritional health and wellbeing of children.

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