

Food neophobia status in Ardabil children

Abstract

Background: Food neophobia means not accepting a new food, which seems to be a protective mechanism against new foods. The aim of this study was to assess the food neophobia status in Ardabil children.

Methods: The present study was a cross-sectional study to assess the situation of children's disgust at two to six years of age in households in Ardabil. A questionnaire relating to five main food groups was used to assess the type of food that was hated. A questionnaire containing four questions was completed to check the factors affecting food neophobia.

Results: The results of the study showed that 52.5% (95% confidence interval) of the children were suffering from food neophobia. The children in the study felt more disgusted about dairy products and vegetables. Parents have stated that their children refuse to eat fruit and vegetables.

Conclusion: More than half of the children were suffering from food neophobia and the socioeconomic status of parents, parental employment and the type of child feeding before the age of two were among the factors influencing the disgust of children in the study.

Keywords: food, neophobia, children, Ardabil

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Running title: food neophobia and children

Introduction

Food neophobia means not accepting a new food, which seems to be a protective mechanism against new foods [1]. The disgust with food up to 24 months of age is low.

As the baby gets older, the fear of new foods rises, and it reaches its peak between the ages of two and six, and then gradually diminishes to adulthood. Food preferences and dietary patterns develop in childhood [2,3]. Therefore, childhood is a golden time to form a healthy diet. The formation of poor food behaviors, such as the low levels of fruit and vegetable and dairy consumption in childhood, can lead to the formation of a dietary misconception in adulthood and can therefore be a risk factor for chronic diseases such as cardiovascular disease, and so on. Studies have shown that the fear of new foods occurs within the age range of 2–8 years and reaches its peak in the years 13–16 [4–6].

The baby's disgust for the main food groups, including dairy products, meat, vegetables and fruit and whole grains, can cause many problems, including lack of macronutrients, micronutrients and energy, which lead to problems such as malnutrition and childhood impairment. The complications of micronutrient and macronutrient deficiencies in childhood include short-sightedness and being underweight. Reducing the intake of meat products in children can reduce the intake of micronutrients such as iron, zinc and so on; iron deficiency in childhood leads to decreased memory, and retardation of the physical and mental development of the child [7–11].

The existence of the problem of food disgust in children and an increase in the prevalence of malnutrition and retardation of the physical and mental development of the child will increase the cost of healthcare for the country, increase the cost of education and increase the teaching and medical burden on families. On

the other hand, these physical and mental problems can in the future increase the number of adults with chronic diseases such as cardiovascular disease, hypertension and various types of cancers, along with diminishing community vitality, resulting in increased violence in society, reduced social capital and so on. Increasing the prevalence of obesity due to a poor diet can increase the prevalence of depression, which can also affect the depression of peers [12–18]. Studies have shown that factors such as parental dietary habits, parental education, parental income, food eaten by the family, baby food, mealtimes, parenting during meals, childhood relaxation, the eating habits of friends and peers of the child, location of the meals, appearance and cooking methods, smells and the taste of food can have an effect on the appearance of childish disgust. Some studies have suggested that genetic history can play a role in this problem [19–25]. As our review of the literature suggested there had not been any study conducted on food neophobia in Ardabil children, we carried out this study on children between two and six years of age in Ardabil Health Centres.

Methods

The present study was a cross-sectional study in order to assess the situation of children's disgust at two to six years of age in households in Ardabil. This project was implemented after approval and coordination with the health centres of this city and after obtaining cooperation and obtaining informed consent from the research units. Cluster sampling was carried out among children covered by 10 urban health centres (12 children from each centre) in Ardabil city (in the month of January 2012), who had previously not been referred to a nutrition expert within the relevant health centre to improve their nutritional status. The researcher determined the

exact date and time to complete the questionnaires, and after explaining the contents of the informed consent form, the questionnaire relating to personal characteristics and food disgust was completed for these children.

A questionnaire pertaining to five main food groups was used to assess the type of food that was hated. A questionnaire containing four questions was completed to examine the factors affecting food disgust. All questionnaires were completed via an in-person interview with the mother of the child. The collected data were analyzed using SPSS software version 23 using descriptive and inferential statistical methods.

Results

The pedigree information for children participating in this study is presented in Table 1. The results of the study showed that 52.5% (95% confidence interval) of children had food

Variable	mean±SD (%)
Age (years)	4.26±0.23
Sex	
Male	62 (52)
Female	58 (48)
Weight (kg)	19.16±4.36
Height (cm)	88.44±10.98
Mother's job	
Housewife	80 (67)
Employee	40 (33)
Child birth rank	
First	90 (75)
Second	20 (16.67)
Third and higher	10 (8.33)
Father's education	
Under Diploma - Diploma	10 (8.33)
Super Bachelor - Master's Degree	100 (83.34)
Master's Degree - Upward	10 (8.33)

Table 1 Demographic data for the participants in the study

neophobia. The results of the mean scores of food disgust and the types of foods that the children hated are presented in Table 2.

The children assessed had the most disgusting foods in the dairy group and the fruit and vegetable groups. Parents have stated that their children refuse to eat fruit and vegetables. According to parents, the most important factors were the odour of food and the appearance of the food among those factors influencing the choice of food for the child. There was a significant negative correlation between maternal education ($r=-0.15$) and maternal occupation ($r=-0.22$) with respect to the food disgust score ($p<0.05$) (Table 3).

Variable	Mean±standard deviation (%)
Disappointment score	32.22±2.26
Affecting factor frequency	
Taste of food	24 (20)
Smell of food	36 (30)
Food appearance	36 (30)
Food temperature	24 (20)
Food group frequency	
Meat	6 (5.02)
Fruit	23 (19.16)
Vegetables	24 (20)
Dairy	62 (51.66)
Cereals	5 (4.16)

Table 2 Status of food neophobia, the factors influencing it and the type of food group affected in the children studied

Variable	r	p*
Father's job	-0.32	0.021
Mother's job	-0.22	0.015
Maternal education	-0.15	0.031
Paternal education	-0.48	0.014
Breastfeeding	-0.58	0.015
* Based on the chi-square test		

Table 3 Correlation analysis between socioeconomic determinants within the family and food neophobia

Discussion

This study was conducted with the aim of investigating the status of food disgust among two- to six-year-old children in Ardabil for the first time. The results of the study showed that more than half of the children were suffering from food disgust. Among the food groups, dairy products and vegetables and fruit were the most disgusting foods for children. The results of this study showed that there is a negative relationship between the education and occupation of parents and food disgust in the children. Along with our study, a report by Gallo-way carried out on seven-year-old girls showed that the foods most despised by the girls were in the vegetable group^[26]. He pointed out in this study that there is a significant inverse relationship between parental work hours and girls' disgust. Studies^[27-30] have shown that there are many determinants of dietary patterns and dietary choices. One of these determinants is the socioeconomic status of individuals, which can be determined by factors such as the level of parental education, parental employment and family income, all of which reflect the home environment. The role of parenting education in children's dietary patterns has been discussed in many studies. The results of these studies have shown a positive relationship between the mother's education and healthier food choices. Parental employment increases family income and, as a result, increases access to healthier food, while mothers' employment, and in particular, their full-time employment, reduces the time spent on food and the probability of food being prepared in the home, which can cause a reduction in the access of children (both physically and mentally) to healthy food. Some reasons for the frustration with the vegetable group is that vegetables are harder and tougher, and they lack sweetness or a salty taste. Most children are keen on consuming high-fat

and sweet foods. It can therefore be said that the taste and hardness of vegetables are some of the reasons for disgust in childhood^[31-33].

Study limitations

The limitations of this study include the lack of observation of the status of children's disgust at child care centres or at home and the use of questionnaire data in the form of interviews with the mothers of children.

Conclusion

More than half of the children were suffering from food disgust, and the socioeconomic status of parents, parental employment and the type of child feeding before the age of two were among the factors influencing the disgust of children in the study.

References

1. Alley TR (2018) 9 - Conceptualization and measurement of human food neophobia. In: Reilly S (ed) Food Neophobia. Woodhead Publishing, pp 169-192
2. Al-Shawaf L, Lewis DMG, Alley TR, Buss DM (2015) Mating strategy, disgust, and food neophobia. *Appetite* 85:30-35
3. Damsbo-Svendsen M, Frøst MB, Olsen A (2017) Development of novel tools to measure food neophobia in children. *Appetite* 113:255-263
4. Damsbo-Svendsen M, Frøst MB, Olsen A (2017) A review of instruments developed to measure food neophobia. *Appetite* 113:358-367
5. De Andrade Previato HDR, Behrens JH (2017) Taste-related factors and food neophobia: Are they associated with nutritional status and teenagers' food choices? *Nutrition* 42:23-29
6. Dovey TM (2018) 16 - Avoidant/restrictive food intake disorder: An eating disorder on a spectrum with food neophobia. In: Reilly S (ed) Food Neophobia. Woodhead Publishing, pp 329-349
7. Elkins A, Zickgraf HF (2018) Picky eating and food neophobia: Resemblance and agreement in parent/young adult dyads. *Appetite* 126:36-42

8. Evans S, Daly A, Chahal S, Ashmore C, MacDonald J, MacDonald A (2018) The influence of parental food preference and neophobia on children with phenylketonuria (PKU). *Mol Genet Metab Rep* 14:10–14
9. Gomes AI, Barros L, Pereira AI, Roberto MS, Mendonça M (2018) Assessing children's willingness to try new foods: Validation of a Portuguese version of the child's food neophobia scale for parents of young children. *Food Qual Prefer* 63:151–158
10. Helland SH, Bere E, Bjørnarå HB, Øverby NC (2017) Food neophobia and its association with intake of fish and other selected foods in a Norwegian sample of toddlers: A cross-sectional study. *Appetite* 114:110–117
11. Jaeger SR, Rasmussen MA, Prescott J (2017) Relationships between food neophobia and food intake and preferences: Findings from a sample of New Zealand adults. *Appetite* 116:410–422
12. Kral TVE (2018) 14 - Food neophobia and its association with diet quality and weight status in children. In: Reilly S (ed) *Food Neophobia*. Woodhead Publishing, pp 287–303
13. La Barbera F, Verneau F, Amato M, Grunert K (2018) Understanding Westerners' disgust for the eating of insects: The role of food neophobia and implicit associations. *Food Qual Prefer* 64:120–125
14. Laureati M, Spinelli S, Monteleone E, Dinnella C, Prescott J, Cattaneo C et al (2018) Associations between food neophobia and responsiveness to "warning" chemosensory sensations in food products in a large population sample. *Food Qual Prefer* 68:113–124
15. Maiz E, Balluerka N (2016) Nutritional status and Mediterranean diet quality among Spanish children and adolescents with food neophobia. *Food Qual Prefer* 52:133–142
16. Maiz E, Balluerka N (2018) Trait anxiety and self-concept among children and adolescents with food neophobia. *Food Res Int* 105:1054–1059
17. Maratos FA, Sharpe EE (2018) 15 - The origins of disordered eating and childhood food neophobia: Applying an anxiety perspective. In: Reilly S (ed) *Food Neophobia*. Woodhead Publishing, pp 305–328
18. Maratos FA, Staples P (2015) Attentional biases towards familiar and unfamiliar foods in children. The role of food neophobia. *Appetite* 91:220–225
19. Moding KJ, Stifter CA (2016) Stability of food neophobia from infancy through early childhood. *Appetite* 97:72–78
20. Moding KJ, Stifter CA (2016) Temperamental approach/withdrawal and food neophobia in early childhood: Concurrent and longitudinal associations. *Appetite* 107:654–662
21. Modlinska K, Pisula W (2018) 1 - Social influences on food neophobia in nonhuman animals. In: Reilly S (ed) *Food Neophobia*. Woodhead Publishing, pp 3–24
22. Nicklaus S, Monnery-Patris S (2018) 13 - Food neophobia in children and its relationships with parental feeding practices/style. In: Reilly S (ed) *Food Neophobia*. Woodhead Publishing, pp 255–286
23. Proserpio C, Laureati M, Invitti C, Pagliarini E (2018) Reduced taste responsiveness and increased food neophobia characterize obese adults. *Food Qual Prefer* 63:73–79
24. Stafford LD, Tsang I, López B, Severini M, Iacomini S (2017) Autistic traits associated with food neophobia but not olfactory sensitivity. *Appetite* 116:584–588
25. Stratton LM, Vella MN, Sheeshka J, Duncan AM (2015) Food neophobia is related to factors associated with functional food consumption in older adults. *Food Qual Prefer* 41:133–140
26. Galloway AT, Lee Y, Birch LL (2003) Predictors and consequences of food neophobia and pickiness in young girls. *J Am Diet Assoc* 103:692–698
27. Rioux C, Lafraire J, Picard D (2017) The Child Food Rejection Scale: Development and validation of a new scale to assess food neophobia and pickiness among 2- to 7-year-old French children. *Revue Européenne de Psychologie Appliquée/Eur Rev Appl Psychol* 67:67–77
28. Ristic R, Johnson TE, Meiselman HL, Hoek AC, Bastian SEP (2016) Towards development of a Wine Neophobia Scale (WNS): Measuring consumer wine neophobia using an adaptation of The Food Neophobia Scale (FNS). *Food Qual Prefer* 49:161–167
29. Roßbach S, Foterek K, Schmidt I, Hilbig A, Alexy U (2016) Food neophobia in German adolescents: Determinants and association with dietary habits. *Appetite* 101:184–191
30. Schnettler B, Crisóstomo G, Sepúlveda J, Mora M, Lobos G, Miranda H et al (2013) Food neophobia, nanotechnology and satisfaction with life. *Appetite* 69:71–79
31. Schnettler B, Grunert KG, Miranda-Zapata E, Orellana L, Sepúlveda J, Lobos G et al (2017) Testing the Abbreviated Food Technology Neophobia Scale and its relation to satisfaction with food-related life in university students. *Food Res Int* 96:198–205
32. Siegrist M, Hartmann C, Keller C (2013) Antecedents of food neophobia and its association with eating behavior and food choices. *Food Qual Prefer* 30:293–298
33. Steinsbekk S, Bonneville-Roussy A, Fildes A, Llewellyn CH, Wichstrøm L (2017) Child and parent predictors of picky eating from preschool to school age. *Int J Behav Nutr Phys Act* 14:87