EATING PATTERN

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Submission date: 30-May-2023 08:11PM (UTC+0700)
Submission ID: 2105237775
File name: File230508141338230508141338050306027206.pdf (288.16K)
Word count: 2316
Character count: 11794

ORIGINAL RESEARCH

Journal of Dentomaxillofacial Science (*J Dentomaxillofac Sci*) December 2022, Volume 7, Number 3: 201-204
P-ISSN.2503-0817, E-ISSN.2503-0825

Association between eating pattern and food neophobia in children with Autism Spectrum Disorder (ASD): Parents' perceptions

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Abstract

Objective: To explain the correlation between cariogenic (high sugar diet) with Food Neophobia (FN) in Autism Spectrum Disorder (ASD) children.

Material and Methods: This type of research is analytically observational with a cross-sectional design. Sampling technique purposive sampling, number of samples 65 respondents of parents/caregivers in LRD community members of suar autism. Data collection with a questionnaire for five eating patterns and FN three questions in the form of a Google Form. The data were analyzed descriptively, and the spearman rank correlation test was used to analyze the difference between diet and FN.

Results: Children consume one to two spoons of sugar per day 95.4%; like sweet food 80%, sweet food between meals 80%; soft drinks 49.2%; non-sweet snacks 56.9%. Based on the category of the frequency distribution of neophobia food levels in children with ASD were light 32.31%, moderate 30.77%, and heavy 36.92%. Spearman rank correlation test r=0.06 p>0.05 was 0.36%.

Conclusion: This research shows that diet pattern has a very low association with FN in children with autism spectrum disease.

Keywords: Autism Spectrum Disorder (ASD), Diet, Food Neophobia (FN), Parents' perception
DOI: 10.15562/jdmfs.v7i3.1428

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Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by social communication deficits and restricted and repetitive behaviors, and it has been linked with feeding-related problems.[1] Epidemiological studies have revealed rapid growth in the prevalence of ASD in recent years, with a prevalence of four to five times more in boys than girls. The average prevalence of ASD in Asia, Europe, and North America is estimated at 1%.[2]

Many sufferers need the help of other people for life. Children with ASD are unique in their eating patterns and oral hygiene habits, resulting in impaired dental and oral health.[3] Some researchers argue that sufferers tend to experience food restrictions.[4] The prevalence of eating problems in these children ranged from 46% to 89%. The most common problems are limited food intake, refusal to eat certain foods, or being selective about food. Related to food neophobia, i.e., refusal to try new foods, sensory problems such as smell, texture, color, and temperature also contribute to this behavior and inflexibility toward using tools, brands, and packaging.[7]

Children with ASD that is frequently snacking twice a day or more and not brushing their teeth after eating snacks have increased dental caries.[8] Several studies have shown a significant relationship between a diet high in sugar and caries children's teeth.[9] The prevalence of dental caries in children with ASD is higher than that of normal children.[10] A systematic review and meta-analysis study of the prevalence of dental caries in children and adolescents is 60%. In Indonesia, a study conducted in Surabaya showed that the prevalence of dental caries in children with ASD is 78.6%.[8,11] Various studies have reported a relationship between the amount of sugar consumption and destructive, aggressive, restless, and hyperactive behavior in children with problems such as autism spectrum disorder. Besides, it also reported that a diet low in refined carbohydrates and free of sugar is effective in reducing children's hyperactivity. Foods that contain calcium and magnesium, such as vegetables, nuts, and seeds, can calm and improve behavior and concentration.[9]

Food Neophobia (FN) is a tendency to refuse or try unknown foods.[2] FN is a component of food selectivity caused by withdrawal syndrome or addiction to certain foods due to the non-optimal role of enzymes in digesting specific polypeptides such as gluten and casein.[13] Epidemiological studies of nutrition explain that diet describes the overall diet, such as food, variety of food, frequency, and quantity commonly consumed.[14] Diet in dentistry is considered an essential factor in maintaining

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Received 10 February 2022
Revised 25 April 2022
Accepted 8 November 2022
Available online 1 December 2022

Table 1. Dietary results for children with ASD

Dietary habit	Amount (n)	%
Frequency of Consuming sugar in a day		
a. More than two spoons per day	3	4.6
b. 1 to 2 spoons per day	62	95.4
Likes to eat sweet foods		
a. Yes	52	80.00
b. No	13	20.00
Frequency of consuming sweet foods between meals		
a. Yes	52	80.00
b. No	13	20.00
Frequency of how many times a child consumes soft drinks		
a. Never	30	46.2
b. Sometimes	32	49.2
c. Once a day	3	4.6
d. Twice a day	0	0.0
e. Three times a day or more	0	0.0
f. Do not know	0	0.0
Eat non-sweet snacks per day		
a. Never	6	9.2
b. Sometimes	37	56.9
c. Once a day	12	18.5
d. Twice a day/ Three times a day or more	7	10.7
e. Do not know	3	4.6

Table 2. Frequency distribution of dietary levels in children with ASD

Diet Levels	Amount (n)	%
Mild	3	4.62
Moderate	55	84.62
Severe	7	10.77
Total	65	100.0

Table 3. Frequency distribution of neophobia food levels in children with ASD

Level of Food	Amount (n)	%
Mild	21	32.31
Moderate	20	30.77
Severe	24	36.92
Total	65	100.0

good dental and oral health.[9] Foods consumed most often by sufferers are rice, potatoes, beans, and soup containing instant pasta. Mothers also mentioned that children consumed a wide variety of cookies, soft rolls filled with cheese, processed meats or hamburgers, sausages, bacon, butter, soft drinks, pizza, popcorn, french fries, ice cream, creamy yogurt, and chocolate. The relationship between eating a high-sugar diet and FN is perilously understood, especially for children with autism spectrum disorder. Apart from being at risk of developing dental caries, it also triggers changes in hyperactive behavior.

Material and Methods

The type of research used was an analytic observational study. The design used in this study was a cross-sectional study chosen based on the inclusion and exclusion criteria set for the study. The study population was parents or caregivers of children with ASD who are members of the "LRD suar autism community" with 78 active members. Determination of the number of samples using the slovin formula, in order to obtain 65 samples. The sample that agreed then filled out informed consent and a questionnaire using the Google Form.

The questionnaire has been validated and tested for reliability.[5,9] This questionnaire contains five questions about cariogenic eating patterns and three about FN based on Wallace et al.[1] The research data were then analyzed descriptively and divided into three categories mild, moderate, and severe. Then the data were analyzed using the rank spearman correlation test to see the relationship between eating patterns and FN.

The study's results Table 1 showed that 95.4% of ASD children consumed 1 to 2 tablespoons of sugar per day. Research conducted by Kotha et al.[5] stated that children who consumed more than two spoons of sugar per day had a higher dmft value (dmft = 5.5) compared to children who consumed less than two spoons per day (dmft = 1.42).[5] As many as 80% of children like sweet foods, according to Murshid's.[9] research which shows that children like lots of foods high in sugar, such as chocolate, candy, cookies, and cakes (70.9%).[9] The study's results Table 1 show the frequency of soft drinks, where 49.2% of children sometimes drink soft drinks once a day, and 46.2% of other children never drink soft drinks. It is slightly different from a study by Murshid.[9] which stated that 33.4% of children consumed soft drinks twice a day, while 30.2% occasionally drank and 1.5% never drank.[9] Soft drinks are an extrinsic factor in the incidence of dental caries because they contain high concentrations of simple carbohydrates such as glucose, fructose, sucrose, and other simple sugars.[15]

Based on the categorization Table 2, we can see that children with ASD have a moderate high-sugar diet, 84.62%.

In terms of FN, we found that the number of children with ASD who had a mild level of FN was almost the same as the percentage of children with moderate and severe FN Table 3, which was an average of 30%. Spearman's rank analysis shows that the relationship between diet and FN gives a correlation coefficient of 0.06 or a correlation of 0.36%, which is not statistically significant with a p-value > 0.05.

Discussion

In this study, it was seen that 80% of children consumed sweet foods between meals which indicated that children like to eat sweets between meals. Murshid's.[9] research showed that 70% of children eat sweet foods between meals. Several studies have shown a significant relationship between a high-sugar diet and children's dental caries.[9] Shree PC et al.[14] showed that most children with ASDprefer to consume foods high in sugar and snacks that often put them at high risk of developing dental caries.[15] Consumption of high-sugar foods and prolonged intake play an essential role in the development of dental caries as well as destructive, aggressive, restless, and hyperactive behavior.[8,9] The results of a study by Mira et al.[12] showed that there was a spontaneous change in behavior to become hyperactive after consuming excessive sweetness in children with autism spectrum disorder.[13]

Simple sugars and artificial sweeteners have detrimental behavioral effects on some children. Laboratory tests reveal abnormal carbohydrate chemistry in most autistic children. According to Lázaro et al.[7] this may occur due to habits formed long ago by siblings or through friends at school and may be an attempt by parents to provide sweet food so that their children are happy. Several mothers mentioned that their children consumed many cookies, soft drinks, ice cream, and chocolate.[7]

Most of the ASD children in this study chose high-sugar diet foods or food selectivity, and only a small number refused FN. Following the rank spearman correlation test results, the relationship between diet and FN is minimal at 0.36%. It indicates that the cariogenic diet is a selective food, not a food that is rejected FN, namely, in this study, a high-sugar diet.

Research explained that parents provide foods to children without considering dietary recommendations, such as chocolate biscuits, chocolate wafers, sweetened condensed milk, and glass-packed sweet drinks.[3] This feeding is due to the child's response in the form of interest in favorite foods, hunger and want to eat, do not want to eat other than these foods, decreased appetite, worry about sick and fussy children, and the presence of relatives who offer non-diet foods. This may also be due to a lack of information about FN, so children who are used to consuming sweet foods can refuse if given new foods and have difficulty changing eating patterns.[4]

Some researchers argue that people with ASD tend to limit food. Food selectivity is related to FN. It negatively impacts the consumption of nutrient-rich fruits and vegetables, which gradually affects health.[7] Reflected in rejecting vegetables, fruit, meat, pika, selectivity to starch, and limited food variations.[17] Research by Wallace et al.[1] state that children with ASD have more FN than normal children. The increase in food neophobia in ASD is not only during childhood but also during adolescence and young adulthood.[12,16]

Children with ASD are unique in their diet and hygiene habits so that the health condition of their teeth and mouth is disturbed.[5] A good diet is vital for the development and maintenance of healthy teeth. In addition, healthy teeth are essential for eating a varied and healthy diet throughout life. Most studies show that food selectivity is a widespread problem among a sample of autistic adolescents.[19]

The concept of food addiction postulates that food has addictive potential. Foods high in sugar and fat are more frequently associated with addictive snacking, which is associated with the desensitization of opioid and dopamine receptors that mimic the neural affirmation of tolerance and dependence.[2] Various studies have reported a relationship between the amount of sugar consumption and hyperactive behavior in children with such as autism spectrum disorder. It is because simple carbohydrate sugars, a fuel source, enter the blood quickly after consumption, triggering an adrenaline rush. Adrenaline is what most likely leads to hyperactive behavior after high-sugar food intake. Therefore, supervising the diet of children with ASD is essential in terms of behavior and crucial for dental health.[9]

Conclusion

Children with ASD are unique in their diet and hygiene habits, so their dental and oral health condition is disturbed. The most common problems are limited food intake, refusal to eat certain foods, or being selective about food. One core component of food selectivity is FN, the propensity to refuse to try unfamiliar foods. This research shows that diet pattern has a very low association with FN in children with autism spectrum disease.

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