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EVALUATION OF ORAL HEALTH STATUS AND BRUSHING HABITS IN CHILDREN WITH AUTISM: A CROSS SECTIONAL STUDY

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Introduction: Autism Spectrum Disorder (ASD) is a type of neurological development disease marked by difficulties in social interaction and communication, as well as repetitive behaviour. Sensory hypersensitivity to visual, auditory, olfactory, or gustatory stimuli has been linked to dental care issues in children with ASD. The purpose of this research is to assess the oral health and brushing behaviours of children with Autism.

Methods: In this study, 70 autistic children aged 3 to 9 years were chosen. The study was conducted into two parts: Questionnaire Survey & Oral Examination. The Questionnaire consisted of two components. The first component dealt with children's brushing practises and oral health, while the second dealt with eating patterns and previous dental appointments. An oral examination was performed to determine the presence of dental caries.

Results: All the collected data is tabulated in MS-Excel. This data was transformed into SPSS 20.0 software for analysis. The frequency distribution was used to test frequencies of this study whereas association between study variables and types of brushing was done by using chi-square test. It was considered that $p<0.05$ at 95% CI. It was observed that children with autism using powered toothbrush showed lower caries incidence as compared to children using manual toothbrush.

Conclusions: Children with Autism need more supervised oral care & as the parental awareness is increasing though multi-disciplinary approaches there has been an improvement in oral health status due to less cariogenic diet and use of electric tooth brushes. For such special needs children, dental practitioners must highlight the need of frequent dental appointments and preventative measures.

Keywords: Autism, Autism Spectrum Disorders, Brushing Habits, Oral Health Status

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The authors declare no conflicts of interest

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ÉVALUATION DE L'ÉTAT DE SANTÉ BUCCO-DENTAIRE ET DES HABITUDES DE BROSSAGE CHEZ LES ENFANTS AUTISTES : UNE ÉTUDE TRANSVERSALE

Introduction: Le Trouble du Spectre de l'Autisme (TSA) est un type de maladie du développement neurologique, marqué par des difficultés d'interaction sociale et de communication, ainsi que des comportements répétitifs. L'hypersensibilité sensorielle aux stimuli visuels, auditifs, olfactifs ou gustatifs a été associée à des problèmes de soins dentaires chez les enfants atteints de TSA. Le but de cette recherche est d'évaluer la santé bucco-dentaire et les comportements de brossage des enfants autistes.

Méthodes: Dans cette étude, 70 enfants autistes âgés de 3 à 9 ans ont été choisis. L'étude a été menée en deux parties : enquête par questionnaire et examen oral. Le questionnaire comprenait deux éléments. Le premier volet traitait des pratiques de brossage des enfants et de la santé bucco-dentaire, tandis que le second traitait des habitudes alimentaires et des rendez-vous dentaires antérieurs. Un examen oral a été réalisé pour déterminer la présence de caries dentaires.

Résultats: Toutes les données collectées sont tabulées dans MS-Excel. Ces données ont été transformées dans le logiciel SPSS 20.0 pour analyse. La distribution de fréquence a été utilisée pour tester les fréquences de cette étude, tandis que l'association entre les variables de l'étude et les types de brossage a été réalisée à l›aide du test du Chi 2, avec $p<0,05$ et 95 % IC. Il a été observé que les enfants autistes utilisant une brosse à dents électrique présentaient une incidence de caries inférieure à celle des enfants utilisant une brosse à dents manuelle.

Conclusions: Les enfants autistes ont besoin de soins bucco-dentaires plus supervisés et, à mesure que la sensibilisation des parents augmente grâce à des approches multidisciplinaires, il y a eu une amélioration de l›état de santé bucco-dentaire grâce à un régime alimentaire moins cariogène et à l›utilisation de brosses à dents électriques. Pour ces enfants ayant des besoins particuliers, les dentistes doivent souligner la nécessité de rendez-vous dentaires fréquents et de mesures préventives.

Mots clés: Autisme, troubles du spectre autistique, habitudes de brossage, état de santé bucco-dentaire

Introduction

Autism is a condition of neurological development marked by poor social interaction and communication, as well as confined and repetitive behaviour, which was originally recognised by child psychiatrist Leo Kanner in 1943 [1]. Autism Spectrum Disorders (ASD) is an umbrella name for five disorders: Autistic disorder, Rett's syndrome, Childhood Disintegrative Disorder, Asperger's syndrome, and Pervasive Developmental Disorders (PDDs) [2].

Autism Disorder is also known as early infantile autism, childhood autism, or Kanner's autism. The National Institute of Child Health and Human Development has defined the autism spectrum disorders as: "A complex biological disorder that generally lasts for an individual's entire life, beginning before the age of three, in the developmental period, and causes delays or problems in many different domains in which a person develops or grows" [3].

In India about 2 million individuals are autistic. Autism spectrum disorders have an incidence of 6 per 1000, with autism having a prevalence of 1–2 per 1000 [2].

All of these characteristics are observed before child reaches the age of three. It is a varied brain developmental condition that generally begins in childhood or infancy and lasts for the rest of one's life without remission. After the age of six months, noticeable symptoms appear gradually and are well established by the age of two to three years, with a propensity to remain throughout adulthood, though in more subdued forms [4].

According to Stein et al, [5] children with ASD may have hypersensitivity to visual, auditory, olfactory, or gustatory stimuli, which has been linked to oral care issues at home and behavioural issues in the dental office, and according to Smith et al, food selectivity and atypical dietary behaviour patterns may also have implications for dental caries. Parents expressed difficulty cleaning their children's teeth due to their sensory sensitivities.

Periodontal infections, bruxism, self-inflicted damage, xerostomia, non-nutritive chewing, and tongue thrusting are among the most common problems observed in children with ASD [6].

The purpose of this research is to assess the oral health and brushing behaviours of children with Autism.

Materials and Methods

In this study, 70 autistic children aged 3 to 9 years who visited the Paediatric department and Occupational therapy department were chosen. Prior to the start of the investigation, an ethical clearance was acquired from the ethics committee. (MGDCH/Dental/2020/1201)

Inclusion Criteria:

1. Autistic child
2. Age Group: 3-9 years

Exclusion Criteria:

1. Parents who did not gave consent
2. Children with any other special health care needs

The parents of the youngsters gave their informed consent. The study was conducted into two parts: Questionnaire survey/interview & Oral Examination. The Questionnaire survey consisted of two components and distributed to the parents to be filled. The first component was regarding the brushing habits and oral health status of children (type of toothbrush used, frequency, dependency while brushing, caries, grinding of teeth and halitosis). The second component included dietary habits (sugar consumption frequency), and past dental office visits.

In the presence of their caretakers, a single examiner who was a pedodontist carried out the oral examination to avoid bias. Examination was done by placing the child on a comfortable chair under natural light and utilising a mouth mirror and probe. The examination was done to assess the dental caries and other anomalies. All the obvious caries lesions as well as caries on pits and fissure surface which showed catch while examination were considered as carious.

Results

The data was transformed into SPSS 20.0 software. The result was analysed using chi-square test. The research involved a total of 70 participants amoug which 37 (52.9%) were $\leq$ 5 years of age whereas 33 (47.1%) were >5 years. The majority of children were males (46 / 65.7%), whereas 24 (34.3%) were females.

Tooth Brushing Habits

86% of the children reported that they had habit of daily toothbrushing and 31.4% had the habit of toothbrushing twice a day. Among the 70 (100%) participants, 58% children were independently brushing their teeth while 42% of children require some parents' assistance with brushing. A majority of 49 (70%) children used powered tooth brush whereas 21 (30%) childs used manual tooth brush.

Oral Health Status

Children were reported to have dental caries in 21 cases (30%). In contrast, 6 (8.6%) of children had only one tooth affected, 8 (11.4%) had two teeth affected, 6 (8.6%) had three or more teeth affected, and 50 (71.4%) of children had no single damaged tooth. Only 15 children (21.4%), were found to grind their teeth. (Table 1).

Dietary Habits

It was found that among the children, 15 (21.4%) of children consume chocolates and sweets everyday followed by 29 (34.3%) of children consume more than once per week, 30 (42.4%) of children consume once per week respectively and 1 (1.4%) of children consume once per month.

Table 1. Frequency distribution of study variables among the children.

Study Variables	Frequency (n=70)	Percent
Sex		
Female	24	34.3
Male	46	65.7
Is your child brushing his or her teeth on a daily basis?		
No	8	11.4
Yes	62	88.6
How many times does the child brush his/her teeth?		
No	8	11.4
Once	47	67.1
Twice	15	21.4
Can your child brush independently?		
No	40	57.1
Yes	30	42.9
How many times brushing?		
Once	41	58.6
Twice	29	41.4
Total	70	100
How frequently do you take your child to a dentist?		
Never	48	68.6
Once in year	1	1.4
When in pain	21	30
How much chocolate/sweets does your child consumes?		
Everyday	15	21.4
More than once	24	34.3
Once in a month	1	1.4
Once in a week	30	42.9
Does your child have caries?		
No	50	71.4
Yes	20	28.6
How many teeth are affected?		
0	50	71.4
1	6	8.6
2	8	11.4
3 or more	6	8.6
Does your child grind his/her teeth?		
No	55	78.6
Yes	15	21.4
Type of toothbrush used?		
Manual Toothbrush	21	30
Powered Toothbrush	49	70

* Significant $p<0.05$

The table 2 shows that out of the total children using manual tooth brush 11(15.7%) children had caries while 9 (12.9%) caries was found in the powered toothbrush. However the caries were lesser in the powered toothbrush group, but it was not statistically significant.

Discussion

It is important that children receive proper dental care at home as well as in the dental clinic in order to improve their oral health. Due to their poor behavioural activities and complex physiological state, dental care of children with ASD is difficult. [7] The intrusive nature of dental treatment, which includes sensory stimulations such as sound, touch, and light, might result in a severe and unfavourable reaction [8].

In our study, we found that children with Autism had a considerably decreased overall frequency of dental caries, which is similar to the study conducted by C.Y. Loo et al [9] & M. Vajawat et al [10]. In our study a difference in the number of caries was observed between different modes of brushing, the children using Powered toothbrush reported lesser caries as compared to children using manual tooth brush but the result was not statistically significant. According to the study conducted by Vajawat et al [10] overall plaque management and gingival health improved significantly when powered toothbrushes were used which is similar to our study, whereas the studies by E. Z. Murshid [11] & M. A. Jaber [12], who reported that ASD children had higher prevalence of caries.

According to Bailey, autistic spectrum disorder children, have a propensity of retaining food in their mouth for extended periods of time due to their tongue coordination issues hence, increasing their vulnerability to caries [3]. The intake of sweets was lower in our research, with just 21% doing so on a daily basis, due to increased knowledge, good home care by care providers,

Table 2: Association between some study variables and types of toothbrush used.

Study Variables of child	Types of Toothbrush Used		Total	Chi-square	p-value
	Manual Toothbrush (n=21)	Powered Toothbrush (n=49)			
Age (in Years)					
<=5	12(17.1%)	25(35.7%)	37(52.9%)	0.04	0.84
>5	9(12.9%)	24(34.3%)	33(47.1%)		
No. of times of brushing					
Once	17(24.29%)	24(34.29%)	41(58.57%)	4.95	0.026*
Twice	4(5.71%)	25(35.71%)	29(41.43%)		
Caries Present					
No	12(17.1%)	38(54.4%)	50(71.4%)	2.08	0.15
Yes	11(15.7%)	9(12.9%)	20(28.6%)		

* Significant p<0.05

and dietary habits consisting of less cariogenic products which was similar to the study conducted by Morinushi and colleagues in which caries experience of a cohort of Japanese children with autism wasn't really different from that of normal children. Caries prevalence and severity were also shown to be reduced in children with autism compared to those who were not afflicted. As a result, the decreased caries rate might have been due to a lower frequency of snacking between meals and a lower carbohydrate consumption. Despite the fact that ASD is not linked to an increased incidence or severity of dental caries, dental practitioners should stress the necessity of frequent preventative measures and excellent eating habits, since sweet foods may be employed in behaviour modification tactics. They claimed that children with autism are less fond of sweets and have more consistent mealtime behaviour than children who are not affected.

Bruxism was also an oral health condition faced by children with ASD in a research by Gandhi, and 21.4 % of the children in our study were also afflicted by bruxism [13].

Brushing one's teeth is one of the most prevalent oral hygiene practises all around the globe. In our study, 30% children were using manual tooth brush and 70% were using powered tooth brush. Although both powered and manual toothbrushes provide excellent oral hygiene, powered toothbrushes are more efficient, enjoyable to use, and unexpectedly appealing to patients. In the 1960s when the powered toothbrushes were first manufactured, and from that time onwards they have proven to be helpful for patients with special need. Powered toothbrushes work on the basic of oscillations and rotations which have been found to remove more plaque, reducing gingival inflammation and lesser caries than manual toothbrushes [14]. The sensory input provided by powered toothbrushes to the mouth helps in neutralization of sensory responses in the oral cavity. It has been seen that powered toothbrushes also have "novelty effect" that helps to increase the compliance [15].

Conclusion

Children with ASD need more supervised oral care than children without ASD, and as the parents are becoming more and more aware about the condition though multi-disciplinary approach like regular pediatric visits and occupational therapy, there has been a decline in the poor oral hygiene in patients with special needs.

Due to improved home care given by the parents or caregivers, intake of less cariogenic diet and use of electric tooth brushes have improved oral conditions in children. However, ASD is not associated with increased risk of dental caries, professionals need to emphasize on the importance of regular preventive measures being taken during dental visits and good dietary habits.

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Questionnaire

Evaluation of Oral Health Status & Brushing Habits in children with Autism

1. Name: _____

2. Age: _____

3. Sex: _____

Mark only one oval

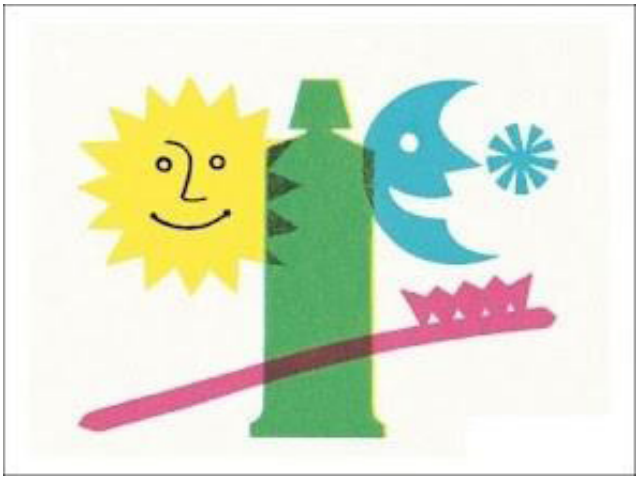
0 *Male* 0 *Female*

- ***Does your child brush his/her teeth everyday ?***

Mark only one oval

0 *yes* 0 *no* 0 *sometimes*

- ***How many times does the child brush his/her teeth ?***



Mark only one oval.

0 *Once* 0 *twice*

• ***Can your child brush independently ?***

Mark only one oval.

0 *yes* 0 *no* 0 *Maybe*

• ***Does your family have a habit of brushing the teeth ?***

Mark only one oval.

0 *Yes* 0 *No*

• ***How many times per day ?***

Mark only one oval.

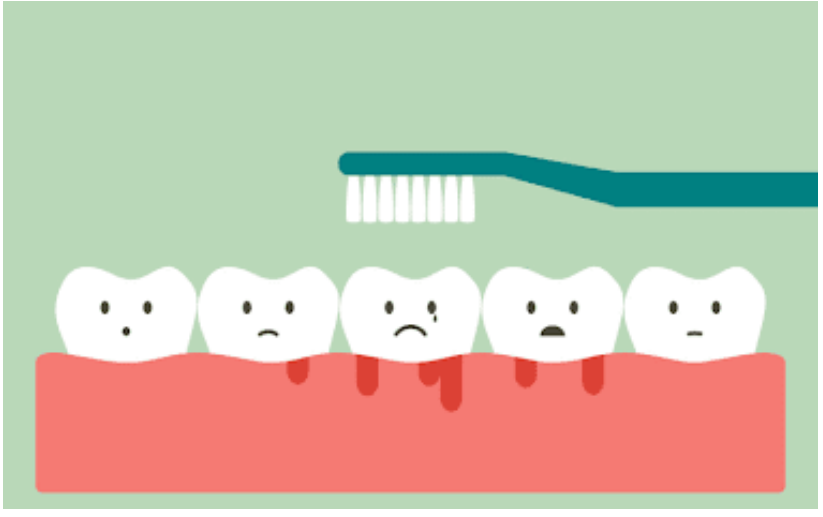
0 *Once* 0 *Twice* 0 *Thrice*

• ***Methods used for maintaining oral hygiene ?***

Check all that apply.

0 *tooth brush without toothpaste*
0 *tooth brush and tooth paste*
0 *finger and tooth paste*
0 *mouth wash*
0 *none of the above*

• ***Does your child's gum bleed while brushing ?***



Mark only one oval.

0 *Yes* 0 *No*

• ***How frequently do you take your child to a dentist ?***

Mark only one oval.

0 *once in six months*
0 *once in a year when in pain*
0 *never*

• ***How was your child's previous dental experience ?***

Mark only one oval.

0 *pleasant*
0 *un- pleasant*
0 *normal*

• ***Does your family makes periodic dental visits ?***

Mark only one oval.

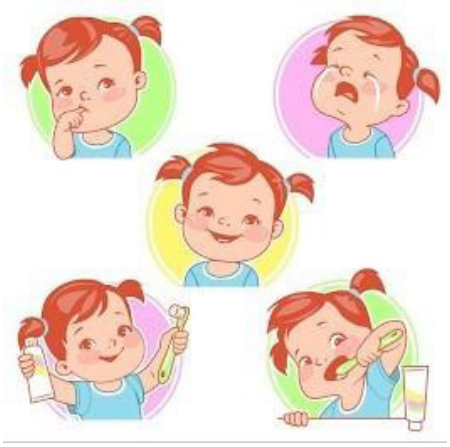
0 *Yes* 0 *No*

• ***How many times per year ?***

Mark only one oval.

0 *once* 0 *twice* 0 *thrice* 0 *or more*

• ***Does your child get anxious, nervous before or after brushing the teeth ?***



Mark only one oval.

0 *Yes* 0 *No*

• ***How much chocolate/sweets does your child consumes ?***

Mark only one oval.

0 *everyday*
0 *once in a week*
0 *more than once in a week once in a month*

• ***Does your child have caries ?***

Mark only one oval.

0 *Yes* 0 *No*

• ***How many teeth are a!ected ?***

Mark only one oval.

0 *0* 0 *1* 0 *2* 0 *3* 0 *>3*

• ***Does your child have bad breath ?***

Mark only one oval.

0 *Yes* 0 *No* 0 *Maybe*

• ***Does your child grind his/her teeth ?***

Mark only one oval.

0 *Yes* 0 *No*