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Oral Health Status of Children with Autism Spectrum Disorder (ASD) in India: Review Article

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Abstract— Children with Autism Spectrum Disorder often need functional assistance thus daily essential activity like oral health care becomes important.

Aim: Assess oral health status of children with ASD in India.

Materials and methods: A literature search was conducted through MEDLINE/PubMed and Google scholar for period 2010 to 2024. Search strategy were used, and 273 articles were identified. Following relevance review seven full text articles were chosen for the final review.

Results: The review demonstrated that most children with ASD had fair OHI-S scores and lower deft/DMFT score compared to children without any systemic disease.

Conclusion: While children with ASD are at risk of poor oral hygiene and dental caries due functional support required throughout life, the daycare routine prescribed by special educators to children with ASD which included tooth brushing, mouth rinsing, and low sugar diet, these children demonstrated lower prevalence of dental cares and fairer oral hygiene.

Index Terms: Oral health, Autism, Autism Spectrum Disorder, India, Dental health.

I. INTRODUCTION

Autism Spectrum Disorder (ASD) is considered as disorders with social communications, repetitive behaviours and fixations in certain activities and interests.(1) The sensory sensitivity and behavioural issues in children with autism often seems to make the oral hygiene maintenance at home and treatment in dental office difficult.(2) It makes the availing of oral health care a major challenge and oral health condition in these group a concerning issue which requires further research and solution.(3) The studies have shown that the vulnerable populations are in increased risk of oral health than the general population.(4) With the increasing prevalence of ASD in South east Asia(six cases per 1000) the problem becomes more intense.(5)

The studies have shown that about 60.6% to 67.3% of population with autism suffer from caries and likewise, 59.8% to 69.22% of population with autism suffer from periodontal disease Globally.(3,6) There are few studies done on population with autism in South east Asia but there is still lack of data on oral health.(7) More targeted research and specialized dental care programs for the children with autism are required. (8)

II. MATERIALS AND METHODS:

A. Review protocol

This is a review article, efforts were made to follow the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol.(9)

B. Selection Criterion for the Review:

Inclusion and exclusion of studies were done to properly cater the objectives and scope of the reviewers study. Peer-reviewed research articles were included in the study to obtain the reliable information. Full text articles from the period 2010 to 2024, where data extraction was possible, were chosen for the study. Agreement of both the authors was required to ensure that the article met inclusion criteria.

Inclusion criteria:

- Population: Research aiming the children with autism spectrum disorder were chosen.
- Intervention: The papers on caries, oral hygiene, periodontal conditions in children with autism were selected
- Comparison: Cross sectional study and Case-control studies were selected for the inclusion
- Outcome: The papers addressing the prevalence of caries, oral hygiene, periodontal conditions and the treatment needs in children with autism were selected.

Exclusion criteria:

- Irrelevant Population: the population without ASD and are not on the age group of children were discarded from the study.
- No Relevant Outcome: the studies which did not include the dental caries, periodontal conditions and oral hygiene were not included.
- Publication Type: Non peer reviewed materials like

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editorials, letter were not included in the study.

- Non-English Language: studies published in other languages other than English were discarded for the better understanding.

C. Electronic database search strategy:

Electronic databases like MEDLINE/PubMed and Google scholar were used to search for the content of the study. Advanced search technique with the mesh headings was done. Search strategy with the Boolean operators "AND "and "OR" were used to obtain precise and relevant contents. The key words used for the search were oral health, dental health, Autism, ASD, Autism spectrum disorder, children, India. The phrases like "Oral health" OR Dental health" AND "Autism" OR "ASD" OR "autism spectrum disorder" AND "Children" AND "India" were used to retrieve the relevant data.

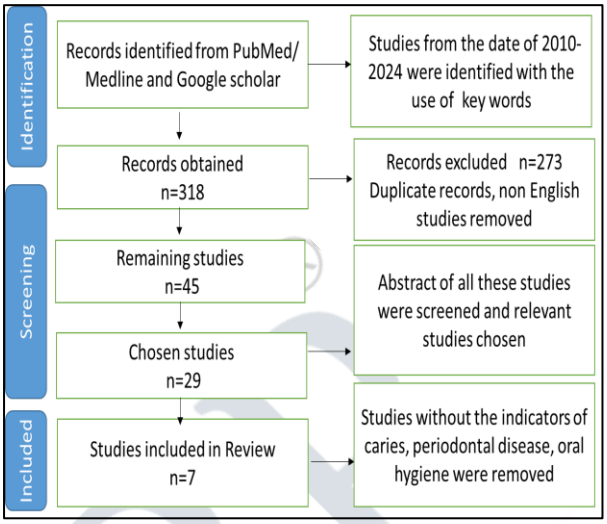

Figure 1. Flowchart of the identification, screening and inclusion for articles for the review.

III. RESULT

A total of 318 articles were initially identified from PubMed/Medline and Google scholar database using the search strategy. Around 273 articles were excluded as duplicate records or non-English language articles. Abstract of remaining forty-five studies were screened and twenty-nine articles were chosen for further in-depth review. Finally, seven articles were selected from the twenty-nine articles for the review that met all inclusion criteria and exclusion criteria.(10–16) (Figure 1)

Table 1: Overview of the key findings and conclusions of the selected articles with Oral Hygiene (OHI-S) and decayed, missing and filled primary and permanent teeth (DMFT) as variable of interest.

Article	Sample	Key Findings
Narula et al.(10)	Age-5-14 years 80 ASD children	DMFT in ASD child: 0.19+0.71 and Normal child: 1.01+1.51 OHI-S score in ASD- 18.8% Good, 56.2% Fair, 25% Poor OHI-S in Normal- 6.2% Good, 46.3% Fair, 47.5% Poor
Yadav et al.(11)	Age- 3-9 years 70 ASD children	Dental caries in 21 cases (30%). While 6 (8.6%) 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
Chadha et al.(12)	Age-5-10 years 35 ASD children	Three children were caries free and maximum (n=24) had DMFT greater than 3. The DMFT ranged from 0 to 6.OHI-S was good in 20%, fair in 40% and poor in 40%
Santosh et al.(13)	Age-3-17 years 142 ASD children	OHI-S: 0.88 + 0.79 (mean + SD)-overall Fair DMFT: 2.17+ 2.9
Vajawat et al.(14)	Age-5-22 years 117 ASD patient	Mean DMFT score in cases 1.2966 and in controls 3.736. The prevalence of caries was lower in autistic patients with a statistical significance of P = 0.000, the incidence of caries was increasing with age in both cases and controls
Subramaiam et al.(15)	Age-4-15 years106 ASD patient in clinical care setting	The mean OHI-S score in autistic children was 2.19, the mean DI-S (Debris Index – Simplified) score was 1.45. The CI-S (Calculus Index – Simplified) score for autistic children was 0.85.
Richa et al.(16)	Age-4-15 years	Mean OHI-S, DMFT scores were significantly high among children

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Article	Sample	Key Findings
	135 ASD patient in clinical care setting	with autism (2.07 ± 0.83; 0.86 ± 1.22,1.40 ± 2.48) when compared to children without autism (0.46 ± 0.58;0.46 ± 1.06, 0.59 ± 1.28) respectively

A summary of the key findings and conclusions of the selected articles are presented in the table 1. (TABLE 1) All of the articles had studies from clinical care setting where children with ASD visited for care. The articles had sample size ranging from 35 to 142 and age group ranged from 3 years to 22 years. Five of the seven articles had age range up to 10 years and the remaining two articles had age range beyond 10 years of age.

The oral hygiene index score (OHI-S) and decayed, missing and filled primary (deft) and permanent (DMFT) teeth from all the seven studies were reviewed. Five of the seven studies suggested that most children with ASD had fair OHI-S scores and lower deft/DMFT score compared to children without any systemic disease, who had a poorer OHI-S score. The remaining two studies acknowledged that most participant were at 'watch out' zone which indicated that anything above this was at a greater risk of developing caries and acknowledged that planned care could have prevented worsening of oral hygiene in these children.

IV. DISCUSSION

ASD is a special health condition, diagnosed at an early age, that requires mild to substantial functional support throughout life due to inherent neuro-developmental impairment, Loo et al. and Marshall et al. documented that oral health challenges among children with ASD are high and increase exponentially with the level of severity of symptoms, dependency on the caregiver for basic life skills, advancing age, and associated pathologies.(17,18) There is paucity of information related to the evaluation of oral health in children with ASD in India.(7)

Five of the seven articles reviewed pointed to similar factors and findings from different settings. The article from Narula et al. suggested that the majority of children with ASD had fair OHI-S scores compared to children without any systemic disease, who had a poorer OHI-S score, the article attributed this due to the daycare routine prescribed by special educators to children with ASD which included tooth brushing, mouth rinsing, and low sugar diet.(10) Similarly, the article from Yadav et al. also reported 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 & M. Vajawat et al.(11,14,18)The article from Santosh et al. reviewed in this study documented good oral hygiene in autistic children and observed that the autistic children in the study underwent their daily routine of oral hygiene measures at home under the supervision of their parents.(13) Besides, they were also subjected to brushing their teeth by the trainers at the respective schools which could account for their good oral hygiene. The article from Subramaniam et al. also had similar findings and attributed them to the behavior showed by autistic children.(15)

However, two articles documented different findings but had similar conclusions. Richa et al. documented significant higher scores for OHI-S, DMFT, dmft, DMFS and dmfs score among children with autism and hinted that these could be due to higher unmet functional needs of the autistic children of the study population to conduct activities of daily living.(16) Similarly, study from Chadha et al recorded that the oral hygiene status was poor with abundance of soft debris and fair calculus accumulation in children with autism.(12) The mean caries experience (deft) in these children was 6.4.However, the study acknowledged that most participant were at 'watch out' zone which indicated that anything above this was at a greater risk of developing caries and acknowledged that planned care could have prevented worsening of oral hygiene in these children.

In all the articles reviewed, the study children with ASD were guided well to follow a daily routine plan as prescribed by the special educators. Lower caries in autistics can be attributed to the good supervision by the parents and schoolteachers in the child's daily life activities like tooth brushing and lack of in-between snacking. This regimen proved helpful in improving the Oral Health condition of these children effectively. This reinforces the idea of collaboration of pediatric dental clinics with medical facilities to impart Oral Health Education and training to children with ASD at their primary care center. As a result, a comprehensive, specially designed Oral Health Education Program for children with ASD and their caregivers needs to be formulated and implemented.

A further review of literature concurred with the finding of the five articles that pointed out lower prevalence of dental caries and fair oral health. Comparable results were reported by Du et al. who found that children with autism had lower plaque scores than children without autism.(19) Hussein et al. also had similar findings in a study on the assessment of periodontal health status in a sample of autistic children, which stated that both the test and control groups showed fair OHI-S scores with autistic children showing less calculus compared to unaffected children.(20) However, Morales-Chavez contrastingly reported a mean OHI-S score of 3.4, coinciding with the poor oral hygiene status, in children with ASD.(21) They also reported that 59.41% children with ASD showed the presence of calculus.(22) Yashoda et al. also reported contrasting results with a poor OHI-S score in children with ASD in comparison to a good OHI-S score in unaffected children.(16) A high mean OHI-S score showing fair to poor oral hygiene status in children with

ASD could be due to irregular brushing habits and difficulties encountered by parents and caregivers in brushing their child's teeth. In a study with similar result Shapira et al. concluded that the lower caries in autistics was due to less cariogenic diet, regular behavior at meals, and the autistics being less partial to sweets.(23)

V. CONCLUSION

The review concludes that while children with ASD are at risk of poor oral hygiene and dental caries due to the inherent property of neuro-developmental impairment condition that requires significant functional support throughout life, due to the daycare routine prescribed by special educators to children with ASD which included tooth brushing, mouth rinsing, and low sugar diet these children demonstrated lower prevalence of dental cares and fairer oral hygiene compared to non-ASD children.

The review thus underscores the need for a collaborative care system involving Dental care providers, Care givers, paediatricians and the autism therapists for the children with ASD to address the specific needs like sensory needs and behavioural managements to ensure proper management and better care of oral health issues. Advocacy for the proper policies to support the oral health care needs of children with ASD is necessary to provide with necessary funds and infrastructures along with the manpower for the research studies and training of the dental and other interrelated professionals.

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