

# Dental Caries Experience among the Children with Autism Spectrum Disorder in 3-15 Years

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## ABSTRACT

**Introduction:** Dental caries remains the most prevalent, unmet health care need for children with special health care needs such as autism spectrum disorder. This study was carried out to help in providing a baseline data to enable comparison and future planning of dental services for autistic children.

**Objective:** The study aims to evaluate the oral health status among the 3-15 years old children with Autism Spectrum Disorder in Kathmandu.

**Methods:** A cross sectional study was done among 80 autistic children of age 3-15 years. Dental caries was measure by Decayed, Missing and Filled teeth. Data was entered and analyzed in SPSS.

**Results:** The prevalence of the dental caries was found to be 66.3% (53) with mean dmft of  $3.03 \pm 3.71$  and DMFT of  $0.51 \pm 1.78$  among children with Autism Spectrum Disorder. Caries prevalence was higher in females compared to males. Among the carious teeth 94% were untreated.

**Conclusions:** The prevalence of dental caries was high in children with Autism Spectrum Disorder with higher percentage of untreated decays, which emphasizes the need for immediate preventive as well as curative interventions.

**Keywords:** Autism Spectrum Disorder; dental caries; untreated dental caries.

## INTRODUCTION

Autism or Autistic Spectrum Disorder (ASD) was first described in 1943 by Dr. Leo Kanner as a pervasive developmental disorder.<sup>1</sup> It refers to complex neurodevelopmental disorder that include impairments in social communication, maintaining social interaction, and a range of restricted repetitive behaviors (RRBs).<sup>2</sup>

ASD typically presents during the first three years of life and usually affects males more than females. Recent estimates by the World Health Organization show that the global prevalence of ASD is 1:160 people,<sup>3</sup> while there

is no exact data in Nepal but Autism Care Nepal Society (ACNS) estimates that there are 250,000 to 300,000 people with Autism (PWAs) in Nepal (ACNS, 2015).<sup>4</sup>

Autism population experience few unusual oral health conditions, such as pouching of food, bruxism, self-injuries and are at a higher risk for poor oral health throughout their lifespan.<sup>2</sup> Few studies reported a higher prevalence of caries,<sup>5,6</sup> others reported lower rate of caries,<sup>7,8</sup> while some showed no association between risk of caries and ASD.<sup>9,10</sup> However, organized oral health care for individual with special need is not yet established in Nepalese population. Therefore, this study was conducted to describe the caries experience among children with ASD whose findings can be used as baseline for appropriate planning in their oral health services.

## METHODS

A cross-sectional study was conducted for three months from January to March of 2022 in two autistic centers of Kathmandu using convenient sampling. Ethical approval for this study was obtained from the Institutional Review Committee, (Ref: 2/202) Kantipur Dental College and

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Teaching Hospital. The required consents and approvals were obtained from the parents and respective head teacher. Dental examination was done in the presence of the parents or caretaker in their respective centers.

**Inclusion criteria:** Children aged 3-15 years who have been medically diagnosed with Autism Spectrum Disorder.

**Exclusion criteria:** Children suffering from Down syndrome and diabetes that is known to influence dental caries or the severity of periodontal disease.

Sample size was calculated by using the formula  $n = z^2 pq / e^2$  (where,  $z = 1.96$ ,  $p = 4.90\%$ ,  $e = 0.05$ ,  $q = 1 - p$ )<sup>11</sup>

$$n = \frac{(1.96)^2 \times 0.049 \times 0.951}{(0.05)^2}$$

$$= 71$$

Non- response rate = 10%

Thus N = 80.

The clinical examination was carried out by a single qualified examiner, seated on an ordinary chair in daylight facing away from direct sunlight, and assistance was gained from the parent or care givers for those children who showed uncooperative behavior. Caries status was assessed using Decayed Missing Filled Teeth (dmft./DMFT) as recommended by the WHO's oral health surveys.<sup>12</sup>

Data were collected, summarized and analyzed using Statistical Package for Social Science (SPSS) program (Version 20). Descriptive statistics were calculated including mean, standard deviation and percentage.

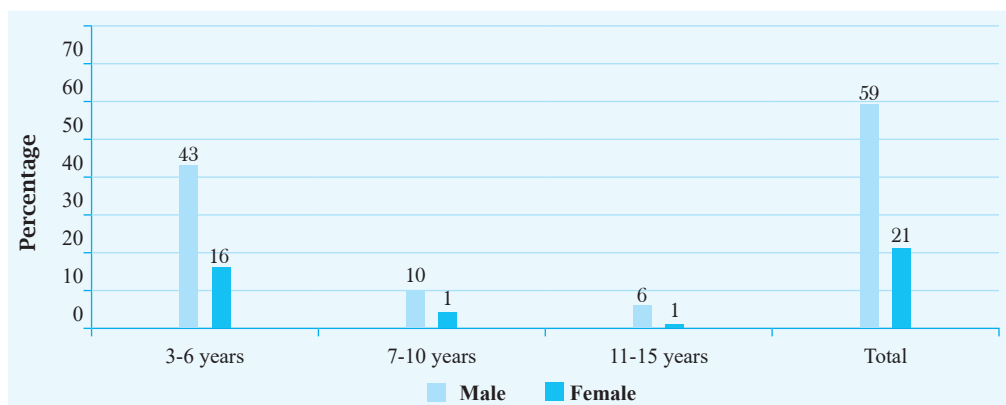
Independent t-test and ANOVA test were performed to determine the statistical significance. For all the statistical tests  $p < 0.05$  was considered as significant.

## RESULTS

A total of 80 autistic children (59 boys and 21 girls) and their parents participated in the study. Male to female ratio was 2.8:1 (Figure 1) and age ranged from 3-15 years with a mean age group of  $6.01 \pm 3.24$  and was categorized into three age groups.

The prevalence of dental caries among the children with ASD was found to be 66.3% (53). Among which 94% were with untreated carious lesion. Caries prevalence was slightly higher in females (71.4%) compared to males (64.4%). The highest percentage of dental caries was recorded for the primary dentition 68%. The distribution of mean dmft in primary teeth according to age group and gender for children with ASD is shown in Table 1. The meanSD dmft of primary dentition was  $(3.03 \pm 3.71)$ , where female  $(3.38 \pm 3.45)$  exhibited higher dmft than male  $(2.915 \pm 3.825)$ . Statistical significant difference was found in association to age group and dmft among the children with ASD ( $p < 0.05$ ).

On the basis of gender and age group the distribution of mean DMFT in permanent teeth is shown in Table 2. The total mean DMFT of the permanent dentition was  $0.51 \pm 1.78$ , where male  $(0.61 \pm 2.02)$  exhibited higher DMFT than females  $(0.19 \pm 0.67)$ . Statistical significant difference was seen in association with age group and DMFT among the children with ASD ( $p\text{-value} < 0.001$ ).



**Figure 1: Distribution of Autistic Children according to age and gender.**

**Table 1: Distribution of mean dmft according to age group and gender.**

Age Group (Years)	dmft Mean±SD		Total	P Value
	Male	Female		
3-6years	2.76±3.63	3.50±3.77	2.966±3.65	0.024
7-10 years	5.20±4.66	3.75±2.06	4.78±4.06	
11-15 years	0.166±0.40	-	0.142±0.377	
<b>Total</b>	2.915±3.825	3.38±3.45	3.03±3.71	

**Table 2: Distribution of mean DMFT according to age group and gender.**

Age Group (Years)	DMFT Mean±SD		Total	P Value
	Male	Female		
3-6years	0	0	0	<0.001
7-10 years	0.80±1.39	0.25±0.50	0.64±1.22	
11-15 years	4.67±4.63	3	4.43±3.71	
<b>Total</b>	0.61±2.02	0.095±0.30	0.51±1.78	

## DISCUSSION

In Nepal, only few researches have been conducted on children with Autism Spectrum Disorder from a medical point of view, while research are sorely lacking from the dental aspect. The present study aims to overview the carious status among children with ASD in Kathmandu with regard to their age and gender. The gender distribution of autistic children in the present study was 2.8:1 which reflected the higher prevalence of autism in males similar to other studies among autistic population.<sup>2,13</sup>

The results of studies regarding dental caries experiences among ASD in different countries are controversial. In developed countries, where there are special care and training centers for individuals with ASD, a low caries experience has been reported.

In this study, the overall caries prevalence was 66.3% which was in accordance with studies by Jaber MA et al,<sup>13</sup> Al Humaid J et al<sup>14</sup> but in contrast to De Mattei R et al,<sup>7</sup> and Vishnu R et al.<sup>8</sup>

Females showed higher prevalence of dental caries which was similar to Al Haddad et al.<sup>15</sup> The higher prevalence of caries in females may be attributed to their hormonal fluctuations, dietary habits, genetic variations, different salivary composition, and flow rate as well as due to earlier eruption of teeth in females.<sup>16</sup>

It was found that among the carious tooth, the major proportion had untreated caries with a low proportion

of filled teeth. It might be due to physical, financial, and psychological burdens of taking care and coping with an autistic child and lack of parental prioritization regarding oral health needs.

In the present study, the total mean dmft and DMFT (caries index) were found to be 3.03 and 0.51 respectively. The level of caries index in primary teeth (3.03) was low, compared to some studies<sup>5,17,18</sup> and in contrast to study.<sup>2</sup> The level of caries index in permanent teeth (0.51) in this study was low then other studies.<sup>11,13,14</sup> The variation of caries index in different countries may be partially attributed to their sample size, ethnic background, dental awareness among the parents/caregivers, parental awareness, and the availability of dental care in respective countries.

The caries index scores showed a significant increase with age. This is due to the accumulative and irreversibility nature of the disease. The level of dmft/DMFT index was higher than rates given by National Pathfinder Survey of non-autistic children in Nepal.<sup>19</sup> It is known that autistic children tend to pouch food inside mouth instead of swallowing, thereby increasing their susceptibility to caries.<sup>20</sup> Moreover, the risk of dental caries is expected to be higher due to difficulties in brushing and incapability of cooperating in the dental setting owing to their impaired commination and social interaction skill.

This cross-sectional observational study is the first one in its kind focusing on caries status among children with

ASD in Kathmandu. Providing baseline data to support the poor oral health and urgent intervention needs. However, there were few limitations in this study as it could not interpret cause-effect relationships between ASD and children's dental caries. Additional variables such as oral health knowledge and attitudes, oral hygiene behavior, sugar consumptions, fluoride intake and habits can be included in future studies. The small study sample size limits the generalization of findings to the broader autistic population in the whole country.

## CONCLUSIONS

The study shows that caries prevalence was high among children with ASD, with a significant proportion of the children having untreated caries. This highlights the need for implementation of effective screening, preventive programs, treatment motivation and oral health education among the parents and care taker of children with ASD.

**Conflict of Interest:** None

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