“Oral Health of Individuals with Down Syndrome in Karachi, Pakistan”

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OBJECTIVE: To determine the frequency of dental caries and oral hygiene status of children with Down syndrome, Karachi, Pakistan.

METHODOLOGY: It was a cross-sectional study conducted at Special needs children School Karachi, Pakistan & the duration of study was 6 months. Total 119 children with Down syndrome of age 5-20 years of either gender were enrolled. After taking informed consent the subjects were examined for dental caries and dental status. Dental caries were assessed by using DMFT index and Oral hygiene status was assessed by using oral hygiene index?simplified (OHI-S). The data was analyzed by using SPSS version 23.

Results: The overall caries prevalence in the study population was 68.1% with an overall mean DMFT score of 1.10±1.31. Out of 119 children with Down syndrome, majority had good hygiene status (51.2%), 27.7% had fair hygiene status and 21% had poor hygiene status with overall mean OHI-S score of 1.79±1.43.

CONCLUSION: A high prevalence of dental caries was observed among children with Down Syndrome. There is a high need for an epidemiological survey followed by the comprehensive dental care programs for these children, as well as efforts should be taken to encourage and promote parents of these children to improve their oral health.

KEYWORDS: Dental caries, DMFT, Oral health, Oral hygiene status, Down Syndrome

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INTRODUCTION

Down syndrome is a congenital autosomal anomaly caused due to the changes in the sequence of DNA of chromosome 21. According to WHO the global incidence of Down syndrome (DS) is estimated as 1 out of 600-1000 live births.\textsuperscript{1,2} The syndrome is classified by characteristic facial features with a protruding tongue, congenital heart disease, short stature, a wide range of learning difficulties, gastrointestinal disorders, and other features.\textsuperscript{3,4}

Down syndrome children have specific characteristics of orofacial related with the syndrome. The majority of the oral disorders consist of open bite, periodontal disease, mouth breathing, malocclusion, delayed teeth eruption, macroGLOSSIA, missing and malformed teeth, crowding, bruxism, microdontia, fissured lips and tongue, low level of caries and poor oral hygiene.\textsuperscript{1,5-7}

Periodontal disease is the most prevalent oral health issue in the individuals with Down syndrome. Manual dexterity troubles may prompt oral hygiene issues, which may bring in accumulation of debris and plaque, thus supporting development of periodontal disease and gingivitis. Extensively large number of youngsters with DS lose their permanent front teeth in their initial teens. The reasons of high risk of periodontal disease among Down syndrome individuals are cariogenic food choices and less food clearance from the mouth.\textsuperscript{5,9}
In Pakistan, there is no appropriate data available with respect to oral health status of individuals with DS. Such data is necessary for the planning of treatment in DS individuals for dental practitioner and also to assist other health professionals in understanding the oral health status of DS patients and the importance of liaison with dental professionals. Therefore this study was proposed and conducted to evaluate the oral hygiene and caries status of individuals with DS attending special needs children at Karachi, Pakistan.

**METHODOLOGY**

It was a cross-sectional study conducted at the special needs children school Karachi, Pakistan and duration of study was 6 months. The sample size of 119 participants was obtained by using open epi online sample size calculator. The statistics considered for sample size estimation was good oral hygiene status as 50%, margin of error as 9% and 95% confidence level. The non-probability purposive sampling technique was employed. All participants of 5-20 years of either gender with Down syndrome were included in the study. Participants exhibiting other forms of systematic diseases, compound disability or extremely uncooperative individuals were excluded from the study.

Informed consent was taken from school admin and parents of the children to participate in the study. The clinical examination was carried out according to World Health Organization (WHO) techniques in the OPD of Integrated Occupational Health Services (IOHS) by the examiner. The demographic information such as age, gender, weight & height of the children was recorded. BMI of each children was calculated by using the formula BMI =weight/height$^2$(kg/m$^2$). Other related information regarding previous dental visits, frequency of tooth brushing, material used for brushing & food preferences were obtained under the supervision of school interpreters.

The children were then examined for oral status by making them sit on the upright chair in adequate light using autoclaved instruments. Each surface of mouth was checked by using plain mouth mirror and WHO probe. Caps, gloves, masks and gauze were used in accordance with infection control guidelines. Dental caries was evaluated by using DMFT (decayed, missing, and filled teeth) index. Children with DMFT=0 were labelled as "Caries-free" & children with DMFT>0 were labelled as "Caries Present". Oral hygiene was evaluated by using the simplified oral hygiene index (OHI-S) introduced by Green and Vermillion. OHI-S score was labelled for oral cleanliness as "good" for score between 0.1-1.2, "fair" between 1.3-3.0 and "poor" between 3.1-6.0.

Data analysis was carried out using the SPSS Version 23. Frequencies and percentages was calculated for all the qualitative variables. Mean & SD was calculated for all the quantitative variables. Independent t-test & chi-square were applied where appropriate. The confidence level was considered as 95% and P-value $\leq 0.05$ was taken as statistically significant.

**RESULTS**

The study sample was consisted of 119 children with mean age as 14.19±5.54 years. Out of 116, 76 were males and 43 were females. The mean weight of individuals with Down syndrome was calculated as 50.69±15.74 kg. The mean DMFT was calculated as 1.10±1.31, debris index as 1.01±0.69, calculus index as 0.56±0.72 & OHI-S score as 1.79±1.43. (Table 1)

The mean DMFT of males was calculated as 1.03±0.11 and female as 1.71±0.26. Hence the mean difference of DMFT with respect to gender was observed as at the edge of significance (p=0.057). The mean DMFT score was high in age group 11-15 years followed by 16-20 years and 5-10 years. The mean difference of DMFT with respect to age was fund as statistically significant (p<0.05). Out of 116 participants about 68.1% were presented with dental caries. The prevalence of dental caries was high in males (59.2%) as compared to females (40.7%), hence the relationship is insignificant (p>0.05). The prevalence of dental caries was high in age group 16-20 years (48.1%) followed by 11-15 years (34.6%) and 5-10 years (17.3%), hence the relationship was significant. (Table 2)

The gender and age wise mean OHI-S score was computed and compared. The significant difference was observed in mean OHI-S with respect to gender and age, p<0.05. The majority had good hygiene status (53.1%), 27.7% had fair hygiene status and 21% had poor hygiene.
status. Stratification with respect to gender and age was done for oral hygiene status, the relationship was found as statistically significant (p<0.05). (Table 3)

Table 2: Gender and Age wise distribution of DMFT and dental caries

<table>
<thead>
<tr>
<th>Variables</th>
<th>DMFT (Mean±SD)</th>
<th>Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Free (n=38)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.03±0.11</td>
<td>28(73.7%)</td>
</tr>
<tr>
<td>Female</td>
<td>1.71±0.26</td>
<td>10(26.3%)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.057</td>
<td>0.127</td>
</tr>
<tr>
<td>Age Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-10 years</td>
<td>0.65±0.89</td>
<td>18(47.4%)</td>
</tr>
<tr>
<td>11-15 years</td>
<td>1.44±1.82</td>
<td>8(21.1%)</td>
</tr>
<tr>
<td>16-20 years</td>
<td>1.10±1.31</td>
<td>12(31.6%)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.052</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Table 3: Gender and age wise distribution of OHI-S score and Oral hygiene status

<table>
<thead>
<tr>
<th>Variables</th>
<th>OHI-S (Mean±SD)</th>
<th>Oral Hygiene Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good (n=61)</td>
<td>Fair (n=33)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.92±1.60</td>
<td>39(63.9%)</td>
</tr>
<tr>
<td>Female</td>
<td>1.58±1.03</td>
<td>22(36.1%)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.001</td>
<td>0.021</td>
</tr>
<tr>
<td>Age Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-10 years</td>
<td>1.30±1.79</td>
<td>21(34.4%)</td>
</tr>
<tr>
<td>11-15 years</td>
<td>1.28±1.03</td>
<td>25(41%)</td>
</tr>
<tr>
<td>16-20 years</td>
<td>2.21±1.30</td>
<td>15(24.6%)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.008</td>
<td>0.002</td>
</tr>
</tbody>
</table>

DISCUSSION

The oral disease is the most common problem among individuals with physical and mental disabilities. The frequency and severity of oral disease is high among people with disabilities as compared to normal population. The findings may be associated to less physical abilities and consequent difficulties in tooth brushing among them. Oral well-being might be influenced by several factors such as restricted comprehension on the significance of oral health management, anticonvulsant medicines that effect upon gum health, troubles in imparting oral health needs, and a dread of oral health procedures. General anesthesia and physical restraints are usually used to treat adults with disabilities who have dread and correspondence troubles associated to oral health. The present study was conducted to know the current dental health status of individuals with Down syndrome in Karachi, Pakistan as data was required to plan proper oral health programme for them.

In the present study, mean DMFT was 1.10±1.31 and dental caries was prevalent among 68.1% of the participants. When stratification of DMFT indexes were evaluated with regard to sex, the mean DMFT was found to be higher among females as compared to males. However, the dental caries were prevalent among males. The previous literature, has usually found high prevalence of dental caries among females than males. When stratification of DMFT indexes were evaluated with age, the mean DMFT was found to be higher among age group 11-15 years as compared to other age groups. Whereas the dental caries were prevalent among age group 16-20 years. In year 2014, a study was conducted among 90 individuals with Down Syndrome from Sarajevo and Tuzla Canton, Bosnia and Herzegovina, the mean DMFT index for age group 0-6 years was found as (6.40±6.05); 7-12 years (2.05±2.04) and 13-18 years (10.30±6.80). By using Pearson's correlation value for DMFT, debris index and age of examinees with Down syndrome, statistically significant positive correlation was found. Another study conducted by Cornejo et al. in which they had compared oral health status of 3-19 years of Down syndrome individuals versus normal children. They observed the DMFT indexes were higher in Down syndrome children than control populace. They also found that in age onwards 10 years the DMFT indexes of the normal children were higher than the Down syndrome individuals. In a study conducted by Singh V et al. total of 30 Down syndrome and 30 normal children were included. The dental caries were more prevalent among normal children (83.5%) as compared to children with down syndromes (70%). It has been observed that Down syndrome children had higher risk for the development of nursing bottle caries than typically developing children to be weaned off bottled milk at an older age or given syrup-based medicines for repeated infections because of swallowing problems. In the present study most of children had good oral hygiene status, followed by fair and poor. These findings are in disagreement with many previous studies which reported poorer status of oral hygiene and higher prevalence.
of periodontal diseases in DS children than their normal population. The reasons for this may include the reduced manual dexterity of the participants, joint laxity, and lack of comprehension of oral hygiene needs due to mental difficulties. They, therefore, need help to carry out routine oral hygiene measures. The present study found increased in OHI-S score with increase in age, which is in agreement with previous literature. In the present OIH-S score is higher in males as compared to females. When oral hygiene status stratified with respect to gender most of the males had good oral hygiene and when stratified with respect to age, the children in the age group 11-15 years had good oral health status. In the previous analysis of oral hygiene of Down syndrome children by using the debris index, it was found that 43.9% had very good oral hygiene, 33.3% respondents had good oral hygiene, 15.8% were with poor oral hygiene, while the very poor hygiene was present in 7% of the subjects. However, no statistical significant difference was found in Debris index subjects with Down's syndrome. The highest percentage of all age groups have very good oral hygiene, and good oral hygiene.

**CONCLUSION**

A high prevalence of dental caries was observed among children with Down Syndrome. There is a high need for an epidemiological survey followed by the comprehensive dental care programs for these children, as well as efforts should be taken to encourage and promote parents of these children to improve their oral health.

**CONFLICT OF INTEREST**

None to declare

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