



## ORAL HEALTH STATUS AND TREATMENT NEED AMONG MENTALLY DISABLED INDIVIDUALS IN INDORE CITY, CENTRAL INDIA

### Dental Science

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### ABSTRACT

**Objective:** To assess oral health status and treatment need among mentally disabled subjects of Indore city.

**Materials and Method:** A cross-sectional survey was conducted in disabled institution of Indore, (M.P.). Convenient sampling was employed to select a study sample of 120 mentally disabled subjects aged 12-22 years. Mentally disabled individuals diagnosed for conditions like cerebral palsy, Down's syndrome or Autism were included in the study. The residential and family information was obtained from the participating special children schools. A home visit was then scheduled to collect the data on demographic variables, oral hygiene practices and clinical examination. Dentition status, Community periodontal index (CPI) and Dean's fluorosis index was recorded using WHO 1997 proforma. Descriptive statistics and analytical tests like chi-square test, one way ANOVA was employed to compare the oral health status among the types of disabilities.

**Results:** The overall prevalence of dental caries among the participants was 82.5 percent with a mean DMFT of  $1.68 \pm 1.18$ . Individuals with cerebral palsy showed higher DMFT ( $1.98 \pm 1.14$ ) compared to autistic ( $1.77 \pm 1.23$ ) and Down syndrome individuals ( $1.10 \pm 1.04$ ) ( $p < 0.05$ ). About 54% of participants exhibited calculus deposits and shallow pockets were seen in 5%. The fluorosis experience was very minimal limiting to mild fluorosis in 2% participants.

**Conclusion:** The caries experience of mentally disabled individuals was very high. Individuals with Cerebral palsy had the higher caries level than other categories of mental disability. Gingival Bleeding and calculus deposits are more. Unmet treatment need has to be addressed among this population.

### KEYWORDS

Dentition status; mentally disabled; treatment need

### INTRODUCTION

The disabled comprise a substantial section of the community and it is estimated that there are about 500 million people with disabilities worldwide.<sup>1</sup> Mental disability has been defined by the American Association of Mental Deficiency (AAMD) as a deficiency in theoretical intelligence that is congenital or acquired in early life.<sup>2</sup> A disabled child may suffer from functional impairment that could cause special needs for dental care. In such cases conventional dental care could also be more difficult to carry out. Several investigations have highlighted the difficulties of performing dental care on children with a serious mental disability.<sup>3</sup>

Dental caries is an irreversible microbiologic disease of calcified tissues of teeth characterized by demineralization of inorganic portion and destruction of the organic substance of the tooth which often leads to cavitation.<sup>4</sup> It is the major oral health problem in developing countries, affecting 60-90% of the schoolchildren and the vast majority of adults and also most prevalent disease among mentally retarded children worldwide and dental treatment is the greatest unattended health need of the disabled.<sup>5</sup>

In India, the prevalence of dental caries is reported to be 50-60%. The data of comprehensive National Health Survey conducted in 2004 in India showed 51.9% of 5-year-old children, 53.8% of 12-year-old children and 63.1% of 15-year-old teenagers are affected by dental caries.<sup>6</sup> Some of the most important reasons may be inadequate recall systems, practical difficulties during treatment sessions, socioeconomic status, underestimation of treatment need or pain, communication problems and bad cooperation, lack of availability of dental care, postponement of treatment due to cost consideration, and under-utilization of available facility are the factors associated with the high prevalence of dental caries.<sup>1,7-9</sup>

Health of people is strongly influenced by the social and economical environment in which they live. Burden of all diseases was more in disadvantaged and socially marginalized individuals.<sup>5</sup> Oral diseases are the most common of chronic diseases and important public health problem.<sup>10</sup> Hence, this study was undertaken to assess the oral health status and treatment needs of mentally disabled individuals in Indore city. The study findings will help to draft policies to treat and prevent oral disease among mentally disabled children.

### MATERIALS AND METHODS

A descriptive cross-sectional survey was conducted in the month of May 2015 among mentally disabled individuals of Indore city, India. The sample size estimation was based on the pilot study conducted to assess the feasibility and standardization of data collection. Considering the caries prevalence of 78 percent among 20 subjects of pilot study, 5% level of confidence and 0.8 power the estimated sample size was 108. A 10 percent increase in sample size was considered taking into account the non-cooperation of study participants. So the final sample was 120 mentally disabled individuals.

The ethical clearance was obtained from Institutional Ethical Committee. Only those participants whose parents or caregivers provided consent and willing to participate were included in the study. Individuals attending special schools for any type of mental disabilities including Down syndrome, autism or cerebral palsy were included in the study. Any condition that contraindicated or did not allow oral examination in the study subject was considered for exclusion.

### DATA COLLECTION

A provisional list of schools for mentally disabled in Indore city was prepared. There were total 8 schools with a total of 340 mentally

disabled individuals. The school authorities of all schools were contacted for permission for study. Schools providing permission were further asked for enrolled individuals list and their demographic data. Only 4 schools permitted and provided the details of 146 individuals enrolled. Considering residential location of each subject on the list, it was found that 26 children were unreachable. Hence the final sample size was 120 mentally disabled individual aged between 12 to 25 years from the list prepared. The parents were then contacted for consent and permission.

A personal home visit was scheduled to collect the data. Oral examination was performed under adequate illumination (ADA Type III), using a mouth mirror and WHO CPI probe. Care was taken to avoid any discomfort to the participant. The data on dental fluorosis, periodontal status, dentition status, treatment needs and dento-facial anomalies was recorded using WHO 1997 proforma.<sup>11</sup> The parents or caregivers provided the information on family characteristics and oral hygiene practices that were recorded on printed forms.

### Statistical analysis

The data collected was entered into Microsoft Excel and analyzed using SPSS 20.0 software (IBM, Chicago). Descriptive statistics was employed to calculate and tabulate frequency, mean and standard deviation. Caries, periodontal and fluorosis experiences were compared among age, gender and type of disability using t-test, one-way ANOVA, Chi-square test. In-between groups comparison was analyzed using post hoc Least Significance difference test.

### RESULTS

The results are based on the data collected from 120 mentally disabled individuals. Table-1 shows distribution of study subjects with respect to age, gender and parental characteristics such as education, occupation and monthly income. Out of 120 subjects, 91(75.8%) were aged between 12 to 16 years and 29 (24.2%) were 17 to 22 years old. There were 52.5% males and 48.3% females. Considering the monthly family income, majority of children were belonging to low socioeconomic status (44.2%). Comparable frequency distribution was observed among the demographic variables in various categories of mental disabilities.

The frequency distribution for oral hygiene behavior among the mentally disabled individuals is tabulated in Table-2. The use of toothbrush & paste was highest amongst the individuals with cerebral palsy (93.4%) followed by Down's syndrome (74.7%) and autism (68.2%). Adjunctive oral hygiene use like mouthwash (18.2%) and dental floss (13.6%) was seen with higher frequency in individuals with Down syndrome. Majority of individuals brush their teeth for 2-4 minutes once a day.

Comparison of dental caries, periodontal disease and dental fluorosis experience among mentally disabled individuals was shown in Table 3. The overall caries prevalence among the study subjects was 82.5 percent. The CPI scores indicated that about 54 percent of mentally disabled individuals showed presence of calculus. Whereas only 4 percent of the study participants suffered from shallow pocket. None of them exhibited deeper pockets. The dental fluorosis experience was very minimal in the form of questionable to mild fluorosis among 9% of the mentally disabled individuals. Among the disability types, Individuals with cerebral palsy (95.1%) were having significantly higher caries experience compared to individuals with autism (86.4%) and Down syndrome (59.5%) ( $p < 0.05$ ). In terms of periodontal condition, individuals with Down syndrome showed higher presence of calculus (54.1%) and shallow pocket (8.1%) compared to other disabilities ( $p = 0.199$ ).

The mean DMFT scores were compared among the study participants in relation to their age, gender and type of disability (Table-4). The mean DMFT of study subjects was  $1.68 (SD \pm 1.18)$ . There was no statistically significant difference observed in mean DMFT score among the age-groups and gender. Although, males exhibited higher mean DMFT  $1.73 (SD \pm 1.18)$  than females  $1.6 (SD \pm 1.2)$ .

A statistically significant difference with mean DMFT score was found among various categories of mental disabilities using a one-way ANOVA ( $p < 0.05$ ). A higher DMFT score was observed among individuals with cerebral palsy ( $1.98 \pm 1.14$ ) and Autism ( $1.77 \pm 1.23$ ) compared to Down syndrome ( $1.10 \pm 1.04$ ). A post-hoc analysis using Least Significance Test indicated a statistical significant difference

between cerebral palsy and Down syndrome; autism and down syndrome, but no difference was observed between cerebral palsy and autism.

The treatment needs among the study subjects indicated that, out of 120 participants, 99 (82.5%) required some forms of treatment, the major treatment required was one surface filling (65.8%) followed by two surface filling (21.6%), pulp care (19.1%) and extraction (15%) [Figure-1].

### DISCUSSION

This study describes the oral health practices, prevalence of dental caries, periodontal health and treatment needs in a sample of mentally disabled individuals of Indore city, Central India. It was evident that the caries experience of the disabled individuals was higher than that found in national oral health survey and fluoride mapping in India (2002) reported dental caries prevalence of 61.7% in 12 years age normal children of Indore.<sup>6</sup> which also adhered to the WHO methodology. The present study reported overall prevalence of dental caries among mentally disabled individuals was 82.5%. Similar findings were reported by Jain M (2008) caries prevalence of 83.92% in mentally disabled 5-22 years old Indian population.<sup>1</sup> Studies carried out by Pope JEC et al., (1991)<sup>12</sup>; Purohit BM and Singh A (2012)<sup>13</sup>; Hashim NT et al (2012)<sup>14</sup> have also reported higher caries prevalence among mentally disabled children (60%). Due to their psychological and physical impairment, uncooperative behavior as well as inadequate oral hygiene measurements, they might consequently be at risk for a higher intensity of caries. This can also be explained on the basis of socioeconomic status of mentally disabled individuals. In our study majority of the participants belonged to the low socioeconomic status. According to Hobdell et al., (2003)<sup>15</sup> a strong association exists between dental caries prevalence and socioeconomic status. Similarly, Petersen (2005)<sup>16</sup> also reported the existence of a social gradient in dental caries prevalence on studying the association in dental caries indicators and socioeconomic status. High caries prevalence is associated with a low socioeconomic status.

The treatment need among mentally disabled individuals was higher and could be due to untreated caries. These populations had a greater need for specialized dental care. They were totally dependent on the caregivers or parents and this will certainly impact on care seeking.

In the present study, tooth brushing with toothpaste was reported in all the participants. But use of adjunctive oral hygiene aids like flossing and mouthwash was majorly observed among the autistic and Down syndrome individuals. Supportive to this higher caries was observed among the cerebral palsy individuals who were only dependent on tooth brushing by them or by their parents or caregivers. Cerebral palsy individuals are generally incapable of obtaining an adequate oral hygiene level by manual brushing because of their limited motor skills and lack of knowledge of oral hygiene measures and effective tooth brushing technique, which in turn result in poor oral conditions. Hence, while suggesting oral care for these mentally disabled individuals it is always helpful to recommend usage of mouthwash and dental flossing.

The prevalence of calculus deposits and shallow pockets was higher among the Down syndrome individuals compared to other types of disabilities. These findings are in accordance with reports of Gullikson JS (1973)<sup>17</sup> and Forsberg H et al., (1985)<sup>18</sup> who showed that persons with Down's syndrome consistently showed increased frequency of periodontitis compared with other mentally retarded patients. Many contributing factors like abnormal anatomical aspects of teeth, disorders of connective tissue and alteration in immunological response may also play a role in the prevalence and progression of the periodontal disease process.

The present study showed higher DMFT score among cerebral palsy individuals ( $1.98 \pm 1.14$ ) followed by autistic ( $1.77 \pm 1.23$ ) and Down syndrome individuals ( $1.10 \pm 1.04$ ). A study by Barnett et al., (1986)<sup>19</sup> reported that Down syndrome individuals had lower caries prevalence when compared with age matched other mentally disabled subjects. Similarly, studies carried out by Vigild (1986)<sup>20</sup>; Ulseth et al., (1991)<sup>21</sup>; Dellavia et al., (2009)<sup>22</sup>; Davidovich et al., (2010)<sup>23</sup> found lower prevalence of dental caries among Down syndrome individuals. Also, study done by Kamen & Skier (1985)<sup>24</sup>; Planefeldt CF (2001)<sup>3</sup> reported a low incidence of caries in autistic children. The low caries prevalence among individuals with Down syndrome and Autism may be related to

delayed eruption of the teeth, higher salivary pH and bicarbonate levels, microdontia, spaced dentition, shallow fissures of the teeth and congenitally missing teeth.<sup>25,26</sup>

The results of present study should be carefully generalized to other similar populations as this study may have some limitation of small study population and convenience sampling. As parents were the proxy indicators of dietary habits of mentally disabled individuals. Anyhow, not considering the diet habits has been considered in the limitation and recommended for further studies. Nevertheless this study shows the neglected oral health among this population and stresses the need for better oral care by the health professionals.

**CONCLUSION**

This study concludes high prevalence of dental caries among mentally disabled individuals of Indore city. The unmet treatment need is also

reported to be high. Individuals with Cerebral palsy had the higher caries level than other categories of mental disability. The periodontal condition like bleeding on probing and calculus was commonly found, although severe periodontal pocket occurrence was less. The oral health professionals should focus on meeting the need of this population and improve the knowledge and behavior regarding oral health maintenance.

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**CONFLICT OF INTEREST**

There is no conflict of interest.

**Table 1: Frequency distribution of demographic variables among the mentally disabled individuals**

Demographic variables		Cerebral Palsy		Down Syndrome		Autism		Total	
		N	(%)	n	(%)	n	(%)	n	(%)
Age group	12-16 Yrs	49	(80.3)	26	70.3	16	72.7	91	75.8
	17-22 Yrs	12	(9.7)	11	29.7	6	27.3	29	24.2
Gender	Male	28	(45.9)	21	56.8	14	63.6	63	52.5
	Female	33	54.1	16	43.2	8	36.4	57	47.5
Per Capita income of Family	Less 50000	17	27.9	10	27.0	4	18.2	31	25.8
	50k-2L	28	45.9	17	45.9	8	36.4	53	44.2
	2L-4L	15	24.6	9	24.3	10	45.5	34	28.3
	more 4L	1	1.6	1	2.7	0	0.0	2	1.7
Father Education	Up-to 10th grade	30	49.2	14	37.8	15	68.2	59	49.2
	Pre-university	16	26.2	12	32.4	3	13.6	31	25.8
	Graduate	12	19.7	9	24.3	4	18.2	25	20.8
	Postgraduate	3	4.9	2	5.4	0	0.0	5	4.2
Father Occupation	Government service	4	6.6	4	10.8	2	9.1	10	8.3
	Private service	31	50.8	19	51.4	12	54.5	62	51.7
	Small scale business	22	36.1	9	24.3	8	36.4	39	32.5
	Large scale business	4	6.6	5	13.5	0	0.0	9	7.5
Mother Education	uneducated	8	13.1	0	0.0	1	4.5	9	7.5
	Up-to 10th grade	34	55.7	24	64.9	14	63.6	72	60
	Pre-university	15	24.6	8	21.6	6	27.3	29	24.2
	Graduate	1	1.6	1	2.7	0	0.0	2	1.7
Mother Occupation	Postgraduate	3	4.9	4	10.8	1	4.5	8	6.7
	Government service	0	0.0	3	8.1	1	4.5	4	3.3
	Private service	9	14.8	4	10.8	3	13.6	16	13.3
	Small scale business	4	6.6	5	13.5	1	4.5	10	8.3
	Large scale business	0	0.0	0	0.0	0	0.0	0	0
	Housewife	48	78.7	25	67.6	17	77.3	90	75

**Table 2: Oral hygiene behavior of the mentally disabled individuals.**

Demographic variables		Cerebral Palsy		Down Syndrome		Autism		Total	
		n	(%)	n	(%)	n	(%)	n	(%)
Means	Tooth brush and paste	57	93.4	28	75.7	15	68.2	100	83.3
	Dental Floss	2	3.3	0	0	3	13.6	5	4.2
	Mouth wash	2	3.3	9	24.3	4	18.2	15	12.5
Duration	Less than 2 min	13	21.3	5	13.5	2	9.1	20	16.7
	2-4 min	27	44.3	13	35.1	11	50.0	51	42.5
	More than 4 min	21	34.4	19	51.4	9	40.9	49	40.8
Frequency	Not everyday	7	11.5	7	18.9	4	18.2	18	15
	Once daily	35	57.4	19	51.4	12	54.5	66	55
	Twice daily	19	31.1	11	29.7	6	27.3	36	30

**Table 3: Comparison of dental caries, periodontal disease and dental fluorosis experience among mentally disabled individuals using chi square test.**

Oral health status		Disability type			Total (n = 120)	p-value
		Cerebral Palsy (n = 61)	Down Syndrome (n = 37)	Autism (n = 22)		
Dental caries	Present	58 (95.1)	22 (59.5)	19 (86.4)	99 (82.5)	.000*
	Absent	3 (4.9)	15 (40.5)	3 (13.6)	21 (13.6)	
CPI score	Healthy	4 (6.6)	4 (10.7)	2 (9.1)	10(8.3)	.199
	Bleeding	33 (54.1)	10 (27.1)	8( 36.4)	51 (42.5)	
	Calculus	23 (37.7)	20 (54.1)	11 (50)	54 (45)	
	Shallow Pockets	1 (1.6)	3 (8.1)	1 (4.5)	5 (4.2)	
Fluorosis	Normal	56 (91.8)	33 (89.2)	20 (91.0)	109 (90.8)	.796
	Questionable	4 (6.6)	2 (5.4)	1 (4.5)	7 (5.8)	

	Very Mild	1 (1.6)	1 (2.7)	0 (0)	2 (1.7)	
	Mild	0 (0)	1 (2.7)	1 (4.5)	2 (1.7)	

\* = Statistically significant (p<0.05)

**Table 4: Comparison of mean DMFT score among mentally disabled individuals.**

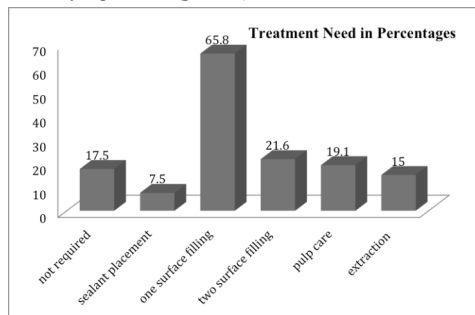
Variables		N	Mean DMFT	Std. Deviation	Sig. (2-tailed)
Age Group #	12-16 Yrs	91	1.6703	1.19308	.940
	17-22 Yrs	29	1.6897	1.19832	
Gender #	Male	63	1.7302	1.18057	.595
	Female	57	1.6140	1.20645	
Disability \$	Cerebral Palsy	61	1.9836	1.14734	.001*
	Down Syndrome	37	1.1081	1.04838	
	Autism	22	1.7727	1.23179	
Post Hoc (Least Significance Test)	Cerebral Palsy Vs Down Syndrome				.000*
	Down Syndrome Vs Autism				.031*
	Autism Vs Cerebral Palsy				.456

# = unpaired t test

\$ = One way ANOVA

\* = Statistically significant (p<0.05)

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**Figure 1 - Dental treatment need among mentally disabled individuals**

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