

Dentofacial Changes, Oral Health Status and Treatment Needs of Disabled Children in Udaipur City, Rajasthan

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ABSTRACT

Aim: To assess the prevalence of Dentofacial changes, Oral health status and Treatment needs in institutionalized disabled children of Udaipur City, Rajasthan.

Methods and Materials: Three hundred children in the age group of 6-15 years were examined in special schools of Udaipur city to record the oral health status, dentofacial abnormalities and will also be subjected to detailed evaluation of treatment needs using WHO oral assessment criteria.

Results: Poor oral hygiene status was more prevalent among mentally disabled in comparison to physically disabled subjects. Mean dmft and DMFT was greater among blind subjects than Hearing impaired followed by Cleft palate and Down's syndrome subjects. Overall one and two surface filling was most frequent treatment needs in the handicapped individuals. 17(12.0%) CP and 36(25.4%) Down's syndrome subjects had severe malocclusion in comparison to 4(2.8%) blind and 1(0.7%) hearing impaired subjects.

Conclusion: Education and motivation of the care providers of these children is vitally important towards improving and maintaining the oral health and hence the overall general health of these children.

Keywords: Dentofacial changes, oral health status and treatment needs of disabled children.

INTRODUCTION

Oral health has been defined as "The standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort and embarrassment and which contributes to general well-being".^{1,2} Oral health has strong biological, psychological and social projections; because it affects our aesthetics and communication, and the quality of life is affiliated with oral health status.³ Normal facial morphology and its components are necessary for harmony and aesthetic of the craniofacial complex.

Oral and dental anomalies are a frequent accompaniment of special needs children leading to improper functioning of stomatognathic complex. Oral cavity plays an important role in the satisfaction to be achieved from life through functions like mastication, aesthetic, phonetics, communication and expression.^{4,5}

The disabled form a substantial section of the community and it is estimated that world wide there are about 500 million people with

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disabilities.^{1,2} The portion of the disabled in India as per Census 2001 is 21,906,769 which constitutes at 2.13% of the population. In India, sensory impairment (visual and hearing) together accounts to largest percentage of disability followed by mental disabilities.^{6,7,8} In poor societies, many disabled persons find it difficult to survive, where nutritional status is very low and services are inadequate and hence disabled often live in extreme poverty, misery and despair, leading to dependency and deprivation.⁷

Sensory impairment in childhood is often part of a multiple disability disorder. When sight and hearing are impaired in childhood, it can have detrimental effects on physical, neurological, cognitive and emotional development. In addition, they are deprived of the opportunity to learn by imitation. Dental and periodontal problems are more prevalent in these patients although the aetiology is similar to that of healthy children.^{3,9,10}

Mental retardation has been defined by the American Association of Mental Deficiency (AAMD) as "Subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior".^{11,12}

Down's syndrome (DS) and cerebral palsy (CP) are two of the most often encountered and easily discernible of all developmental disabilities. In literature they have been reported to have poorer oral hygiene, compromised periodontal status, greater degree of untreated caries, fewer remaining teeth, malocclusions, temporomandibular joint dysfunctions, bruxism, drooling etc.¹³⁻²³ It is highly essential to safe guard oral health of disabled children from childhood otherwise poor oral health will adversely affects the overall health.

In recent years, there have been an increasing number of studies concerning the dental health of normal children. However, very little attention has been paid to the dental health of the disabled children, who actually require special care and attention. Since there is paucity of data regarding the oral health conditions of disabled children in institutionalized blind, hearing impaired (HI) and mentally disabled children in the city of Udaipur in Rajasthan, as well as the awareness of care-

providers of these children towards their child's oral hygiene, hence the need for this study.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted to evaluate the Oral health status, Dentofacial changes and Treatment needs of three hundred Institutionalized Hearing impaired, Blind and Mentally disabled children (Down's syndrome and Cerebral palsy) in the age group of 6-15 years, of Udaipur City, Rajasthan. Children who were uncooperative and had severe detrimental systemic disorders were excluded from the study.

Before starting the study, the purpose of study was informed and explained to the children. Prior consent was obtained from the respective institution authorities and from the parents/guardians through the institutions to conduct the study. The children were examined at their respective schools/centers, seated on an ordinary chair, under good illumination, either natural light or hand torch using a sterile mouth mirror and William's probe. All examinations were conducted by the same examiner.

The first part of the required data was recorded in a proforma which consisted of name, age, sex of the children, special group they belonged to and name of the institution. Oral hygiene of the children was evaluated using the Simplified oral hygiene index.²⁴ This proforma was filled by the trained recorder by interviewing the care taker during fieldwork. The second part consisted of WHO Oral Health Assessment form (1997).²⁵ The oral cavities of children were examined and Dentition status, Treatment needs and Dentofacial anomalies were recorded using WHO-criteria.²⁵ A master table was prepared and subjected to statistical analysis using Statistical Package of Social Science (SPSS Version 15; Chicago Inc., USA). Data comparison was done by applying specific statistical tests to find out the statistical significance of the comparisons. Significance level was fixed at $P \leq 0.05$.

RESULTS

Poor oral hygiene status was more prevalent among mentally disabled in comparison to physically disabled subjects. 15(5.0%) HI subjects had poor oral hygiene status in comparison to 35(11.7%)

blind subjects. While 38(12.7%) CP subjects had poor oral hygiene status in comparison to 37(12.3%) DS subjects. There was statistically significant difference between these groups. **(Table I & Graph I)**

Table II shows mean level of caries prevalence in primary and permanent dentition according to type of handicap. Mean dmft and DMFT was greater among blind subjects than HI followed by CP and DS subjects. There was no statistically significant difference between all the groups.

Among 300 subjects, 117(39.0%) subjects had traumatic injury. 19(16.2%) HI were having traumatic injury in comparison to 40(34.2%) blinds. While 37(31.6%) CP subjects were having traumatic injury in comparison to 21(17.9%) There was statistically significant difference among the groups. **(Table III)**

Overall one and two surface filling was most frequent treatment need in the handicapped individuals. Blind showed significantly higher two surface filling treatment need than HI. Overall pulp care and restoration was required in 31(48.4%), 18(28.1%), 9(14.1%) and 6(9.4%) blind, HI, CP and DS subjects. Extractions were required in 37(40.7%), 17(18.7%), 13(14.3%) and 24(26.4%) blind, HI, CP and DS subjects of the study population respectively. No statistical significant difference was found between groups for crown and veneer laminate. However, there was significant difference between groups needing preventive care and fissure sealant. **(Table IV)**

Table V & Graph IV shows prevalence of dentofacial anomalies according to level of severity. Out of 300 subjects, 51(35.9%) had minor malocclusion [Dental Aesthetic Index (DAI) Score $\leq$ 25] while 25(17.6%) had definite malocclusion (DAI Score 26-30). Severe (DAI Score 31-35) and handicapping (DAI Score $\geq$ 36) malocclusion were seen in 58(40.9%) and 8(5.6%) respectively. 17(12.0%) CP and 36(25.4%) DS subjects had severe malocclusion in comparison to 4(2.8%) blind and 1(0.7%) hearing impaired subjects. None of the hearing impaired subjects had severe handicapping malocclusion in comparison to 2(1.4%) blinds. There was significant difference in level of severity among all groups.

DISCUSSION

People with special needs have been described as those who encounter more barriers to the receipt of dental care than other people. In the present study, the disabled subjects attending special needs schools had a poorer standard of oral hygiene and greater prevalence of calculus and periodontal disease than that found in normal children of comparable age groups. Similar studies were done by Adenubi JO et al. (1997)³⁸, Ahmad MS et al., (2009)³⁹ and Rao D et al., (2005)³ which showed that subjects with intellectual disabilities had the worst oral hygiene. While hearing and visually impaired subjects had better oral hygiene than other disabled individuals.

The reason for poor oral hygiene in disabled children has been attributed to low power of concentration and lack of motor skills. The most obvious challenge is the physical inability to adequately clean the oral cavity. In general, there is a wide range of toothbrushing ability, which is related to coordinated muscular movements, innate skills, ability to understand instructions, and age of the individual.^{40,41} Many systemic conditions increase the risk of poor oral hygiene. A number of studies point out towards abnormalities of polymorphonuclear leucocytes and monocytes in DS individuals.³¹⁻³³

Children with HI come close to being 'normal' and probably were able to function well both manually and intellectually. Individuals with problems of vision are able to comprehend oral hygiene instructions and also have more normal kinetic skills; however, they may still have difficulty seeing and removing plaque. A similar study done by Ajami BA et al., (2007)⁴² showed that caries prevalence for HI was lower than those mentally retarded and blind. In contrast to this study, a study done by Simon ENM et al., (2008)⁴³ showed that the deaf had the highest mean decayed surfaces, followed by the mentally retarded and the blind. Few of the CP children suffered with caries as one significant finding was that the children affected with drooling were not affected with caries teeth. Thus, the important variable in determining oral health status is the type of disability and how that disability impacts the maintenance of adequate or sound oral hygiene.

Table I: Distribution of Oral health status according to type of Handicap.

Oral health status	Type of handicap				Total	Chi- square	p- value
	Blind	Hearing impaired	Cerebral palsy	Down's syndrome			
Good	10	22	1	0	33	83.111	0.001
	3.3%	7.3%	.3%	.0%	11.0%		
Fair	55	63	11	13	142		
	18.3%	21.0%	3.7%	4.3%	47.3%		
Poor	35	15	38	37	125		
	11.7%	5.0%	12.7%	12.3%	41.7%		
Total	100	100	50	50	300		
	33.3%	33.3%	16.7%	16.7%	100.0%		

Table 2: Distribution of Mean value ($\pm$ Standard Deviation) of dmft and DMFT in Primary and Permanent dentition according to Type of Handicap.

	Type of Handicap				Total	Chi-square	p-value
	Blind	Hearing impaired	Cerebral palsy	Down's syndrome			
Mean dmft	1.19 $\pm$ 1.26	1.08 $\pm$ 1.47	0.50 $\pm$ 0.78	0.77 $\pm$ 1.07	0.89 $\pm$ 1.18	1.966	0.123
Mean DMFT	2.47 $\pm$ 1.61	2.33 $\pm$ 1.52	2.17 $\pm$ 1.79	1.61 $\pm$ 1.47	2.08 $\pm$ 1.60	2.157	0.097

Table 3: Distribution of Traumatic Injury according to type of Handicap.

	Type of Handicap				Total	Chi- square	p- value
	Blind	Hearing impaired	Cerebral palsy	Down's syndrome			
Traumatic Injury	40	19	37	21	117	11.923	0.008
	34.2%	16.2%	31.6%	17.9%	39.0%		

Table 4: Distribution of overall Treatment needs according to type of Handicap.

Treatment need	Type of Handicap				Total	Chi-square	p-value
	Blind	Hearing impaired	Cerebral palsy	Down's syndrome			
1. One surface filling	58 47.9%	37 30.6%	12 9.9%	14 11.6%	121 40.3%	46.702	0.001

2. Two surface filling	59 52.2%	27 23.9%	13 11.5%	14 12.4%	113 37.7%	48.947	0.001
3. Crown for any reason	30 35.7%	18 21.4%	19 22.6%	17 20.2%	84 28.0%	5.238	0.154
4. Veneer or laminate	38 32.5%	30 25.6%	25 21.4%	24 20.5%	117 39.0%	4.197	0.240
5. Pulp care and restoration	31 48.4%	18 28.1%	9 14.1%	6 9.4%	64 21.3%	23.625	0.001
6. Extraction	37 40.7%	17 18.7%	13 14.3%	24 26.4%	91 30.3%	14.626	0.003
7. Preventive care	50 31.1%	53 32.9%	30 18.6%	28 17.4%	161 53.7%	12.739	0.006
8. Fissure sealant	48 35.0%	46 33.6%	20 14.6%	23 16.8%	137 45.7%	19.175	0.001

Table 5: Table V: Distribution of subjects with Dentofacial Anomalies according to level of severity and type of Handicap.

	Type of Handicap				Total	Chi- square	p- value
	Blind	Hearing impaired	Cerebral palsy	Down's syndrome			
Minor malocclusion DAI Score ≤ 25	23 16.2%	12 8.5%	9 6.3%	7 4.9%	51 35.9%	62.685	0.001
Definite malocclusion DAI Score 26-30	3 2.1%	3 2.1%	14 9.9%	5 3.5%	25 17.6%		
Severe malocclusion DAI Score 31-35	4 2.8%	1 0.7%	17 12.0%	36 25.4%	58 40.9%		
Very Severe malocclusion DAI Score ≥ 36	2 1.4%	0 0.0%	4 2.8%	2 1.4%	8 5.6%		
Total	32 22.5%	16 11.3%	44 31.0%	50 35.2%			

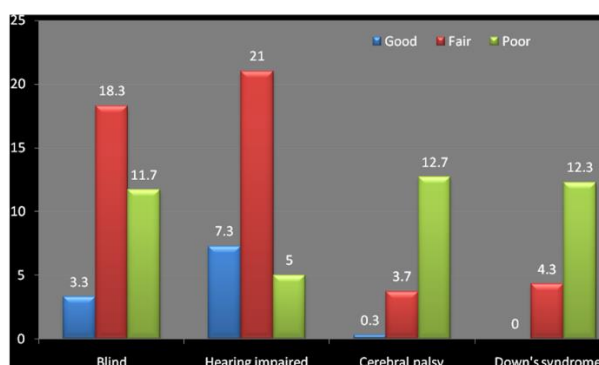
From the epidemiological data available to date there is conflict in the views of caries susceptibility in Down syndrome children. Delayed eruption, reduced time of exposure to a cariogenic environment, congenitally missing teeth, higher salivary pH and bicarbonate levels, spaced dentition, microdontia and shallow fissures of the teeth, all lend to lower risk of dental caries.^{13,14,16,44,45}

In the present study, one surface, two surface filling requirements was significantly higher in blind than the HI population which can be correlated to the

significantly higher mean decayed teeth in blind than the HI individuals. Pulp care and extraction were seen more in blind probably because the blind are not able to see their dental problems even at a later stage of decay and depend more on symptoms like pain to know about their problem.³⁹ The results of this study were similar to various studies done by Desai M et al.,(2001)⁴⁶; Kumar M et al.,(2006)⁴⁷; Asokan S et al., (2008)⁴⁸.

A number of factors may exist to explain why there is so much unmet treatment needs among the handicapped children. Lack of knowledge about

good oral hygiene is prevalent among the care takers and concerned authorities, lack of motivation, low priority given to the dental care in the society, lack of facilities for early and regular oral health check-up and prompt treatment, poor socioeconomic status of the parents or the guardians and cost of treatment may be the reason for the accumulated treatment needs.



Graph 1: Distribution of Oral health status according to type of Handicap.

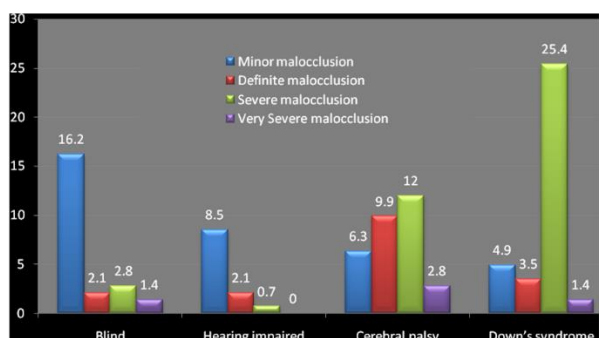


Fig 2: Distribution of subjects with Dentofacial anomalies according to the level of severity and type of Handicap.

In the present study fracture of teeth was seen more in blind subjects than HI, CP and DS subjects. More fracture of teeth in disabled population can also be correlated to higher number of these subjects having Class II Div I malocclusion in which proclined maxillary incisors have higher chances of trauma. The majority of dental injuries in the anterior teeth, in particular are to the central incisors, which, being on the front of the face, are in the direction of body movement and tend to receive more trauma; and the early eruption exposes the central incisors to the risk of trauma for a longer

period. Severe malocclusion was a significant risk factor for the occurrence of traumatic injuries.^{49,50}

The type of disability was not a risk factor for occurrence of traumatic injuries. However, a large proportion of individuals with mental retardation sustain dental injuries; and this has been attributed to the associated epileptic seizures, which is an important predisposing factor in this group of individuals. Among a group of disabled children, more than half who were recorded as having had a fall were found to suffer from epilepsy.^{13,14,16}

Disabled subjects attending special needs schools had higher prevalence of malocclusion than normal children did, which is consistent with the results of previous studies. Factors contributing to the high prevalence of malocclusion might be functional anomalies of the tongue, perioral muscles and particular patterns of oral habits.

Although different criteria have been used, the findings of this study show that persons with Down syndrome have markedly increased frequencies of mandibular overjet, mesial molar occlusion, crossbite and frontal open bite compared to Increased prevalence of Angle's class III malocclusion has been recorded in a high proportion of subjects with Down syndrome. There is an alteration in the cranial-base relationships, which predisposes individuals with Down syndrome to class III malocclusion, and an extensive skeletal basis for this finding has been reported.^{4,5,15,20}

Reports on the prevalence of Class II Div I malocclusion in children with cerebral palsy seems to be related to the disharmonious relation between intra-oral and peri-oral movements. Uncontrolled and uncoordinated movements of jaws, lips and tongue are observed often in patients with cerebral palsy.^{4,5,15,20}

CONCLUSION

The findings in this study spotlight the lack of dental treatment for this group. The poor oral health is due to poor dental care facilities and the attitude and lack of awareness among the care takers in these institutions. There is an urgent need to plan properly to meet the unmet needs of these institutionalized disabled children.

Therefore, early screening and intervention programmes are essential. Education and motivation of the care providers of these children is vitally important towards improving and maintaining the oral health and hence the overall general health of these children.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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