

Oral Health Status in Mentally Disabled Children, Dental Care Knowledge of Parents, and the Impact of Audiovisual Oral Health Education Program

Ruby K Shah¹, Swati Choudhary², Sandeep Tandon³

ABSTRACT

Aims and objectives: The aims and objectives of this study were to evaluate the oral health status in a group of mentally disabled children, to identify the oral health knowledge of parents and to assess the impact of audiovisual oral health education program.

Materials and methods: The study sample comprised of 120 mentally disabled subjects aged 5–16 years and 40 parents attending a vocational institute in Jaipur, India. Caries status and oral hygiene status were assessed by DMFT Index and Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillion, respectively. Twenty pre- and post-structured close-ended questions were designed and a 5-minute video on oral health education was prepared. Data was analyzed by using one way ANOVA test followed by *Post hoc* Tukeys HSD Test, Wilcoxon Signed Rank Test, and Chi-square test. Effectiveness index was calculated to find the impact of AV Teaching Program.

Results: Oral hygiene status deteriorates as the severity of mental retardation increases but it was not found significantly associated with oral hygiene status. An effectiveness index of at least 0.5 indicates that the instructional media was satisfactorily effective.

Conclusion: Maximum children with poor oral hygiene were in the category of severe mental retardation and mean OHI-S score decreases from severe-to-mild mental retardation. The newly designed audiovisual aid on complete oral health care was effective at some levels in improving the oral health knowledge of the parents/caregivers of mentally retarded children.

Keywords: Caries status, Mental retardation, Oral-health education program, Oral hygiene.

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INTRODUCTION

Oral health is an important aspect of health for all children, and is all the more important for children with special health needs. Individuals with disabilities or illnesses receive less oral care than the normal population in spite of the high level of dental diseases among them. It has been reported that dental treatment is the greatest unattended health need of the disabled people.¹ The primary aim of dental services for disabled people should be to prevent dental diseases, which require proper planning and implementation of services.

It has been established that the children in the population are priority group in planning and health program. A normal child gets the benefit of love and care from his or her parents and society where as the unprivileged children such as physically handicapped, mentally handicapped, and socially handicapped are neglected by their own kith and kin as well as the society.² Their oral health condition may be influenced by age, severity of impairment, and living conditions. Individuals with special needs may have great limitations in oral hygiene performance due to their potential motor, sensory, and intellectual disabilities,³ and so are prone to poor oral health. This group of individuals may also not understand and assume responsibility for or cooperate with preventive oral health practices. Those who are very young, those with severe impairments, and those living in institutions are dependent on parents, siblings or caregivers for general care including oral hygiene. Many parents/caregivers do not have the requisite knowledge or values to recognize the importance of oral hygiene and do not themselves practice appropriate oral hygiene or choose a proper diet.⁴ They may be more susceptible to dental

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caries if they reside at home and are pampered with cariogenic snacks and other unhealthy eating habits.⁵

An important component in reducing the caries/gingivitis rate in these children worldwide is to provide information to the parents, guardian, and caregivers regarding the causes and self-care prevention of dental disease. Understanding of oral health among the parents is typically lacking due to inadequacy of oral health programs conducted in institutions or schools for these special children. Most of the parents lack sufficient knowledge of importance of oral health, while the instruction aids available to them are often inadequate and outdated.⁶

WHO in 1981 first started the medical services for handicapped children. Since then, a number of specialist pediatric dentists are willing and qualified to provide dental health services to this group of children.⁷ Also, with relatively few investigations done into the

dental conditions of these children and evaluation of effectiveness of oral health education program in the form of audiovisual aids generally in this country, there has been inadequate dental care for disabled children.

MATERIALS AND METHODS

A total of 120 children with disability between the ages of 5–16 years of age and parents of such children who provided the consent for the participation (40) were included in the study as sample. The study was carried out in Prayas-vocational institute for the mentally and physically challenged in Jaipur, Rajasthan, India.

The study was divided into four parts, including a clinical examination, a questionnaire survey, promotion program in the form of audiovisual aids about primary oral health care for the parents/guardian, and assessment of the impact of audiovisual aid on increasing the knowledge and awareness of parents/caregivers after a period of 2 weeks.

All clinical examinations were conducted by one examiner assisted by trained person for recording data throughout the study. The medical records of the students attending the special schools at the time of examination were studied and data regarding personal information, IQ level (The Stanford-Binet Intelligence Scale), and type of mental disability was recorded.

Subjects were examined for the following parameters using the World Health Organization Oral Health Survey Basic Methods:

- Dental caries examinations were carried out using a mirror and explorer in accordance with World Health Organization criteria and methods.
- Twenty pre and post structured close-ended questions were designed for the study. The questionnaire was used in a pilot test on five parents not participating in the study.
- 5-minute video, which was demonstrated to the parents/caretakers emphasizing the importance of oral health, caries process, selection of proper diet, proper tooth brushing technique, and the preventive aspects.

The data were analyzed to determine the difference between pre- and post-test scores and then the effectiveness of the media.

The instructional media's effectiveness was calculated from the following formula (Goodman et al.),⁸

Effectiveness Index:

$$\frac{\text{Sum of post - test scores} - \text{Sum of pre - test scores}}{(\text{Number of subject} \times \text{Full score}) - \text{Sum of pre - test scores}}$$

All data was entered in excel sheet and subjected to statistical Analysis. Data on Interval and Ratio scale was summarized as Mean and Standard Deviation while data on Nominal scale as Percentages.

Interval and Ratio scale data was analyzed by using one way ANOVA test followed by *Post hoc* Tukeys HSD Test. Ordinal scale data was compared by Wilcoxon Signed Rank Test and Chi-square test was applied for Nominal Data.

SPSS 17.0 version was used for Statistical Calculations. "*p*" < 0.05 was taken as significant.

Effectiveness index was calculated to find the impact of AV Teaching Programme.

RESULTS

A total of 120 subjects attending the special school were examined, out of which 92 (76.67%) were males and 28 (23.33%) were females. Maximum (47.50%) mentally disabled children were in the age group of 11 years and above while least (24.17%) were below 8 years of age (Table 1).

Maximum (57.50%) mentally disabled children were having fair oral hygiene score (OHI) while only 10% were having poor OHI score (Table 2).

Incidence of poor oral hygiene was maximum (14.04%) in age group ≥ 11 years of age whereas incidence of good oral hygiene was maximum (51.72%) in age group <8 years of age.

In children with mild mental retardation the oral hygiene status was good in 22.22%, fair in 72.22% and poor in 5.56%.

Oral hygiene status in children with moderate retardation was good in 41.67%, fair in 48.33% and poor in 10%.

In children with severe mental retardation oral hygiene status was good in 25%, fair in 58.33% and poor in 16.67%.

Table 1: Distribution of mentally disabled children according to age and sex

Age (yrs)	Male		Female		Total	
	No.	%	No.	%	No.	%
<8	22	18.33	7	5.83	29	24.17
8–10	24	20.00	10	8.33	34	28.33
≥ 11	46	38.33	11	9.17	57	47.50
Total	92	76.67	28	23.33	120	100.00

Table 2: Distribution of study population according to age and oral health status

Age (yrs)	Poor		Fair		Good		Total	
	No.	%	No.	%	No.	%	No.	%
<8	1	3.45	13	44.83	15	51.72	29	100.00
8–10	3	8.82	20	58.82	11	32.35	34	100.00
≥ 11	8	14.04	36	63.16	13	22.81	57	100.00
Total	12	10.00	69	57.50	39	32.50	120	100.00

Chi-square, 8.303 with 4 degrees of freedom; *p*, 0.081

Therefore oral hygiene status was good in children with moderate mental retardation and poorest in children with severe mental retardation (Table 3).

All the three categories of mental retardation were found statistically alike w.r.t. Debris Index (DI) when ANOVA test was applied ($p = 0.390$) (Table 4).

Children with severe mental retardation were having maximum mean Calculus Index (CI-S) Score, that is, 0.51 followed by children with moderate (0.64) and mild (0.55) mental retardation (Table 5).

Mean oral hygiene score was maximum in children with severe mental retardation (2.08) followed by children with moderate mental retardation (1.83) and mild mental retardation (1.83) (Fig. 1).

Although all the three categories of mental retardation were found statistically alike w.r.t. Oral Hygiene Index (OHI-S) when ANOVA test was applied ($p = 0.505$) (Table 6).

Mean DMFT was maximum (1.53) in children with severe mental retardation and was not found alike statistically with rest of other two categories of children with mental retardation when ANOVA test was applied ($p = 0.018$).

When *Post hoc* Tukey' HSD test was applied severe mentally retarded children showed statistically significant difference with

children with moderate mental retardation but not with mild mentally retarded children.

Mean DMFT score in children with moderate mental retardation was 0.76 and in children with mild mental retardation DMFT score was 1.32 (Table 7) (Fig. 2).

Mean deft score was maximum (2.30) in children with severe mental retardation and was not found alike statistically with rest of other two categories of children with mental retardation when ANOVA test was applied ($p = 0.049$).

When *Post hoc* Tukey' HSD test was applied severe mentally retarded children showed statistically significant difference with children with moderate mental retardation but not with mild mentally retarded children.

Mean deft score in children with moderate mental retardation was 1.62 and in children with mild retardation deft score was 1.55 (Fig. 2).

Mean deft score was maximum (2.30) in children with severe mental retardation and was not found alike statistically with rest of other two categories of children with mental retardation when ANOVA test was applied ($p = 0.049$).

When *Post hoc* Tukey' HSD test was applied severe mentally retarded children showed statistically significant difference with

Table 3: Distribution of study population according to severity of mental retardation and oral hygiene status

Severity of mental retardation	Poor		Fair		Good		Total	
	No.	%	No.	%	No.	%	No.	%
Mild	2	5.56	26	72.22	8	22.22	36	100.00
Moderate	6	10.00	29	48.33	25	41.67	60	100.00
Severe	4	16.67	14	58.33	6	25.00	24	100.00
Total	12	10.00	69	57.50	39	32.50	120	100.00

Chi-square, 7.151 with 4 degrees of freedom; $p = 0.128$

Table 4: Comparison of DI-S w.r.t degree of mental retardation

Mental retardation	N	Mean	S.D.	ANOVA	
				"F" ratio	"p" value
Mild	36	1.41	0.52	0.95	0.390
Moderate	60	1.4	0.48		
Severe	24	1.56	0.51		

Table 5: Comparison of CI-S w.r.t degree of mental retardation

Mental retardation	N	Mean	S.D.	ANOVA	
				"F" ratio	"p" value
Mild	36	0.43	0.55	0.15	0.862
Moderate	60	0.43	0.64		
Severe	24	0.51	0.77		

Table 6: Comparison of OHI-S w.r.t degree of mental retardation

Mental retardation	N	Mean	S.D.	ANOVA	
				"F" ratio	"p" value
Mild	36	1.83	0.73	0.69	0.505
Moderate	60	1.83	0.98		
Severe	24	2.08	1.08		

children with moderate mental retardation but not with mild mentally retarded children.

Mean deft score in children with moderate mental retardation was 1.62 and in children with mild retardation deft score was 1.55 (Table 8).

Average number of correctly answered questions by per respondents was 8.425 before the intervention which rose to 19.00 immediately after the intervention and retained to 14.70 2 weeks after the intervention (Table 9 and Fig. 3).

This change was found highly significant when compared statistically by using Wilcoxon Signed Rank Test.

Moreover, table also shows that only one respondent answered more than 70% of questions correctly while just after the intervention all 40 respondents answered above 70% of questions correctly.

Two weeks after the intervention 31 respondents were still able to answer above 70% of questions correctly (Table 9).

Effectiveness Index :

$$\frac{\text{Sum of post - test scores} - \text{Sum of pre - test scores}}{(\text{Number of subject} \times \text{Full score}) - \text{Sum of pre - test scores}}$$

After 2 weeks: $588 - 337 / (40 \times 20) - 337 = 251 / (800 - 337) = 251 / 463 = 0.5421$
Immediately after Post Test: $772 - 337 / 800 - 337 = 435 / 463 = 0.9395$

When Effectiveness Index was calculated using the above table it was found 0.5421 which signifies that 2-week after the intervention impact of oral health education in the form of audiovisual aid was 54.21% of possible impact while it was 93.95% immediately after the intervention.

DISCUSSION

Oral health has strong biological, psychological, and social projections, because it affects aesthetics and communications. The quality of life is affiliated with oral health status. Even though it is recommended that dental health of disabled children should be brought up to, and maintained to the level provided for other children, it is also observed that the dental problems of the disabled children are not very different from those of the normal. It is therefore of considerable importance that the present study assess the oral health status of mentally disabled children attending special school of Jaipur city, which would aid in recognizing the dental health needs and help in planning a better health care for them in the future.

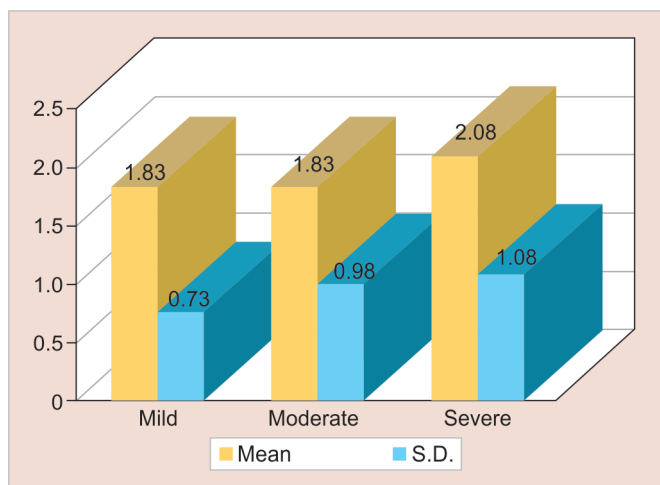


Fig. 1: Comparison of OHI-S degree of mental retardation

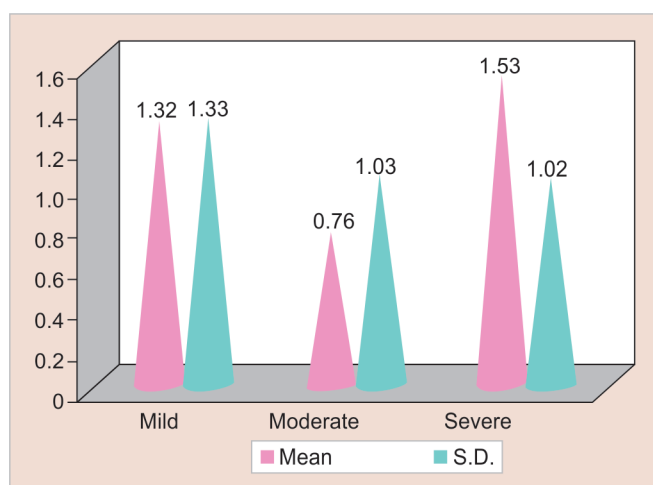


Fig. 2: Comparison of DMFT w.r.t. degree of mental retardation

Table 7: Comparison of DMFT w.r.t degree of mental retardation

Mental retardation	N	Mean	S.D.	ANOVA		
				"F" ratio	"p" value	"p" value* <0.05 from
Mild	28	1.32	1.33	4.17	0.018	
Moderate	49	0.76	1.03			Severe
Severe	19	1.53	1.02			Moderate

*Tukeys HSD test

Table 8: Comparison of DEFT w.r.t degree of mental retardation

Mental retardation	N	Mean	S.D.	ANOVA		
				"F" ratio	"p" value	"p" value* <0.05 from
Mild	26	1.58	1.55	3.12	0.049	
Moderate	41	1.2	1.62			Severe
Severe	20	2.3	1.72			Moderate

*Tukeys HSD test



The children taken up for the study were in the age group of 5–16 years. About 38.33% of children were in the age group of more than 11 years, 20% were in the age group between 8 and 10 years and 18.33% belongs to the age group of less than 8 years.

Incidence of poor oral hygiene was maximum (14.04%) in age group ≥ 11 years of age whereas incidence of good oral hygiene was maximum (51.72%) in age group < 8 years of age. This was found by Grants and Stern⁹ to be due to cumulative effect of plaque and calculus with increase in age. This correlation confirms the previous findings of S Kumar and J Sharma¹⁰ and Denloye O O.¹¹

Although on application of statistical test there was no significant association ($p = 0.081$) found between age and Oral hygiene score. This goes in similarity with the findings of A. Adeniyi Abiola et al.¹²

With regard to severity of mental retardation, maximum children with poor oral hygiene were with IQ score 20–40, that is, with severe mental retardation followed by children with moderate and mild retardation. Children with severe mental retardation also showed maximum mean OHI-S (2.08). All the three categories of mental retardation were found statistically alike w.r.t. OHI-S when ANOVA test was applied ($p = 0.505$). Similar results have been shown earlier by NT Hashim et al.,¹³ Martens et al.¹⁴ and Rao et al.¹⁵

Martens et al.¹⁴ has observed that children who were mildly mentally retarded had significantly better manual dexterity skills than the severely mentally retarded, which explains the finding in the present study.

In general, oral hygiene of the mentally retarded children in the present study was fair (57.50%). The average individual or group

DI-S and CI-S scores are combined to obtain the simplified oral hygiene index (OHI-S). In this study children had good or fair DI-S (average DI-S 1.43) but CI-S index was very low (average CI-S 0.44), even zero in some cases. Therefore, in this age group of children OHI-S is indicative of DI. These findings are in concurrence with the findings of Behjat Almolook Ajami and Yar Ali Reza¹⁶ who assess the frequency and severity of oral diseases and treatment needs in a selected population of children with disabilities in Mashhad, Iran.

Shaw L. Maclaurin¹⁷ has discussed that home care is essential to an effective plaque control and oral hygiene for handicapped children is dependent on quality of care given by parents and guardians. The institute in which the present study has been conducted is a non-profit, Non-Governmental Organization (NGO) in which various learning programs and therapies like Activity-Based learning (ABL), Individual Education Programs (IEPs), medical camps, physiotherapy and speech therapy are adopted for differently-able children based on their needs and abilities. Active participation by the parents and the various awareness programs which are conducted on periodic basis may have contributed to good or fair oral hygiene status of these children. However, the findings of the current study are inconsistent with the previous studies^{5,6} which can be attributed to the difference in methodology followed and the knowledge, behavior, and attitude toward oral health in the parents/caregivers of the concerned child.

Severe mentally disabled group had a higher mean deft and DMFT score (2.30 ± 1.72 , 1.53 ± 1.02) when compared to mild and moderate groups of mental disability. The values for severe mental retardation were not found alike statistically with rest of other two categories of children with mental retardation when ANOVA test was applied (deft $p = 0.049$, DMFT $p = 0.018$).

When *Post hoc* Tukey' HSD test was applied severe mentally retarded children showed statistically significant difference with children with moderate mental retardation but not with mild mentally retarded children. The findings are in accordance with the findings of study by Natasa Ivancic Jokie and Martina Majstorovic.¹⁸

All the parents in the present study seem to understand the importance of good dental health and importance of regular dental check-ups in maintaining good dental health. The knowledge of parents on maintaining the proper oral care was also satisfactory. A previous study by Amjad H. Wyne¹⁹ in determining the knowledge and attitude of the parents on oral health also showed a positive attitude to prevention.

Oral health problems in mentally disabled children may be because of the parental belief of a reduced importance to oral health in comparison to the overall scheme of health management or may be more time is devoted to assist these children in other daily activities which are seen to be more important compared to their

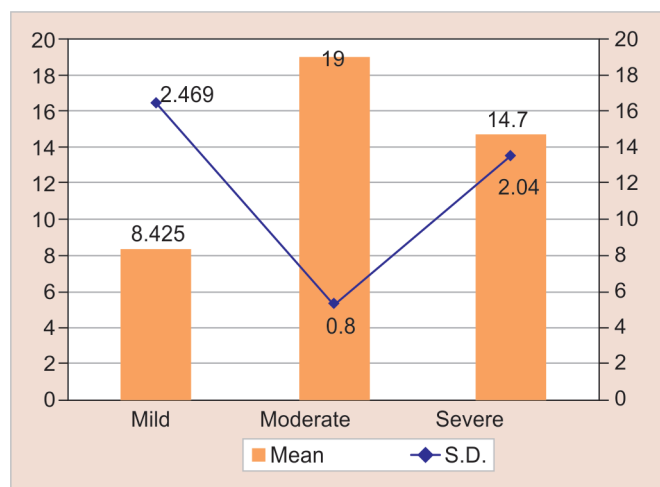


Fig. 3: Average of correctly answered before and after the intervention

Table 9: Average number of correctly answered questions per respondent before and after intervention

	Pretest	Immediate post-test	After 2 wks post-test
Mean	8.425	19.00*	14.70**
S.D.	2.469	0.80	2.04
Min out of 20	5	17	10
Max	14	20	19
Sum (800)40 x 20	337	772	588
No. of respondents $\geq 70\%$	1	40	31

*Wilcoxon Signed Rank Test - HIGHLY SIGNIFICANT DIFFERENCE ($p < 0.00,001$); **Wilcoxon Signed Rank Test - HIGHLY SIGNIFICANT DIFFERENCE ($p < 0.00,001$)

nondisabled counterparts. In this study parents and caretakers filled in a detailed questionnaire including the questions on oral hygiene practices. Understanding of oral health among the parents is typically lacking due to inadequacy of oral health programs conducted in institutions or schools for these special children. Most of the parents lack sufficient knowledge of importance of oral health, while the instruction aids available to them are often inadequate and outdated.

Although several studies have shown that audio-visual aids are effective in facilitating oral health education in children (Asvanit et al.²⁰; Alsada et al.²¹) but the literature lacks the basic understanding of the preventive oral healthcare through instructional media in the parents/caregivers of the mentally retarded children.

It has been reported that parents with good oral health knowledge can play a better role in maintaining optimal oral health in their children.

Results achieved in this study indicate that the media effectiveness index was 0.5421, which signifies that 2-week after the intervention impact of oral health education in the form of audio-visual aid was 54.21% of possible impact (100%) while it was 93.95% immediately after the interventions after a single viewing of the presentation. In educational terms, an effectiveness index of at least 0.5 indicates that the instructional media is satisfactorily effective (Goodman et al.⁸).

As this study clearly showed, production and presentation of oral health media is one way to promote oral health care (Horowitz and Kleinman²²). Such media promotes better understanding and challenges preconceptions of oral disease. Its exceptional power in conveying this message can create a strong foundation of understanding oral health care in mentally retarded children.

In conclusion, maximum children with poor oral hygiene were in the category of severe mental retardation and mean OHI-S score decreases from severe to mild mental retardation. Mean DMFT/deft also found maximum in children with severe mental retardation. Oral health knowledge, attitudes and behavior of the parents/caregivers was satisfactory. Majority of them knew the basic preventive aspects regarding oral health. The newly designed audiovisual aid on complete oral health care was effective at some levels in improving the oral health knowledge of the parents/caregivers of mentally retarded children.

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