ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 4, Issue – 2, March - 2021, Page No. : 32 - 43

Assessment and Improvement in Oral Health Status of Visually Impaired Students of Nashik, India

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Citation of this Article: Aditya Raveendran Menon, Shermeen Sultan Merani, Dr Juhi Puri,"Assessment and Improvement in Oral Health Status of Visually Impaired Students of Nashik, India", IJDSIR- March - 2021, Vol. – 4, Issue - 2, P. No. 32 – 43.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: An alarming situation exists today with respect to the problem of the education & rehabilitation of the visually impaired students in India today.1 out of 80 Indians is either visually impaired or partially sighted. The rationale behind higher prevalence of dental caries (in disabled students) is the inadequate plaque removal and lack of access to dental care. We, by the means of our study made the visually impaired students in educational set-up understand the plaque formation over teeth with help of models and demonstrated the benefits of good oral hygiene techniques and maintenance.

Methods: 30 Visually impaired students of Nashik were studied to determine the oral health status, oral health practice and dental caries among them.

General questionnaires, regarding oral health practice followed by a routine dental check up, and education & motivation to improve their oral health status was performed with help of models, educational aids. Results were calculated and assessed after a period of 4 weeks. The examination was done on a simple chair and in day light with the help of Dental mirror and Dental probe.

Results: A questionnaire regarding the brushing techniques and frequencies was analyzed according to their responses.23.3% students have good prognosis, 60% Fair Prognosis, 16.7% students have poor prognosis.

Conclusion: Visually impaired students of Nashik indicated a high prevalence of dental caries, and moderate periodontal health. One to one explanation of benefits of good oral hygiene and maintenance ameliorated their oral health care.

Keywords: Blind, Brushing Techniques, Dental, Oral - Hygiene, Students

Introduction

Nashik is an ancient city of India and the largest city in the northern region of Maharashtra. The Government Blind School, Nashik (Samaj Kalyan) K J Mehta High School, Nashik Road) offered an opportunity to assess descriptive quantitative study and improve the oral health care of visually impaired male students.

Oral health still raises many questions among masses. Some people are aware about the benefits of maintaining a good oral hygiene whereas, a greater portion takes it for granted.

According to WHO[$], "Oral Health" is a state of being free from mouth and facial pain, oral and throat cancer, tooth loss, oral infection and sores, tooth decay, periodontal disease, and other diseases and disorders that limit an individual's capacity in chewing ,biting, smiling, speaking, and psychosocial well-being. Compromised oral health can lead to deterioration in nutritional status [7]. "Handicap" is elucidated as the loss or limitation of opportunities to participate in life on an equal level with others due to physical or social barriers [8]. The process of developing oral disease does not differ among disabled and non-disabled individuals. No changes in prevention of the disease and the treatment modalities can be found among these groups.[19]

An alarming situation exists today with respect to the problem of the education & rehabilitation of the visually impaired in India today. Today, blindness takes hold on over 180 million people globally, it is approximated that 45 million people are totally visually impaired[20] .There are nearly 6.7 million visually impaired/partially sighted peoples in India, which mean one out of 30 Indians is either visually impaired or partially sighted[12].

Visually Impaired Individuals tend to have a higher incidence of dental caries and difficulty in accessing dental care[10].The rationale behind higher prevalence of dental caries (in disabled students) is the inadequate plaque removal and lack of access to dental care. Visually impaired students failed to visualize the plaque on the teeth surfaces therefore understanding the importance of good oral hygiene is difficult for them, which results in the advancement of dental caries as well as inflammatory disease of the periodontium[14.] The most common oral disease is dental caries[18] Dental plaque deposited over the tooth surface is the main causative factor. In order to prevent the disease, our main concern is to reduce plaque deposition on tooth surface by different means. Oral health education has been shown to have a positive impact in lowering plaque scores[14]

Blindness alone is not a significant risk factor for higher prevalence of dental caries and hence by taking care of blinds in educational set-up associated with appropriate training can result in acceptable health status, similar to normal population.

In a study it was observed no significant relationship between dental decay and blindness among 120 blind students[17]. Accordingly, blindness is not the only responsible factor for dental decay as long as appropriate correct training, education and motivation are accessible9. So, there is utmost need of individual training and awareness in oral care and plaque control in order to reduce the prevalence of dental caries among visually impaired students. Health care providers must have unique communication skills to deal with these special needs of visually impaired individuals. This study is conducted to disapprove the basis that no significant change would be observed (Null Hypothesis).

The purpose of this study is to evaluate the effectiveness of oral health education/motivation/ instruction programme and the improvement of oral health knowledge and status of the visually impaired children in Nashik, India.

Aims and Objectives

- To check the prevalence of oral health conditions comprising Dentition status, and the Number of Decayed, Missing, Filled Teeth present among visually impaired students in a residential school of Nashik.

- To assess any difference in the Oral health Condition after the motivation and education of the students about Oral Hygiene.

Materials and Methods

Visually impaired students living in a residential place at The Government Blind School, Nashik {(Samaj-Kalyan) K J Mehta High School, Nashik Road} were studied to determine the oral health status, oral health practice and dental caries among them. Dental questionnaires were administered after written informed consent obtained from the parents and teachers. This study is approved by the MGV's KBH Dental College Ethical Committee (Institutional Ethical Committee), Maharashtra University of Health Sciences, Nashik, India

General questionnaires, regarding oral health practice followed by a routine dental check up, and education & motivation to improve their oral health status would be performed. They were examined by single examiner to control the examiner variability. They were educated about the benefits of improved oral hygiene, the correct brushing techniques with the help of models and aids, were taught to the students and results were calculated after a period of 4 weeks. The examination was done on a simple chair and in day light with the help of Dental mirrors and Dental probes.

After the dental check -up, students were educated about the correct Brushing techniques and benefits of maintenance of good oral health Hygiene with help of Educational models and audio aids. At the end of study students were provided with dental kits consisting of dental toothbrush and Toothpaste.

Study Design: A descriptive quantitative study was conducted to assess the oral health status and treatment needs of visually impaired students at The Government Blind School, Nashik

Hypothesis: Null Hypothesis. The study is conducted to disapprove the basis that no significant change would be observed.

Feasibility Criteria: A list of schools for blind is obtained from Ministry of Social Justice And Empowerment. Cluster sampling methodology was used for selection of the study subjects located at a distance of 4km from MGV's KBH Dental College And Hospital, Nashik.

Inclusion and Exclusion Criteria: The subjects (30 students) who are more than 7 years were included and those who are more than 18 years are excluded from the study. (Class 5-8)

The data was analyzed by [15]

A) Dental Questionnaire

B) WHO$^{\phi}$ assessment form (2) [16]

(Personal details, periodontal status {CPI$^{\phi}$ modified} is checked and recorded) {at the beginning of study and after a period of 4 weeks}

C) Caries Index (WHO$^{\phi}$ Modification-DMFT$^{\phi}$ & DFT$^{\phi}$ Indices) Oral Health Surveys, Basic Method (2013).

(Details about diseased, missing and decayed teeth are checked and recorded {at the beginning of study and after a period of 4 weeks}

D) OHIS$^{\phi}$ Index (by Greene and Vermillion, 1964)

(Composed of the combined Debris Index and Calculus index, each of these index is in turn based on 12 numerical determinations representing the amount of debris or calculus found on the buccal and lingual surfaces of dental arch)

- (Autoclaved) Dental diagnostic Instruments including
  a. Dental Mouth Mirror
  b. Dental explorer
  c. Dental probe
  d. Tweezers

e. Protective equipment including Examination Gloves and Masks
f. Audio presentations for interactive sessions
g. Teaching models for better understanding.
h. At the end of dental check-up each student was given dental kit comprising Toothbrush and toothpaste for maintenance of good oral hygiene.

Data collection

On the 1st day, written consent/assent was obtained from parents and child & along with that information about the study was explained to them. The next day, the basic information and personal history was recorded, and children's medical history was taken from parents. A total of 30 visually impaired male students of government Blind School (SamajKalyan), Nashik were subjected to the study.

On the third day, a survey concerning the brushing techniques and frequencies was studied according to their responses. The complete case histories were inspected and studied upon. Students were taught and motivated about benefits of maintaining oral hygiene. Help was taken with audio presentations and students were taught correct brushing techniques through hands on dental cast and toothbrush. [6]

The examiner was standardized in interpreting and recording dental records.

The analyzed responses to survey was gathered on general characteristics, oral health-related behaviours, use of fluoride-containing toothpaste, dietary habits, healthcare-seeking behaviours, and knowledge and attitudes about good oral healthcare.[6]

The oral examination of students was carried out by investigators in the school premises with use of the Dental mouth mirror and Dental probe under supervision by teacher/guardians. The treatment needs for each student was evaluated and ascertained after discussion with one of the supervisors.

For the check-up, the student was made to sit on a chair in front of the investigator in broad daylight. Gauze pads/cotton rolls were used to clean and dry teeth surfaces before the examination. To minimize the intra-examiner variability, the first 15 children who were observed on the 1st day, were re-examined before examining the new batch of children.[21]

Results

Total 30 Male students were subjected to the study. All students belong to age criteria 10-18.

Table 1.1 [23]Distribution of students (according to their age, group and number.)

Table 1.2 [24]Distribution of students (according to their age, group and number.) via pie chart

A questionnaire regarding the brushing techniques and frequencies was analyzed according to their responses.

25 students mentioned they perform Horizontal Motion.5 students reported performing Circular motion.

Table 2.1 [25] Brushing techniques of students

Table 2.2 [26] Brushing techniques of students via chart

23 students responded that they brush once daily and 7 students they brush once a day

Table 3.1 [27] Brushing frequency of students

Table 3.2 [28] Brushing frequency of students via chart

100% (30) of the children responded that they used tooth paste along with the help of a Toothbrush for their cleaning.

While conducting the examination regarding dental caries, and assessing the DMFS and OHIS[$] index, the mean DMFS[$] score was 1.733 and the mean OHIS[$] index was 2.1033.

Table 4.1 [29] DMFS[ϕ] scores of students

Table 4.2 [30] Average DMFS[ϕ] scores of students

Mean DMFS score of all 30 students is 1.73± 2.61.

Table 5.1 [31] OHIS[ϕ] scores of students

Table 5.2 [32] OHIS[ϕ] average scores of students

Mean OHIS[ϕ] scores of all 30 students is 2.10±0.69.

On the basis of OHIS [ϕ]scores calculated, the oral hygiene status was categorized and assessed .

Table 6.1 [33] Oral hygiene status of students

Table 6.2 [34] illustration of Oral hygiene status of students

23.3% (n=7) students have Good prognosis, 60% (n=18) have Fair Prognosis,

16.7% (n= 5) students have Poor prognosis.

Discussion and Conclusion

Through this study we could identify many problems faced by visually impaired students, we were lucky to give our contribution pertaining towards the oral health problems. As visually impaired students cannot visualize the dental plaque, motivation to maintain good oral hygiene is less as compared to normal individuals. Therefore, they require a special way to educate and motivate to keep the oral hygiene better in order to prevent dental caries1**.**It is observed that with an appropriate session, the oral health knowledge of visually impaired students is improved. This session was conducted on a one-to-one basis, which ensured clinical and statistical significance [3]. From the one to one sessions, it was observed that there were drastic changes in oral hygiene techniques and its maintenance. The reduction of plaque and debris from teeth are skills that can be picked up only by an individual who has the ability to manipulate the toothbrush and understand the benefits of these actions [5].

At the beginning of study, it was observed that students had an irregular brushing habit which was a major red flag for us. By the end of study we could teach and motivate them about the benefits of brushing twice daily. We significantly improved the knowledge and queries of students regarding their oral health and its associated problems. With appropriate oral hygiene education and behaviour management techniques a significant reduction in anxiety levels in visually impaired towards their dental treatment was observed[22.]This study is conducted to disapprove the basis that no significant change would be observed (Null Hypothesis).The oral health status of involved students will be improved and they would be educated about the benefits of maintaining good oral hygiene. It is expected that we would see the improvement through scores in enclosed annexure As pointed out by many authors, the main barriers to dental treatment for individuals with disabilities seems to be inadequate facilities and insufficient time, lack of adequate knowledge and general stress related to treating this group [5]. Various studies have shown that visually impaired individuals have better tactile sense as compared to sighted individuals. By taking advantage of this, we used various hands on dental casts models and audio aids to explain brushing techniques and benefits of efficient plaque removal. The hands on one to one explanation also helped us to explain the general oral health queries of the students. By assessing our study analysis, we came to a conclusion that majority of the students were using the horizontal motion while brushing their teeth. We explained the modified Bass Brushing techniques individually with the help of models and stressed upon the benefits of this techniques and its maintenance. It was found that most students brushed once daily, so we instructed them to curtail the habit of brushing twice daily. We were happy to note that all students used toothbrush and toothpaste for brushing their teeth. After engaging with students and answering all of their dental queries, we proceeded with the dental check-up. We calculated the DMFS[ϕ] and OHIS[ϕ] scores for every student. The mean

DMFS[$] score of all 30 students is 1.73± 2.61. The mean OHIS[$] scores of all 30 students is 2.10±0.69. 23.3% (n=7) students have Good prognosis, 60% (n=18) have Fair Prognosis, 16.7% (n= 5) students have Poor prognosis. It was saddening that majority of the students had fair dental prognosis.

A few ways through which this scenario can be changed is:

School dental health should be based on improving school community relations by constituting a dental health groups that includes teachers and parents.

-Conducting dental surveys frequently.

-Oral health education programs, fluoride rinsing programs and diet counseling.

- Oral health inspection and dental care referrals[5]

With the help of these changes and adapting these modifications and we wish to see amelioration in accessibility and treatment of dental care for visually impaired students.

Abbreviations used [$]

OHIS- Oral hygiene index simplified

DMFS- Decayed Missing Filled Surfaces

WHO- World Health Organisation

CPI- Community Periodontal Index

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Legend Table and Figure

Table 1. 1. [citation number 23]

Distribution of Students (according to their age, group and number)

Age Group	Number of Students
10--12	6
12--14	6
14-16	7
16-18	11
Total	30

Table 1.2.[citation number 24]

Distribution Of Students illustrated via pie chart

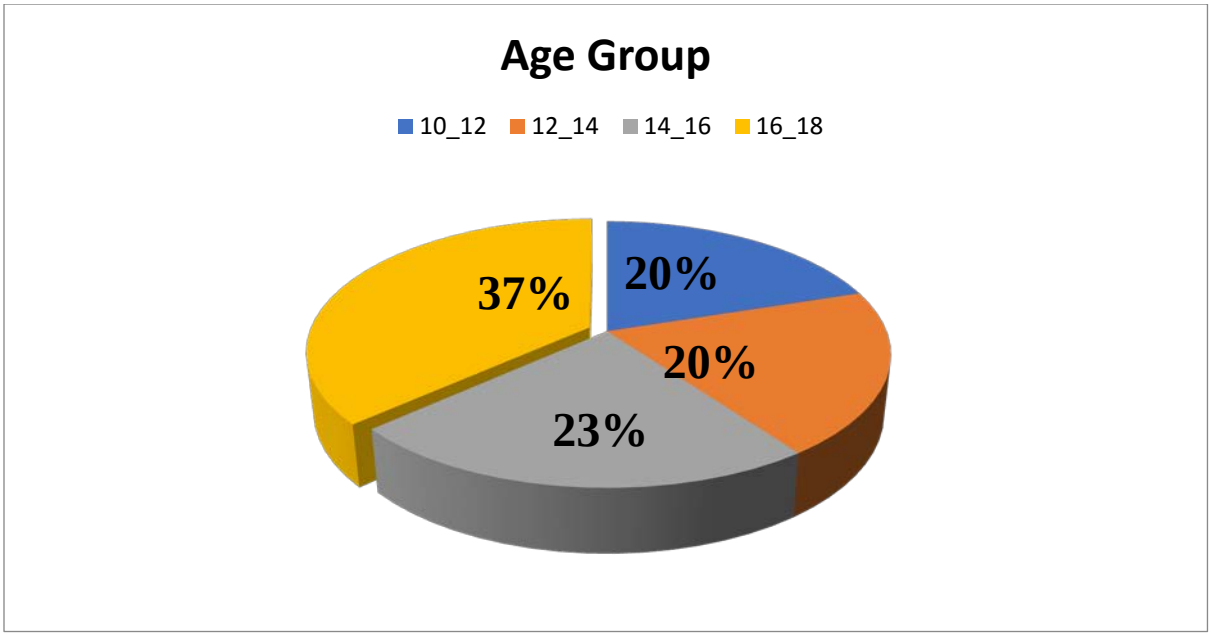

Table 2.1[citation number 25]

Brushing techniques of Students

Brushing Techniques	Number of Students
Vertical Motion	00
Horizontal Motion	25
Circular Motion	05

Table 2.2[citation number 26]

Brushing techniques of students

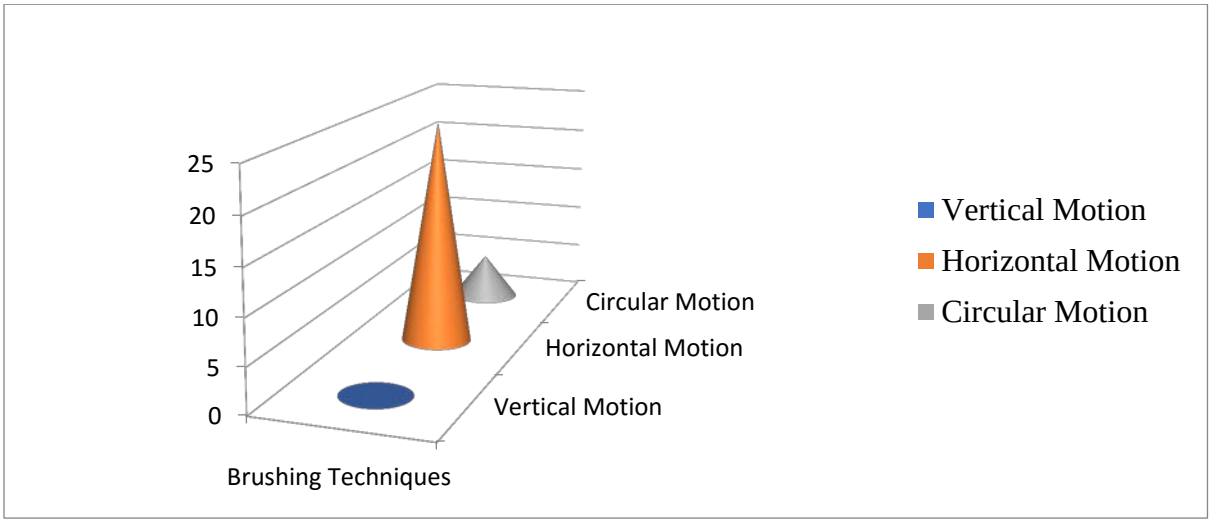

Table 3.1[citation number 27]

Brushing Frequency of students

Brushing frequency	No of students
Twice daily	07
Once daily	23

Table 3.2[citation number 28]

Brushing frequency of students illustration

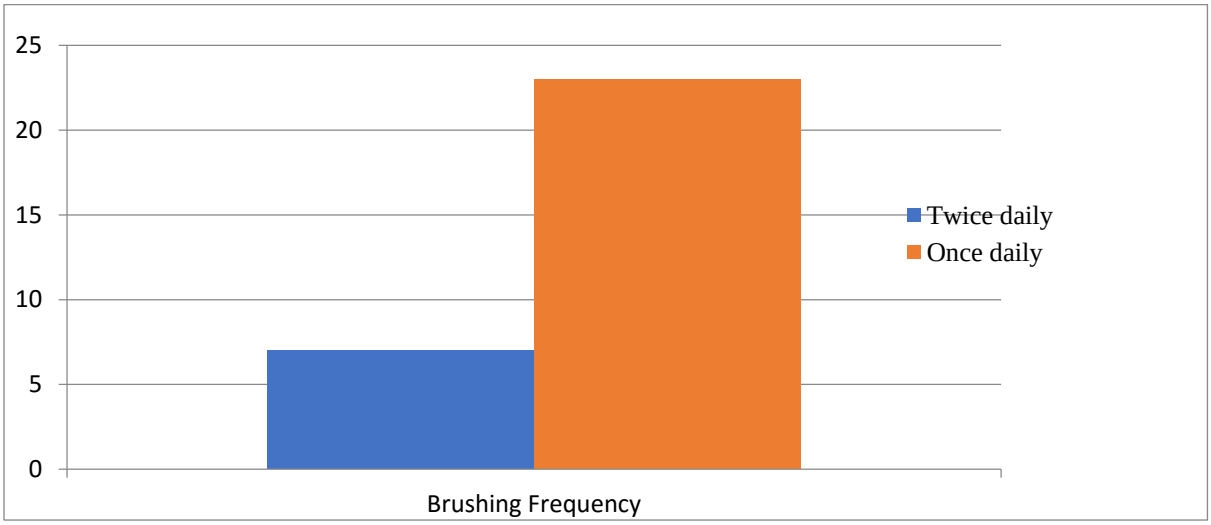

Table 4.1[citation number 29]

Individual 1DMFS scores of students

Students	DMFS scores
S 1	3
S 2	2
S 3	0
S 4	7
S 5	2
S 6	0
S 7	4
S 8	3
S 9	0
S 10	2
S 11	3
S 12	2
S 13	0
S 14	3
S 15	0
S 16	2
S 17	2
S 18	2
S 19	3
S 20	2
S 21	0
S 22	0
S 23	1
S 24	1
S 25	0
S 26	2
S 27	3
S 28	0
S 29	3
S 30	0

Table 4.2[citation number 30]

DMFS scores of students

Age groups	Number of students	Total DMFS scores	Average DMFS scores
10-12	6	9	1.5
12-14	6	7	1.2
14-16	7	11	1.5
16-18	11	25	2.3

Table 5.1 Individual OHIS scores [citation number 31]

Students	DMFS Scores
S 1	2.9
S 2	3
S 3	4
S 4	2
S 5	2.2
S 6	2.5
S 7	2
S 8	1
S 9	2
S 10	1.2
S 11	1.1
S 12	3
S 13	1.5
S 14	2
S 15	1.8
S 16	1.5
S 17	1.7
S 18	1
S 19	0.9
S 20	2.2
S 21	1.7
S 22	1.9
S 23	3.1
S 24	2.7
S 25	2
S 26	2.2

S 27	3.1
S 28	2.7
S 29	2.2
S 30	2

Table 5.2 [citation number 32]

OHIS scores of students

Age groups	Number of students	Total OHIS scores	Average OHIS scores
10-12	6	14.1	2.35
12-14	6	12.4	2.06
14-16	7	12.5	1.78
16-18	11	24.1	2.2

Table 6.1[citation number 33]

Oral Hygiene Status of students

Oral Hygiene status	Number of students
Good	07
Fair	18
Poor	05

Table 6.2[citation number 34]

Illustration of Oral hygiene status of students