



# The Effects of Visual Impairment Upon Oral Health Care

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## Abstract:

**Aim:** To study the effects of visual impairment upon oral health care among visually impaired patients

**Objective:** To correlate the effects of visual impairment upon oral health care

**Background:** The occurrence of visual impairments is increasing globally due to several factors such as local and systemic disease, medical advances and increasing age of population groups. Although oral health care is a vital component of overall health, it remains one of the greatest unattended needs among the disabled. Most of the individuals with visual impairment may only seek oral health when it is necessary such as pain problems as reported. Visual impairment is said to have negative effects on oral hygiene such as blind and partially sighted individuals having worse oral hygiene compared to those with sighted peers.

**Results:** Data from study revealed that more than 50% of the participants in the study had medium and poor level of oral hygiene status based on answers given in response to the questionnaires.

**Conclusion:** Visual impairment may impact on access to dental care and oral health information. Primary health centres are to be developed for the welfare of disabled people in order to promote their oral and general health.

**Keywords:** visual impairment, floss, mouth rinse, dental caries

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## INTRODUCTION

In 1997, there were about 45 million people who were blind globally and approximately more than 50% of them were aged 60 years old and above. This statement was declared by World Health Organization, WHO (1).

The causes of visual impairment globally are varied. About 43% of the population in this world blind due to cataract, which is in the most cases followed by ocular disease, which is secondary to diabetes mellitus, which stated about 24% (1, 2). In addition, visual impairment may be caused by problems in the brain related to stroke, prematurity or trauma, which is better known as cortical visual impairment(3). The most common cause of visual impairment in developing country is age-related macular degeneration (4). Congenital visual impairment rated the least, only 8% of the population whereas the rest of them having visual impairment due to local or systemic disease, and some are due to accident or age related degeneration (5, 6, 7). Other disabilities and health problems also may be among of the causes of visual impairment.

Oral health can affect the overall health as well as well-being of a person. However, maintaining good oral health could be challenging to those with special needs. These people are described as individual who needs assistance for disabilities including mental, psychological as well as medical (8). Special needs refer to a several groups of people. Among these, visually impaired individuals face the higher challenge in order to carry out daily tasks. Blindness as defined by WHO are visual acuity of less than 3/60 m or corresponding visual field loss in the better eye with the best possible correction. In case of visually impaired individuals, they can see three meters whilst non-visually impaired person able to see up to 60 meters (9).

Many individuals with a visual impairment may only seek oral health when there are problems such as pain. Visual impairment have a negative effect on oral hygiene as these individuals having worse oral hygiene than sighted peers. Many individuals with visual impairment receive dental care in General Dental Service. For those with medical complications may be seen in community and hospital dental services.

There could be numerous barriers for the individuals with visual disability to access dental care. One of those barriers would be physical access. As these people require companion in order to reach the dental care, the people surrounding them such as family members and friends play a vital role in achieving this. Thus, it is not only the desire of the individual itself but as well people surrounding would be able to make them available to do so. Keeping passages clear, ensuring areas are well lit, door frames and handles are well defined and placing handrails by stairs or elevator can be implemented in order to improve access to dental services (10)

Generally, the oral health problem in visually impaired people is worse in comparison to general population as they have untreated dental diseases and inability in accessing dental care (11). The common problem among these population is dental caries. Presence of plaque and calculus are the etiology for dental caries. Dental caries can be prevented by maintaining oral hygiene. However, the visual aids such as tooth brushing models and demonstration of flossing given to normal individuals do not well implemented visually impaired people.

Blind people unable to recognize dental caries at the initial stage. This include the presence of discoloration or cavity formation. These problem only aware when they start to experience pain or any discomfort. Loss of teeth occur

when dental caries is not being treated. Loss of mastication, aesthetic, speech and even self-confidence arise when tooth are missing. It is understandable that these group of people prioritize the general health and well-being more than oral health. Therefore, effective oral health promotion programs including oral education and practical demonstration by the public health response in a way that could help these people to maintain optimum level of oral hygiene.

The aim of the present study was to assess the oral health status of society of visually impaired individuals, in Terengganu, Malaysia.

**MATERIALS AND METHOD**

A questionnaire was constructed and asked verbally to 30 visually impaired people of Society of Visually Impaired Muslims of Malaysia, PERTIS, Terengganu, Malaysia. The respondents, both male and female, 14 and 16 respectively were given a questionnaire regarding the effects of visual impairment on oral health care. The age of the respondents are in range between 18-60 years old. The participants at this organization are categorized into three groups; B1, B2, and B3. B1 people are those who totally blind; B2 are those with visually impaired and; B3 are those with short and long sightedness.

**Table 1: Types of Visual Impairment**

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B1		B2		B3	
Number or students					
MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
6	5	5	7	3	4

The questionnaire consist of 10 multiple choices questions. The questionnaire is a score based questions. Each choice scored 3, 2 and 1 for choices ‘a’, ‘b’, and ‘c’ respectively. The total score obtained by each individual can determine the potential level of dental care. If the score is in range 20 and above, the potential level of dental care is excellent, score range of 19- 10 is medium and score range of 9 and below is poor.

**Table 2: Score**

Option	Score
a	3
b	2
c	1

**Table 3: Total score**

Score	Potential level of dental care
20 and above	Excellent
19-10	Medium
9 and below	Poor

**OBSERVATION AND RESULTS**

In this study, most of the participants including male and female mostly answered options ‘b’ and ‘c’, which score 2 and 1 respectively which depicts poor level of dental care as the lower the score, the poorer the dental care. Only small number of students who chose to answer option ‘a’ which reflects good dental care.

**Table 4: Questionnaire analysis**

Questions	Number of participants (N=30)		
	B1	B2	B3
1. How often do you brush your teeth per day?			
a) three	2	3	2
b) twice	7	9	4
c) once	2	0	1
2) How often do you floss your teeth?			
a) always	0	0	3
b) sometimes	0	9	3
c) none	11	3	1
3) How often do you use mouth rinse?			
a) always/ after meal	3	5	6
b) sometimes	2	4	1
c) rare	6	3	0
4) When is your last dental visit?			
a) Recently	1	2	2
b) Last year	2	5	3
c) Few years ago	8	5	2
5) What is the reason for that?			
a) scaling/restoration	3	5	5
b) extraction	1	1	1
c) toothache	7	6	1
6) How frequent you visit a dental clinic?			
a) always	0	1	0
b) sometimes	2	3	1
c) rare/when feel pain	9	8	6
7) Do you smoke?			
a) no	6	12	5
b) yes	0	0	2
8) When did you last notice a toothache?			
a) few years ago	8	5	2
b) last year	2	5	3
c) recently	1	2	2
9) What technique do you use for tooth brushing?			
a) roll and vertical			
b) vertical	5	4	1
c) horizontal	1	2	1
	5	6	5
10) What is the most frequent oral problem do you have?			
a) none	1	3	1
b) sensitivity	4	4	5
c) toothache	6	5	2

Overall, only small number of visually impaired individuals scored 20 and above which were approximately 23% as shown in Table 4 and Figure 1. These people were estimated to have excellent level of oral hygiene and dental care based on the answers given for the questionnaire. Highest number of participants dominated the medium level as 44% of them categorized in this level.

Score	Number of participants (N=20)
20 and above	7
19-10	13
9 and below	10

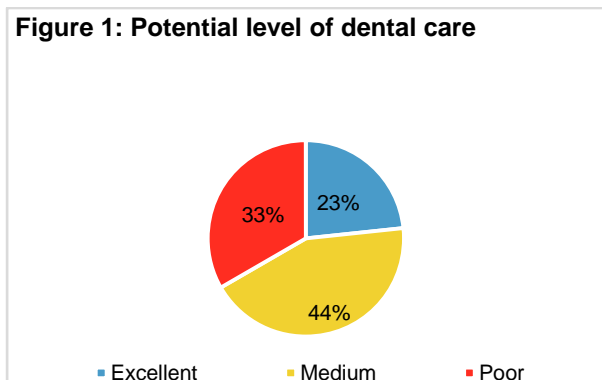
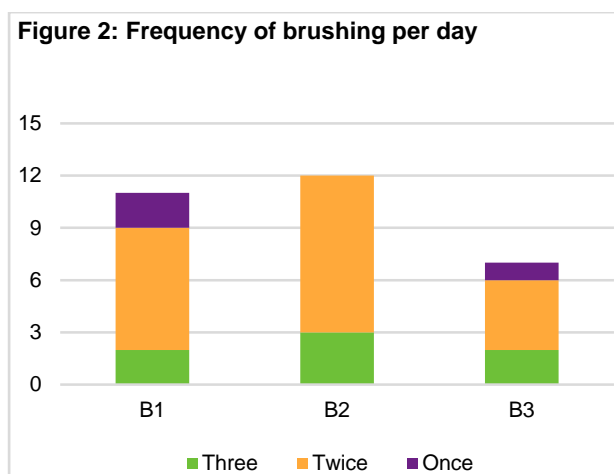


Figure 2 shows the frequency of tooth brushing per day by the visually impaired individuals of this society. Whilst more than 50% of the individuals practicing twice daily tooth brushing, only 10% of them brush the teeth once daily overall. As shown in the same figure, totally blind people, B1 do tooth brushing twice daily which the minimum daily tooth brushing is recommended.



As shown in Figure 3, the use of floss seen as the least practiced interdental aids as almost 60% of the participants, mostly contributed by B1 and B2 groups, never used floss as one of the methods of maintaining good oral hygiene. Among the individuals interviewed, only three of them always use floss in addition to tooth brushing.

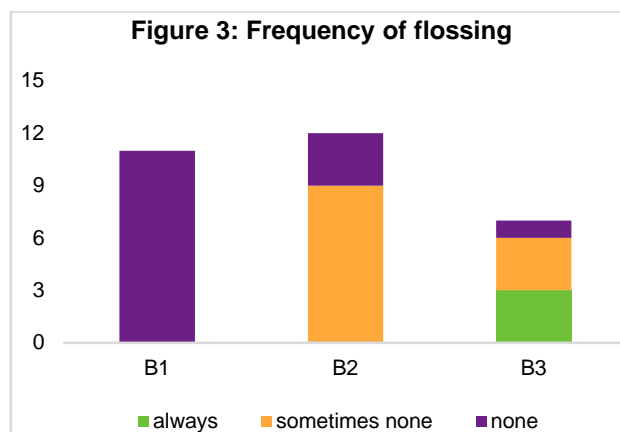


Figure 4 displays the frequency of using mouth rinse. As shown in B1 group, most of them did not use mouth rinse as approximately 54% of them never used mouth rinse in comparison to B3 group, all of these people in this group performed mouth rinse as a medium to maintain oral hygiene.

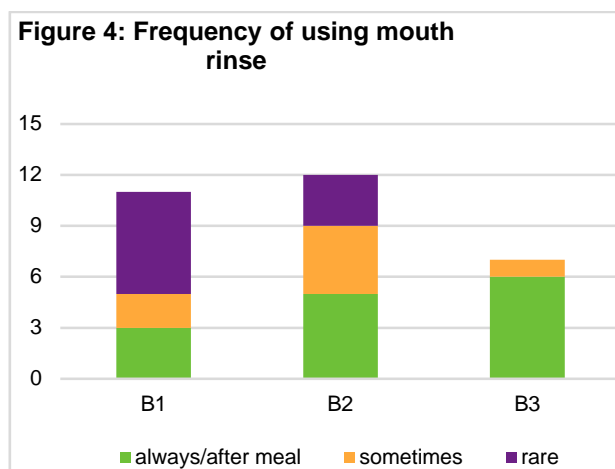


Figure 5 and 6 show the last dental visit and reason for it. Overall, all the three groups participants had last dental visit few years ago and less than 20% of them went recently as in Figure 5. Most of them agreed visited dental clinic only when there was problem arose or had toothache as shown in Figure 6. This was proven as 63% and 50% from B1 and B2 groups respectively went to dental clinic with the presenting chief complaint of toothache. In comparison to B3 people, most of them visited dental clinic for scaling and restoration.

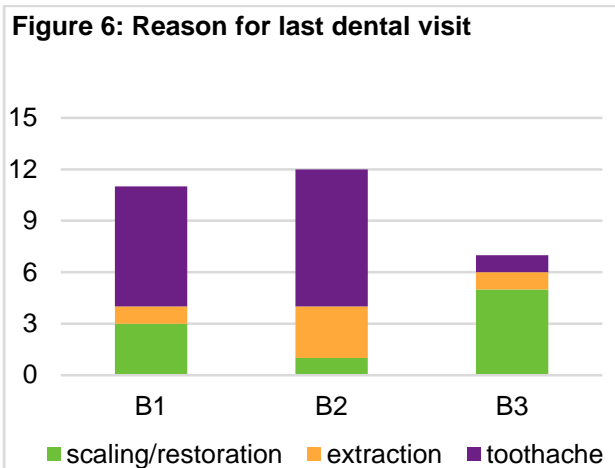
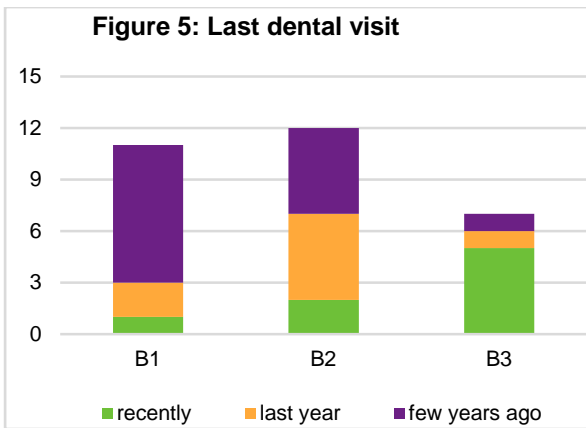
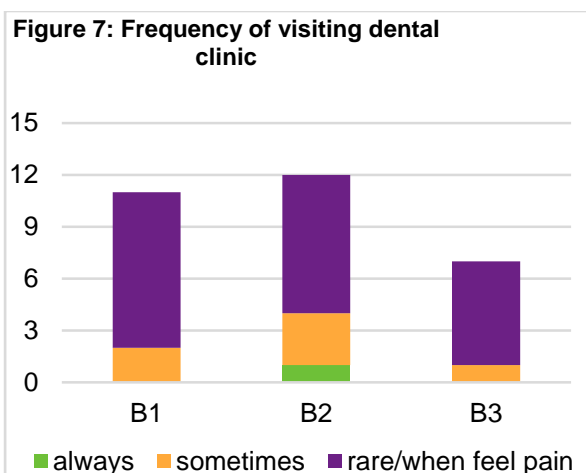
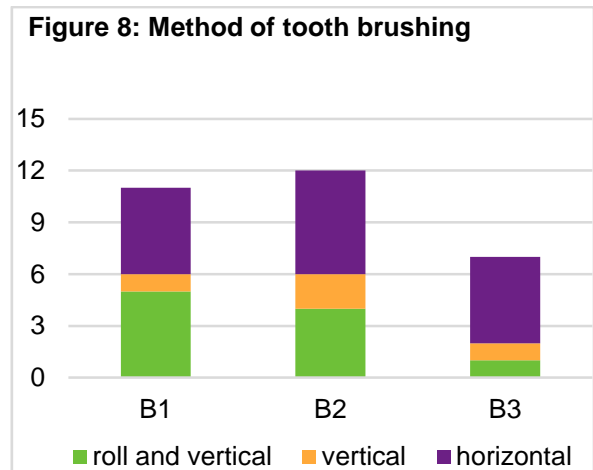


Figure 7 shows more than 70% of them consulted dentist rarely which the percentage contributed in average by all the three groups. Always constituted the least with less than 10% visited dental clinic which belong to B2 group. Sometimes dominated the second highest following rare in each study group which were recorded about 7%, 10% and 3% in B1, B2 and B3 group respectively.

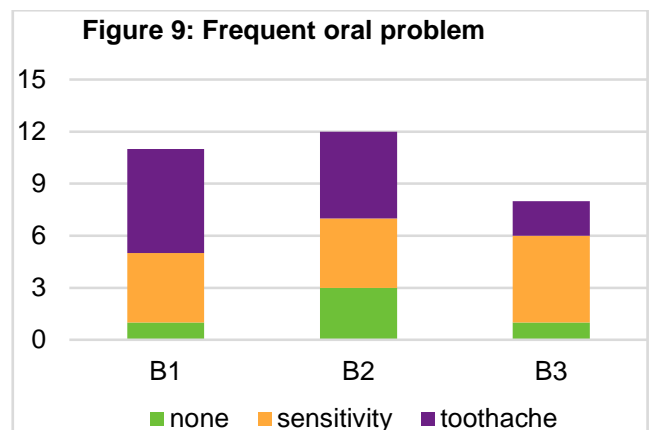


In Figure 8, horizontal was chosen as a most frequent method used for brushing technique. All the three groups chosen horizontal followed by roll and vertical and vertical. Vertical technique scored the least with 3%, 7% and 3% by B1, B2 and B3 respectively. Roll and vertical

followed horizontal as the common brushing technique practiced by the individuals.



Frequent oral problem experienced mostly were toothache which scored the highest in B1 group, approximately 20% as shown in Figure 9. Sensitivity dominated the highest in B3 group which was about 17%. Only 0.03% individual had no oral problem among B1 and B3 group people whereas in B2, there were about 10% whom had no oral problem.



### DISCUSSION

The present study evaluated the oral health status of visually impaired individuals of visually impaired society. Although previous studies found that individuals with visual impairments were less knowledgeable about oral care as reported by Chang and Shih (12) yet, the present study it is shown that the sample had better knowledge and care regarding oral health. This was proven with the most participants of this study were categorized in medium level health status followed by poor and excellent. Tooth brushing is a basic dental health care that should be practiced by an individual in order to maintain good oral health. Tooth brushing twice a day is a recommendation for adults as well as children during the day and at bedtime. As in this study, most of the visually impaired individuals practiced tooth brushing twice daily as per recommended which help to achieve optimum level of oral health. Brushing with a fluoride toothpaste is very

effective in preventing dental decay. Thus, tooth brushing should be practiced daily as regular tooth brushing helps to remove plaque, which can lead to gum disease (13).

Tooth brushing alone is not sufficient to prevent any oral health problems. Therefore, use of interdental aids are recommended to improve oral health. The use of floss as recommended by the American Dental Association can help to clean between the teeth which help to prevent cavities and gum disease. Plaque, a sticky film that is formed between the teeth which later produced acid can lead to cavity formation. However, it cannot be removed by the use of tooth brush alone. Thus, use of floss is suggested to avoid hardening of the plaque into calculus formation which can be removed only by scaling (14). The individuals in this study especially those in B2 and B3 group were well aware of basic aspects of oral health. This was due to the fact that these individuals well familiarized with the use of other interdental aids such as floss other than tooth brushing.

Oral hygiene of an individual plays as an essential part in the oral health status. The study shows that 47% of the individuals in this study rinsed their mouth after every meal which help in clearing food debris from the mouth. The use of mouth rinse as a supplementary oral hygiene materials other than flossing can help improving oral health. In terms of dental visit, previous dental studies shown that the visually impaired individuals had never visited dental health care as reported by Ahmad et al. (15). However, in this study about 17% visited a dentist recently while others went last few years ago. This has shown that there is more awareness about importance of oral health.

There are various techniques of tooth brushing depending on the condition of the alignment of the teeth as well as the age of the patient. However, improper brushing means and technique are significant contributor to periodontal problems and other oral diseases as following correct tooth brushing technique help to remove food debris and plaque for the prevention of dental caries onset (16). Based on study conducted by Singh et al. (17), it is reported that about 54% of the visually impaired used tooth brush and tooth paste as oral hygiene practices. In this study, more than 50% of the visually impaired individuals of this study used horizontal technique as method of tooth brushing. This method of tooth brushing is commonly used. Nevertheless, this type of brushing for long duration can cause cervical abrasion (16).

There are various oral health and mouth problems such as gum disease, missing teeth, sensitivity and dental caries. The present study reported that most of the individuals had equal oral problems which are sensitivity and toothache. Blind individuals have a sharp sensation which helps them to recognize particular conditions such as sensitivity. Sensitivity can happen because of numerous reasons including that can be due to tooth decay, fractured teeth and exposed tooth root (18).

### CONCLUSION

The number of people with visual impairment is increasing throughout the year. Overall, this study has shown the correlation between visual impairment and how

it affects the oral health care. Visual impairment may affect the oral health care as these people have limited access or do not have access to dental care. In addition, people with systemic diseases may face difficulties in dental management. However, there are few ways that can be practiced by these people such as practicing proper method of tooth brushing frequently. Therefore, comprehensive practicing and motivation toward good oral hygiene to these people may help them to approach and reach excellent dental care.

### REFERENCES

1. World Health Organization. World Health Report 1998. 2004. <http://www.who.int/whr/1998/en/index.html> (accessed 7th Jun 2016).
2. Thyelfors B, Negrel A D, Pararajasegaram R, Dadzie K Y. Global data on blindness. *Bulletin of the World Health Organization* 1995; 73: 115–121. | PubMed | ChemPort |
3. Lehman, SS (September 2012). "Cortical visual impairment in children: identification, evaluation and diagnosis.". *Current opinion in ophthalmology* 23 (5): 384–7. doi:10.1097/ICU.0b013e3283566b4b. PMID 22805225.
4. Apte R S, Scheufele T A, Blomquist P H. Etiology of Blindness in an Urban Community Hospital Setting. *Ophthalmology* 2001; 108: 693–696. | Article | PubMed | ChemPort |
5. Royal National Institute for the Blind, 2004. <http://www.rnib.org.uk>. (accessed 7th Jun 2016).
6. Royal National Institute for the Blind. See change. London: Royal National Institute for the Blind, 2003.
7. Rukanko S L, Fellman V, Laatikainen L. Visual impairment in children born prematurely from 1972 through 1989. *Ophthalmology* 2003; 110: 1639–1645. | Article | PubMed |
8. M. McPherson, G. Weissman, B. B. Strickland, P. C. Van Dyck, S. J. Blumberg, and P. W. Newacheck, "Implementing community-based systems of services for children and youths with special health care needs: how well are we doing?" *Pediatrics*, vol. 113, no. 5, pp. 1538–1544, 2004.
9. World Health Organization, "Visual impairment and blindness," *Fact Sheet* 282, 2013.
10. Edwards D M, Merry A J, Pealing R. Disability Part 3: Improving access to dental practices in Merseyside. *Br Dent J* 2002; 193: 317–319.
11. J. Solanki, S. Gupta, and S. Chand, "Comparison of dental caries and oral hygiene status among blind school children and normal children, Jodhpur City Rajasthan, India," *Universal Research Journal of Dentistry*, vol. 4, no. 1, pp. 22–25, 2014. View at Publisher · View at Google Scholar
12. C.-H. S. Chang and Y.-H. Shih, "Knowledge of dental health and oral hygiene practices of Taiwanese visually impaired and sighted students," *Journal of Visual Impairment and Blindness*, vol. 98, no. 5, pp. 289–303, 2004.
13. Effective Toothbrushing | Dental Health Foundation. (n.d.). Retrieved from <https://www.dentalhealth.ie/children/effectivetoothb1.html>
14. Flossing. (n.d.). Retrieved from <https://www.mouthhealthy.org/en/az-topics/f/flossing>
15. M. S. Ahmad, M. K. Jindal, S. Khan, and S. H. Hashmi, "Oral health knowledge, practice, oral hygiene status and dental caries prevalence among visually impaired students in residential institute of Aligarh," *Journal of Dentistry and Oral Hygiene*, vol. 1, pp. 22–26, 2009.
16. Types of Tooth Brushing Techniques. (2016, September 21). Retrieved from <https://www.juniordentist.com/types-of-tooth-brushing-techniques.html>
17. A. Singh, A. Kumar, V. Berwal, and M. Kaur, "Comparative study of oral hygiene status in blind and deaf children of Rajasthan," *Journal of Advanced Medical and Dental Science Research*, vol. 2, no. 1, pp. 26–31, 2014.
18. Concerns, Common Oral Health Problems. (n.d.). Retrieved from <https://www.mouthhealthy.org/en/adults-40-60/concerns>.