

## Oral Health Status, Traumatic Dental Injuries and Malocclusion among a Sample of Sudanese Visually Impaired Individuals

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### Abstract

**Background:** Oral health care remains one of the most unattended needs among the disabled population. Dental Caries is the most common chronic oral disease that interferes with normal nutrition intake, speech and daily regular activities, because its pain adversely affects the normal food eating. It is revealed to be the most common unmet need of disabled people in general. This study is intended to assess the oral health status, traumatic dental injuries and malocclusion of visual impaired individuals in Khartoum state. **Materials and Methods:** A non-interventional descriptive cross-sectional school based study was applied in approaching this research. The study was carried out in two institutes in Khartoum North. Clinical examinations were assessed DMFT, traumatic dental injuries (TDI) and malocclusion. **Results:** A total of 141 adults was examined. Males outnumbered the females. The mean DMFT was 4.43 among male and 4.95 among female. Trauma to teeth was seen among 32.6% of the respondents, no significant difference was observed among gender in relation to DMFT and trauma. Concerning malocclusion 47.5% had normal occlusion and the majority had normal bite 74.5% and 61.7% had normal overjet. **Conclusion:** Visually impaired individuals are burdened with oral health problems, with a high prevalence of caries and traumatic dental injury.

**Keywords:** Visual Impaired; Dental Caries; Traumatic Dental Injury; Malocclusion.

### Introduction

Total blindness is the complete lack of form and visual light perception and is clinically recorded as NLP, which is an abbreviation for "no light perception" [1]. Blindness usually describes severe visual impairment with some remaining vision. Those described as having only light perception have no more sight than the ability to differentiate between light and dark, as well as the general direction of a light source [2].

In 1934, the American Medical Association adopted the definition of blindness as: "Central visual acuity of 20/200 or less in the better eye with corrective glasses or central visual acuity of more than 20/200 if there is a visual field defect in which the peripheral

field is contracted to such an extent that the widest diameter of the visual field subtends an angular distance no greater than 20 degrees in the better eye" [3].

The World Health Organization defines low vision as visual acuity of less than 20/60 (6/18) or a visual field less than 20 degrees. Whereas, it is blindness is defined as a visual acuity of less than 20/400 (6/120) or a visual field of less than 10 degrees. The prevalence of the blind according to WHO's were estimated to be 285 million visually impaired worldwide; 39 million are blind and 246 million suffer from low vision. About 90% of the world's visually impaired people live in low-income settings. 82% of people living with blindness are aged 50 and above. Globally, uncorrected refractive errors are the main cause of moderate and severe visual impairment; myopia, hyperopia or astigmatism [4].

Dental caries is an infectious and communicable chronic disease and it is a major health problem it is defined as localized destruction of susceptible dental hard tissues by acidic products from bacterial fermentation of dietary carbohydrates; it is a dynamic process of demineralization and remineralization of enamel depending on salivary pH [5].

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Malocclusion is an incorrect relationship between the upper and lower dental arch, or general misalignment of the teeth. Malocclusions are so common that most individuals experience one, to some degree. The poor alignment is a result of genetic factors combined with poor oral habits, or other factors in the early years. Malocclusion is usually treated with dental braces [6].

In recent years, there have been an increasing number of studies concerning the oral health of the general population. However, very little attention has been put into the oral health of the physically handicapped population, who actually deserve special care and attention within this field. It is needless to say that due to their physical handicap these groups of population cannot be expected to maintain proper oral hygiene and dental health for want of proper education.

To our knowledge through extensive literature reviews it is revealed that not a lot of data regarding the oral hygiene, dental caries status malocclusion and traumatic dental injuries for visually impaired individuals are available for Sudanese population.

Therefore, the present study has been designed to assess the oral health, traumatic dental injuries and malocclusion in visually impaired individuals in Khartoum State, because we believe that many visually impaired individuals in Sudan are living with consequences and complications resulting from poor oral health care. It is hoped that this study will provide some inputs and data useful for assisting the oral health care providers in implementing the oral health promotion programs among the visually impaired individuals in order to improve their oral health.

## Material and Methods

A non-interventional descriptive cross-sectional school based study in Khartoum which is the capital of Sudan, where proportionally a powerful collection of citizens are found, with multiple ethnic groups and different socio-economic levels. This study began in January 2015 and ended in March 2015. in Khartoum state, North.

Ethical permission and approval clearance was first obtained from the ethical committee of the University of Medical Sciences and Technology, Faculty of Dentistry, prior to the conduction of the study. Permission and approval was obtained from the Ministry of Education and from all visually impaired individual who were around during the study data collection period. The aim

of the study was explained to all individuals. After that a verbal consent was obtained from each before starting the dental examination, any refusal not included in the study. No harm was caused for the participating and all was educated about oral hygiene maintenance, whether they were included in the study or not. The data will kept confidential and was used for the sole purpose of this study.

Data was collected through a predesigned examination sheets, which was distributed among the 141 visually impaired individual, all the questionair had been filled by the main investigator as well as the clinical examination which carried out using sterial examination set and disposable glove in ordinary chair at the teacher office using daylight. The examination sheet consists of two sections. Section (A) enquires about personal data (name, gender, telephone number), in addition to index number and date. Section (B) consists of questions that assess the oral health status and presence of trauma or malocclusion.

The children were examined in the school using natural day light and sterilized instruments with participants seated on an ordinary chair. The findings were recorded on a specially designed oral health assessment form.

Dental caries experience was DMFT>0 or dmft>0 indices according to WHO criteria [7] to facilitate the comparison of the findings with national and international studies. It was detected at the cavitation level only (detectable softened floor, undermined enamel or softened wall). Criteria of "catching" or "retention" of the explorer was not used to detect caries. An explorer was used to remove large debris and to aid in assessing the oral hygiene.

The traumatic dental injuries were assessed according to Andresen's criteria [8]. Roots fracture was not recorded as no radiographs were taken due to practical difficulties in transportation and parent's permission.

Malocclusion was assessed by 4 sub categories; Angle classification of malocclusion; C:I, II and III, the vertical malocclusion and anterio posterior relation [7].

### *Data Management and Analysis*

Data obtained statistical analysis through the computerized program: Statistical Package for social science (SPSS). The findings was presented as tables and Figures. P value less than 0.05 was considered significant in all variable

**Results**

The total number of visually impaired individuals in the two institutions were 190. Only 141 individuals agreed to participate in this study (respondents), 84 (59,6%) of them were males, and 57 (40.4%) were females, Figure 1.

The mean DMFT were found to be slightly more among males than females which is not significant. P-value 0.299, Table 1.

In figure 2 and table 2 the incidence of traumatic dental injuries (TDI) among the study sample was 32.6%. It is slightly more common among males than females. It was noted that the most common traumatic

dental injuries was enamel fracture (65.2%) followed by enamel and dentine fracture and more common among males, Table 3.

*Malocclusion*

Malocclusion (Angle's classification), 74 (52.5%) of the sample had class II. Whereas class I was present among the rest of the sample 67 (47.5%). No individuals were recorded to have Angels class III malocclusion Table 4.

Increased overjet was observed among 36 (25.5%) of the respondents, and it was shown that overjet was slightly more in males whereas deep bite were more among both gender Tables 5 and 6.

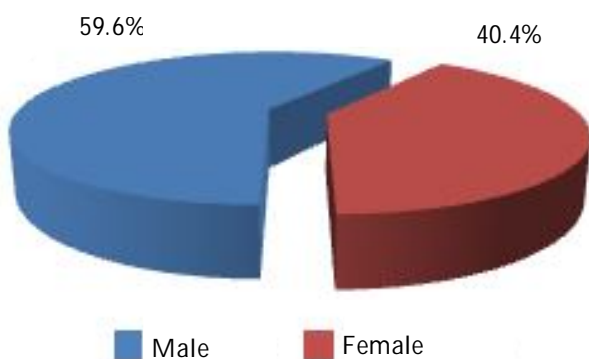


Fig. 1: Distribution of samples according to the gender (%)

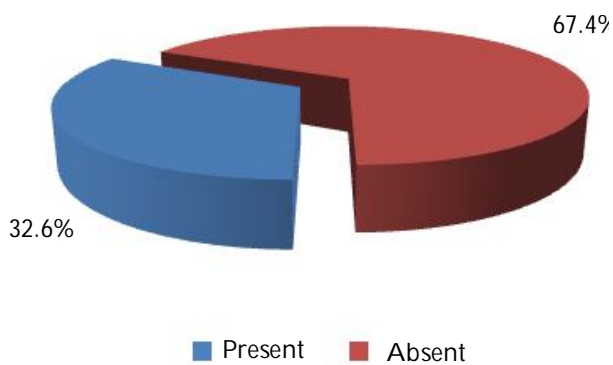


Fig. 2: Prevalence of traumatic dental injuries (%)

Table 1: Distribution of DMFT among gender

	Gender N	Mean	Std. Deviation	Std. Error Mean	P-value
DMFT	Male 84	4.43	2.914	0.318	0.299
	Female 57	4.95	2.887	0.382	

Table 2: Traumatic dental injuries among gender (%)

Trauma to Anterior Teeth	Gendar		Total
	Male	Female	
Present	25 (29.8)	21 (36.8)	46 (32.6)
Absent	59 (70.2)	36 (63.2)	95 (67.4)
Total	84 (100.0)	57 (100.0)	141 (100.0)

Table 3: Type of traumatized dental injury among the genders (%)

Gender	Enamel Fracture	Enamel+dentine	Enamel+dentine+pulp	Intrusion	Avulsion	Total
Male	16(34.8)	4 (8.7)	0 (0.0)	2 (4.3)	3 (6.5)	25 ( 54.3)
Female	14(30.4)	5 (10.9)	0 (0.0)	1 (2.2)	1 (2.2)	21 (45.7)
Total	30(65.2)	9 (19.6)	0 (0.0)	3 (6.5)	4 (8.7)	46 (100)

Table 4: Malocclusion (Angel's clasification) among the sample (%)

Angle's Classification	Frequency	Percent
Class I	67	47.5%
Class II	74	52.5%
Class III	0	0.0%
Total	141	100%

Table 5: Distrubution of overjet trait among gender(%)

Over jet	Gender		Total
	Male	Female	
Normal	59 (70.2)	46 (80.7)	105 (74.5)
Increased	25 (29.8)	11(19.3)	36 (25.5)
Reversed	0	0	0
Total	84(100.0)	57(100.0)	141(100.0)

**Table 6:** Distribution of vertical malocclusion among gender (%)

Vertical malocclusion	Gender		Total
	Male	Female	
Normal bite	51 (60.7)	36(63.2)	87(61.7)
Open bite	9 (10.7)	8 (14.0)	17 (12.1)
Deepbite	24 (28.6)	13 (22.8)	37 (26.2)
Edge-to-edge	0	0	0
Total	84 (100.0)	57 (100.0)	141(100.0)

## Discussion

The principal objectives of this study was to determine the prevalence of dental problems; oral health status, malocclusion and traumatic dental injuries among a sample of visually impaired individuals in Khartoum state. A total of 141 individual were examined from two centers, males were dominant (59.6%). The majority of the sample had increase caries index DMFT mean more than 4 among both gender, normal occlusion and trumatic dental injury was 32.6 in the whole sample.

In this study, the proportion of visually impaired respondents with caries experience was found to be higher (58% males and 40.4% females) than the reported proportion among non-disabled individuals in India where the results revealed that the overall prevalence of dental caries was found to be around 46.88%[9]. In Sudan, Khartoum state a study was carried by Azza Tagelsir et al to determine the oral health status among visually impaired and the result revealed that children with partial visual impairment were 6.3 times more likely to be diagnosed with caries compared to children with complete visual impairment, and children with caries experience were 1.3 times more likely to report an oral health related impact. However, in a different study, the dental caries prevalence was found to be in 73% of the sample [10]. It likewise was shown that among Aligrah students, 55.2% suffered from dental caries [11].

Traumatic dental injuries was presented among 32.6% of the respondents in this study. Males were more affected than females, 54.3% and 45.7% respectively. The same result was reported in India, that 32.5% visually impaired children had significantly higher percentage of teeth fracture than that of sighted children (9.6%). Males had significantly higher percentage of teeth fracture than females in both groups [12]. A study conducted by Agrawal A. et al to determine the prevalence of anterior teeth fracture among visually impaired individuals showed that the overall prevalence was 34.95% of traumatic dental injuries, male were having significantly more fracture than females [13] which resembles this result. High percentage of traumatic

dental injury was also reported among Chinese visual impaired individual [14], which showed a slight lower percentage.

In contrast to the study mentioned earlier that was carried out in Khartoum state, 19% Sudanese visually impaired suffered from traumatic dental injuries [10].

Malocclusion according to angles classification (Class I, II and III), was found to be 74 (52.5%) had class II and the rest of the sample showed Class I 67 (47.5%) no individual had CI: III. The prevalence of overjet and deepbite in this study was found to be 25.5% and 26.2% respectively among the respondents, where a slightly more prevalence in males were shown in both. In comparison to this study in Kuwait a research was conducted to determine the prevalence of malocclusion among individuals attending the special-needs facilities, where the prevalence of malocclusion was 60.6%, Malocclusions were significant risk factors for the occurrence of traumatic injuries [15].

This is variation in the results among different population may be partially attributed to the study sample size, age of the participant, dental awareness and environmental factor.

## Conclusion

The total number of visually impaired have given a somewhat satisfactory global idea about the prevalence of dental problems. 141 subject partictpated out of 190 subjects. Males out numbering the females. Trauma to anterior teeth was seen among 32.6% of the respondents. This population has extensive dental treatment needs and deficient dental care index.

## Recommendation

The population sample of this study is not representative of all the visually imparied population in Sudan, therefore it would be recommended to expand the scale of this research and use a larger sample. It is urgently needed to establish oral health promotion and treatment programs for the visually impaired population in Khartoum state, Sudan.

## References

1. International Council of Ophthalmology. "International Standards: Visual Standards Aspects and Ranges of Vision Loss with Emphasis on Population Surveys." April 2002.
2. "Visual impairment and blindness Fact Sheet N°282". World Health Organization. October 2013. Retrieved 4 May 2014.
3. Maberley, DA; Hollands, H; Chuo, J; Tam, G; Konkall, J; Roesch, M; Veselinovic, A; Witzigmann, M; Bassett, K "The prevalence of low vision and blindness in Canada." March 2006; 20(3): 341-346.
4. WHO Media Centre. Visually impairment and blindness. August 2014. Fact Sheet N°282. [http://www.dental\\_health.ie/dental\\_health/causes/dentalcaries.html](http://www.dental_health.ie/dental_health/causes/dentalcaries.html).
5. Skeie SM, Wendt L, Poulsen S. Dental caries in children and adolescents in: Koch G, Poulsen S, editors. *Pediatric Dentistry A clinical Approach* 2nd. ed. Copenhagen: Blackwell. 2009; 61-68.
6. Gravely JF, Johnson DB. Angles classification of malocclusion. An assessment of reliability. *Br J Orthod.* 1973; 1(3): 79-86.
7. World Health Organization(WHO). *Oral Health Surveys. Basic Methods.* 4th ed. 1997; Geneva: WHO, Geneva.
8. Andreasen JO, Andreasen FM, Andersson L. *Classification, Epidemiology and etiology.* Textbook and Color Atlas of Traumatic Injuries to the Teeth .4ed. Munksgaard. Blackwell.2007; p.217-243.
9. Sujal M Parkar, Nidhi Patel, Nikita Patel, Hemali Zinzuwadia. Dental health status of visually impaired individuals attending special school for blind in Ahmedabad city, India. *Indian J Oral Sci.* 2014; 5(2): 73-77.
10. Azza Tagelsir, Ahmed Eltigani Khogli, Nazik Mostafa Nurelhuda Oral health of visually impaired school children in Khartoum State, Sudan. *BMC Oral Health.* 2013; 13: 33.
11. Mohammad Sami Ahmad, M. K. Jindal, Saif 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.* 2009; 1(2): 22-26.
12. Bhat N, Agrawal A, Nagrajappa R, Roy SS, Singh K, Chaudhary H, Asawa K. Teeth fracture among visually impaired and sighted children of 12 and 15 years age groups of Udaipur city, India—a comparative study. *Dent. Traumatol.* 2011; 27(5): 389-392.
13. Agrawal A, Bhatt N, Chaudhary H, Singh K, Mishra P, Asawa K. Prevalence of anterior teeth fracture among visually impaired individuals, India. *Indian Journal of Dental Research.* 2013; 24(6): 664-668.
14. O'Donnell D. The prevalence of nonrepaired fractured incisors in visually impaired Chinese children and young adults in Hong Kong. *Quintessence Int.* 1992; 23(5): 363-365.
15. Shyama M, al-Mutawa SA, Honkala S. Malocclusions and traumatic injuries in disabled school children and adolescents in Kuwait. *Spec Care Dentist.* 2001; 21(3): 104-108.