

Prevalence of Dental Trauma and Malocclusion Among Institutionalised Visually Impaired Adolescents Who Have Dental Caries in Lagos, Nigeria.

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ABSTRACT

Background: Visually impaired individuals with special needs are at risk of dental trauma due to poor sight, especially in the presence of malocclusion. They are usually underserved because of poor access to oral health services. It is, therefore, important to assess them early for dental injuries and initiate prompt treatment.

Objectives: To assess the prevalence and association between dental trauma and malocclusion among 9- to 21-year-old institutionalised visually impaired individuals in Lagos State.

Methods: A multi-stage random sample of two hundred and twenty-nine visually impaired adolescents from 10 special schools in Lagos State was originally carried out. WHO oral examination assessment form was used for data collection. Data on dental trauma and malocclusion was obtained. Dental trauma was assessed using Andreasen's classification and occlusion was assessed using Angle's classification

Results: Sixty-two subjects were studied with mean age of 15.98 (SD±3.38), male: female ratio of 1.03:1 (SE= 0.065). A prevalence of 16.1% was recorded for participants who had dental injury and malocclusion. Uncomplicated and complicated fractures constituted 11.3% and 4.8% respectively (SE= 0.066). All dental injuries occurred in ≥15 years (SE=0.065) with 70% uncomplicated and 30% complicated injuries (SE=0.000). Females constituted 60% of participants with malocclusion (SE=0.074) while males constituted 88.8% with dental injury (SE= 0.080). Malocclusion constituted 1.6% of those with dental injury. Association between dental injury and malocclusion was not statistically significant (SE=0.068) $p < 0.05$.

Conclusion: Prevalence of dental injury and malocclusion among visually impaired institutionalized individuals were 16.1% and 16.1% respectively. Uncomplicated dental injuries were more prevalent among the males and older adolescent age groups. Association between dental injury and malocclusion was not statistically significant; however, there appeared to be a higher risk of severe injury in those with malocclusion. More studies should be conducted to confirm these findings.

Key words: Visually impaired, adolescents, prevalence, dental trauma, malocclusion

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Introduction

The visually impaired are group of individuals with special needs due to poor sight. Visual impairment is a functional limitation of the eyes or visual system ranging from partial sight to total blindness.¹ It is estimated that 19 million children – who are younger than 15 – have visual impairment.² Oral health of children with special health care needs are often neglected and regarded as secondary to their debilitating condition and this is regarded as a “halo effect”.³ They are, therefore, said to be an underserved population.⁴

Visual impairment can affect quality of life, independence and mobility, predisposing to frequent falls and trauma.⁵ Children who are visually impaired are at high risk of poor oral health⁶, including the risk of multiple dental injuries.⁷ Dental injuries may be neglected until they complain of pain, and therefore, uncomplicated injuries may become worse from lack of prompt care. The prevalence of dental trauma among visually impaired children in special schools in India⁷ was reported to be 39%, comprising 53% enamel fracture and there was strong association with increased overjet and inadequate lip coverage. This correlation between dental trauma and increased overjet is similar to finding by Bhardwaj et al⁸ and Agrawal et al.⁹ There are very sparse published studies on prevalence of dental trauma and malocclusion among visually impaired institutionalized individuals in Nigeria.

The study aimed to assess the prevalence and association between dental trauma and malocclusion among 9- to 21-year-old institutionalised visually impaired individuals in Lagos State, Nigeria.

Methods

This cross-sectional study was part of an oral health survey among visually impaired individuals. Ethical approval for the original survey was obtained from Lagos University Teaching Hospital (LUTH) Health Research Ethics Committee and informed consent was obtained from parents/guardians with the permission of the school authorities and assent from the visually impaired students using Braille consent form. A registered list of 10 special schools were generated from the Lagos State Education Board, out of which two hundred and twenty-nine were visually impaired. Sixty-two subjects of age range 9-21 years consented to the study and were examined orally for dental trauma and malocclusion.

Oral examination was carried out in the school premises by the researcher using the WHO oral health survey assessment form.¹⁰ Dental trauma was

recorded as: {0 = No sign of injury; 1 = Treated injury; 2 = Enamel fracture only; 3 = Enamel and dentine fracture; 4 = Pulp involvement; 5 = Missing tooth due to trauma; 6 = other damage; 9 = Excluded tooth} Dental trauma was then categorised as uncomplicated (trauma involving enamel and dentine and not the pulp) and complicated (trauma involving the pulp). Angle’s classification¹¹ was used as index of measuring malocclusion and categorised as Angle’s class 1, 2 or 3 complicated by any other type of malocclusion. The occlusion was further categorised into:

Normal occlusion – Presence of Angle’s class 1 occlusion with no other complications

Malocclusion – Presence of any other type of occlusion other than normal occlusion

Oral examination was done using individualised tongue depressors under visible light and observing cross infection control. Malocclusion was assessed based on Researcher’s observation. Participants with dental fractures and malocclusion were referred to the Dental Clinic, LUTH, Idi-Araba for further assessment and management. Frequencies of dental injury and types of occlusion were obtained using descriptive statistics. Association between dental injury and type of occlusion was determined using Pearson’s Chi-Square test. SPSS IBM Statistical package version 20 was used for analysis placing p value at < 0.05.

Results

Table 1 shows socio-demographic distribution of participants. Sixty-two subjects participated in the study with mean age of 15.98±3.38, There were 50.8% male and 49.2% female subjects in a ratio 1.03:1 respectively (SE=0.065). Majority of the subjects (67.7%) were in the older age group (SD= 0.717).

Table 2 shows frequency distribution of type of injury and occlusion. Dental injury occurred in 16.1% of the subjects out of which 11.3% were uncomplicated dental injuries (enamel and enamel-dentine fractures only) and 4.8% were complicated dental injuries and 16.1% had malocclusion.

Table 3 shows frequency distribution of dental injuries and type of occlusion among age groups. All dental injuries occurred in ≥15 years (SD=0.000). The highest prevalence of malocclusion occurred among older age group ≥15 years.

Table 4 shows association between types of dental injury and occlusion. One tenth (10%) of the subjects with malocclusion had dental injury which was a complicated crown fracture (SE=0.048). Complicated

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crown fracture occurred in 4.8% (3 out of 62) of subjects, out of which one (33.3%) had malocclusion.

Table 1: Socio-demographic distribution of age group and gender of subjects.

Age groups	Male	Female	Total
9-11 years	-	8	8
12-14 years	9	3	12
≥15 years	23	19	42 (67.7%)
Total	32 (50.8%)	30 (49.2%)	62 (100%)

Table 2: Frequency distribution of type of injury and occlusion

Injury Type	No (%)	Occlusion type	No (%)
Uncomplicated	7 (11.3%)	Malocclusion	10 (16.1%)
Complicated	3 (4.8%)	Normal occlusion	52 (83.9%)
None	52 (83.9%)		
Total	62(100%)	Total	62(100%)

Table 3: Frequency distribution of severity of dental injuries and occlusion among age groups

Age groups(years)	None	Dental Injury Type		Occlusion		
		Uncomplicated crown fractures	Complicated fractures	crown	Malocclusion	Normal
9-11	8	-	-		1	7
12-14	12	-	-		2	10
≥15	32	7	3		7	35
Total	52	7	3		10	52

Table 4: Association between type of dental injury and occlusion

Injury type	Malocclusion	Normal occlusion	Total
No dental injury	9 (90%)	43 (82.7%)	52 (83.9%)
Uncomplicated crown fracture	-	7 (13.5%)	7 (11.3%)
Complicated crown fracture	1 (10%)	2 (3.8%)	3 (4.8%)
Total	10	52	62

P= 0.217

Discussion

Special Health Care Needs (SHCN) are individuals with “any physical, developmental, mental, sensory, behavioural, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs.”¹²

A visually impaired child of special health care need is one whose visual activity is not more than 20/200 even along with correcting lenses.¹³ Traumatic dental injury is a public health problem that affects quality of life¹⁴ as it can cause pain, affect aesthetics as well as oral functions, including speech. It can also affect proper nutrition and predispose to non-nutritive oral habits. The presence of increased overjet and incompetent lips among individuals with visual impairment has been reported to predispose to dental trauma since they are exposed to frequent collision, falls and domestic accidents.⁷

This study is a cross sectional study on the prevalence of dental trauma and malocclusion among sixty-two institutionalized 9- to 21-year-old visually impaired students. Most of the participants were in the older age group of ≥ 15 and the male: female ratio was similar. Thus, a valid comparison was possible. The reason for the higher population of older age groups may be due to the late presentation of children to special need institutions, particularly in developing countries like Nigeria. This is attributable to low awareness, fear of stigmatization on the part of parents/caregivers, or financial constraint because most of the special institutions are privately owned with little or no government support.

The prevalence of dental trauma among visually impaired adolescents in this study was 16.1% and occurred only in the older age group ≥ 15 years with male predominance. In a study among 10- to 29-year-old visually impaired individuals at a blind school in Bilaspur, Chhattisgarh, India¹⁵, the prevalence of dental trauma was 37.8% with no significant age group differences. However, the study reported females having significantly higher prevalence than males, 43.1% and 29.9% respectively. A larger epidemiological study among 400 visually impaired 6- to 18-year-old children at Chhattisgarh in India⁷, reported no significant difference in prevalence of dental injury between sexes but revealed a higher frequency among age group of 13-15 years. This higher prevalence was attributed to less concern for personal safety and involvement in reckless activity when compared to younger age group.

The study reported a relative reduction in prevalence of dental trauma among higher age group of 16-18 years which was attributed to increased level of maturity and control of aggressive behaviour. Studies by Bhat et al¹⁶ and Kumar and Dixit¹⁷ compared prevalence of dental injury among visually impaired and sighted children and reported a significantly higher incidences among males than females. This was attributed to exhibition of more energy in males and indulgence in vigorous activities. In this study, out of 16.1% that had dental injury, 11.3% were uncomplicated dental injuries (enamel and enamel-dentine fractures only) and 4.8% were complicated dental injuries (pulp involvement). The epidemiological study among 6- 18-year-old visually impaired school children in Chhattisgarh⁷ as well as a cross sectional study among 5- to 16-year-old visually impaired children in South Karnataka¹⁸ reported higher prevalence of enamel fractures. The study in Chhattisgarh⁷ reported an overall prevalence of 51.0% dental injury from which 53% was enamel fracture only, followed by 12% enamel and dentine injury, 12% avulsion injury, 11% enamel-dentine-pulp injury and 5% treated dental injury. Enamel fractures have also been reported to be most common among sighted adolescents¹⁹.

A hospital-based Nigerian study by Ligali et al²⁰ on oral health characteristics among individuals with special needs reported a prevalence of 20.9% among visually impaired individuals, out of which 20.8% had malocclusion and 12.5% had trauma to anterior teeth. Another Nigerian study by Akinwonmi and Adekoya-Sofowora²¹ on oral health characteristics of 6-19 children and teenagers with special health care needs in Ile-Ife reported a prevalence of 4.9% visually impaired individuals, but there was no specific prevalence of malocclusion reported among them. It was, however, reported that Angle's class 1 malocclusion and spacing were most prevalent among the general population of special needs individuals compared with a control group without special needs.

In this study, prevalence of malocclusion was 16.1%, most of which were Angle's class 2 division 1 malocclusion. Increased over-jet and inadequate lip coverage have been reported as some of the predisposing factors causing dental injuries among visually impaired individuals, and about 67% of the subjects had considerable over jet (>3.5 mm) in a previous study.⁷ In this study, one tenth (10%) of the subjects with malocclusion had dental injury that was a complicated crown fracture.

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Despite that there was no statistically significant association between malocclusion and dental injury in this study, there was prevalence of severe dental injury. Most other studies^{7-9,16} have reported statistically significant correlation between dental injuries and increased over-jet. The difference in this study may be due to its relatively smaller sample size. Larger samples may be required in the future to confirm the results of this study. This study has revealed that dental trauma and malocclusion are prevalent among visually impaired adolescents found among the sighted. Oral health education and health promotion strategies should be provided among the visually impaired individuals to prevent incidences of dental trauma which may be severe. Appropriate treatment should also be planned to manage their dental trauma and malocclusion.

Conclusion

Prevalence of dental injury and malocclusion among visually impaired institutionalized individuals were 16.1% and 16.1% respectively. Uncomplicated dental

injuries were more prevalent among males and the older age groups. Although the association between dental injuries and malocclusion was not statistically significant, the presence of malocclusion appeared to contribute to the severity of dental injury. Further studies with increased sample size may need to be conducted to further confirm the results. Predisposing factors to dental trauma need to be assessed to prevent dental injuries among the visually impaired population.

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Conflicts of interest

None Declared

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