

Effect of Dental Treatment on the Quality of Life of Children with Traumatic Dental Injuries in Ibadan, Nigeria

Abstract

Background: Anterior dental trauma is known to be common in our environment as well as the complications that come with it. These injuries have been seen to impact the quality of life (QoL) of children significantly due to the fact that they compromise their dental health. This leads to aesthetic, psychological, social, and therapeutic problems impacting both the children and their parents. Treatment of these injuries has also been severely neglected possibly due to lack of awareness of where or how to access treatment as well as fear of dental treatment. However, treatment may on the other hand bring about a substantial improvement on the QoL of children in terms of their daily living. **Aim:** To assess the effect of dental treatment on the QoL of 12- to 15-year-old Nigerian school children previously identified as having had traumatized anterior teeth. **Design:** This is a follow-up study where secondary data were extracted from a cross-sectional study involving 1575 children attending public and private secondary schools in Ibadan, Nigeria. One hundred and ninety-six adolescents with evidence of dental trauma, previously identified as having their QoL negatively affected as a result of dental trauma, were called to take part in the follow-up study. The Child Perception Questionnaire (CPQ₁₁₋₁₄) was used in assessing the QoL of participants with dental trauma before and after treatment. Data were analysed using the IBM® SPSS® Statistics version 20.0, and the effect of dental treatment on the QoL of the participants was assessed using the McNemar's test. Statistical significance was set at $P < 0.05$. **Results:** Fifty-one (26.0%) out of the 196 invited children participated; there were 31 males and 20 females. The mean age was 13.4 years (standard deviation 1.1 years). Eighty traumatized anterior teeth were involved, with the maxillary centrals being the commonest (68, 85%). Twenty-three (45.1%) participants had more than one traumatized tooth. The commonest dental trauma was enamel fracture, which involved the dentine (39, 48.8%). The main treatments given were composite build-up (36, 45%) and root canal treatment (42, 52.5%). With the CPQ₁₁₋₁₄, in the oral symptoms domain, the number adversely affected before treatment fell from 30 (58.8%) to 3 (5.9%) ($P < 0.001$); in the emotional well-being domain, the number dropped from 35 (68.6%) to 10 (19.6%) ($P < 0.001$); and in the social well-being domain, the number fell from 34 (66.7%) to 22 (43.1%) ($P = 0.004$). However, in the functional limitation domain, the number adversely affected increased from 24 (47.1%) before to 46 (90.2%) after treatment ($P < 0.001$). **Conclusion:** Treatment resulted in a significant improvement in the QoL of participants, especially regarding their oral symptoms, and emotional and social well-being. However, there was worsening in the functional limitation domain. There is the need to introduce oral health into the school curriculum in order to encourage early reporting and prompt treatment of traumatic dental injuries.

Keywords: Anterior teeth, children, dental trauma, quality of life

Abstract

Contexte:

Les traumatismes dentaires antérieurs sont connus pour être fréquents dans notre environnement ainsi que les complications qui en découlent. Ces blessures ont un impact significatif sur la qualité de vie des enfants en raison du fait qu'elles compromettent leur santé dentaire. Cela conduit à des problèmes esthétiques, psychologiques, sociaux et thérapeutiques affectant à la fois les enfants et leurs parents. Le traitement de ces blessures a également été gravement négligé, peut-être en raison du manque de connaissance de l'endroit et de la manière d'accéder au traitement ainsi que de la peur des soins dentaires. Cependant, le traitement peut en revanche apporter une amélioration substantielle de la qualité de vie des enfants au niveau de leur vie quotidienne.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Adeyemo YI, Bankole OO, Aladelusi TO, Denloye OO. Effect of dental treatment on the quality of life of children with traumatic dental injuries in Ibadan, Nigeria. J West Afr Coll Surg 2019;9:1-7.

**Yewande Isabella Adeyemo¹,
Olubunmi O. Bankole²,
Timothy O. Aladelusi³,
Obafunke O. Denloye²**

¹Department of Child Dental Health, Bayero University Kano/ Aminu Kano Teaching Hospital, Kano, Kano State, ²Department of Child Oral Health, University of Ibadan/University College Hospital Ibadan, Oyo State, ³Department of Oral and Maxillofacial Surgery, University of Ibadan/University College Hospital Ibadan, Oyo State, Nigeria

Received: 26-May-2021

Accepted: 30-Jul-2021

Published: 05-Feb-2022

Address for correspondence:

Dr. Yewande Isabella Adeyemo,
Department of Child Dental Health, Bayero University Kano/
Aminu Kano Teaching Hospital,
Kano, Kano State,
E-mail: wendiepee@gmail.com

Access this article online

Website:

www.jwacs-jcoac.org

DOI: 10.4103/jwas.jwas_11_21

Quick Response Code:



Objectif:

Évaluer l'effet d'un traitement dentaire sur la qualité de vie d'écoliers nigériens âgés de 12 à 15 ans précédemment identifiés comme ayant eu des dents antérieures traumatisées.

Conception:

Une étude de suivi où les données secondaires ont été extraites d'une étude transversale portant sur 1575 enfants fréquentant des écoles secondaires publiques et privées à Ibadan, au Nigéria. Cent quatre-vingt-seize adolescents présentant des signes de traumatisme dentaire, précédemment identifiés comme ayant une qualité de vie affectée négativement à la suite d'un traumatisme dentaire, ont été appelés à participer à l'étude de suivi. Le Questionnaire de perception de l'enfant (CPQ₁₁₋₁₄) a été utilisé pour évaluer la qualité de vie des participants ayant subi un traumatisme dentaire avant et après le traitement. Les données ont été analysées à l'aide d'IBM® SPSS® Statistics version 20.0 et l'effet du traitement dentaire sur la qualité de vie des participants a été évalué à l'aide du test de McNemar. La signification statistique a été fixée à $P < 0,05$.

Résultats:

Cinquante et un (26,0%) des 196 enfants invités ont participé; il y avait 31 hommes et 20 femmes. L'âge moyen était de 13,4 (SD 1.1) ans. Quatre-vingt dents antérieures traumatisées ont été atteintes, les centrales maxillaires étant les plus fréquentes (68, 85%). Vingt-trois (45,1%) participants avaient plus d'une dent traumatisée. Le traumatisme dentaire le plus fréquent était la fracture de l'émail impliquant la dentine (39, 48,8%). Les principaux traitements administrés étaient la reconstitution de composite (36, 45%) et le traitement canalair (42, 52,5%). Avec le CPQ11-14, dans le domaine des symptômes oraux, le nombre de patients atteints avant le traitement est passé de 30 (58,8%) à 3 (5,9%) ($P < 0,001$); dans le domaine du bien-être émotionnel, le nombre est passé de 35 (68,6%) à 10 (19,6%) ($P < 0,001$) et dans le domaine du bien-être social, le nombre est passé de 34 (66,7%) à 22 (43,1%) ($P = 0,004$). Cependant, dans le domaine de la limitation fonctionnelle, le nombre de personnes atteintes est passé de 24 (47,1%) avant à 46 (90,2%) après traitement ($P < 0,001$).

Conclusion:

Le traitement a entraîné une amélioration significative de la qualité de vie des participants, en particulier en ce qui concerne leurs symptômes buccaux et leur bien-être émotionnel et social. Cependant, il y avait une aggravation dans le domaine de la limitation fonctionnelle. Il est nécessaire d'introduire la santé bucco-dentaire dans le programme scolaire afin d'encourager le signalement précoce et le traitement rapide des blessures dentaires traumatiques.

Mots clés: Traumatisme dentaire, qualité de vie, dents antérieures, enfants. été

Introduction

Quality of life (QoL) can be defined as “an individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns”.^[1] It can be thought of, widely, as the sum of all the factors in a patient's life, including health, environment, personality, age, housing, employment, and family situation.^[2]

Oral health, which is the standard of health of the oral and related tissues, enables an individual to eat, communicate, and socialize without active disease, discomfort, or embarrassment, contributing to a person's general well-being.^[3] Oral health-related quality of life (OHRQoL) is thus a concept with varying dimensions that includes an individual's perception of his or her oral health and its impact on his or her QoL in terms of his or her physical, psychological, and social function.^[4-6] It goes beyond psychological functioning however to encompass clinical, psychosocial, and behavioural concerns.^[2]

The importance of OHRQoL is being widely emphasized in both research and clinical settings, given the increasing demand for active participation of patients in the treatment process for diseases, especially those requiring long-term treatment and follow-up.^[6]

Injuries involving both the primary and permanent teeth and supporting structures are some of the most common dental conditions seen in children making them a serious public health problem.^[7,8] Anterior traumatic dental injuries (TDIs) in children are quite a common occurrence with its, sometimes,

lifetime complications. Their extent varies from cracks in and mild chipping of the enamel to severe maxillofacial injuries.^[7] Dental trauma is known to be associated with adverse psychological impact on both the parents and the child, because these fractures may alter the child's appearance and make him or her the target of teasing and ridicule by other children. They significantly impact on QoL due to the fact that they compromise dental health leading to aesthetic, psychological, social, and therapeutic problems.^[9]

According to child developmental psychology, the age of 6 marks the beginning of abstract thinking and self-concept.^[10] Children start to compare their physical features and personality traits with those of other children or against a norm. Their ability for evaluative judgments of their appearance, the quality of friendships, and other people's thoughts, emotions, and behaviours gradually develops through middle childhood (6–10 years).^[10,11]

Children develop the concept of time about the age of 8, when their recall period starts to lengthen and their understanding of frequency of events begins to emerge.^[12,13] By the age of 11 or 12, they have a clear understanding of complex emotions such as worry, shame, and jealousy characterized by the increasing centrality of peer crowd and clique dynamics in and their pre-occupation with others' views of self as they enter a period of early adolescence (11–14 years).^[10,11] Relationships amongst peers are a significant part of their perceptions regarding health and QoL such that judgments from their peer group can affect their emotional state as well as their relationship with other people.^[14] Thus, age-specific self-report measures were

required to accommodate differences in children's self-concept, understanding of feelings, and ability to interpret other people's behaviour across the 6- to 14-year age range.^[10,11]

Trauma to the anterior dentition should thus always be considered an emergency with an urgent need to be dealt with immediately and efficiently. This is important because, in addition to the fact that the mouth is of primary importance in determining facial attractiveness, there is, at the time, a primary transitory chewing and speaking impairment.^[15] Second, there is the golden time in which to deal with these injuries, especially those in dentine with close approximation to the pulp so that the teeth can remain vital and functional in the arch. Children with dental injuries are always more than likely to report adverse effects on eating and enjoying food, cleaning teeth, smiling, laughing and showing the teeth without embarrassment, maintaining usual emotional state without being irritable, and enjoying contact with people than children without any injury.^[16,17] In a study on dental trauma and its effect on QoL of children carried out by Adeyemo *et al.*,^[18] a high proportion of the respondents experienced "pain" and "difficulty with chewing" stemming from untreated dental trauma.

The tendency to avoid laughing and/or smiling can affect the development of social relationships, and the psychosocial impact often significantly diminishes QoL.^[19] Garcia-Godoy^[20] pointed out that a fractured permanent tooth is a tragic experience for the child and his parents.

A review of the literature revealed that many epidemiological and clinical studies worldwide have reported vastly on the prevalence, distribution, as well as the types and aetiology of injuries to the anterior teeth.^[18,21] Several OHRQoL instruments have been developed to measure the impacts of oral health status on adults' QoL, and some of them have been adapted for use on school-aged children.^[22,23] Not much is known about how injuries to anterior teeth affect children's day-to-day living in Nigeria and the effect dental treatment has on their QoL.

The aim of this study was to assess the effect of dental treatment on the QoL of 12- to 15-year-old Nigerian school children previously identified as having had traumatized anterior teeth.

Materials and Methods

Study population

A previous cross-sectional study had been conducted in 2013 to determine the prevalence and aetiology of dental trauma, and evaluate the effect of untreated traumatized anterior teeth on the QoL of children aged 12–15 from public and private secondary schools in Ibadan, Nigeria. In that study, 196 out of a total of 1575 participants who were examined were aware that they had traumatized anterior teeth and had, at the time, been administered the QoL questionnaire (Child Perception Questionnaire [CPQ₁₁₋₁₄]), which was included in the data collection sheet.^[18] These 196 participants had been given reference notes for treatment in the clinic afterwards.

The contact details of their parents/guardians had also been obtained.

In the present study, calls were intensely and repeatedly placed, after the initial study, to the parents and guardians of participants who were aware of their traumatized anterior teeth, educating them and inviting them to bring their wards promptly for dental treatment at a subsidized rate. Efforts were made by the researcher to either pick up each participant or bear the cost of transportation to and from the clinic per visit. Treatment was carried out between August 2014 and December 2015. Interviewer-administered questionnaire was used in assessing their QoL after undergoing treatment to their anterior teeth.

Sampling procedure

The sample included every participant who was aware of his or her dental trauma and presented in the clinic for assessment and management of their traumatized anterior teeth.

Ethical considerations

The protocol was given full approval by the joint University of Ibadan/University College Hospital Ethical Review Committee before commencement of the study. Selected participants submitted signed consent forms from their parents and also gave their assent.

Study instrument

The study instrument was a data collection sheet, which included a screening/trauma form. The data collection sheet was used to obtain information on age, gender, school type, and socioeconomic status of parents, whereas the screening form was used to gather information on the history and cause of trauma, teeth present, and traumatized anterior teeth charted using the Garcia-Godoy classification.^[24]

The validated abbreviated version of the CPQ₁₁₋₁₄ for population-based health surveys by Jokovic *et al.*^[25] was also administered. It was used to gather data on sociodemographic characteristics, dental injuries, and how the dental trauma affected them daily.

Clinical examination and reassessment

Clinical examinations and reassessment of each participant who presented in the dental clinic were carried out by the same dental surgeon (who was the main researcher) each time, with the participant seated on the dental chair for the examination.

Infection prevention and control measures were ensured while using standard sterile examination instruments including a mouth mirror and a community periodontal index of treatment needs probe with sterile gloves and gauze for each participant. Trauma to the maxillary and mandibular permanent incisor and canine teeth was recorded for each patient; their previous examination and assessment findings were also obtained from their notes.

Preoperative periapical radiographs were taken for each participant to ascertain the extent of the trauma including pulpal involvement and periapical pathologies. Pulp sensibility

testing was carried out where necessary. Afterwards, a final decision on the treatment plan for each subject was taken and explained to the patient and parent/guardian after which treatment was then commenced.

Measuring the impact of trauma on their quality of life

The CPQ₁₁₋₁₄ administered comprised 11 questions. They assessed and measured the impact dental trauma had on each participant’s daily life in the previous 3 months in four domains—oral symptoms, functional limitations, emotional well-being, and social well-being. Each participant was asked about the frequency and severity of each item-specific impact on a Likert scale, which was recorded as follows: (1) = “never”, (2) = “once/twice”, (3) = “sometimes”, (4) = “often”, and (5) = “everyday/almost every day”.

Measurement of impact of untreated TDIs on the QoL of the participants had earlier been recorded when the participants were examined and assessed in their schools in the initial study. These had been dichotomized following some previous OHRQoL studies.^[26,27]

As such, an outcome score of 0 was recorded for “never” from the Likert scale used for the frequency and severity denoting the absence of an oral health-related impact of trauma on QoL, whereas a score of 1 or present was recorded for “once or twice”, “sometimes”, “often”, and “everyday/almost every day”; these were considered to have experienced an oral health-related impact on their QoL.

Data obtained on their QoL before they were treated were compared with their QoL 3 months after they had received treatment for their traumatized teeth.

Data analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS) for Windows, Version 16.0 (SPSS Inc., Chicago, IL, USA). Changes in post-treatment impacts were noted. Data analysis included descriptive statistics. Frequency distributions were presented using tables and summary statistics such as mean and standard deviation (SD), and cross tabulations of qualitative data were expressed as percentages/ proportions and compared using the McNemar’s test where necessary. The level of significance was set at *P* < 0.05.

Results

Demographic and clinical characteristics of participants

A total of 51 children (26.0%) out of the 196 participants with clinical evidence of dental injury reported to the dental clinic for assessment and management of their traumatized teeth. They consisted of 31 (60.8%) males and 20 (39.2%) females [Table 1].

The ages of the children ranged from 12 to 15 years with a mean (SD) of 13.4 (1.1) years. Children aged 13 years accounted for 17 (33.3%) of the participants. Fourteen (27.5%) children were aged 12 years, 15-year-olds accounted for 12 (23.5%), and the

remaining eight (15.7%) were 14 years old. More than half of parents of the children 27 (52.9%) ranked high in social status, 21 (41.2%) were of the middle social class, and three (5.9%) ranked low in social status.

More than three-quarters (76.5%) attended private schools, whereas the remaining 23.5% attended public schools. Forty-seven (92.2%) of the 51 children reported falls as a cause of their TDIs, whereas the remaining four children (7.8%, three males and one female) reported collisions [Table 1].

There were 80 traumatized teeth seen in these 51 participants who presented for dental treatment. The number of traumatized teeth per participant ranged from 1 to 4, with 23 (45.1%) of them having more than one traumatized anterior tooth. The maximum number of traumatized teeth recorded in a participant was 4, and this was seen in only one participant.

Twelve (15%) of the 80 traumatised teeth were enamel fractures, 39 (48.8%) teeth had enamel fractures which involved the dentine, 27 (33.8%) of the teeth had crown fractures with pulpal involvement while 1 tooth had an enamel crack and another was totally avulsed [Table 2]. The maxillary centrals made up 85% (68) of the teeth involved in the trauma, whereas the

Table 1: Sociodemographics of participants

| Variables | Gender | | Total, n (%) |
|------------------------|-------------|---------------|--------------|
| | Male, n (%) | Female, n (%) | |
| Number | 31 (60.8) | 20 (39.2) | 51 (100.0) |
| Age (years) | | | |
| 12 | 11 (35.5) | 3 (15.0) | 14 (27.5) |
| 13 | 9 (29.0) | 8 (40.0) | 17 (33.3) |
| 14 | 4 (12.9) | 4 (20.0) | 8 (15.7) |
| 15 | 7 (22.6) | 5 (25.0) | 12 (23.5) |
| School type | | | |
| Public | 6 (19.4) | 6 (30.0) | 12 (23.5) |
| Private | 25 (80.6) | 14 (70.0) | 39 (76.5) |
| Social status | | | |
| High | 17 (54.8) | 10 (50.0) | 27 (52.9) |
| Middle | 12 (38.7) | 9 (45.0) | 21 (41.2) |
| Low | 2 (6.5) | 1 (5.0) | 3 (5.9) |
| Cause of trauma | | | |
| Fall | 28 (90.3) | 19 (95.0) | 47 (92.2) |
| Collision | 3 (9.7) | 1 (5.0) | 4 (7.8) |

Table 2: Distribution of number of traumatized teeth by type of trauma

| Type of trauma | Number of traumatized teeth, n (%) |
|--|------------------------------------|
| Enamel crack | 1 (1.2) |
| Enamel fracture | 12 (15) |
| ED fracture | 39 (48.8) |
| ED fracture with pulpal involvement | 27 (33.8) |
| Avulsed tooth | 1 (1.2) |
| Total number of traumatized teeth | 80 (100) |

ED: enamel dentine

maxillary laterals and the mandibular canine teeth made up 13.8% (11) and 1.3% (1), respectively [Table 3].

Of the 80 traumatized teeth, composite build-up was done on 36 (45%) of them, whereas root canal treatment was done on 42 (52.5%) teeth. The treatment plan for the avulsed tooth (1.25%) involved fabrication of a removable partial denture, whereas the only tooth with enamel crack was placed under observation after the application of dentine bonding agent over it.

In terms of the participants with the traumatized teeth, 23 (45.1%) of the 51 participants who had treatment had composite build-up done for them, 27 (52.9%) participants had root canal therapy done with composite build-up of their root filled teeth, and one (2%) participant with the avulsed tooth had a removable partial denture fabricated. One of the 23 participants who had composite build-up done also had a dentine-bonding agent applied over an enamel crack on one tooth.

Child Perception Questionnaire item-specific impacts on participants before and after dental treatment

Before treatment, the most prevalent CPQ₁₁₋₁₄ item-specific impact of dental trauma was on “being shy and embarrassed”, reported by 62.7% of the participants. The second most prevalent impact was on “pain”, which was reported by 58.8% of the participants. This was followed by impacts reported on “smiling/laughing” (54.9%) and “concern about what

others thought” (52.9%). The least reported impacts were on “didn’t want to spend time with other children” (9.8%), low concentration in school (7.8%), and sleep disturbance (7.8%) [Table 4].

In the oral symptoms domain, the proportion of participants who reported impact on “pain” and “pain on brushing” after treatment (3.9% and 2%, respectively) reduced significantly ($P < 0.001$) when compared to the proportion prior to treatment (58.8% and 27.5%, respectively).

Also, after dental treatment, participants with TDIs experienced a greater impact on “chewing difficulty” when compared with the impact on their daily lives before treatment where the proportion of participants who experienced “chewing difficulty” increased significantly from 45.1% before treatment to 90.2% post treatment ($P < 0.001$).

The emotional well-being of participants was significantly improved following dental treatment. There was a significant reduction in the proportion of children who reported “being shy and embarrassed”, as well as in those showing “concern for what other children thought” from 62.7% and 52.9%, respectively, before treatment to 11.8% and 19.6%, respectively, after treatment ($P < 0.001$).

Dental treatment was also found to significantly reduce the impact of dental trauma on QoL of the participants on three items in the social well-being domain: “avoid smiling/laughing”, “didn’t want to talk”, and “teased by other children”.

The proportion of participants who reported these impacts prior to treatment significantly reduced following dental treatment, implying that dental treatment had a significant positive impact on the social well-being domain items. On the other hand, there was no significant change in the proportion of participants with impacts reported on “low concentration in school” and lack of desire to “spend time with others” before and after treatment.

Table 3: Distribution of number of traumatized teeth by type of tooth

| Type of tooth | Number of traumatized teeth, n (%) |
|---|------------------------------------|
| Maxillary centrals | 68 (85.0) |
| Maxillary laterals | 11 (13.8) |
| Mandibular centrals | 1 (1.3) |
| Total number of traumatized teeth. | 80 (100) |

Table 4: CPQ₁₁₋₁₄ item-specific impacts of participants before and after treatment

| Item-specific impact | Before treatment, n (%) | | After treatment, n (%) | | P-value ^a |
|---|--------------------------|--------------------------|--------------------------|--------------------------|----------------------|
| | CPQ ₁₁₋₁₄ = 0 | CPQ ₁₁₋₁₄ = 1 | CPQ ₁₁₋₁₄ = 0 | CPQ ₁₁₋₁₄ = 1 | |
| Oral symptoms domain items | | | | | |
| Pain | 21 (41.2) | 30 (58.8) | 49 (96.1) | 2 (3.9) | <0.001 |
| Pain on brushing | 37 (72.5) | 14 (27.5) | 50 (98.0) | 1 (2.0) | <0.001 |
| Functional limitation domain items | | | | | |
| Sleep disturbance | 47 (92.2) | 4 (7.8) | 51 (100) | 0 (0.0) | NA |
| Chewing difficulty | 28 (54.9) | 23 (45.1) | 5 (9.8) | 46 (90.2) | <0.001 |
| Emotional well-being domain items | | | | | |
| Shy and embarrassed | 19 (37.3) | 32 (62.7) | 45 (88.2) | 6 (11.8) | <0.001 |
| Concern for thoughts | 24 (47.1) | 27 (52.9) | 41 (80.4) | 10 (19.6) | <0.001 |
| Social well-being domain items | | | | | |
| Low concentration | 47 (92.2) | 4 (7.8) | 50 (98.0) | 1 (2.0) | 0.25 |
| Avoid smiling/laughing | 23 (45.1) | 28 (54.9) | 37 (72.5) | 14 (27.5) | 0.001 |
| Didn’t want to talk | 40 (78.4) | 11 (21.6) | 49 (96.1) | 2 (3.9) | 0.004 |
| Didn’t want to spend time | 46 (90.2) | 5 (9.8) | 50 (98.0) | 1 (2.0) | 0.125 |
| Teased by other children | 27 (52.9) | 24 (47.1) | 35 (68.6) | 16 (31.4) | 0.04 |

CPQ₁₁₋₁₄: Child Perception Questionnaire, NA: not applicable. ^aP-value obtained from the McNemar’s test
 Figures in bold refer to oral health related impact values

Table 5: QoL based on different domains before and after treatment

| Domain | Dichotomized CPQ ₁₁₋₁₄ | | | | P-value ^a |
|-----------------------|-----------------------------------|--------------------------|--------------------------|--------------------------|----------------------|
| | Before treatment, n (%) | | After treatment, n (%) | | |
| | CPQ ₁₁₋₁₄ = 0 | CPQ ₁₁₋₁₄ = 1 | CPQ ₁₁₋₁₄ = 0 | CPQ ₁₁₋₁₄ = 1 | |
| Oral symptoms | 21 (41.2) | 30 (58.8) | 48 (94.1) | 3 (5.9) | <0.001 |
| Functional limitation | 27 (52.9) | 24 (47.1) | 5 (9.8) | 46 (90.2) | <0.001 |
| Emotional well-being | 16 (31.4) | 35 (68.6) | 41 (80.4) | 10 (19.6) | <0.001 |
| Social well-being | 17 (33.3) | 34 (66.7) | 29 (56.9) | 22 (43.1) | 0.004 |

QoL: quality of life, CPQ₁₁₋₁₄: Child Perception Questionnaire. ^aP-value obtained from the McNemar's test

Figures in bold refer to oral health related impact values

Child Perception Questionnaire domain impacts on participants before and after dental treatment

The impact of dental trauma on QoL of the participants was more on the emotional well-being domain as experienced by 68.6% of participants [Table 5]. This was closely followed by the social well-being domain (66.7%). Impacts relating to oral symptoms were reported by 58.8% of participants, whereas 47.1% experienced functional limitation due to dental trauma. The McNemar's test revealed that dental treatment had significantly positive impacts on oral symptoms ($P < 0.001$), social well-being ($P = 0.004$), and emotional well-being ($P < 0.001$) domains of QoL. The proportion of participants who reported impacts in these domains prior to treatment significantly reduced compared to the proportion of participants following treatment. With regards to the functional limitation domain, the effect of dental treatment was significantly negative, that is, the proportion of participants who experienced functional limitation increased significantly from 47.1% before treatment to 90.2% after treatment ($P < 0.001$) [Table 5].

Discussion

This study assessed the effect dental treatment had on the QoL of 12- to 15-year olds with anterior dental trauma. It analysed the impact of treated and untreated TDIs within the same group of children who presented to the clinic for treatment.

The study revealed that their OHRQoL significantly improved after treatment, indicating that untreated anterior dental trauma experienced by the school children impacted their QoL adversely.

This was as reported by Bendo *et al.*^[27] and Fakhruddin *et al.*^[26] in their studies in which a higher proportion of the participants with untreated TDIs experienced a greater impact on their QoL. After they were treated, many of the participants no longer experienced the impact dental trauma had had on their daily lives. Dental treatment brought respite to them, thus improving their QoL. Oral health education and awareness should therefore be introduced into the school curriculum as part of efforts to prevent such trauma from occurring and to encourage prompt presentation at the dental clinic for immediate assessment and management, should the trauma occur.

It was observed in our study that before treatment, "being shy and embarrassed", "pain", "avoiding smiling or laughing",

"concern about others' thoughts", and "being teased by other children" were the most prevalent of the items that impacted negatively on participants' QoL.

After treatment however, more than half of the participants whose QoL was impacted negatively by trauma had a positive feedback in all but one of these same item-specific impacts. This may be a pointer to the fact that the restorations were aesthetically pleasing such that the social interactions of the participants improved significantly without avoiding smiling or laughing and being shy or embarrassed or concerned about what others thought.

Each item-specific impact had an increasing number of participants with no impact of dental trauma on their QoL after treatment when compared to the number before treatment.

However, regarding the "chewing difficulty" item-specific impact in the functional limitation domain, this impacted negatively on the treated participants' QoL much more after treatment (90.2%) than before they were treated (45.1%). The participants may have been uncomfortable still, not being able to chew or bite with the restored tooth. This may not be unconnected to the post-operative instructions that were given to them, possibly making them very conscious not to bite with their anterior teeth. This was in keeping with findings by Fakhruddin *et al.*^[26] and Bendo *et al.*^[27] where a high proportion of the treated patients still had chewing difficulties though they were more aesthetically pleased and related better socially in terms of their social well-being.

Restoring the teeth of participants in this study did not completely eliminate the impact of TDIs on QoL, especially with regards to social well-being where a little over one-quarter of the participants still avoided smiling or laughing when around other children and about one-third were still being teased by other children. One-fifth of the children with restored anterior teeth also worried about what other people thought or said about their teeth, lips, jaws, or mouth.

Fakhruddin *et al.*^[26] reported that children with restored anterior teeth had functional limitations similar to those with untreated TDIs pointing out that restoring traumatized anterior teeth is only a part of the treatment for dental trauma. There may have been some injury to the pulp and periodontal ligament fibres, which cause pain either on chewing or even at rest. Treatment of these teeth may then become long-lasting, impacting on many aspects of their lives.

The limitations of this study are the low response rate and the fact that most of the participants had parents in the high/middle social class and attended private schools; these make the study sample unlikely to be representative of the study population and therefore the results may not be generalizable.

Conclusion

Untreated TDIs negatively impacted on the daily lives of the participants.

Treatment resulted in a significant improvement in the QoL of participants, especially regarding their oral symptoms, and emotional and social well-being. However, there was worsening in the functional limitation domain.

There is the need to introduce oral health education into the school curriculum in order to encourage early reporting and prompt treatment of TDIs.

Acknowledgements

The authors acknowledge the participants (children) and their parents.

They also acknowledge the contributions of Drs. Victor Akinmoladun, Omobolaji Iyun, Adeola Olusanya, Kolude, Adisa, Gbadebo, Ifesanya, Akinyamoju, and Obioma Uchendu.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- World Health Organization. Division of Mental Health and Prevention of Substance Abuse. (1997). WHOQOL: Measuring Quality of Life. World Health Organization. Available at: <https://apps.who.int/iris/handle/10665/63482>.
- Corson MA, Boyd T, Kind P, Allen PF, Steele JG. Measuring oral health: Does your treatment really make a difference. *Br Dent J* 1999;187:481-4.
- Oral Health Strategy Group. An Oral Health Strategy for England. London, UK: Department of Health; 1994.
- de Oliveira CM, Sheiham A. Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. *J Orthod* 2004;31:20-7; discussion 15.
- Bennadi D, Reddy CV. Oral health related quality of life. *J Int Soc Prev Community Dent* 2013;3:1-6.
- Sischo L, Broder HL. Oral health-related quality of life: What, why, how, and future implications. *J Dent Res* 2011;90:1264-70.
- Rao A, Kamath D, Shenoy R, Sumanth K. Trauma to the anterior teeth and its management. In: Rao A, editor. *Principles and Practice of Pedodontics*. 2nd ed. New Delhi: Jaypee Brothers Medical Publishers; 2008. p. 303-26.
- Wong FS, Kolokotsa K. The cost of treating children and adolescents with injuries to their permanent incisors at a dental hospital in the United Kingdom. *Dent Traumatol* 2004;20:327-33.
- Andreasen J, Andreasen F. Dental traumatology: Quo vadis. *Dent Traumatol* 1990;6:78-80.
- Hetherington EM, Parke RD, Locke VO. *Child Psychology: A Contemporary Viewpoint*. 5th ed. New York: The McGraw-Hill Companies; 1996. p. 240-64.
- Bee H. *Lifespan Development*. 2nd ed. New York: Addison Wesley Longman; 1998. p. 216-66.
- French D, Christie MJ. Developing outcome measures for children: "quality of life" assessment for pediatric asthma. In: Hutchinson A, McColl E, Ricalton C, editors. *Health Outcome Measures in Primary and Outpatient Care*. Amsterdam, the Netherlands: Hardwood Academic Publishers; 1996. p. 45-63.
- Rebok G, Riley A, Forrest C, Starfield B, Green B, Robertson J, *et al.* Elementary school-aged children's reports of their health: A cognitive interviewing study. *Qual Life Res* 2001;10:59-70.
- Jokovic A, Locker D, Guyatt G. What do children's global ratings of oral health and well-being measure? *Community Dent Oral Epidemiol* 2005;33:205-11.
- Marcenes W, Murray S. Social deprivation and traumatic dental injuries among 14-year-old schoolchildren in Newham, London. *Dent Traumatol* 2001;17:17-21.
- Cortes M, Marcenes W, Sheiham A. Impact of traumatic injuries to the permanent teeth on the oral health-related quality of life in 12-14-year old children. *Comm Dent Oral Epidemiol* 2002;30:193-8.
- Marcenes W, al Beiruti N, Tayfour D, Issa S. Epidemiology of traumatic injuries to the permanent incisors of 9-12-year-old schoolchildren in Damascus, Syria. *Endod Dent Traumatol* 1999;15:117-23.
- Adeyemo YI, Bankole OO, Aladelusi TO, Popoola BO, Denloye OO. Traumatic dental injuries and its effect on quality of life of 12 to 15 year old children in Ibadan, Nigeria *Nig J Dent Max Traumatol* 2019;2:15-35.
- Petersen PE. The World Oral Health Report 2003: Continuous improvement of oral health in the 21st century—The approach of the WHO global oral health programme. *Community Dent Oral Epidemiol* 2003;31:3-23.
- Forsberg CM, Tedestam G. Traumatic injuries to teeth in Swedish children living in an urban area. *Swed Dent J* 1990;14:115-22.
- Adekoya-Sofowora C, Sote E, Odusanya S, Fagade O. Traumatic dental injuries of anterior teeth in children in Ile-Ife, Nigeria. *Pediatr Dent J* 2000;10:33-9.
- Yusuf H, Gherunpong S, Sheiham A, Tsakos G. Validation of an English version of the Child-OIDP Index, an oral health-related quality of life measure for children. *Health Qual Life Outcomes* 2006;4:38.
- Easton JA, Landgraf JM, Casamassimo PS, Wilson S, Ganzberg S. Evaluation of a generic quality of life instrument for early childhood caries-related pain. *Community Dent Oral Epidemiol* 2008;36:434-40.
- García-Godoy F. A classification for traumatic injuries to primary and permanent teeth. *J Pedod* 1981;5:295-7.
- Jokovic A, Locker D, Guyatt G. Short forms of the Child Perceptions Questionnaire for 11-14-year-old children (CPQ₁₁₋₁₄): Development and initial evaluation. *Health Qual Life Outcomes* 2006;4:4.
- Fakhruddin KS, Lawrence HP, Kenny DJ, Locker D. Impact of treated and untreated dental injuries on the quality of life of Ontario school children. *Dent Traumatol* 2008;24:309-13.
- Bendo C, Paiva S, Torres C, Oliveira A, Goursand D, Pordeus I, *et al.* Association between treated/untreated traumatic dental injuries and impact on quality of life of Brazilian school children. *Health Qual Life Outcomes* 2010;8:114-22.