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Dental Trauma experience and Oral-Health-Related Quality of Life among university students

Key Words: dental trauma, oral health impact profile, positive and negative affect scale, prevalence, young adults

Abstract

Background: This study aimed to investigate the impact of self-reported dental trauma on oral-health-related quality of life (OHRQoL) of young adults and determine whether personality characteristics influenced how it was reported. *Method:* A cross-sectional study was carried out using a sample of 435 university students. A questionnaire sought data on previous dental trauma. OHRQoL was assessed using the short-form of the Oral Health Impact Profile (OHIP-14); the outcome being one or more impacts occurring 'fairly often' / 'very often'. Personality was assessed using the Positive and Negative Affect Scale (PANAS). *Results:* The participation rate was 87.2%. Dental trauma experience was reported by 110 participants (25.3%), and 242 (55.6%) indicated previous dental caries experience. Among those with dental trauma history, one or more OHIP-14 impacts was reported by 29.1% (with 21.2% among those with no history). Impact prevalence was higher among those who had previous dental caries experience (29.8%) than among those who had not (14.7%; $P < 0.001$). Higher PANAS negative affect scores were observed among those reporting one or more OHIP-14 impacts ($P < 0.001$). *Conclusion:* While dental trauma does not appear to have a negative impact on OHRQoL in young adults, past dental caries experience does. Negative emotionality influences self-reported oral health.

Introduction

Oral health-related quality of life (OHRQoL) research involves the evaluation of various dimensions of a population's self-reported oral health, thereby helping to improve the provision of dental care.¹ Dental trauma is common,² and a dental traumatic injury can result in a lifetime burden in terms of physical, emotional and functional limitations, as well as a sustained financial burden when ongoing dental rehabilitation is required.³ A number of studies have reported a negative impact of dental trauma on quality of life in children of school age.⁴⁻¹⁰ What is not clear is whether the same holds for young adults.

The shortened Oral Health Impact Profile (OHIP-14) is a 14-item inventory that is used to measure OHRQoL.¹¹ While it was initially developed for older adults, it has been shown to be valid in a range of age groups, including adolescents.¹² The OHIP-14 involves assessing the seven domains of functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap.^{13, 2} Aspects of personality have been shown to influence self-rated oral health responses.¹⁴⁻¹⁶ Thus, it may be useful to collect data on appropriate aspects of personality when investigating OHRQoL. The short-form, 20-item Positive and Negative Affect Schedule (PANAS) addresses this by capturing data on the two dominant emotional personality features of Positive Affect (PA) and Negative Affect (NA).¹⁷ PA is the extent to which an individual usually feels (for example) enthusiastic, active, and alert. Low PA is characterised by sadness and lethargy. NA reflects an individual's experience of anger, contempt, disgust, guilt, fear, and nervousness. Low NA indicates calmness and serenity.

The effects of dental trauma in the young adult age group are not well documented in the literature. The aims of this study were to investigate the impact of self-reported dental trauma on the OHRQoL of young adults and to determine whether personality characteristics had an influence on the reported impact.

Materials and Methods

A cross-sectional study was conducted with a large convenience sample of students living in five university residential halls. The participants' ages ranged between 17 and 26 years, but the majority were 18 or 19 years old. Ethical approval was obtained from the university's Human Ethics Committee. Consent was gained from each of the halls participating in the study, and overall approval was granted by the Director of the Accommodation Services Division.

A questionnaire was distributed to the students during dinner time at the halls of residence. Informed consent was gained and the students had the opportunity to be entered into a prize draw upon completion of the survey as an incentive to participate. The participation rate was determined by dividing the total number of completed questionnaires collected by the total number handed out. Participants were excluded if they did not give informed consent or failed to complete the questionnaire.

Data were collected on socio-demographic characteristics and self-report of any previous dental trauma occurring during childhood or more recently. Information was also collected on whether participants had had any dental **restorations** placed due to dental caries. The utilisation of government funding available for the management of dental trauma was also assessed in this questionnaire. The Accident Compensation Corporation (ACC) is a New Zealand Government-run, 'no-fault' social insurance system that covers all accidental injuries, regardless of age group and participants were asked about their utilisation of ACC funding. OHRQoL was measured using the OHIP-14 questionnaire.¹¹ For each of the 14 items, participants were asked how often they had experienced the problem in the previous four weeks. Responses were coded as 'very often' (4), 'fairly often' (3), 'occasionally' (2), 'hardly ever' (1) or 'never' (0). The prevalence of students reporting one or more OHIP impacts 'very often' or 'fairly often' was used as a summary measure in order to enable comparisons with data from similar studies. The PANAS questionnaire¹⁷ was used to assess PA and NA. Participants were asked to indicate the extent to which they had experienced the 20 items in the scale. Responses were coded as 'very slightly or not at all' (1), 'a little' (2), 'moderately' (3), 'quite a bit' (4) and 'extremely' (5). PA and NA are treated as separate entities, and higher scores correspond to more pronounced affect.¹⁸

Data were entered in Microsoft Excel and then analysed using version 20 of the Statistical Package for the Social Sciences (SPSS) software. After the computation of descriptive statistics, cross-tabulations and Chi-square tests were used to examine the statistical significance of differences among groups for categorical dependent variables. ANOVA tests were conducted where comparisons between groups for involved mean scores. The level of significance was set at $P < 0.05$. Multivariate analysis was used to control for age, gender, caries experience, trauma severity, PA and NA on the association between OHRQoL and past dental trauma experience. Statistical tests were two-tailed and interpreted at the 0.05 level.

Results

Of the 499 young adults approached, 435 (87.2%) participated. Males comprised 138 (31.7%), and females 297 (68.3%) of the sample; their ages ranged between 17 and 26 years. There were 62 (14.3%) participants from Hall 1, 107 (24.6%) from Hall 2, 170 (39.1%) from Hall 3, 29 (6.7%) from Hall 4, and 67 (15.4%) from Hall 5. The prevalence of dental trauma and dental restorations by demographic characteristics is presented in Table 1. There were no differences in dental trauma experience by demographic characteristics, but higher proportions of females and older students reported having experienced dental caries.

The most common cause of dental trauma was an accident or collision with an object, reported by 41 (37.3%) of those who had experienced trauma. This was followed, respectively, by sport-related injuries (N=28, 25.5%), falls (N=12, 10.9%), and episodes of violence (N=10, 9.1%). The most prevalent types of dental trauma experienced were teeth fractures and avulsion, reported by 77 (70.0%) and 11 (10.0%) participants respectively. Most of the trauma had occurred 6 or more years previously, as indicated by 53 participants (48.2%), with only 22 (20.0%) having occurred within the previous 2 years. A greater proportion of the most severe injuries had occurred 6 or more years previously; these accounted for 46 (60.0%) of the fractured teeth, and 10 (91.0%) of the avulsion injuries.

Treatment by a dentist, beyond an examination, was required for 50 (45.5%) of participants with dental trauma experience. Of those, 39 (35.5%) reported that all of their dental treatment had been covered by the Accident Compensation Corporation (ACC). ACC partially covered treatment for 8 (7.3%). Some 19 participants (17.3%) reported having had their treatment covered by their parents. Other funding sources accounted for 14 (12.8%) of the cases.

In respect of the impact of the trauma experience on everyday life, more than half of the young people (N=61, 55.5%) reported no impact at all. Concerns with aesthetics and self-consciousness were reported by a small number (N=16, 14.5%), and even fewer (N=9, 8.2%) reported that the nature of dental treatment received was a burden, discomfort or inconvenience.

OHIP-14 scores ranged from 0 to 50, with a mean of 6.1 (SD=8.0); one or more OHIP-14 impacts 'very often'/'fairly often' was experienced by 101 (23.2%). OHIP-14 data are presented in Table 2 by **gender**, age, hall, trauma experience and caries experience. Dental caries experience was strongly associated with the prevalence of OHIP-14 impacts.

The PANAS scale scores were normally distributed, with mean scores for the PA and NA of M=30.4 (SD=9.4) and M=19.5 (SD=7.2), respectively. Those who reported one or more OHIP-14

impacts had higher mean NA scores than those who did not (22.0 and 18.7 respectively; $P < 0.001$). The linear regression model for the OHIP-14 score (Table 3) showed that only NA was associated with the mean OHIP score.

Discussion

This study investigated the association between OHRQoL and dental trauma experience in young adults living in university residential halls. It was found that, while the two were not strongly associated, poorer OHRQoL was observed among those reporting past dental caries experience. However, that association was no longer apparent after controlling for negative affect, suggesting that once NA was controlled for, in a young adult group with generally low oral disease experience, self-reported oral health is determined more by personality characteristics than dental caries or trauma.

There were some limitations in this study that should be borne in mind when considering the findings. The cross-sectional study design was convenient but it precludes examination of the time-ordering of the observed associations. The major limitation was the nature of the sample: not only are University students more privileged than others in their age group, the use of a convenience sample means that the generalisability of the findings is unclear. It was not feasible to collect clinical data in this study, and so there was a need to rely on self-reported information for the dental trauma and caries experience variable, and that is likely to be less valid. The use of a more descriptive classification for dental trauma without clinical assessment is not possible, and this would have influenced the accuracy of the types of trauma reported. Recall bias is always a risk with self-reported questionnaires because participants may not accurately recall events from childhood accurately. The questionnaire was designed to address this by combining both specific and open-ended questions. Open-ended questions required categorisation that was influenced by the responses given, but data were entered in a systematic and standardised way. The questionnaire was designed for report and analysis of one trauma incident per individual despite some cases of repeat episodes of trauma detectable in the raw data.

The strengths of the study were that our convenience sample was essentially a census sample of students at the selected residential halls, and there were no important age or gender differences among the halls. The participation rate was high, at 87.2%, and so the risk of non-participation bias was minimal. At 435, the sample size was large enough to ensure adequate statistical power. The OHIP-14, derived from the longer-form OHIP-49, has been validated as a valid and

reliable measure of OHRQoL,¹¹ thus enabling comparison of the findings to those from similar studies. The original study where the 20-item PANAS was developed also used a sample of university students, and their responses showed considerable stability over time.^{17,19} The score distribution in that study was similar to that observed in the current study. Thus, the self-report OHRQoL and personality data obtained in this study are likely to be valid.

There are useful insights to be had in interpreting the findings in the context of the current literature. The prevalence of dental trauma in the current study (25.3%) was similar to the 23.4% prevalence reported for dentate adults in the most recent New Zealand Oral Health Survey, in 2009,²⁰ and the data on when the injuries occurred, the type of trauma experienced, and the most common causes are consistent with the findings of Bastone et al,²¹ in a literature review of the epidemiology of dental trauma from around the world (and including New Zealand). In the current study, **there was no observation of an** association between greater trauma severity (such as avulsion history) and poorer OHRQoL, but **it was** noted that nearly all of the avulsion injuries had occurred 6 or more years previously. It is likely, therefore, that many of the reportedly avulsed teeth had been primary teeth, and this may explain the lack of an association with OHRQoL by the time the participants were young adults.

Financial burden is another aspect that was investigated. The ACC government funding scheme was utilised by most of the trauma cases, and, if ACC had not covered the treatment, it was likely to have been covered under the Government-funded Adolescent Oral Health Care Scheme (under which routine dental care is available to adolescents until they turn 18). This is important in assessing the impact of dental trauma on OHRQoL, since the financial burden of dental treatment is lower or even eliminated in most cases. It is expected that restorative care experience increases with age,²⁰ as observed in **the** findings. Dental care for those over the age of 18 is not covered financially by the State, and while this theoretically may have an impact on routine dental attendance, (and subsequently greater caries experience and poorer self-reported OHRQoL),²² investigating this was beyond the scope of this study.

PA and NA are measured independently in the PANAS,¹⁸ and a strong association was observed between NA and poorer OHRQoL. A similar observation was noted by Thomson et al,¹⁴ when personality characteristics and OHRQoL impacts were investigated using the OHIP-14. The drawback in comparing these two studies is that Thomson et al used the Multidimensional Personality Questionnaire (MPQ) rather than the PANAS to assess personality characteristics. Despite this, those and the current findings suggest the need to incorporate measures of personality when assessing OHRQoL. A study by Foster Page et al,¹⁶ was valuable in finding that

psychological characteristics appeared to be more important than socio-demographic or clinical characteristics when assessing the influence of these factors on OHRQoL.

Conclusion

The longer-term effects of dental trauma on young adults have not been not well documented.

This study shows that while dental trauma does not appear to have a negative impact on OHRQoL in young adults, past dental caries experience does. Negative emotionality influences self-reported oral health.

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Table 1: Prevalence of dental trauma and dental restorations by demographic characteristic

	Had dental trauma N (%)	P value	Had a restoration N (%)	P value
Gender				
Male	69 (29.7)	0.154	65 (47.1)	0.012
Female	41 (23.3)		177 (60.0)	
Age				
17-18	67 (24.5)	0.616	142 (52.2)	0.045
19 and older	43 (26.7)		100 (62.1)	
Hall				
1	17 (27.4)	0.578	37 (59.7)	0.929
2	24 (22.6)		61 (57.5)	
3	46 (27.1)		90 (52.9)	
4	4 (13.8)		18 (64.3)	
5	19 (28.4)		36 (53.7)	
All combined	110 (100.0)		242(100.0)	

Table 2: Prevalence of OHIP-14 impacts by gender, age, hall, and past experience of dental trauma or dental restorations

	N (%)	1+ OHIP impacts often or fairly often N (%)		P value
		No	Yes	
Gender				
Male	138 (31.7)	113 (81.9)	25 (18.1)	0.086
Female	297 (68.3)	221 (74.4)	76 (25.6)	
Age				
17-18	274 (63.0)	213 (77.7)	61 (22.3)	0.54
29 or older	161 (37.0)	121 (75.2)	40 (24.8)	
Hall				
1	62 (14.3)	48 (77.4)	14 (22.6)	0.14
2	107 (24.6)	82 (76.7)	25 (23.4)	
3	170 (39.0)	139 (81.8)	31 (18.2)	
4	29 (6.7)	19 (65.5)	10 (34.5)	
5	67 (15.4)	46 (68.7)	21 (31.3)	
Have you ever had a dental traumatic injury that has caused damage to your teeth?				
Yes	110 (25.3)	78 (70.9)	32 (29.1)	0.095
No	324 (74.7)	255 (78.7)	69 (21.3)	
Have you ever had dental restorations placed due to decay?				
Yes	242 (55.9)	170 (70.2)	72 (29.8)	< 0.001
No	191 (44.1)	163 (85.3)	28 (14.7)	
All combined	435 (100.0)	334 (76.8)	101 (23.2)	

Table 3: Linear regression model for OHIP score

	Unstandardized coefficients		Standardized Coefficients	T	Sig	95.0% CI
	B	Std. Error	Beta			
Constant	2.464	4.198		0.587	0.559	-5.872, 10.799
Gender (ref = female)	1.118	2.014	0.057	0.555	0.580	-2.881, 5.116
Age (ref = 19 plus)	0.522	1.974	0.027	0.264	0.792	-3.399, 4.442
Dental restorations placed due to decay.	-0.738	2.071	-0.37	-0.356	0.722	-4.851, 3.374
Trauma severity and experienced within the past 2 years.	0.573	2.444	0.024	0.234	0.815	-4.280, 5.425
PANAS Positive Affect scale score	-0.77	0.103	-0.81	-0.743	0.459	-0.282, 0.128
PANAS Negative Affect scale score	0.336	0.144	0.261	2.335	0.022	0.050, 0.621