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Research Article

Sydney Primary School Teachers' Knowledge and Attitudes with Regards to Traumatic Dental Injury Management

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Abstract

Purpose: School teachers' initial management of traumatic dental injuries (TDIs) is crucial to the injured tooth's long-term prognosis. Previous international studies have suggested that teachers lack the necessary knowledge to manage dental trauma appropriately. The aim of the study was to assess the knowledge of Australian school teachers in their initial management of TDIs and to compare this with previously published literature. Furthermore, the study aims to investigate any differences in knowledge between primary school teachers working in public versus private metropolitan schools.

Methods: This investigation was a cross-sectional descriptive study and employed a questionnaire type survey instrument. The study was conducted amongst a convenient sample of 120 school teachers between May and October 2012 across 3 public and 2 private Sydney primary schools.

Results: Primary schools in Sydney management of TDIs were relatively low amongst sampled teachers with similar levels of knowledge found between private and public school groups.

Conclusion: Knowledge gaps were demonstrated amongst Sydney primary school teachers in the initial management of TDIs and found to be consistent with previously published literature. In addition, knowledge was similar for teachers employed in public and private schools. School teachers would benefit from education regarding TDI management which may improve the prognosis of these injuries when they occur.

Keywords: Traumatic Dental Injuries; School Teachers; Dental Knowledge; Management

Introduction

The aim of this study was to assess the knowledge of a select group of metropolitan primary school teachers in their initial management of traumatic dental injuries likely to be faced in the playground. In addition, this study investigated whether teacher knowledge differed between teachers employed in private versus public school sectors.

Traumatic injuries to both the primary and permanent teeth and their supporting structures are one of the most common dental problems seen in children. Tooth injury or loss can affect dental development of a child and can also have an impact

on the child's psychological development [1]. Literature has estimated the prevalence of traumatic dental injuries (TDIs) as affecting approximately 25-50% of school children [2-4]. Studies have also shown that the majority of these injuries occur at home, followed by school [5, 6].

Avulsion of a permanent tooth is one of the more serious dental injuries and is most commonly seen in children, representing about 16% of dental injuries [7,8]. Immediate, appropriate management of an avulsed tooth at the site of the accident heavily influences the prognosis [1,7,9-15]. Current guidelines recommend replantation of the tooth at the accident site as the treatment of choice [1,12-17]. Success rates of 85-97%

following immediate replantation have been reported [18]. If immediate replantation is not feasible, or those present are incapable, there are numerous storage options for transport to a clinic where replantation can take place [19].

Incorrect management of an avulsed tooth can result in a range of aesthetic, functional, psychological and financial consequences for the child and their family [20-22].

Uncomplicated crown fracture is listed as the most common injury in permanent teeth [3] while subluxation and displacement are the most common injuries in the primary dentition [3]. Complicated crown fractures, intrusions, crown-root, root fractures and concussions are other examples of traumatic dental injuries [3,23]. Appropriate management of these traumatic dental injuries by lay people can also aid in providing better long-term outcomes for the injured tooth [1,7,9-15].

Due to the high prevalence of TDIs in children at school (25%) [6], teachers are required to respond first to dental trauma. Primary school children in an Australian Study had an incidence of trauma of 1.7 incidences per 100 children per year [3]. International studies in this area have found that teachers' knowledge levels regarding TDIs are low [24-32] and there is an absence of Australian studies surrounding school teachers' knowledge of TDIs. Studies have found a higher prevalence of dental trauma in private schools compared to public schools [27,28] and teachers who had previously experienced dental trauma in students had a higher level of knowledge regarding dental trauma management [30-32].

Materials and Methods

Study design

This investigation is a cross-sectional descriptive study employing a questionnaire survey instrument delivered to a convenient sample of teachers within a group of Government (public) and Catholic (private) schools in the Sydney metropolitan region. A sample size of $n=120$ school teachers was surveyed. The study sample was stratified into two groups; primary public and primary private schools.

Questionnaire

A survey that included 11 demographic and 14 questions based on managing dental trauma was used to assess teachers' knowledge of the management of dental injuries. It included both closed and open type questions. A five-point Likert scale was used to score 2 of the closed questions with the remainder providing for either yes/no or other closed responses. The survey was de-identified to ensure participant confidentiality.

The survey questions had been previously validated in published literature [30,32-34] and piloted initially among 4 primary and 4 secondary school teachers in addition to 4 dental students. Minor modifications were subsequently made to improve construct validity. These school teachers were from 4 different schools and the results from the pilot were not included in this study.

Ethics

This study received ethics approvals from The University of Sydney Human Research and Ethics Committee [11-2011/14160], the NSW Department of Education and Communities (approval number 2011257) and Catholic Education Office Sydney Diocese (approval number 789) ethics committees. The names of the schools that were to be included in the study were provided to the NSW Department of Education and Communities as well as to the Catholic Education Office.

Participants and settings

School principals of conveniently located schools were contacted for permission to participate in the study by phone or e-mail. Permission was sought to attend a staff meeting at a time convenient to both principal and teachers. At the staff meeting teaching staff completed a voluntary questionnaire, of approximately 5 minutes duration.

Following the survey delivery, three final year Bachelor of Dentistry students from the University of Sydney presented a short 10-minute presentation, outlining appropriate management of TDIs. Teachers were then given an opportunity to ask questions relating to the management of dental trauma.

Participation in the study was voluntary and teachers were able to exit the study at any time. Verbal instruction relating to the purpose, confidentiality and voluntary nature of the study was emphasised by the study facilitators. All teachers at the staff meeting were included. Teachers that were absent on the day of the staff meeting were not included in this study.

Data collection and analysis

Surveys were collected between May and October 2012 from 120 primary school teachers from 3 public and 2 private schools in the Sydney metropolitan region. Following consent, survey responses were not identifiable to maintain confidentiality. The data was analysed using the statistical software SPSS™ statistics V18. Frequency calculations and cross-tabulations using Chi-squares was performed across strata with significance set at $p \leq 0.05$.

Results

Characteristics of participants (Table 1)

Of the 120 study participants, all completed and returned the questionnaire and consent forms. Of these, 118 were teachers and 2 were teachers' aides. Sixty seven (56%) worked at one of 3 public schools in Sydney and 53 (44%) were from one of 2 Sydney metropolitan private catholic schools, additionally, 92% of participants were female.

	%	n
<i>Gender?</i>		
Male	8.3	10
Female	91.7	110
<i>Teach at Public or Private school?</i>		
Public	55.8	67
Private	44.2	53
<i>Age?</i>		
20-30	37.5	45
31-40	26.7	32
41-50	16.7	20
>50	19.2	23
<i>Level of Education?</i>		
High School	1.7	2
Bachelor's degree	81.7	98
Master's degree	16.7	20
<i>Years of teaching experience?</i>		
1-5 years	36.4	43
6-10 years	22.9	27
11-15 years	11.0	13
>15 years	29.7	35
No response	1.7	2
<i>Lunch/ recess supervision?</i>		
Yes	94.1	112
No	5.9	7
<i>Sports supervision?</i>		
Yes	80.7	96
No	19.3	23
<i>Children of their own?</i>		
Yes	49.2	59

No	50.8	61
<i>TDI experience?</i>		
Yes	14.2	17
No	85.8	103
<i>Dental trauma education?</i>		
Yes	3.3	4
No	95	114
No response	1.7	2
<i>First aid education?</i>		
Yes	92.5	111
No	7.5	9
<i>Feel well informed?</i>		
Yes	5	6
No	95	114
<i>Importance of TDI education?</i>		
Very important	48.3	58
Important	45	54
Somewhat important	6.7	8
<i>Interest in TDI education?</i>		
Yes	82.5	99
No	15.8	19
No response	1.7	2

Table 1. Characteristics of participants

More than half (59%) of respondents had up to 10 years of teaching experience and 30% had more than 15 years of experience. Ninety eight percent of participants taught only primary school and of these, 61% taught kindergarten to year 3 and 37% years 4-6. The majority of participants were required to supervise children outside of the classroom with 112 (94%) providing lunchtime and recess supervision and 96 (81%) providing sports supervision. Ninety three percent of teachers had some form of formal first aid education or training.

In regards to previous TDI experience, only 3.3% had previously received some form of dental trauma education and 14% had an experience involving a TDI, the majority of which came from a single public school. The majority of respondents

(93.3%) regarded TDI education as very important or important. Ninety five percent of teachers felt uninformed and 82.5% were interested in having TDI education.

Knowledge of what constitutes a TDI and avulsion management (Tables 2 and 3)

The majority of respondents were aware of what constituted a TDI with 94% either agreeing or strongly agreeing that a broken or chipped tooth is considered a dental injury. Eighty five percent either agreed or strongly agreed that a tooth moved from its original position would be considered a dental injury while 96% either agreed or strongly agreed that a tooth knocked out of the mouth would be considered a dental injury.

	Broken tooth?		Moved tooth?		Knocked out tooth?		Tooth can be saved?		Would look for pieces?	
	%	n	%	n	%	n	%	n	%	n
No response	1.7	2.0	1.7	2.0	1.7	2.0	1.7	2.0	2.5	3.0
Strongly disagree	1.7	2.0	1.7	2.0	1.7	2.0	2.5	3.0	2.5	3.0
Disagree	n/a	n/a	3.3	4.0	n/a	n/a	6.7	8.0	9.2	11.0
Uncertain	2.5	3.0	8.3	10.0	0.8	1.0	28.3	34.0	16.7	20.0
Agree	46.7	56.0	32.5	39.0	16.7	20.0	36.7	44.0	39.2	47.0
Strongly agree	47.5	57.0	52.5	63.0	79.2	95.0	24.2	29.0	30.0	36.0

Table 2. Knowledge of what constitutes a TDI and broken/saved tooth management.

Question	%	n
<i>Urgency of treatment?</i>		
No response	1.7	2.0
0-30min	65.0	78.0
within a few hrs	32.5	39.0
next day	0.8	1.0
<i>Would you replant?</i>		
Yes	40.0	48.0
No	25.8	31.0
Unsure	33.3	40.0
No response	0.9	1.0
<i>How would you wash the tooth?</i>		
Scrub the tooth	1.7	2.0
Rinse with water	50.0	60.0
Replant as is	15.0	18.0
Other	7.5	9.0
Don't know	25.8	31.0

<i>Best storage?</i>		
No response	0.8	1.0
Tissue/handkerchief	15.8	19.0
Warm water	4.2	5.0
Ice	3.3	4.0
Fresh cold milk	50.0	60.0
Saliva/mouth	21.7	26.0
Saline	4.2	5.0
<i>When do you refrain from replanting?</i>		
Primary teeth	69.2	83.0
Permanent teeth	4.2	5.0
Both	6.7	8.0
Unsure	19.9	24.0

Table 3. Knowledge of avulsion management.

In response to questions regarding TDI management 62% either agreed or strongly agreed and 29% were uncertain that a chipped/broken tooth could be saved and 40% of teachers would replant an avulsed tooth whilst 33% were unsure.

Of those who would replant an avulsed tooth, almost twice as many taught in public schools. Half of all respondents would store the avulsed tooth in fresh cold milk and would rinse the tooth with water prior to replanting it. Fifteen percent of respondents would replant the tooth as is, all of whom were public school teachers.

Discussion

Response rate

The high response rate was largely due to hand delivery of questionnaires during the staff meetings, including the provision for answering questions during the survey administration. The short post survey educational presentation may have also contributed to participation rates.

Public vs. Private

The rationale behind comparing TDI knowledge of teachers between various school groups was to investigate any difference in knowledge and to consider possible reasons for any differences. The school system in Australia has primary schools and high schools (secondary schools), which may either be private schools or public schools. The primary schools that participated in the study had Kindergarten to Grade 6 students. Public schools in Australia are wholly State or Territory government funded, whilst private schools

are funded by fee-paying parents in addition to government subsidization[35].

Previous studies have shown that private schools have more resources to employ teachers with higher qualifications [36,37] when compared to public schools and this could equate to greater knowledge, including knowledge in managing TDIs. Results from this study indicate no statistically significant difference between qualifications of teachers from private and public schools as represented by this metropolitan Sydney sample. This may be due to government schools attracting similar qualified teachers due to increases in school funding from the Australian Government from \$6.9 billion in 1999–00 to \$11.5 billion in 2011–12 [35]. Two thirds of this funding is expected to go to public schools creating better equity in relation to their private school counterparts.

It was hypothesised in previous literature that private school teachers could have a higher level of knowledge than public school teachers due to a higher prevalence of dental trauma in private schools [27,31,34,38,39] due to the greater affordability of student's 'toys', such as bikes, skateboards and swimming pools. However, this was not the case in this Australian Sydney study. This may be partially explained by the comparable affluence between Australian public and private schools as well as the similar education of their teachers.

Comparisons with previous studies

Only 50% of respondents knew to rinse a dirty tooth with water prior to replantation as has been suggested by other literature [40]. This result is similar to those published in other studies from Ireland, Norway and the United Kingdom [6,26,31]. Half of survey participants knew that milk was the best storage medium from the options given and 62% knew that a fractured tooth could be saved. This is similar to results from other developed countries [30,39], whilst developing countries displayed a lower level of knowledge about storage medium of choice for an avulsed tooth[12-15,41,42]. This is important because initial management of avulsions has a strong bearing on the long-term prognosis of the tooth [7,9-11]. It is important to prevent dehydration and excess handling of the tooth, both of which affect the success of tooth re-implantation through the preservation of periodontal ligament cells on the root surface [17,39]. Viability of the periodontal ligament is crucial and is affected by extra-alveolar time, type of storage and handling [39]. It is therefore in the initial management of such injuries that teachers' actions could contribute to the longer-term prognosis, despite this also being the area in which they display limited knowledge.

Furthermore, most teachers (69%) understood that baby teeth should not be replanted if they are avulsed. This is likely to stem from the common knowledge that primary teeth are replaced eventually with permanent successors.

All Australian schools promote high participation in sports activities. Sports injuries have been reported to be the most common reason for attendance to emergency departments in one Australian study [43]. Considering almost 81% of teachers surveyed were involved in such supervision, this may help explain the relatively high awareness of what was considered a TDI. Despite this, 33% of teachers would seek professional help for an avulsion after several hours rather than immediately.

This study, similar to recent previous studies provides evidence that there is a lack of adequate knowledge among teachers in the management of dental trauma [1,12-15]. The majority of respondents however were aware of what constituted a TDI with more than 70% of participants agreeing or strongly agreeing that a chipped tooth, moved tooth and knocked out tooth were types of TDIs. This may be partly explained by the finding that 93% of teachers had participated in first aid training which may have included information about dental injuries. There was no significant difference in responses between publicly and privately employed teachers in TDI awareness.

The Mann Whitney U test was applied to survey questions with ordinal scales such as those relating to participant demographics. This indicated that the teachers surveyed from the public and private schools were demographically very similar. This would help explain the few statistically significant differences in responses between these two groups. One of these differences being that private teachers were significantly less likely to have had first aid education ($p=0.04$) despite the high combined rate.

Similar responses were also noted between public and private schools regarding management of TDIs. Forty percent of respondents surveyed would replant an avulsed tooth which is less compared to results from other developed countries which ranged from 80% [3] to 75% [29] and 72% [31]. Although 40% of teachers overall would replant an avulsed tooth, over twice as many [33] taught at public schools compared to private schools [19]. Also of this thirty three, twenty two teachers were from the same public school. This significant difference ($p= 0.02$) between private and public schools regarding avulsion management may be attributable to a particular event such as a well-publicised avulsion injury or particular educational intervention, especially given that 75% of the teachers reported to have received some form of dental trauma education were from the one school. This is consistent with previous studies [24-34,38,39,41], which have indicated that benefit can be gained from education on dental trauma management.

In order to encourage survey participation and promote TDI knowledge, a short presentation focusing on tooth avulsion, storage medium and re-implantation, was provided to the school teachers. Educational benefits of similar interventions

have been reported by other literature. Holan et al. surveyed physical education teachers one month before and eight months after an educational seminar and a significant increase in TDI knowledge was noted [30]. A study in Bern, Switzerland assessed TDI knowledge of two school areas, one that received an educational poster campaign and one that had not. Similarly, there was a significant increase in TDI knowledge reported following exposure to the poster campaign [44]. A study in Ankara, Turkey further demonstrated the increase in TDI knowledge from educational leaflets with a follow up questionnaire delivered one month following the educational intervention [1]. These three studies support the theory that education about TDIs, employing a variety of methods, can have favourable outcomes in terms of knowledge gains with regards to TDIs

Study strengths and limitations

This study represents the first time a group of Australian school teachers, both public and private, have been asked about their knowledge surrounding TDI's. The questionnaire used in this study used unaltered questions from previously published literature and was further piloted to improve construct validity.

The study involved a relatively small convenient sample of Australian primary school teachers within the city of Sydney. Extrapolating these results to represent other teacher groups such as high school teachers or non-metropolitan Australian locations may be difficult. Furthermore, the catholic private school sector represents the largest segment of private schools in Sydney but may not be representative of teachers in other types of private primary schools. The survey tool used in this qualitative study has limitations associated with questionnaire type instruments.

Conclusions

Knowledge amongst Sydney primary school teachers is similar in both public and private schools. This study has identified knowledge gaps amongst a group of metropolitan Australian primary school teachers in their knowledge and management of TDIs in the areas of adequacy of information surrounding TDI's, urgency for treatment following avulsions, preparedness to implant an avulsed tooth and appropriate storage mediums. Further education in the management of TDIs would benefit school teachers and this education should include increased TDI awareness, urgency of treatment and appropriate storage mediums.

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