



## Awareness of Dental Trauma Management among School Teachers

Hui Qing Chong<sup>1\*</sup>, Shahid Mitha<sup>1</sup>, Ponnuswamy Manikandan<sup>2</sup> and Dawn Lovell<sup>3</sup>

<sup>1</sup>*Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah Institute of Health Sciences, Universiti, Brunei Darussalam, Jalan Tungku Link, BE1410, Gadong, Brunei Darussalam, Brunei.*

<sup>2</sup>*PAPHMWHB Gadong Health Centre, Rimba, Brunei.*

<sup>3</sup>*Exeter Dental Referral Centre, Castle Square House, 17 Castle Street Exeter EX43PT, UK.*

### **Authors' contributions**

*This work was carried out in collaboration amongst all authors. The study was conceived and designed by author SM. The literature search and data collection were performed by author HQC, who also wrote the first draft of the manuscript and performed the statistical analysis. Authors PM, DL, Authors SM and HQC managed the data interpretation/analysis of the study and critical revisions of the article. All authors contributed toward and have approved the final manuscript.*

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### **ABSTRACT**

**Aims:** The primary objective of this study was to evaluate the level of knowledge and attitude of schoolteachers in Brunei towards emergency dental trauma management. A secondary objective was to investigate the association between knowledge and attitude of schoolteachers towards dental trauma and its management.

**Study Design:** Cross-sectional study using self-administered, pre-validated questionnaire.

**Methodology:** The English and Malay language self-administered and pre-validated questionnaires were distributed to a random sample of schoolteachers in five schools. The school principals distributed the questionnaires to schoolteachers that met the inclusion criteria. There were 344 schoolteachers included. The questionnaire has been pretested by 5 schoolteachers before the study was conducted.

**Results:** Mean knowledge score was found to be 'poor' (1.2) and mean attitude score was found to be 'normal' (39.9). A majority of the schoolteachers agreed to the need of more information on dental trauma (79.4%). Significant relationships were found between knowledge and the following

\*Corresponding author: Email: [hqnn98@gmail.com](mailto:hqnn98@gmail.com);

factors: school (<0.001), gender (<0.001), first aid training (<0.001), dental trauma education (0.02) and prior witnessing of a dental trauma event (<0.001). However, no variables exhibited a statistically significant relationship with attitude. A positive association was found between knowledge and attitude, where a positive attitude would reflect better knowledge ( $\rho=0.23$ ,  $p < 0.001$ ).

**Conclusion:** The level of knowledge among the schoolteachers was found to be unsatisfactory and the level of attitude as average. There was a weak, positive association observed between schoolteachers' knowledge and attitude. Therefore, there is a significant need for measures to be taken to raise the knowledge of this subject among these education professionals.

*Keywords: Dental trauma; tooth avulsion; knowledge, emergency management; teachers.*

## 1. INTRODUCTION

Studies have reported that dental trauma is becoming more frequent, especially among schoolchildren [1-3]. The prevalence of dental trauma was found to be 16.5% in a Brazilian study [4]. A dental injury can range from minor enamel fracture to complete tooth displacement, also known as avulsion [1,5]. Such an injury, however, is usually accompanied with injuries to surrounding tissues, such as lips, gums, tongue, and face [6]. If not treated appropriately, these may result in a significant negative impact on one's quality of life, where physiological, psychological, aesthetic and financial adverse sequelae may occur [6,7].

The primary cause of dental trauma has been reported to be falls [5,8-10], while other causes include collisions with people and objects [10], traffic accidents and sports [11]. To prevent the prospect of oral trauma during sports, the use of mouthguards becomes important, and these have been underutilized for many years [12]. Homes and schools are the most common locations for dental trauma to occur [5,13]. For any case of dental injury, immediate appropriate management should be carried out or requested as soon as possible for a better prognosis [5]. Therefore, the need for adequate knowledge of dental trauma management in schoolteachers and parents – as the most likely people to be present at the injury site – is imperative.

In recent years, many studies have been done on this topic to assess the level of knowledge of schoolteachers in different regions of the world. The results, however, were similarly unsatisfactory [2,14,15]. In Brunei, there is no relevant data and study about this subject to date. Therefore, the results of this study may assist the Ministry of Health in planning initiatives in this regard and provision of resources in developing relevant training for schoolteachers.

## 2. MATERIALS AND METHODS

The study was framed as a cross-sectional where a total of 344 teachers from five schools, randomly selected by proportionate sampling were included. Half of the sample was comprised of government schools and the remaining half from private schools. All teachers who were willing to participate in the study, with a criterion of teaching primary or/and secondary schoolchildren were sampled and included in the study, whereas those who were reluctant or not teaching primary or secondary schoolchildren were excluded.

The research instrument utilized in this study was a pre-validated self-administered questionnaire.<sup>6</sup> The validation of this questionnaire was approved by the Institutional Review Board (IRB) in Yazd, Iran. The questionnaire was divided into four parts. Part one contained demographic questions such as age, gender, and educational level. Part two contained scenario-based questions to evaluate participants' knowledge about dental trauma and its management. Part three contained Likert scales to measure participants' attitude towards dental trauma. Part four contained questions for participants' self-assessment. A pre-test was done on five voluntary participants (not included in the study) to ensure the language used in the questionnaire was simple to understand. The pre-tested questionnaire was then delivered to the school principals for distribution among the eligible teachers. The completed forms were collected back three days following distribution.

For knowledge, the score range was between 0 and 7. A score of 5.2 and above was considered 'excellent', 1.3 to 5.1 considered 'moderate', and 1.2 and below considered 'poor'. Meanwhile, for attitude, the score range was between 7 and 35. A score of 30 and above was considered 'good', 23 to 29 considered 'average', and below 23

considered 'poor'. All data collected were analyzed using R studio (version 1.1.414). Statistical analyses include Cronbach's alpha, descriptive statistics, inferential statistics (independent t-test, Mann-Whitney test, one-way ANOVA) and Spearman's rank correlation.

### 3. RESULTS

Table 1 demonstrates the demographic information of the 344 participated schoolteachers. In the sample, 86.3% were from government schools and 13.7% were from private schools, with 84.3% being females and 15.7% being males. More than half were in the age group of 35-39 years. Nearly 80% held a Bachelor's degree. Although more than 20% had first aid training, only less than 2% had dental trauma education. Almost 10% of the schoolteachers had witnessed dental trauma cases among schoolchildren before.

Table 2 illustrates teachers' knowledge with regard to dental trauma and its management. There was less than 28% who could correctly identify the tooth type damaged in case 1 and

nearly 92% did not know the most appropriate action in response to the situation. In case 2, more than 98% selected the incorrect response and approximately 99% did not know the correct way of keeping the tooth for transport to the dentist. There was almost 97% who chose the wrong storage liquid and less than 7% knew the best time to replant an avulsed tooth.

Table 3. shows the attitude of teachers towards dental trauma using a Likert scale. More than half agreed that being capable of managing dental trauma can improve treatment outcome. Approximately 60% felt neutral about dental trauma not being an emergency. Managing dental trauma was considered professional and needs special training by more than 55%.

Table 4 reveals teachers' self-assessment with regards to managing dental trauma. Nearly 97% believed they did not have sufficient knowledge of dental emergencies and its management, with about 80% agreed to the necessity of more dental emergency management education. More than 70% felt incompetent to perform necessary appropriate actions should a dental injury occurs.

**Table 1. Sociodemographic characteristics of study sample (n = 344)**

Characteristic	n	(%)	(95%CI)
<b>School</b>			
Government	297	86.3	(82.1, 89.7)
Private	47	13.7	(10.3, 17.9)
<b>Gender</b>			
Female	290	84.3	(79.9, 87.9)
Male	54	15.7	(12.1, 20.1)
<b>Age</b>			
24-34 years	58	16.9	(13.1, 21.3)
35-39 years	186	54.1	(48.6, 59.4)
40-59 years	100	29.1	(24.4, 34.2)
<b>Highest level of education</b>			
Higher National Diploma	26	7.6	(5.1, 11.0)
Bachelor's degree	271	78.8	(74.0, 82.9)
Master's degree	47	13.7	(10.3, 17.9)
<b>First aid training</b>			
Yes	79	23.0	(18.7, 27.8)
No	265	77.0	(72.2, 81.3)
<b>Dental trauma education</b>			
Yes	5	1.5	(0.54, 3.6)
No	339	98.5	(96.4, 99.5)
<b>Ever witnessed dental trauma</b>			
Yes	32	9.3	(6.5, 13.0)
No	312	90.7	(87.0, 93.5)

*n* = frequency, % = percentage, *CI* = Confidence interval

**Table 2. Teachers' knowledge on dental trauma management (n = 344)**

Question		n	%
Case 1: A 9-year-old student was hit in the face while playing soccer during school hours. Unfortunately, his upper front tooth was broken. Luckily, there was no other injury.			
1. What type of tooth which was damaged in the accident?	Correct response	87	25.3
	Incorrect response	257	74.7
2. Which action is the most appropriate?	Correct response	29	8.4
	Incorrect response	315	91.6
Case 2: During school hours, a 12-year-old girl fell from stairs and hit in the mouth. The upper teeth are not visible, and there is bleeding in the mouth.			
3. What should you do?	Correct response	5	1.5
	Incorrect response	339	98.5
4. How would you keep the tooth while transporting it to the dentist, if you could not replant it (replace it into the socket)?	Correct response	3	0.9
	Incorrect response	341	99.1
5. If you are going to store the tooth in a liquid, what liquid would you use to transport it to the dentist?	Correct response	11	3.2
	Incorrect response	333	96.8
6. When is the best time to replant (replace tooth into the socket), if the tooth is avulsed (fallout from the mouth)?	Correct response	23	6.7
	Incorrect response	321	93.3

*n = frequency, % = percentage*

**Table 3. Teachers' attitude towards dental trauma (n = 344)**

Question		n	%
1. Teachers not responsible for managing dental trauma.	Strongly disagree	19	5.5
	Disagree	39	11.3
	Neutral	204	59.3
	Agree	47	13.7
	Strongly agree	35	10.2
2. Able to manage emergency dental trauma improves treatment outcome.	Strongly disagree	7	2.0
	Disagree	8	2.3
	Neutral	90	26.2
	Agree	217	63.1
	Strongly agree	22	6.4
3. Teachers' training should include emergency dental trauma management.	Strongly disagree	17	4.9
	Disagree	47	13.7
	Neutral	190	55.2
	Agree	67	19.5
	Strongly agree	23	6.7
4. Dental trauma is not an emergency.	Strongly disagree	18	5.2
	Disagree	60	17.4
	Neutral	217	63.1
	Agree	40	11.6
	Strongly agree	9	2.6
5. Managing dental trauma is professional and requires special training.	Strongly disagree	6	1.7
	Disagree	12	3.5
	Neutral	41	11.9
	Agree	193	56.1
	Strongly agree	92	26.7

*n = frequency, % = percentage*

Table 5 compares the mean knowledge score and mean attitude score between each and all of the variables. Overall, the mean knowledge score obtained from all participants was 1.2, which was considered 'poor' and the mean attitude score obtained was 23, being considered

'average'. Significant relationships were found between knowledge and all the variables except age group and highest educational level. Teachers from the following categories obtained a higher mean knowledge score than their respective alternative option: 'private school',

'males', 'had first aid training', 'had dental trauma management education', 'witnessed dental trauma'. However, no significant relationships were found between attitude and any of the variables.

**Table 4. Teachers' self-assessment (n = 344)**

Question		n	%
1. Do you think your knowledge on dental emergencies and its treatments is enough?	Yes	11	3.2
	No	333	96.8
2. Do you need more education on dental emergencies and its treatments?	Yes	273	79.4
	No	71	20.6
3. Would you be able to carry out the necessary actions if you encounter dental injuries in a student promptly?	Yes	90	26.2
	No	254	73.8

*n = frequency, % = percentage*

**Table 5. Comparison of mean knowledge score and mean attitude score between different variables (n = 344)**

	Mean knowledge score	±SD	p-value	Mean attitude score	±SD	p-value
<b>School</b>						
Government	0.8	1.3	<b>&lt; 0.001<sup>a</sup></b>	39.6	5.6	.05 <sup>a</sup>
Private	1.7	2.1		41.3	4.8	
<b>Gender</b>						
Female	0.8	1.4	<b>&lt; 0.001<sup>b</sup></b>	39.8	5.5	.70 <sup>a</sup>
Male	1.6	1.8		40.1	5.6	
<b>Age</b>						
24-34 years	1.2	1.5	.66 <sup>c</sup>	40.1	4.5	.87 <sup>c</sup>
35-39 years	0.8	1.5		39.7	4.3	
40-59 years	1.0	1.4		40.1	7.6	
<b>Highest educational level</b>						
Higher National Diploma	1.3	1.8	.76 <sup>c</sup>	38.1	8.9	.77 <sup>c</sup>
Bachelor's degree	0.8	1.4		40.2	5.1	
Master's degree	1.2	1.4		39.2	5.0	
<b>First aid training</b>						
Yes	1.7	1.9	<b>&lt; 0.001<sup>a</sup></b>	39.6	6.7	.56 <sup>a</sup>
No	0.7	1.2		40.0	5.1	
<b>Dental trauma management education</b>						
Yes	2.5	2.1	.02 <sup>a</sup>	35.9	11.8	.11 <sup>a</sup>
No	0.9	1.4		39.9	5.4	
<b>Witnessed dental trauma</b>						
Yes	1.9	1.8	<b>&lt; 0.001<sup>a</sup></b>	38.9	7.1	.30 <sup>a</sup>
No	0.8	1.4		40.0	5.3	

<sup>a</sup>Independent t-test, <sup>b</sup>Mann-Whitney test, <sup>c</sup>One-way ANOVA, bold = significance at 0.05, SD = standard deviation  
There was a weak, positive association between mean knowledge score and mean attitude score which suggested that those with a positive attitude had higher knowledge score ( $\rho=0.23$ ,  $p < 0.001$ ).

#### 4. DISCUSSION

The response rate of this was good where the number of received forms exceeded the expected minimum sample size. The finding of 'poor' knowledge scores and 'average' attitude scores in this study were similar to a study conducted in Iran [6]. Roughly 10% of schoolteachers were reported to have observed dental trauma in school, which indicated an approximate prevalence of one in 10 schoolchildren for this study. It was found that more schoolteachers have had first aid training than dental trauma education which is similar to some other studies [2,16-18]. The higher proportion of schoolteachers having undergone first aid training could be explained by the better accessibility to local first-aid programs like Basic Life Support (BLS) training and Red Crescent Society, unlike dental trauma education. The greater percentage that agreed to not feeling responsible for managing dental trauma in school was in contrast to another study conducted in Iran [6]. This may be explained by the fear among schoolteachers that they may not be able to manage the trauma appropriately. Another reason could also be due to the belief of some schoolteachers that dental trauma might not be as critical for secondary schoolchildren who are less susceptible to injuries and more able to take care of themselves.

Similar to some studies, it was found that more than half of all schoolteachers were unable to recognize the broken tooth in Case 1 as a permanent tooth [1,8,17,14]. The ability to identify the type of tooth is significant in determining the appropriate management [14]. For the fractured tooth fragment in the same case, more than half would not look for it and send the child to the dentist, which was consistent with a study done in Iran [6]. In Case 2, about 98% of schoolteachers did not know the appropriate actions in response to the avulsed teeth. This finding was in line with other several studies [1,5-6,13,8,15], probably due to the majority of schoolteachers not being aware of the possibility of replantation. Most schoolteachers were also unaware of the proper way of storing the teeth prior to transporting to the dentist, similar to a study from Croatia [18]. One of the best and easily available storage vehicles is milk, which was selected by less than 5% of schoolteachers and is comparable to some studies [1,6,13,15]. Although among storage mediums, Hank's Balanced Salt Solution is excellent in keeping cells viable, it is not easily

available in many countries [19]. The ideality of a storage medium depends on its composition and its osmolality to preserve cells' viability [19]. It was concerning that only about 7% were aware of the 30-minute maximum time limit to replant the avulsed teeth, where a good prognosis is heavily dependent upon time of replantation. This is similar to an Iranian study which reported 9% for a similar response [5] but much lower compared with another Iranian study finding of 33.8% in contrast [6].

From these results, it can be inferred that there is a demand for more dental trauma education, as attributed by nearly 80% of schoolteachers where a majority of them felt that they did not have sufficient dental trauma knowledge and were uncertain in the proper management in any case of dental injury (Table 4).

There was a significant relationship found between knowledge and schools where private teachers were found to have better knowledge than government teachers. This could be due to a potential difference in the way that government teachers and private teachers were trained, and the international teachers who may have come from a country with better dental awareness, being more likely to be teaching in private schools. Gender was also found to exhibit a significant relationship with knowledge where males were able to obtain a higher mean knowledge score. This is in contrast to a Brazilian study, where females had better knowledge [17]. This could possibly be due to males being more likely to have viewed a similar personal experience and their participation in activities that might be associated with higher risk of dental trauma. Sports and outdoor activities are more likely prone to dental trauma incidents. In this study, all three of first aid training, dental emergency management education, and witness of dental trauma were found to significantly relate to knowledge. This is distinct from a study which observed no statistically significant difference between knowledge and former first aid training [5], but matches the result of another study which stated that there was a significant relationship between first aid training and dental emergencies education and knowledge [6]. The attitude, however, was not significantly related to any variables, as in an Iranian study [6]. (Table 5)

#### 5. CONCLUSION

From this study, it is apparent that the knowledge level of dental trauma management among these

schoolteachers was inadequate. Despite the poor knowledge, attitude of schoolteachers was found to be acceptable. There was also a weak, positive association observed between knowledge and attitude of schoolteachers on dental trauma management. There seems to be the to increase awareness and knowledge level of schoolteachers as they may be the first person to attend to a child with dental trauma. This can be incorporated as part of the first aid training that teachers receive.

### CONSENT AND ETHICAL APPROVAL

Before the commencement of this study, ethical approval (UBD/PAPRSBIHSREC/2018/106) was obtained from the Institute of Health Sciences Research Ethics Committee (IHSREC) at Universiti Brunei Darussalam (UBD). Written consent was taken prior to participation of this study.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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