Dental Trauma Management by New York City School Nurses

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ABSTRACT

Purpose: The purpose of this study was to assess the knowledge and ability of school nurses in NYC to manage and properly treat traumatic dental injuries.
Methods: A survey questionnaire was sent to 160 randomly selected public schools and 40 randomly selected private schools in New York City. The questionnaire consisted of 24 multipart questions regarding background, personal experience, and knowledge of dental trauma.
Results: Seventy-four percent (74%) of the nurses rated their confidence in handling dental trauma in the middle range on a scale from 1 to 10. Sixty-two percent (62%) of nurses knew liquid was the optimal transportation method of an avulsed tooth; however, 52% of participants responded incorrectly that it was not appropriate to replant an avulsed permanent tooth. Ninety percent of nurses surveyed were interested in receiving further education in the management of dental trauma.
Conclusion: This survey indicates that a gap of knowledge exists in the ability of school nurses to handle dental trauma. (J Dent Child 2012;79(2):74-8)

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Most 5- to 18-year-olds spend approximately half of their total waking hours in school. Annually, 1 in 14 students suffers an injury at school.[1] Approximately 80% of elementary school students will visit a school nurse for injury-related complaints over a 2-year period.[2] Approximately 19% of dental injuries occurred at school.[3] Among all facial injuries, dental injuries are the most common in children.[4]

Dental injuries can cause esthetic, psychological, social, and therapeutic problems.[5] The prognosis of traumatized teeth depends on prompt and appropriate emergency management.[6] Therefore, appropriate treatment after a dental injury is very important to optimally allow for a good prognosis. Often, the first person to encounter an injured child in school is the teacher or school nurse. School nurses are responsible for the immediate management of dental injuries that occur throughout the school day. Thus, appropriate diagnosis, plan of action, and treatment by school nurses handling the trauma are crucial to the child's dental health.

The purpose of this study was to assess the knowledge and ability of school nurses in New York City to manage dental trauma.

METHODS

A survey was developed based on published articles on dental trauma management in school.[1,2,4,5,8,9,11,16] The questionnaire consisted of 24 questions regarding background, personal experience, and knowledge of dental trauma management. All questions were closed-ended.

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A randomly selected list of 160 public schools and 40 private schools in NYC was obtained from the New York State Department of Health. The list was created via a random number generator computer program used by the NYS Department of Health to randomly select schools. The schools were limited to elementary schools. The surveys were proportionately distributed among the 5 boroughs of New York City: the Bronx, Brooklyn, Manhattan, Queens, and Staten Island.

A written survey was mailed to school nurses individually, and a self-addressed stamped envelope was included with the survey. The survey contained 2 parts. The first portion consisted of 5 multipart questions to assess knowledge in handling dental trauma. These questions included appropriate management and storage of both avulsed and fractured primary and permanent teeth. The second part contained 19 questions about personal and professional data. This included questions on age, gender, experience, training, and number of continuing education hours. All dental terminology was clearly defined.

After 1 month, a second survey was sent, and follow-up phone calls were placed to those who did not respond. All returned surveys were manually entered into SurveyMonkey software (SurveyMonkey, Palo Alto, Calif., USA), and the values were statistically analyzed. Fisher's exact test was used to analyze the data. The level of significance was set at $P<.05$.

RESULTS

One hundred school nurses responded. Eighteen schools were identified that did not have a school nurse, and therefore were deemed to be ineligible. Three surveys were returned because of an incorrect address. Therefore, the adjusted response rate is 56% (100 responses/179 schools).

Eighty-two school nurse respondents worked in public schools and 18 worked in private schools. Ninety-six respondents were registered nurses, and 93 respondents were female. The nurse respondents were primarily employed by the school full-time (85%), and were the only school nurse employed by the school (91%). Eighty-nine school nurses had been employed as a school nurse more than 1 year.

Table 1. Distribution of School Nurse Responses by Borough Location of School

Borough	No. of schools the survey was sent to	No. of schools responded	Response rate (%)
Brooklyn	41	19	46
Bronx	41	21	51
Manhattan	44	24	55
Staten Island	22	11	50
Queens	52	25	48

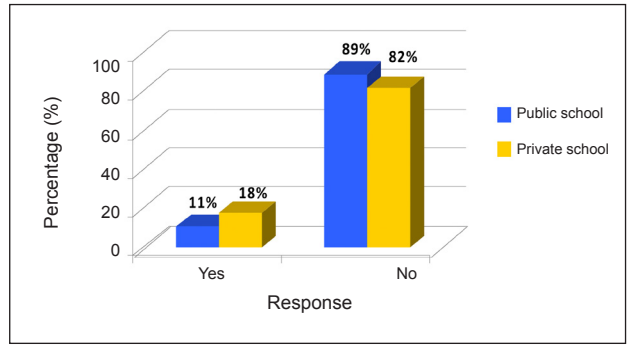

Figure 1. Percent of school nurses who had received formal training in managing dental trauma by school type.

There were no significant differences in response rates among the 5 boroughs (Table 1). A chi-square test showed that the differences between public and private school nurses in their responses to the knowledge part of the questionnaire were not statistically significant. Since significant differences were not found among the boroughs or between private schools and public schools, when appropriate, data were combined for these 2 variables. Even though there was no significant difference between public school nurses and private school nurses in their responses, there was a trend for public school nurses to score higher than private school nurses.

Figure 1 shows the number and percentage of respondents who had received formal training in handling dental trauma; 87% of all respondents from both public and private schools had not received formal training in handling dental trauma. For those who did receive training, the sources of training in handling dental trauma were: self-study; study group; in-service by a dental professional; or continuing education classes (online or onsite).

The survey inquired about the number of cases of each type of oral trauma seen within a school year: chipped tooth; avulsed tooth; lip laceration; intraoral laceration; and subluxated tooth. Seventy-six percent (76%) of school nurses had observed oral trauma in school. School nurses saw an average of 7.9 (788 cases/100

Table 2. Dental Trauma Seen by School Nurses by Types and Frequencies by Types

Type of oral trauma	School nurses who saw these types of oral trauma (%)	Cases per school year
Chipped tooth	53	101
Avulsed tooth	42	271
Lip laceration	67	266
Intraoral laceration	28	78
Subluxated tooth	22	28
Total	**76**	**788**

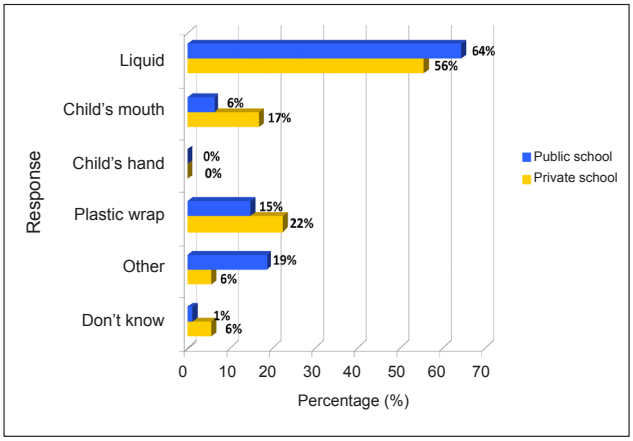

Figure 2. School nurses perceptions of optimal transportation method for an avulsed tooth.

nurses) cases of oral trauma each year. The most commonly reported oral trauma was an avulsed tooth (271 cases per year) (Table 2). Results showed that there was no significant correlation between the school locations or types and the incidence of trauma. Fisher's exact test also indicated that there was no significant association between the number of cases seen and the appropriate response to treatment.

Sixty-four percent of nurses in public schools and 56% of nurses in private schools knew liquid was the optimal transportation method of an avulsed tooth. Although most nurses knew liquid was the optimal transportation method, 79% chose milk as an acceptable transportation method for an avulsed tooth; 41% of school nurses selected Hank's solution as an acceptable transportation method (Figure 2 and Table 3).

Table 3. School Nurses Perceptions of Acceptable Storage Media for Avulsed Teeth

Appropriate storage method	N (%)
Antiseptic solution	6 (6)
Tap water	24 (24)
Milk	79 (79)
Saline	4 (4)
Hank's solution	41 (41)
None	8 (8)
Don't know	2 (2)

*Table 4. School Nurses Perceptions of Appropriateness of Replanting Avulsed Teeth**

Appropriate to replant avulsed tooth	Yes	No	Don't know
Primary tooth	3%	88%	9%
Permanent tooth	31%	52%	16%

** Figures shown as % of respondent with 100 respondents .*

The vast majority of school nurses (88%) knew they shouldn't replant an avulsed primary tooth; however, 52% of participants responded it was not appropriate to replant an avulsed permanent tooth (Table 4).

Very few school nurses (17%) had a readily available phone number of a dentist to call for consults and referrals. Only 15% of the nurses had actually ever called a dentist for a consult on dental trauma that occurred in school.

Sixty percent of participants were very interested in receiving education in dental trauma. Ninety percent of nurses surveyed were interested in receiving further education in this area (Figure 3).

One of the questions in the survey asked school nurses about their confidence handling dental trauma (1=not confident at all; 10=very confident). Seventy-four percent of school nurses indicated their confidence handling dental trauma was between 4 and 6.

DISCUSSION

The present survey included 160 public schools and 40 private schools proportionately distributed across New York City with the hope of distinguishing between schools with greater resources than others. Our results did not produce any differences across the geographic locations or between public and private schools. The nursing experience of those surveyed covered a wide range of years. According to the Association of School Nurses, there is no required course for dental trauma, while most school nurses surveyed did not have any formal training in handling dental trauma.

In our sample of 100 schools, there were on average 7.9 cases of oral trauma per school year. As shown in Table 2, the most commonly reported oral trauma in the survey was avulsed teeth. The nurses reported only a moderate amount of confidence in dealing with dental trauma and given how frequently dental trauma occurs, nurses should be better prepared to deal with it. The majority of school nurses knew not to replant primary teeth. This is generally accepted because of the possibility of damaging the developing tooth bud of the permanent

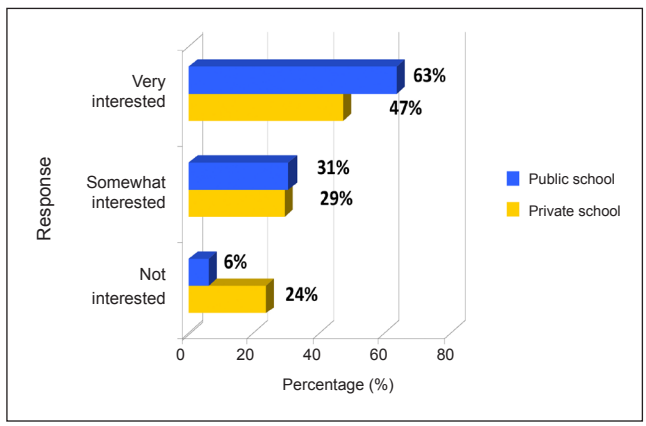

Figure 3. School nurses expressed interest in education about managing dental trauma.

successor. More than 60% of school nurses, however, did not know that they should replant avulsed permanent teeth. The most vital factor for successful replantation is maintaining the periodontal membrane vitality.[7] Keeping the tooth moist and avoiding handling the root are the best ways to maintain this vitality.[8] Only 62% of school nurses participating in the survey knew that liquid was the appropriate method of transporting avulsed and fractured teeth. Due to osmolality, milk and saline maintain the periodontal ligament vitality best. Tap water should be the last resort due to its hypotonicity.[9]

The loss of a permanent tooth at a young age has potentially psychological, social, and financial consequences. As a result of a missing anterior tooth, the individual will have difficulty smiling, eating and participating in social experiences. Thus, the individual may be disabled and/or may be disadvantaged in society. Inappropriate or delayed treatment of dental trauma has the potential to have lifelong effects on children.[10] It is widely recognized that timely, correct management in the early stage of traumatic dental injuries, as well as prompt treatment, provide for the best prognosis of a traumatized tooth.[11] School nurses have no required course in handling dental trauma. There are also no courses on this topic offered by the Department of Education, the New York State Nursing Association, or the Association of School Nurses to provide such education. Most school nurses are interested in and would welcome a review of managing dental trauma.

Dental associations and dentists within the community play an important role in providing education and support to school nurses. Only 17% of school nurses surveyed had a dentist they could call for a consultation or referral. It is essential for community dentists to develop relationships with local schools and vice versa. Not only should dentists reach out to local schools as health care professionals, but also local dentists should make themselves more available to school personnel for the possible dental trauma at school. Every school and school nurse should have a local dentist to contact if and when they have to deal with traumatic dental injuries in school. As a majority of a child's time is spent in the school setting, it is crucial for school nurses to be prepared to manage all traumatic events that occur during the school day. School nursing associations, along with dental associations, have to work together to formulate educational programs. As a first step, the National Association of School Nurses and American Dental Association formed a partnership in February 2011 to provide resources to school nurses to promote the oral health among students at school. With this ongoing partnership between these two organizations, more children will have access to dental care not only for the emergency treatment, but also other needed dental treatment.

Appropriate treatment after a dental injury is very important for a good prognosis. All of the published literature points out the importance of the need for continued research in this area. The importance of continuous efforts to develop educational interventions aimed at increasing school teachers' and school nurses' knowledge of dental trauma management is a recurring theme. Based on our study, we found that school nurses have limited knowledge, resources, and experience to provide appropriate emergency treatment for dental trauma in school. Our findings suggest the need to develop a better partnership between dentistry and school nurses to provide educational programs and training to increase school nurses' knowledge of immediate management of traumatized teeth. The intervention training program selected should help them acquire the confidence and proper knowledge in this area. The potential educational program can be supplemented with frequent comprehensive public awareness campaigns focusing on dental trauma.

A survey can be conducted of school nurses to investigate their awareness of the immediate management of dental trauma, and the results obtained from the survey can be used in designing or planning dental trauma education for school nurses. One such potential educational program proposes that the following information be included[12]:

1. problems and consequences of dental trauma;
2. availability of after-hours office emergency services;
3. specific storage media for avulsed teeth;
4. critical timing for replantation of permanent avulsed teeth for long-term success;
5. current concepts of management of fractured teeth; and
6. providing useful websites such as "www.dentaltraumaguide.org".

A collaborative effort is needed between schools and the dental community to implement the aforementioned educational model and to ultimately improve the knowledge of nurses caring for our school children in the area of dental trauma.

CONCLUSIONS

1. Eighty-seven percent of surveyed NYC school nurses have not received formal training in the management of dental trauma.
2. Fifty-two percent of surveyed NYC school nurses responded that it is not appropriate to replant an avulsed permanent tooth indicating a lack of knowledge in dental trauma management.
3. Ninty percent of surveyed NYC school nurses have an interest in receiving training in the management of dental trauma.

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