

Child Care Providers' Knowledge About Dental Injury First Aid in Preschool-age Children

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Abstract

Purpose: The aim of this study was to assess child care providers' level of knowledge of first aid management and attitudes towards dental injuries among preschool-age children within Fairfield County, Connecticut and Boston, Massachusetts.

Methods: This descriptive cross-sectional study used a web-based, validated questionnaire adapted from several studies with permission from authors. A panel of 5 dental experts determined the relevance of the questions and overall content (I-CVI range 0.8-1; S-CVI = 0.95). The 28 question survey included demographics, level of knowledge, attitudes about traumatic dental injuries, emergency management, and 2 case study questions on management of luxation and tooth fracture. Survey data was coded and analyzed for associations and trends using STATA® statistics/data analysis software v. 11.2.

Results: A total of 100 child care providers completed the online questionnaire. Eighty-four percent self-reported little to no knowledge about dental injury management. Sixty percent of child care providers agreed that they are responsible for managing dental injuries. Approximately two-thirds of child care providers reported not feeling adequately informed about dental injuries, with 77% expressing interest in receiving more information.

Conclusions: The majority of child care providers' do not have the knowledge to perform adequate first aid following a dental injury. Professional development on first aid for dental injuries is recommended among this workforce population.

Keywords: child care providers, dental trauma, pre-school children, first aid

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Introduction

In 2011, the United States Census Bureau on Child Care Arrangements reported that 12.5 million (61%), of the 20.4 million US children under age 5, were in some type of regular child care arrangement over the course of a typical week.¹ Findings also indicate that this age group spent most of their time with a child care provider when not with their parents.^{1,2} Dental injuries among preschool-age children has been reported with a prevalence as high as 30%; generally occurring as a result of falls.³ Eighty percent of these injuries occur in the home and are particularly due to poor muscle coordination between the ages of 12 to 24 months.^{3,4-12} Risk of dental trauma peaks at age four due to increased physical activity, with twice the average incidence within this age group as compared to all other age groups.^{3,5,10} In the instance of dental injury, first aid measures include: compressing the injured area with cotton or gauze for five minutes to stop bleeding, use of a cold cloth or ice pack to reduce swelling and seeking emergency treatment from a pediatric dentist.^{13,14}

Existing research shows first aid provided by parents and teachers following dental injury is inadequate.¹⁵⁻¹⁷ Previous studies investigating parent/teacher knowledge, attitudes, and management regarding dental injuries have had a number of limitations including underpowered sample sizes comprised of convenience samples, low response rates, and selection bias. There is currently little information in the literature regarding child care provider knowledge, attitudes, and management of dental injuries in preschool-age children. Given the high likelihood of being the first responders to preschool-age dental injuries, it is important that child care providers understand the significance of prompt first aid measures.

The purpose of this study was to assess child care providers' level of knowledge, attitudes, and first aid management of dental injury among preschool-age children.

Materials and Methods

This descriptive, cross-sectional study design used a non-probability, convenience sample of twenty child care centers in Fairfield County, Connecticut and in Boston, Massachusetts. The questionnaire was developed by modifying previous research survey instruments.¹⁶⁻¹⁹ The questionnaire was composed of 4 sections; Section I: demographics including gender, age, race, employment status, years of experience as a child care provider, level of education, and number of children for the respondent; Section II: multiple choice questions on level of dental injury knowledge, experiences with dental injuries, and first aid training; Section III: five-point Likert response questions scaled from "strongly agree" to "strongly disagree" on attitudes towards dental injuries; Section IV: multiple-choice questions regarding dental injury first aid and 2 case study questions with images (See Table I). Case studies were developed based on American Academy of Pediatric Dentistry Dental Trauma Guidelines.²⁰

Table I. Case Study Questions

Case Study Question #1	Case Study Question #2
A 14-month old falls from her high chair causing her front tooth to dislocate and appear pushed back towards the palate. What should you do next?	One of your five year old children is playing outside and knocks his tooth on the slide. You see the tooth is fractured and a piece is missing. What should you do next?
a. Place a cold, damp cloth to the injury site and inform the child's parents/caregivers	a. Find the piece, call the child's parents/caregivers and place a cold, damp cloth to the injury site
b. Place a cold, damp cloth to the injury site, inform the child's parents/caregivers and take the child to the hospital immediately	b. Find the piece, call the child's parents/caregivers, place a cold, damp cloth to the injury site and take the child to the hospital immediately
c. Place a cold, damp cloth to the injury site, inform the child's parents/caregivers and take the child to the pediatrician immediately	c. Find the piece, call the child's parents/caregivers, place a cold, damp cloth to the injury site and take the child to the pediatrician immediately
<i>Correct Response: d. Place a cold, damp cloth to the injury site, inform the child's parents/caregivers and take the child to the pediatric dentist immediately</i>	<i>Correct Response: d. Find the piece, call the child's parents/caregivers, place a cold, damp cloth to the injury site and take the child to the pediatric dentist immediately</i>

During the development of the survey questionnaire, content validity index (CVI) was assessed by a panel of 5 dental experts.²¹ Three of the dental experts were authors of related research and were initially contacted in the development phase of the questionnaire.¹⁶⁻¹⁸ The two other dental experts were specialists in pediatrics. Individual question relevance (I-CVI) as well as the overall content of the questionnaire (S-CVI) were quantitatively assessed by the expert panel. Items with an I-CVI of 0.78 or higher for 3 or more experts are considered evidence of good content validity; S-CVI of 0.90 or higher is considered acceptable.²¹ For the present study I-CVI question scores ranged from 0.8-1. The S-CVI for the survey was 0.95. The questionnaire was then pilot tested with a group of 6 child care providers at a child care center that met inclusion criteria, for comprehension and feedback only. The Massachusetts College of Pharmacy and Health Sciences (MCPHS) University Institutional Review Board oversaw the protection of all human subjects in this research study.

Forty child care centers in Connecticut and Massachusetts were solicited for study participation with 20 centers agreeing to participate. Directors of the centers were contacted and given a flyer providing information about the study including an electronic link to the survey instrument via Survey Monkey®. Directors were asked to disseminate the survey link to the child care providers in the facility. The principal investigator was blinded to the number of child care providers within the centers solicited for study participation by the center directors. Therefore, a response rate could not be accurately enumerated.

The statistical analysis included descriptive statistics using frequency percentiles. Non-parametric Spearman Rank Correlation tests were performed to test for statistical associations between independent and dependent variables.²² Independent variables were age, years of experience as a child care provider, if the child care provider had children of their own, prior experience with dental injuries and history of first aid training with or without dental injury first aid. Dependent variables were level of knowledge regarding dental injury, attitudes regarding dental injury, and first aid management knowledge following dental injury. An alpha threshold of 0.05 was set for all statistical testing. All statistical analyses were performed in STATA® statistics/data analysis software, version 11.2.

Figure 1: Self-Reported Assessment of knowledge level of traumatic dental injuries in preschool-age children (n=100)

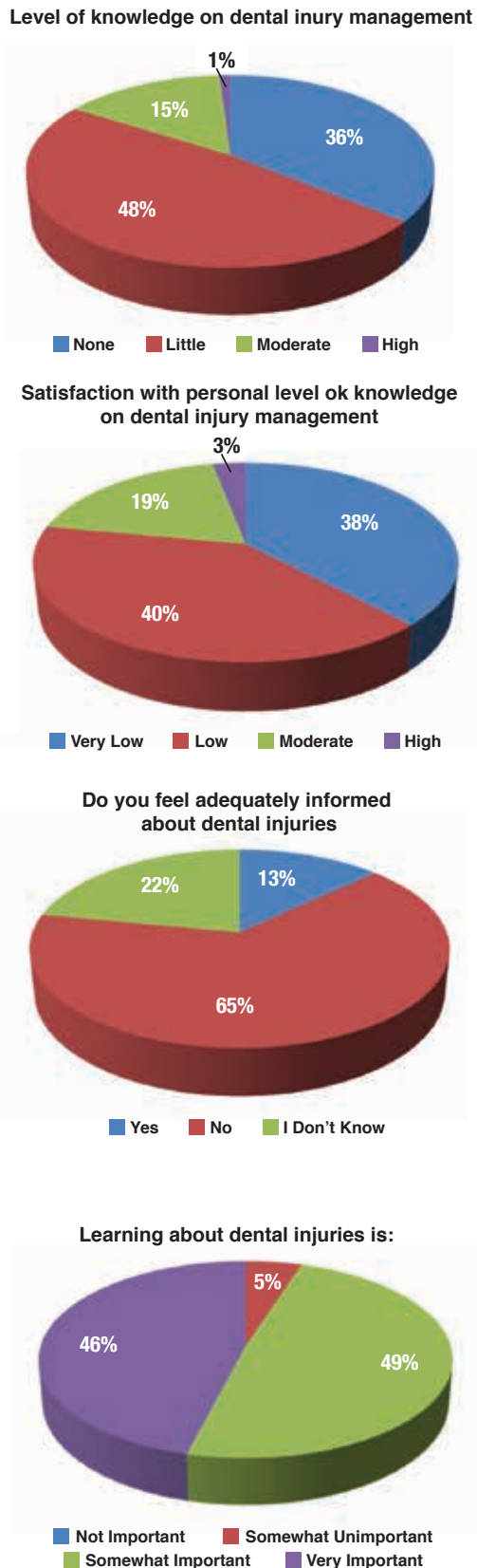
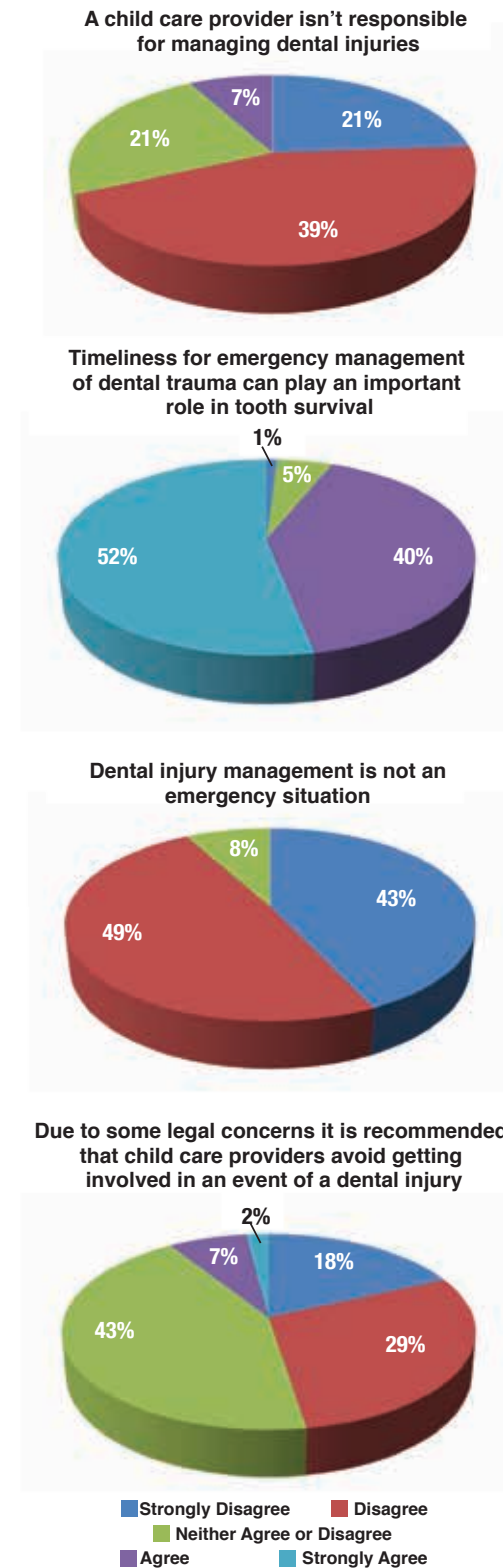


Figure 2: Self-Reported Assessment of knowledge level of management of traumatic dental injuries in preschool-age children (n=100)



Results

A total of 100 child care providers completed the web-based questionnaire. Age categories of study respondents were as follows: 19-29, 30-39, 40-49, 50-59 and ≥ 60 years old. Figures 1 and 2 show descriptive statistics of participant knowledge and attitudes about dental injury, respectively. Of the respondents, 84% self-reported little to no knowledge about dental injury management, suggesting lack of education and training on the subject. Similarly, 78% of child care providers reported very low to low satisfaction with their personal level of knowledge about dental injury management. Nearly two-thirds of child care providers reported not feeling adequately informed about dental injuries, with 77% expressing interest in receiving more information. Of the respondents, 60% agreed that child care providers are responsible for managing dental injuries. However, when asked to respond to the question, "Due to some legal concerns, it is recommended that child care providers avoid getting involved in the event of a dental injury," 43% of respondents were undecided whether they agreed or disagreed.

Table I shows the two case study questions asked of the participants. In case I, a 14-month-old girl falls from her high chair causing her front tooth to dislocate and appear pushed back towards the palate, 61% of child care providers chose the appropriate action which included bringing the child to the dentist immediately. When asked about their advice upon the arrival of the child's

Table II b: Selected correlation trend tests between management of traumatic dental injuries and demographics

	Spearman's Rank Correlation Coefficient (ρ)				
	Age	Child care provider experience	Have children (0:no, 1:yes)	Personally witnessed a dental injury (0:no, 1:yes)	Had any training on dental injury management (0:no, 1:yes)
"A child care provider isn't responsible for managing dental injuries" (strongly disagree, disagree, neither agree or disagree, agree, strongly agree)	-0.18	-0.16	-0.03	-0.22*	-0.26*
"Timeliness for emergency management of dental trauma can play an important role in tooth survival" (strongly disagree, disagree, neither agree or disagree, agree, strongly agree)	0.19	0.23*	0.21*	0.16	0.15
"Dental injury management is not an emergency situation" (strongly disagree, disagree, neither agree or disagree, agree, strongly agree)	-0.31**	-0.29**	-0.16	-0.04	-0.10
"Due to some legal concerns it is recommended that child care providers avoid getting involved in an event of a dental injury" (strongly disagree, disagree, neither agree or disagree, agree, strongly agree)	0.32**	-0.30**	-0.14	0.01	-0.10

* $p < 0.05$ for trend ** $p < 0.01$ for trend

parents following the event of a traumatic dental injury, 87% recommended referring the parents and child to their dentist. In case II, regarding the 5-year-old boy knocking his front tooth and fracturing it on the slide, 57% gave the correct response on how to manage the injury. When asked about replanting a primary tooth, 76% chose the correct response not to replant. Two-thirds of the child care providers were aware that immediate emergency action was needed for the treatment of traumatic dental injuries.

Table II (a and b) show the results of Spearman Rank Correlation Tests between select demographic variables and dental injury knowledge and management questions respectively. Self-reported level of knowledge on dental injury management was found to have a statistically significant direct correlation with increasing age ($p < 0.05$), increasing child care provider experience ($p < 0.01$), having children of their

own ($p < 0.05$), witnessing a dental injury ($p < 0.05$), and having training on dental injury management ($p < 0.01$). These predictors suggest age, training and personal experiences with dental injuries prepare child care providers for dealing with dental injury events.

Level of satisfaction with knowledge on dental injury management was found to have a statistically significant direct correlation with witnessing a dental injury ($p < 0.05$), and training on dental injury management ($p < 0.01$), further suggesting confidence in knowledge with increased exposure to dental injury management. Results indicated that providers who had previously witnessed a dental injury or had training in dental injury management were more likely to recognize child care providers are responsible for managing dental injuries. Experienced providers with children of their own were more likely to agree timeliness plays an important role in tooth survival.

Table II a: Selected correlation trend tests between knowledge level of traumatic dental injuries and demographics

	Spearman's Rank Correlation Coefficient (ρ)				
	Age	Child care provider experience	Have children (0:no, 1:yes)	Personally witnessed a dental injury (0:no, 1:yes)	Had any training on dental injury management (0:no, 1:yes)
Level of knowledge on dental injury management (none, little, moderate, high)	0.21*	0.26**	0.23*	0.21*	0.48**
Satisfaction with personal level of knowledge on dental injury management (very low, low, moderate, high)	0.01	0.10	0.08	0.22*	0.46**
"Learning about dental injuries is" (not important, somewhat unimportant, somewhat important, very important)	0.16	0.09	0.07	0.12	0.17

* p < 0.05 for trend ** p < 0.01 for trend

Regarding legal concerns, older providers were more likely to agree that legal concerns prevented them from getting involved in the event of a dental injury, while more experienced providers were likely to disagree. However, additional analyses showed no significant associations between age and legal concern response. Lastly, the 43% of "undecided" responses to the question surrounding legal concerns suggests child care providers' lack an understanding about their legal role in such an event.

Discussion

Past research regarding knowledge and management of dental injury has been conducted among teachers and caretakers, primarily concerning injury to the permanent dentition.^{15-19,23-35} However, regarding the primary dentition, there is a lack of research regarding knowledge and first aid management of child dental injury among child care providers.^{1,2,5,10,36} This study provided insight on child care providers' knowledge regarding dental injury, and first aid management concerning the primary dentition. Permanent dentition is seen as more urgent since parents' do not understand the importance of primary teeth. However, primary dentition help permanent teeth to grow in the proper position and if injured, underlying damage may occur to the permanent teeth leaving significant risk of infection, decay, long lasting aesthetic affects or even tooth loss.^{19,20,26} As with most dental diseases, prevention is key. There is a general lack of information about this subject.

Similar to this study, Fux-Noy et al. found elementary school teachers had limited knowledge

about emergency care of dental injuries, and revealed comparable predictors of greater knowledge about dental injuries to the current study: being parents to children, previous experience with dental injuries, and increased age.¹⁷ Likewise, Fux-Noy et al. reported 81% of elementary school teacher respondents were aware that replantation of primary dentition is not recommended¹⁷, corresponding to the 76% found in this study.¹⁷ However, Fux-Noy et al. reported that participants demonstrated less interest (42%) in receiving more information on the subject, compared to the 78% within this study, suggesting a lack of awareness on the importance of dental injury first aid among the elementary school teachers in Tel-Aviv, Israel.¹⁷ Fux-Noy et al. also allowed participants to withdraw from the survey if respondents had a lack of knowledge on the subject, resulting in possible outcome bias.¹⁷

Level of satisfaction with knowledge on dental injury management was found to have a statistically significant direct correlation with witnessing a dental injury and training on dental injury management. These same predictors of knowledge on the management of dental injuries were found within previous studies.^{16,17,23,24}

As per the results of the Spearman Rank Correlation analysis, there are some key findings from this study that could help inform future education in dental injury management. The finding that providers with less experience and no children were less likely to realize timeliness plays an important role in tooth survival suggests early education and training is essential. Additionally, this study's findings indicated that older providers were more likely to allow legal

concerns to prevent them from involvement in dental injury management, suggesting targeted education to older providers on the legalities of emergency dental intervention may be useful. Staff education and training on dental injury management should also aim to include a risk management component since participants' indicated uncertainty regarding their specific role of responsibility in such an event.

This study had several limitations. The effective sample size of the study (100 respondents) may lack sufficient statistical power to detect important associations. In addition, survey participants were drawn from a convenience sample which may affect generalizability of the results to a broader population of child care providers. Furthermore, study findings may have been skewed due to the large percentage of white/Caucasian respondents and participants within the 19-29 year old age group. Lastly, due to the logistics used to solicit participants, the total number of potential respondents asked to partake in the study could not be enumerated, leaving the study response rate unknown.

Regarding generalizability of results, it is important to note that Connecticut and Massachusetts require a health or dental consultant be available regarding health and dental advice, to make quarterly visits (CT), as well as to review safety measures at child care centers.^{37,38} *The 50 State Child Care Licensing Study of 2011-2013* reported that only 19 states within the US require health consultants (including dental consultants) be available to staff at child care centers.³⁹ These states are Colorado, Connecticut, Delaware, Hawaii, Indiana, Maryland, Maine, Massachusetts, Minnesota, North Carolina, North Dakota, New Jersey, Nevada, New York, Oklahoma, Rhode Island, Washington, Wisconsin and West Virginia.³⁹ The availability of a dental consultant could enhance health promotion education to child care providers and parents alike. A dental consultant could proactively address children's oral health needs in a timely manner, and assist families with establishing a dental home.⁴⁰

Conclusion

The findings from this study suggest a need for additional education on dental injury first aid for daycare providers. A dental injury management module could be included in conjunction with the required annual first-aid training for the day care center directors and staff, to promote professional development and oral health awareness. Further investigation on successful outcomes of these types of oral health interventions could be beneficial.

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