



Introduction

Traumatic Dental Injury (TDI) Definition: The sudden transfer of kinetic energy to teeth, adjacent soft tissues, and supporting structures, leading to tooth fractures, dislocations, and damage to gingival tissues and alveolar bone (Yeng et al., 2020).

Importance of TDI Management: Effective management of Traumatic Dental Injuries (TDIs) in schools is crucial for preserving children's permanent teeth into adulthood. School nurses, who often are witnesses to such incidents firsthand, play a pivotal role in the recognition and triage process. Their knowledge and actions often determine the referral and subsequent treatment of affected children at dental offices.

Research Objective: This cross-sectional study aims to assess the understanding of Traumatic Dental Injuries (TDIs) among elementary school nurses in South New Jersey.

Null Hypothesis: H0: There is no association between the general knowledge on TDIs and experience in managing TDIs among the survey participants.

Methods

Participants: School nurses employed at elementary schools in Southern New Jersey.

Materials: A structured, multiple choice questionnaire covering various aspects of TDIs and their treatments.

Survey Method: Electronic, multiple choice questionnaires were utilized to assess baseline information about TDIs from elementary school nurses in South New Jersey. The questionnaires were conducted via Redcap software, which was also used to access and securely store participants information. Communication with participants and other involved parties was facilitated through Cooper University Hospital email.

Questionnaire

Overview: The questionnaire comprised of 24 questions covering various aspects of Traumatic Dental Injuries (TDIs).

Demographic Characteristics: Participants were asked about their age, gender, and professional credentials.

Work-related Information: Data included the type of school, years of work experience, and whether participants had received formal training in treating dental injuries.

Knowledge and Skills Assessment: Questions addressed the understanding of TDIs and emergency management of such injuries. Participants were also asked about their confidence level in treating or managing TDIs and their interest in receiving educational materials on TDIs and their treatment.

Data Collection

Participant Selection: The study targeted school nurses employed in elementary schools across Mercer, Burlington, Atlantic, Salem, Camden, Gloucester, Ocean, Cape May, and Cumberland counties. The study sample was gathered by a google search of elementary school's county wide. Email contacts of the nurses were obtained from the individual school websites.

Data Collection: A total of 450 nurse email addresses from public, private non-religious, and private religious school websites were randomly selected to participate in the questionnaire.

Survey Timeline: An electronic questionnaire was distributed from January 15th, 2024, to January 30th, 2024.

Survey Procedure: Participants received an email containing a brief introduction to the study and an incentive for participation, along with the questionnaire link.

Reminder Process: For non-respondents, reminders were sent four times over a two-week period to encourage participation.

Results

Table 1: Characteristics of Study Participants

| Gender | N | % |
|---|-----|--------|
| Males | 1 | 0.50% |
| Females | 208 | 99.50% |
| Age Group | | |
| <35 years | 17 | 8.10% |
| 35-45 years | 43 | 20.60% |
| >45 | 133 | 63.60% |
| Age not disclosed | | |
| | 16 | 7.70% |
| Education | | |
| MSN | 25 | 43.1% |
| BSN | 90 | 12% |
| RN | 44 | 21.1% |
| Others and not mentioned | 50 | 23.8% |
| Work Experience | | |
| 1-5 years | 66 | 31.50% |
| 5-10 years | 39 | 18.70% |
| 10-15 years | 34 | 16.20% |
| >15 years | 52 | 24.90% |
| Undisclosed | 18 | 8.70% |
| Type of School where the participant is working | | |
| Public School | 176 | 84.20% |
| Private Non Religious School | 4 | 1.90% |
| Private Religious School | 10 | 4.80% |
| Others and not disclosed | 19 | 9.10% |

Table 3: Were you formally trained in how to manage Traumatic Dental Injuries?

| | v | % |
|-----|-----|-------|
| Yes | 19 | 9.05 |
| No | 172 | 90.05 |

Frequency (v) Missing = 2

Table 2: Distribution of correct answers in the questions covering knowledge and skills on TDI

| Questions | Frequency | % |
|--|-----------|--------|
| What is Traumatic Dental Injury (TDI)? | 199 | 90% |
| What can be a consequence of untreated Traumatic Dental Injuries? | 203 | 99.50% |
| Why is timely intervention important in Traumatic Dental Injuries | 188 | 92.60% |
| What is the best immediate treatment for a broken tooth? | 166 | 81.40% |
| What is the best immediate treatment of a displaced tooth? | 126 | 62.10% |
| What is the appropriate first aid measure for a knocked-out adult tooth? | 179 | 88.20% |
| What is the appropriate first aid measure for a knocked-out baby tooth? | 57 | 28.20% |
| How would you store the tooth or tooth fragments until you reach the dentist? | 143 | 70.80% |
| How quickly the child's parent should seek immediate dental assistance in case of knocked out adult tooth? | 173 | 86.50% |

Table 4: Have you experienced treating/managing a dental injury in your workplace?

| TDI | v | % |
|-----|-----|------|
| Yes | 118 | 58.1 |
| No | 85 | 41.9 |

Frequency (v) Missing = 1

The data was analyzed using REDCap software statistics and SPSS software for frequency distribution and Chi-Square test. Out of the 450 school nurses surveyed across South Jersey schools, 209 responded, representing a response rate of 46%. Due to incomplete or unanswered questions, some responses were excluded from the analysis to ensure accurate test results. Therefore, the value of 'n' used in our statistical tests may vary. Table 1 shows the demographic characteristics of the study participants like gender, age group, education level, work experience, type of school they work for. Table 2 results show a generally high level of awareness and knowledge among the respondents regarding Traumatic Dental Injuries. Most participants showed an understanding of what TDI is, its consequences, and the importance of timely intervention, which is crucial for effective management and prognosis of these injuries. Notably, there was a strong awareness of the immediate treatments for broken and knocked-out adult teeth, suggesting effective dissemination of these particular aspects of dental first aid. However, the results also highlight significant gaps in certain areas. The knowledge regarding the immediate treatment of a displaced tooth and the appropriate first aid for a knocked-out baby tooth was notably lower. This indicates a need for targeted educational initiatives to address these gaps. The low awareness regarding the first aid for a knocked-out baby tooth is particularly concerning, as incorrect handling in such cases can have long-term implications on the child's dental health. The knowledge about storing a tooth or tooth fragment and the urgency required in seeking dental assistance in case of a knocked-out adult tooth was reasonably good, indicating an awareness of the critical steps needed in dental emergencies. Table 3 shows that ninety percent of the nurses did not receive formal training in how to manage TDIs. Table 4 shows that 58.1% of the nurses did experience managing/treating a dental injury at their workplace. The correlation between Traumatic Dental Injury (TDI) knowledge and experience in treating dental injuries reveals the following insights: General Knowledge of TDI (what_is_tdi): Shows a weak positive correlation (0.0623) with experience in treating dental injuries. This indicates a slight association where more experience could be associated with a bit more general knowledge of TDI. Knowledge of Specific Treatments: Displaced Tooth Treatment (displaced_tooth_tx): Shows a moderate negative correlation (-0.1493) with experience. This suggests that more experience in treating injuries might be associated with lesser knowledge about treating displaced teeth, which is quite counterintuitive. Knocked Out Adult Tooth Treatment (knocked_out_adult_tooth_tx): Also shows a weak negative correlation (-0.0702) with experience. Knocked Out Baby Tooth Treatment (knocked_out_baby_tooth_tx): Similar to the above, there is a weak negative correlation (-0.0773) with experience. Interpretation: The correlations suggest that experience in treating dental injuries does not strongly correlate with specific knowledge about managing different types of TDIs. The negative correlations for specific treatments might indicate that practical experience in the field does not always align with theoretical or guideline-based knowledge, or it might reflect a need for more targeted education in these specific areas. This underscores the importance of structured training and education programs that encompass both general TDI knowledge and specific treatment guidelines, irrespective of the practical experience level of the healthcare professionals. The Chi-Square test was conducted to examine the association between general knowledge of Traumatic Dental Injuries (TDI) and experience in treating dental injuries. The results are as follows: Chi-Square Statistic: 0.7581, P-value: 0.6845. Interpretation: The Chi-Square statistic of 0.7581 with a p-value of 0.6845 suggests that there is no statistically significant association between general TDIs knowledge and experience in treating dental injuries. This implies that in this dataset, having experience in treating dental injuries is not significantly related to a person's general knowledge of TDIs. These results align with the earlier observations that practical experience does not necessarily correlate strongly with theoretical or general knowledge of TDI. This further supports the need for formal education and training programs in TDI, regardless of the level of practical experience. Hence the null hypothesis for this study was accepted.

Discussion

This cross-sectional study and survey shed light on the disparities in knowledge and management of Traumatic Dental Injuries (TDIs) among healthcare professionals. While the survey revealed a high level of awareness about TDIs among respondents, with 98% correctly identifying what TDIs are and 99.5% understanding its consequences, concerning gaps were also identified. For instance, only 62.1% of participants knew the best immediate treatment for a displaced tooth, and just 28.2% knew the correct first aid for a knocked-out baby tooth. These areas of deficient knowledge underscore the need for targeted educational initiatives. Despite most participants being aware of the best immediate treatment for a broken tooth (81.4%) and appropriate first aid for a knocked-out adult tooth (88.2%), knowledge gaps persisted regarding proper tooth storage (70.8%) and the urgency of seeking immediate dental assistance for a knocked-out adult tooth (86.5%). The Chi-Square test aimed to explore the relationship between general knowledge of TDIs and experience in treating dental injuries. However, the results revealed no significant association between these variables. This suggests that practical experience in managing dental injuries may not necessarily translate into a comprehensive understanding of TDIs. This finding underscores the importance of educational and training programs for healthcare professionals, especially first responders like school nurses, who may lack formal training in TDI management despite encountering dental injuries at work. Interestingly, 97.4% of school nurses expressed interest in receiving more information on TDI management, indicating a willingness for educational interventions. To address these knowledge gaps and enhance healthcare professionals' skills and confidence in managing TDIs, practical training, case-based learning, and simulation exercises should be implemented. By doing so, we can improve patient care and outcomes in TDIs cases.

Conclusion

The study reveals a commendable level of knowledge among respondents regarding TDI management, with certain areas of expertise being well represented. However, the identified knowledge gaps, particularly concerning the treatment of displaced teeth and first aid for knocked-out baby teeth, underline the necessity for continuous education. Future efforts should aim to design and implement comprehensive educational campaigns to close these gaps, ultimately contributing to better dental health outcomes for patients. The absence of a significant correlation between TDIs knowledge and experience in treating dental injuries highlights a crucial need in healthcare education. Specifically, it underscores the importance of integrating structured, comprehensive training programs in TDI into the curriculum for healthcare professionals, particularly those who are likely to encounter such injuries in their line of work. Such training should not only reinforce the basic concepts and management strategies for TDIs but also be continuously updated to reflect the latest research and best practices in the field. This approach will ensure that healthcare professionals are equipped with both the theoretical knowledge and practical skills necessary to effectively manage TDIs, ultimately leading to better patient outcomes. Furthermore, these findings advocate for ongoing professional development opportunities in this area, encouraging healthcare providers to supplement their practical experience with formal education to gain a well-rounded understanding of TDI management.

References

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