



Factors Associated with Knowledge and Attitude of Management of Traumatic Dental Injuries: A Cross-Sectional Study among Turkish Dentists

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Abstract

Objective: To evaluate the factors associated with knowledge and attitude of dentists regarding management of traumatic dental injuries (TDI). **Material and Methods:** In this cross-sectional and correlational study, the sample consisted of 136 Turkish dentists. A specialized questionnaire was developed and validated to collect data. The first part of the questionnaire included questions about sociodemographic characteristics, education level, working experience, working place, last dental trauma course, self-efficacy about management of TDI, and treatment frequency. The second part included a total of 17 questions with multiple choice and single correct answers regarding the management of intrusion and extrusion, avulsion, complicated crown fracture and crown-root fracture injuries in children. Descriptive statistics, multivariate analysis of variance, and partial eta squared coefficient (η^2) were used for statistical analysis. **Results:** There was a moderate level of knowledge among participants. The level of knowledge was statistically correlated ($p < 0.05$) in terms of working experience, working place, last dental trauma course and education level of participants, but not according to gender, self-efficacy, and treatment frequency ($p > 0.05$). General dentists had lower self-efficacy than specialist dentists ($p < 0.05$). **Conclusion:** While Turkish dentists working in a province seem to have a moderate level of knowledge regarding treatment of different types of TDI, it is necessary to carry out necessary studies to improve the knowledge and raise self-efficacy.

Keywords: Attitude; Tooth Injuries; Health Knowledge, Attitudes, Practice.

Introduction

Traumatic dental injuries (TDI) are commonly seen all over the world [1]. While TDI is more common in children [2], the prevalence varies between 7% and 58% [3], and the incisors are more affected [4,5]. It has been reported that nearly one in three school-age children are traumatized by permanent teeth until the end of school [6]. Children who have fractures due to trauma in their anterior teeth may experience psychological problems due to pain and loss of function as well as poor aesthetics [7]. However, the incidence of TDI varies according to the country, age group, methodology, sex, geographical location, and the factors causing the traumatic injury [8].

In Turkey, after dental trauma, the patients usually refer to the emergency clinics of state hospitals, private polyclinics and self-employed dentists, which are closest to the patients [9]. For this reason, the level of knowledge and experience of general dentists, and therefore the training they have received in the past, is critical to the treatment of dental injuries in children. However, studies have shown that the knowledge of trauma and treatment management of general dentists may be inadequate [10-14]. The confrontation of general dentists with a limited number of patients with TDI may prevent them from maintaining and improving their knowledge level and experience [15]. However, it has also been reported that dentists may be aware of the importance of acute management of TDI [16,17].

While Turkey has a high frequency of TDI [4,8,9], there is a limited research attention to evaluate the factors associated with TDI knowledge level of dentists [13]. The aim of this study was to evaluate the factors associated with knowledge and attitude of dentists regarding management of traumatic dental injuries (TDI) in a province (Turkey). The null hypotheses of this study were; (i) there is no difference between the knowledge levels of TDI treatment protocols of dentists working in Sivas province, and (ii) there is no effect of variables such as gender, working place, working experience, education level, self-efficacy, last dental trauma course, and TDI treatment frequency on knowledge level and attitudes of TDI management.

Material and Methods

Study Sample

In this cross-sectional study, 136 dentists (82% attendance rate) participated in the private clinic, polyclinic and oral and dental health centers in Sivas province (Turkey). The study was carried out between January 2017 and June 2017. All participants were volunteers and informed about the aims of the study.

In the dental education system in Turkey, dentistry is divided into 8 different specialty areas. Among these, pediatric dentistry, endodontics, and restorative dentistry are the departments where acute management of dental trauma are performed. For this reason, specialist doctors were selected from these departments. There were 16 pediatric dentist, 15 endodontist, and 12 restorative dentistry specialists, and all of them were working in the same faculty of dentistry. The reason for

choosing the province was that the city center was conveniently accessible from the periphery and the vast majority of patients came to the city center to be treated since dentists working in periphery does not prefer to manage these patients. Participants were selected from volunteers and answered the questionnaire prepared under the confidentiality assurance.

Data Collection

A new questionnaire form was developed and validated as a data collection tool. Various stages were applied in the development of the questionnaire form and in its validity and reliability analyzes. First, the conceptual framework and content of the questionnaire was planned. In this context, it was decided that survey questionnaires should be collected in four headings of TDI and their management, which are frequently encountered clinically in primary and permanent dentition [13,18]. The headings of questionnaire were as follow: (a) intrusive and extrusive luxation injuries (b) complicated crown fractures, (c) avulsion injuries and post-reimplantation approaches with optimal storage conditions, splinting period and antibiotic use, and (d) root fractures. Other types of TDI were not included in the questionnaire.

First, the literature was searched by using the keywords "dental trauma", "traumatic dental injury", "dental trauma", "traumatic dental injuries" in Turkish and English sources and guide books. Then, a 25-item question pool compiled from related sources was created. Within the content validity, the question pool was sent to a group consisting of three pediatric dentists, one endodontist and one restorative dentistry specialist, who did not participate and have no conflict of interest with the study. As a result of comments from experts, eight items were removed from the pool of questions. Then, with a group of 10 dentists, it was tested whether the final 17 questions were understandable and within the conceptual framework. Finally, the prepared form was sent to a Turkish language expert in terms of linguistic validity and the form was finalized.

The questionnaire consists of two parts and four pages. The first part consists of socio-demographic questions about personal questions such as gender, age, education level, working experience, working place, last dental trauma course, self-efficacy about management of TDI, and TDI treatment frequency. The second part of the questionnaire consists of a total of 17 questions about the knowledge of dentists regarding treatment approaches for different types of TDI in primary and permanent dentition. The questions were multiple choice and had only one right answer. In this way, the lowest possible score for a participant was 0 and the highest score was 17. The categorization of knowledge levels according to the total scores received by participants was made as follows; 0-4 scores = low, 5-8 = moderate, 9-13 = high, and 14-17 = very high.

For reliability analysis, questionnaires were applied to 30 senior dental students at the faculty of dentistry at intervals of two weeks. Cronbach's alpha value was found as $\alpha = .91$, which was evaluated as excellent ($\alpha > 0.90$).

Statistical Analysis

The data were analyzed using SPSS (Statistical Package for the Social Sciences) 20.0 version. Descriptive statistics, analysis of variance (MANOVA) and partial eta squared coefficient (η^2) were used to examine the effect and correlation of independent variables on the dependent variable. Statistical significance level was accepted as $p < 0.05$.

Ethical Aspects

It was emphasized both verbally and in the instructions included in the data collection tool that the study was intended for scientific purposes only and the provided personal data would be kept confidential. Informed consent according to the ethical principles of the World Medical Association Declaration was obtained from all participants.

Results

Among all participants, 62% ($n = 84$) were males and 38% ($n = 52$) were females. Of the dentists, 68% ($n = 93$) were general dentists and 31% ($n = 43$) were specialist dentists. The mean age of participants was 29.6 yr ($SD = 7.3$). Table 1 shows the participants' level of knowledge about TDI treatments and their relationship with gender, education level, working experience, working place, last dental trauma course, self-efficacy about management of TDI, and its treatment frequency.

Table 1. Comparison of scores of knowledge about management of traumatic dental injuries by all participants.

| Variables | Frequency N | % | Mean | p-value | η^2 | 95% CI | |
|-------------------------------------|----------------|------|------|---------|----------|--------|-------|
| Gender | | | | | | | |
| Women | 52 | 38.2 | 8.2 | >0.05 | | 7.46 | 9.0 |
| Men | 84 | 61.8 | 7.7 | | | 7.01 | 8.4 |
| Working Experience (Year) | | | | | | | |
| 1- 5* | 60 | 44.2 | 9.5 | <0.05 | 0.115 | 8.62 | 10.46 |
| 6-10* | 47 | 34.5 | 8.7 | | | 8.01 | 9.5 |
| 11-15 | 17 | 12.5 | 7.6 | | | 7.05 | 8.2 |
| >16 | 12 | 8.8 | 5.2 | | | 3.24 | 7.2 |
| Working Place | | | | | | | |
| Public | 71 | 52.2 | 4.9 | <0.05 | 0.024 | 3.5 | 6.3 |
| University* | 39 | 28.6 | 9.6 | | | 8.7 | 10.5 |
| Private Clinic | 26 | 19.2 | 5.8 | | | 4.9 | 6.6 |
| Education Level | | | | <0.05 | 0.154 | | |
| Undergraduate* | 93 | 68.4 | 5.2 | <0.05 | 0.175 | 4.7 | 5.7 |
| Postgraduate | 43 | 31.6 | 8.7 | | | 7.2 | 10.3 |
| Last Dental Trauma Education | | | | | | | |
| Undergraduate* | 88 | 65.7 | 5.6 | <0.05 | 0.175 | 5.0 | 6.3 |
| Postgraduate | 38 | 27.9 | 9.0 | | | 8.1 | 9.8 |
| Special course | 9 | 6.4 | 9.8 | | | 8.8 | 7.8 |
| Self-Efficacy | | | | | | | |
| Sufficient | 33 | 24.2 | 7.2 | >0.05 | | 6.4 | 8.0 |
| Neither nor | 86 | 63.3 | 7.7 | | | 6.9 | 8.6 |
| Insufficient | 17 | 13.5 | 7.0 | | | 6.2 | 8.0 |
| TDI Treatment Frequency | | | | | | | |
| All | 8 | 5.8 | 7.4 | >0.05 | | 6.6 | 8.2 |
| Some of them | 111 | 8.6 | 7.7 | | | 7.0 | 8.4 |
| None of them | 17 | 12.6 | 6.5 | | | 6.0 | 8.0 |

*Statistically significant.

Participants were found to have a moderate level of knowledge about TDI management (Mean = 7.96, SD = 1.96). It was found that while the knowledge level of the participants was significantly correlated with the working experience, working place, last dental trauma course and education level ($p < 0.05$), it was not significantly correlated with gender, self-efficacy, and treatment frequency ($p > 0.05$). In addition, while the working experience, last dental trauma course and education level had a higher effect size on participants' knowledge levels, the effect of working place was lower. In terms of TDI management, general dentists had lower self-efficacy than specialist dentists ($p < 0.05$) (Table 1).

Table 2 shows the distribution of correct answers by participants for each question about management of TDI. Participants had the lowest scores from questions regarding root fractures, while the highest scores were from post-avulsion storage media and antibiotic therapy. Another finding was that participants responded correctly to questions of which correct answers were non-conservative treatments such as tooth extraction or root canal treatment at a higher rate than those with correct being conservative treatments.

Table 2. Distribution of correct answers by participants for each question about management of traumatic dental injuries.

| Questions | Correct Answer | N | % |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----|------|
| • Immature permanent tooth with pinpoint pulp exposure within 2 hours after trauma | Pulp Capping | 60 | 44.1 |
| • Immature permanent tooth with pinpoint pulp exposure after 24 hours after trauma | Partial Pulpotomy | 42 | 30.9 |
| • Mature permanent tooth with large pulp exposure after 24 hours after trauma | Pulpectomy | 76 | 55.9 |
| • Mature permanent tooth with root fracture and pulp necrosis | Pulpectomy of coronal segment to fracture line | 52 | 38.2 |
| • Mature permanent tooth with fracture at middle 1/3 of root | Flexible splint for 4 weeks | 37 | 27.2 |
| • Deciduous maxillary incisor tooth with fracture at apical 1/3 of root and displaced coronal segment | Extraction of both segments | 62 | 45.6 |
| • Mature permanent tooth with fracture at cervical 1/3 of root | Flexible splint up to 4 months | 30 | 22.1 |
| • Mature permanent tooth with fracture at cervical 1/3 of root and displaced coronal segment | Reposition coronal segment, splint up to 4 months and pulpectomy | 31 | 22.8 |
| • Deciduous maxillary incisor tooth with intrusion and apex is displaced toward the labial bone | Left for spontaneous repositioning | 45 | 33.1 |
| • Immature permanent tooth with intrusion and intrusion is less than 7 mm | Allow eruption without intervention | 49 | 36.0 |
| • Mature deciduous maxillary incisor tooth with extrusion and extrusion is higher than 5 mm | Extraction of tooth | 72 | 52.9 |
| • Splint type for extruded mature permanent tooth? | Semi-rigid | 65 | 47.8 |
| • Best storage media for avulsed tooth (if unable to reposition tooth due to uncooperative patient) | Milk | 75 | 55.1 |
| • Immature permanent tooth with avulsion after 30 minutes after trauma in good storage media | Reposition, splint for 2 weeks and follow-up | 40 | 29.4 |
| • Splint time and type for avulsion | Flexible splint for 2 weeks | 43 | 31.6 |
| • Prescribe antibiotic therapy | Yes, tetracycline (>12 years old) | 80 | 58.8 |
| • Deciduous tooth with avulsion after 30 minutes after trauma | No replantation | 75 | 55.1 |

Discussion

Knowing appropriate treatment for TDI can reduce stress and anxiety for both patients and dentists [19]. Correct application of treatment protocols after traumatic injury improves both short and long-term results. In this context, this study aimed to measure the knowledge level of treatment protocols of traumatic dental injuries of dentists in Sivas province. The response rate of participants (82%) was well acceptable for such descriptive studies [10]. Dentists who did not want to participate in the survey or cannot be reached were excluded from the study.

Within the development of data collection tool, care has been taken to determine the content of the questionnaire developed in our study as it included various type of TDI, which were mainly gathered under four main topics that dentists frequently encountered [20].

In this study, general dentists were found to have a moderate level of knowledge about TDI treatments. Similarly, many previous studies have reported that general dentists have lack knowledge about the management of acute dental trauma [12,13,15,21]. Participants also showed a higher level of knowledge in crown fractures, primary teeth avulsion and antibiotics use after avulsion. This finding is in consistent with previous studies [10,12]. Intrusion and extrusion injuries and post-avulsion splint duration showed moderate level of knowledge about the storage condition, with the lowest knowledge level regarding the treatment of root fractures. Previous authors stated that participants had lower scores with regard to splinting time for avulsed teeth and appropriate treatment for complicated crown-fractured deciduous incisor [13]. This maybe due that root fractures and avulsion cases are complicated and have different treatment options based on the various variables affecting the treatment option and prognosis [22,23]. In our study, dentists who had seen more cases of dental trauma in the past were found to have a higher level of knowledge than those who did not. In consistent with this finding, a previous study showed that physicians who had previous trauma experience in the clinical practice had significantly higher dental trauma knowledge scores [10].

Most of the participants stated that they do not consider themselves as adequate to treat TDI. One of the reasons for this may be that the participants have a low level of knowledge about management of TDI. In addition, the majority of participants have received their most recent education regarding TDI during their undergraduate education, leading to the fact that they do not follow current treatment options and therefore have a lower self-efficacy. Dental students see themselves very inadequate in terms of dental trauma and think that maxillofacial trauma is handled in a limited way in the curriculum [24]. Within this context, some authors emphasize the need to expand postgraduate education and to develop postgraduate programs in dental traumatology. Also, they consider dental trauma as one of the most common and serious public health problem [25].

Another issue that supports this view is that the level of knowledge has decreased as the working experience has increased. Dentists who had worked less than ten years in the profession had a statistically significant higher level of knowledge than dentists who worked more than ten years ago.

In the study, the knowledge level of the participants was significantly correlated with the working experience, working place and education level. The effect of the working experience and education level on the participants' knowledge levels was higher while the effect of the working place was lower. One possible reason for this may be advanced training about dental trauma in the period of postgraduate specialty training in dentistry. Similarly, it was demonstrated that dentists who had additional education in dental traumatology after graduation (post-graduate courses) had a higher knowledge level with respect to other dentists [12].

The effect of the working experience on knowledge and attitudes may be related to the continuous updating of TDI treatments through new literature and new dental materials developed. This may be due to the fact that long-term working dentists in the profession already have the knowledge of the old literature they received in their undergraduate education, instead of this updated information. In this context, some authors suggest that further studies and areas for research are necessary to examine whether there is a difference in the willingness to treat patients with TDI, sustained knowledge of management of dental trauma, and community involvement to support prevention [26].

There are some limitations to this study. First, although the participation rate is high (82%), due to relatively small number of participants, the findings may not be attributed to the Turkish dentistry population. Second, the study group consisted of dentists working in a single city center. Future studies should be conducted with higher number of dentists selected from different cities and different geographical regions, and thus more generalized deductions can be reported. On the other hand, the strength of the study was to determine the level of knowledge about TDI in relation to various variables such as working place, education level, working experience and self-efficacy that have never been explored in the Turkish population and the magnitude of the effect on the level of knowledge of these variables.

Conclusion

General dentists' knowledge and self-efficacy in TDI were found to be low. However, the level of knowledge of dentists varied according to the TDI type. For this reason, comprehensive strategies seem to be necessary both in terms of TDI and current treatments both in terms of education and health policy. In order to maintain both the up-to-date information and awareness of dentists, protocols should be emphasized as regular in-service training on TDI and preparation of brochures and posters for emergency and dental clinics. In addition, the presence of TDI-trained dentists in institutions and polyclinics that provide emergency treatment services may increase the prognosis of treatments by providing immediate and correct intervention to traumatized teeth.

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