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Parental Knowledge of Traumatic Dental Injury Management in Hail, Saudi Arabia

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Abstract **Background:** Traumatic Dental Injuries (TDIs) occur in approximately 37% of children globally, with nearly 16% involving permanent tooth avulsion, primarily in children aged 7-11 years. **Objective:** To examine Saudi parents' awareness regarding the identification and management of TDIs in children. **Methods:** A total of 552 parents in Hail, Saudi Arabia completed a structured and validated questionnaire on managing tooth fractures and avulsions. Pearson's chi-squared and Fisher's exact tests were used to evaluate associations between demographic variables and TDI awareness. **Results:** 87.7% of parents had witnessed a TDI; however, only 16.5% had attended a TDI education course. 28.1% had received prior information on TDIs, mainly from dentists (55.5%). While 84.4% recognized the need for urgent dental care, only 33.2% chose correct preservation methods for avulsed teeth. Government-employed and college-educated parents were more likely to feel confident managing TDIs ($p<0.05$). However, no demographic factor showed significant association with overall TDI knowledge scores. **Conclusion:** Despite frequent exposure to TDIs, parents in Hail exhibit gaps in effective TDI management knowledge. Educational programs tailored to various demographic groups are essential to improve outcomes in emergency dental care.

Key Words Dental trauma, Traumatic dental injuries, Tooth avulsion, Saudi parents, Saudi Arabia

INTRODUCTION

Traumatic Dental Injuries (TDIs) are common among children and adolescents worldwide, with prevalence rates varying between 4.9% and 44% [1,2]. Tooth avulsion, characterized by a tooth's complete and irreversible displacement from its periodontal socket, is a severe and complex form of dental trauma [1,3]. The frequency of this injury varies from 1% to 16% of all dental trauma cases, primarily affecting the maxillary central incisors in children aged 7 to 11 years [1,4]. Prompt and productive onsite intervention is indispensable for successful replantation and the survival of avulsed teeth. It is best to put the missing tooth back into its socket right away to limit the damage to the cells in the periodontal ligament and increase the chances of successful revascularization [5]. A multifactorial paradigm dictates the prognosis of avulsed teeth, which includes the duration between trauma and replantation, the type and condition of the storage medium, the stage of root formation and the presence of contamination [6]. Andreasen *et al.* [1] noted that the survival rates of avulsed teeth range from 39% to 89% and they observed significantly improved outcomes when they adhered to optimal management protocols, particularly at the site of injury [1]. The utilization of storage media assumes paramount importance in maintaining the viability of periodontal ligament cells, which is indispensable for the survival of avulsed teeth [5]. Conversely, dry storage protocols are associated with irreversible damage to periodontal ligament cells, ultimately culminating in the loss of the replanted tooth. Conversely, wet storage media exhibit a more favorable efficacy. Specifically, milk, readily accessible at the site of injury, possesses a suitable osmolality and compositional profile that supports the viability of periodontal ligament cells, thereby rendering it a recommended medium for temporarily storing avulsed teeth [7,8]. Although water is not recommended due to its low osmolality, using the patient's saliva may be deemed suitable for short-term storage [9-12]. Though the use of specially formulated cell culture media is recommended in the literature for optimal preservation, their availability at the accident scene is limited [1,12].

A comprehensive assessment of parents' knowledge is essential for optimizing avulsed teeth's long-term prognosis and survival rates. This understanding is critical for facilitating prompt and appropriate management of TDIs in children. Notably, cross-sectional studies conducted in Saudi Arabia have revealed that parents possess limited knowledge regarding avulsion. However, small sample sizes or the omission of socioeconomic factors constrained these studies, thereby limiting their generalizability [13,14]. Despite this, studies in Saudi Arabia have shown limited parental knowledge about TDI management [13,14]. The Hail region requires assessment for its public awareness levels because it differs from other Saudi cities because its population includes both rural and urban communities. Dental trauma shows high prevalence in the local area per research reports [2,3] so it is crucial to analyze awareness patterns exclusively for this specific region. Existing research has only conducted limited investigation regarding the influence of demographic variables including marital status, age, education and occupation on TDI awareness. The research aims to solve this noticeable absence of information.

Our research suggests that individuals who are employed or married alongside parents who completed higher education will demonstrate better understanding about TDI management.

METHODS

A cross-sectional epidemiological investigation for measuring parent awareness and TDI emergency care understanding took place during August 27 to September 28 of 2024 within Hail Saudi Arabia. Our research gained ethical approval from the Research Ethics Committee of the University of Hail through its Approval No. H-2024-355. All research participants provided voluntary consent while the study followed ethical guidelines based on Declaration of Helsinki provisions.

Study Population and Inclusion Criteria

The research included Saudi parent participants throughout Hail region who had standard-health children. All potential participants needed good mental and physical health abilities to complete Arabic surveys. The research excluded both parents showing cognitive difficulties from substantial mental or physical conditions and those who did not hold Saudi citizenship to establish uniform demographics across the study population.

Sample Size Determination

The single population proportion formula established the necessary sample size according to these given assumptions:

- Confidence level: 95%
- Margin of error: 5%

The study estimated TDI awareness at 50% in order to obtain the largest possible sample.

The calculation produced a necessary minimum sample requirement of approximately 384 participants. A total of 552 respondents participated in the research exceeding the needed minimum threshold to enhance statistical power and address incomplete responses and improve generalizability of results.

Sampling Methodology

Research subjects were chosen through a non-probability method that merged convenience sampling with snowball sampling functions. Health care centers and popular communication apps like WhatsApp together with Snapchat served as venues to recruit participants. The choice to combine online outreach with community-based methods focused on two objectives: efficiently connecting with parents from urban and peri-urban areas within the given time period.

The method succeeded in growing sample range and participant numbers yet simultaneously created selection bias since people who actively joined social networks or medical settings demonstrated higher participation probability. This study acknowledges this problem during the discussion phase.

Survey Instrument

The research utilized a three-section self-administered questionnaire that adopted an instrument licensed from Al-Sehaibany *et al.* [13] with written permission from the authors. The researcher tested the questionnaire with the local speaking population to check its understanding and language quality. It comprised:

Section 1 of the questionnaire included sociodemographic data consisting of age, gender, marital status, number and level of education and employment status.

The survey included items to understand TDIs and the respondents' educational material exposure as well as their knowledge of TDI protocols in Section 2.

The emergency section included two clinical cases depicted in pictures showing an anterior tooth fracture combined with an avulsed upper incisor that required participants to answer questions about parental choices and their understanding of injury types together with correct emergency procedures including time required for replantation and storage preferences.

All questions were close-ended, structured in multiple-choice format, with several "I don't know" options to avoid forced guessing.

Data Analysis

Data were entered and analyzed using IBM SPSS Statistics for Windows, Version 26.0. Descriptive statistics (frequencies and percentages) were used to summarize demographic characteristics and individual item responses.

Bivariate analysis was conducted using Pearson's chi-squared test to evaluate associations between categorical variables such as demographic factors (age, gender,

education level, occupation, marital status) and awareness/response accuracy. In instances where expected cell values were less than 5, Fisher's exact test was applied to ensure statistical validity.

For the purpose of evaluating overall awareness, a participant was considered to have "adequate knowledge" if they answered more than 50% of scenario-based questions correctly, consistent with standard thresholds used in similar studies. A p-value <0.05 was considered statistically significant.

Handling of Missing Data

Missing or incomplete responses were handled through complete case analysis, where only fully completed questionnaires were included in the final analysis. Given that most questions were mandatory in the electronic survey format, the number of missing responses was minimal and no imputation techniques were required. This ensured high data integrity and reduced the risk of nonresponse bias.

RESULTS

Participants' Demographic Characteristics

Our study included 552 parents. Most of our participants were married (89%). Regarding age, the largest group was aged 45 years or older (45%). In terms of educational attainment, the majority had completed college (70%), followed by high school education (24%). In terms of occupation, the majority of the group held government jobs (63%). Table 1 outlines the demographic characteristics of study participants.

Parents' Awareness and Knowledge of TDIs

Parents' responses showed that a majority (87.7%) had previously witnessed a TDI, yet only 16.5% had attended a TDI education course and 28.1% had received prior information on TDIs. For those informed, most (55.5%) cited dentists as the source, followed by the internet/social networks (29%). In the case scenarios, 38.6% correctly identified the importance of saving a broken tooth fragment, while 84.4% recognized the need to send the child to a dentist immediately. For a scenario involving a knocked-out tooth, 33.2% chose to preserve it in an appropriate medium, though 23.2% were uncertain about the correct action. There were mixed opinions on the tooth's type, with 46.4% identifying it as a permanent tooth. The most chosen storage medium was normal saline (35.7%), followed by antiseptic solutions (27.7%). In terms of replanting time, 30.6% recommended immediate replanting, while others recommended it within 30 minutes or later. Only 26.4% felt capable of managing a TDI, but a majority acknowledged the importance of learning about TDIs (73.6%) and 87.3% expressed a desire to receive further information. Table 2 summarizes the participants' responses regarding their cognizance and knowledge of TDIs, case scenarios, management of TDIs and further education.

Relationships Between Demographic Variables and Traumatic Dental Injuries (TDIs) Knowledge and Management

Table 3 summarizes the associations between participants' demographic characteristics-marital status, age group, level of education and employment status-and their responses to questions assessing awareness, knowledge and management of Traumatic Dental Injuries (TDIs). Marital status demonstrated a significant association with participants' prior experience of witnessing TDIs (Q1, $p = 0.05$) and their sources of information regarding TDIs (Q4, $p = 0.02$). Age was a significant factor in participants' likelihood of having witnessed TDIs (Q1, $p = 0.02$), their immediate response to TDI situations (Q7, $p = 0.03$) and their confidence in managing TDIs (Q11, $p<0.01$). Educational attainment significantly influenced participants' previous exposure to TDIs (Q1, $p = 0.02$), attendance at TDI education courses (Q2, $p = 0.04$) and understanding of appropriate immediate actions in response to TDIs (Q6, $p = 0.05$). Employment status significantly impacted attendance at TDI education courses (Q2, $p<0.01$), immediate responses to TDIs (Q7, $p = 0.01$) and participants' self-reported ability to manage TDIs (Q11, $p = 0.04$). No statistically significant associations were observed between demographic factors and certain aspects of TDI knowledge, such as identifying appropriate storage media for avulsed teeth (Q9) or understanding optimal timing for replantation (Q10).

Table 1: Study participants' demographic characteristics.

Variables		N (%)
Marital status	Widowed	21 (3.8%)
	Married	492 (89.1%)
	Divorced	37 (7.1%)
Age (years)	< 25	22 (4%)
	25 - 35	70 (12.7%)
	36 - 45	212 (38.4%)
	> 45	248 (44.9%)
Level of education	High school	131 (23.7%)
	College	386 (69.9%)
	Higher education	35 (6.3%)
Occupation	Unemployed	154 (27.9%)
	Government job	346 (62.7%)
	Private job	52 (9.4%)

Table 2: An overview of the participants' responses regarding their awareness and knowledge regarding TDIs and case scenarios

Questions		N (%)
Q1. Have you ever seen any TDIs before?		
	Yes	484 (87.7%)
	No	68 (12.3%)
Q2. Have you ever taken a course on TDIs education?		
	Yes	91 (16.5%)
	No	461 (83.5%)
Q3. Have you previously received information regarding TDIs?		
	Yes	155 (28.1%)
	No	397 (71.9%)
Q4. If yes, the source of information:		
	Dentist	86 (55.5%)
	Physician	4 (2.6%)
	Friend	11 (7.1%)
	Internet/social network	45 (29%)
	Other	9 (5.8%)
Case 1: an 11-year-old child fell and broke an upper front tooth **Q5. Should the broken tooth piece be saved?**		
	Yes	213 (38.6%)
	No	143 (25.9%)
	I don't know	196 (35.5%)
Q6. Immediate action should be:		
	Send the child immediately to the dentist	466 (84.4%)
	Put the child to bed	15 (2.7%)
	I don't know	71 (12.9%)
Case II: a 9-year-old child fell down and the upper front tooth got knocked out **Q7. What immediate action will you take?**		
	Replant the tooth and send the child to the dentist	77 (13.9%)
	Save it in storage medium and send the child to the dentist	183 (33.2%)
	Stop the bleeding and have the child rest	164 (29.7%)
	Not sure what to do	128 (23.2%)
Q8. The knocked-out tooth is expected to be:		
	Baby tooth	206 (37.3%)
	Permanent tooth	256 (46.4%)
	I don't know	90 (16.3%)
Q9. Which storage medium is best for storing the knocked-out tooth?		
	Tap water	53 (9.6%)
	Antiseptic solution	153 (27.7%)
	Tissue paper	62 (11.2%)
	Milk	87 (15.8%)
	Normal saline	197 (35.7%)
Q10. How quickly should the knocked-out tooth be replanted?		
	Immediately	169 (30.6%)
	Within 30 minutes	85 (15.4%)
	Within a few hours	149 (27%)
	By the next day	149 (27%)
Q11. Are you capable of managing a TDI if it occurs?		
	Yes	146 (26.4%)
	No	406 (73.6%)
Q12. How crucial is it to understand TDIs?		
	Very important	406 (73.6%)
	Important	122 (22.1%)
	Not important	24 (4.3%)
Q13. Do you want to learn more about TDIs?		
	Yes	482 (87.3%)
	No	70 (12.7%)

Table 3: Associations between demographic factors and participants' knowledge and management of traumatic dental injuries (TDIs)

Question/Variable	Marital status	Age group	Level of education	Employment status
Q1 Have you ever seen any TDIs before?	0.05*	0.02*	0.02*	0.27
Q2 Have you ever taken a course on TDIs education?	0.55	0.12	0.04*	<0.01*
Q3 Have you previously received information regarding TDIs?	0.44	0.69	0.77	0.19
Q4 Source of information (if yes) Dentist Physician Friend Internet/social network Other	0.02*	0.58	0.90	0.72
Q5 Should the broken piece be saved?	0.18	0.39	0.46	0.13
Q6 Immediate action should be Send the child immediately to the dentist Put the child to bed I don't know	0.86	0.24	0.05*	0.99
Q7 What immediate action will you take? Replant the tooth and send the child to the dentist Save it in storage medium and send the child to the dentist Stop the bleeding and have the child rest Not sure what to do	0.61	0.03*	0.32	0.01*
Q8 The knocked-out tooth is expected to be: Baby tooth Permanent tooth I don't know	0.46	0.57	0.42	0.40
Q9 Which storage medium is best for storing the knocked-out tooth? Tap water Antiseptic solution Tissue paper Milk Normal saline	0.60	0.36	0.18	0.82
Q10 How quickly should the knocked-out tooth be replanted? Immediately Within 30 minutes Within a few hours By the next day	0.53	0.11	0.30	0.35
Q11 Are you capable of managing a TDI if it occurs?	0.69	<0.01*	0.95	0.04*
Q12 How crucial is it to understand TDIs? Very important Important Not important	0.25	0.69	0.28	0.12
Q13 Do you want to learn more about TDIs?	0.59	0.37	0.85	0.57

Levels of Poor and Good Understanding of TDIs among Participants Based on their Marital Status, Age, Level of Education and Job

A subject was considered to have adequate knowledge and awareness if they successfully answered over 50% of the questions. No significant differences were observed in knowledge levels for marital status ($p = 0.43$), age ($p = 0.50$), number of children ($p = 0.91$), education level ($p = 0.42$), or occupation ($p = 0.06$). Figure 1 displays the participants' levels of poor and good knowledge of TDIs across demographic variables of marital status, age, educational level and occupation.

Out of the 552 study participants 89.1% were married and 44.9% exceeded 45 years of age while 69.9% obtained college degrees. The results showed that most survey participants worked in government positions (62.7%) because they match the population statistics of Hail region. A substantial portion of 87.7% parents had experienced TDI but merely 16.5% had enrolled in educational classes about the subject. Dentists (55.5%) provided the most information about tooth damages to 28.1% of the respondents who joined the study. Second to dentists were online sources combined with social network sources. In the clinical scenario with an anterior fractured tooth, 84.4% of parents showed correct understanding for prompt dental care yet only 38.6% understood the value of preserving the broken tooth fragments. A large number of adults (33.2%) selected proper storage medium solution such as normal saline in the avulsion scenario but significant groups (27.7% and 9.6%) selected antiseptic solutions and tap water respectively while 23.2% remained unsure about their action steps. The majority of parents (87.3%) expressed strong interest in acquiring additional knowledge about dental trauma management although their self-confidence in performing such tasks rested at only 26.4%.

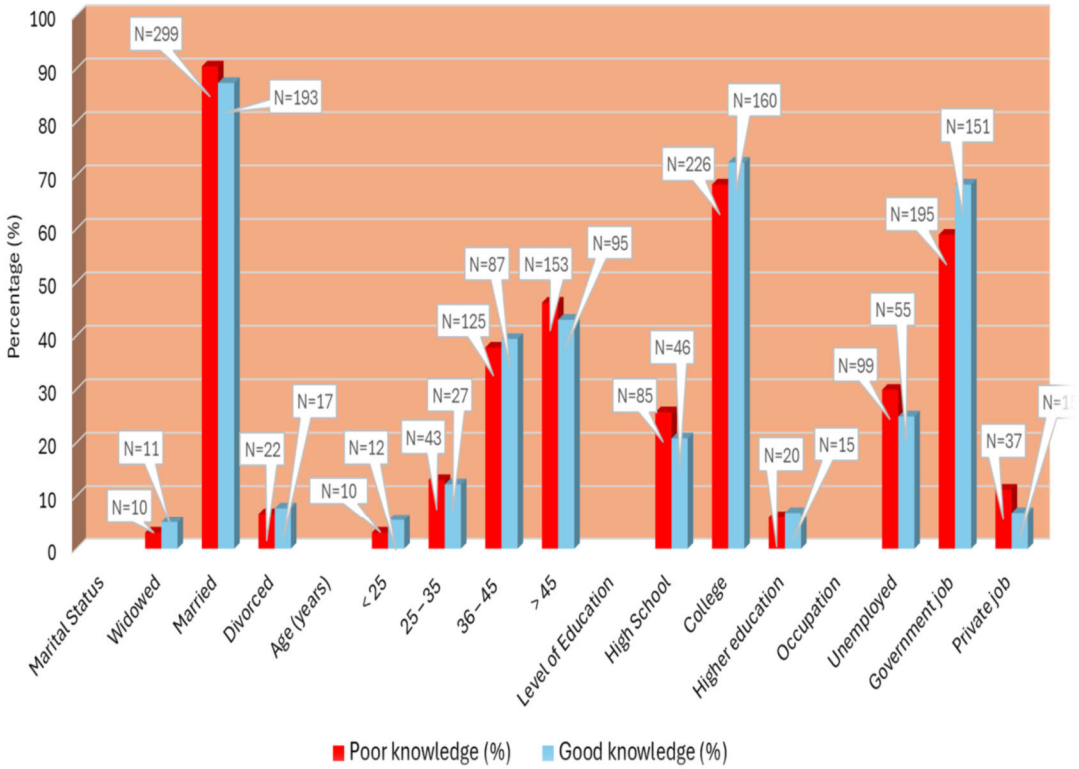

Figure 1: Participants' levels of inadequate and adequate awareness of TDIs across the demographic factors of marital status, age, educational attainment and occupation

Different demographic groups showed defined relationships between their characteristics and aspects of TDI knowledge through statistical analysis. The relationship between marital status and both TDI observation experience and information source was established as significant ($p<0.05$). Among participants age served as a determining factor for witnessing TDIs and performing right procedures in avulsion cases as well as reporting self-assuredness ($p<0.05$). The influence of educational level appeared through two effects on TDI exposure and educational session participation ($p<0.05$) and government workers demonstrated significant relationships with TDI training attendance and emergency management confidence ($p<0.05$). None of the demographic variables established statistically relevant connections to the correct understanding of essential technical information including storage medium selection and replantation timing specifics.

Less than half (30%) of those surveyed demonstrated "adequate knowledge" according to the criterion of correctly answering more than half of the case scenario questions. The data demonstrated no meaningful relationship between marital status ($p = 0.43$), age ($p = 0.50$), educational attainment ($p = 0.42$), or occupational group ($p = 0.06$) and knowledge adequacy regarding plant emergency procedures. This indicates that the inadequate plant-related knowledge affected everyone in similar ways.

DISCUSSION

Traumatic Dental Injuries (TDIs), specifically dental avulsion, represent one of the few time-sensitive emergencies in dentistry. The prompt onsite intervention can significantly impact the retention of a tooth or prevent a lifelong dental challenge. The prognosis for avulsed teeth significantly improves with prompt and appropriate initial management, often contingent on the knowledge of individuals present at the accident scene before professional dental care is available [1]. Insufficient awareness of proper urgent onsite management can result in non-reimplantation of the avulsed tooth or using unsuitable storage media prior to replantation, which can markedly reduce treatment prognosis and lead to tooth loss. Since parents are often the first responders in such emergencies, assessing their knowledge and identifying factors influencing their understanding of managing these severe injuries is essential.

Our study included 552 parents. Awareness of TDIs was high, with 87.7% having witnessed a TDI, though only 16.5% had attended a TDI education course. While 84.4% knew to seek immediate dental care for a child with a TDI, fewer (33.2%) recognized proper tooth storage. Knowledge varied by demographic factors: married individuals were more likely to have received information from a dentist, while those aged 36-45 years and 25-35 years were more likely to have witnessed TDIs and to suggest correct actions in specific scenarios. In addition to significantly influencing participants' likelihood of witnessing TDIs, age also significantly influenced their immediate response to TDI situations and their confidence in managing TDIs. These findings indicate that age groups may vary in their exposure to TDIs or their ability to manage such situations, possibly

due to differences in experience, awareness, or access to information. Education level significantly impacted witnessing TDIs and course attendance, with those with higher education reporting more exposure to both. These results emphasize the role of education in shaping both awareness and practical preparedness for TDI management. Marital status had a notable correlation with participants' previous experiences of observing TDIs and their knowledge sources concerning TDIs. This indicates that marital status may affect the probability of exposure to TDIs or the manner in which individuals obtain pertinent knowledge, potentially reflecting variations in social interactions or responsibilities.

Occupation also influenced TDI knowledge, as government employees had higher attendance at TDI courses and better-perceived capability in managing TDIs. Employment status also significantly impacted attendance at TDI education courses, immediate responses to TDIs and participants' self-reported ability to manage TDIs. These findings highlight the potential influence of workplace-based training or professional exposure on knowledge and preparedness for TDI scenarios.

Despite some differences in awareness and responses, overall knowledge about TDIs was not significantly associated with marital status, age, education level, or occupation. Knowhow of technical aspects of TDI management, such as storage media or replantation timing, was uniformly lacking across all demographic groups. Interestingly, we observed no statistically significant associations between demographic factors and certain aspects of TDI knowledge, like identifying appropriate storage media for avulsed teeth or understanding optimal timing for replantation. This suggests a general knowledge gap in these critical areas, regardless of demographic background. However, a majority expressed interest in learning more about TDIs.

When comparing the present study's findings to those of neighboring countries and international studies on TDI awareness, several similarities and differences emerge. Regarding overall TDI knowledge, our participants demonstrated a relatively high level of awareness, with 87.7% having witnessed a TDI, although only 16.5% attended a formal TDI education course. Other countries, like Qatar, have reported lower levels of knowledge about avulsion management, despite nearly half of respondents having received prior information [15]. International studies conducted in the UK (19%) and the United Arab Emirates (16.6%) [16, 17] also noted similar results. Other studies also reflected this pattern, finding no correlation between previous exposure to TDI and accurate recall or practical management skills [20,21]. An investigation in Riyadh, focusing exclusively on mothers, found that only 54% had witnessed TDI and 29% had attended an educational course on managing it [13]. Given its status as the capital and its larger proportion of rural areas compared to Hail, one could attribute the latter finding to the greater availability of resources in Riyadh. However, we observed similar findings regarding TDI management in both locations. Also, our study considered potential confounding factors such as age, marital status, occupation and educational level concerning TDI knowledge and awareness, an aspect not addressed in previous studies in Saudi Arabia through such a comprehensive analysis and stratifications.

Regarding handling avulsed teeth, our study was consistent with previous studies by Alharbi *et al.* [16] and Alyahya *et al.* [22]. A substantial proportion of our participants exhibited inadequate knowledge regarding the management of avulsed teeth. While 84.4% of respondents recognized needing immediate professional assistance, only 30.6% suggested prompt tooth replantation. Such gaps in parents' knowledge may result in suboptimal decisions, as highlighted in prior studies where misinformation led to the disposal of avulsed teeth or leaving them at the trauma site, thereby compromising the child's dental prognosis. Our participants demonstrated limited awareness regarding the appropriate storage media for avulsed teeth, paralleling findings from international studies. In our cohort, 35.7% of participants recommended normal saline as a storage medium, with fewer recognizing milk or other suitable solutions. These results align with the findings from Kuwait, Saudi Arabia and the UK, where only 15%, 27% and 29% of respondents identified proper storage media [16, 18, 22]. Researchers similarly underappreciated the critical 30-minute window for replantation, which is essential to periodontal ligament cell viability and successful reattachment [23,24]. The foremost reason for preserving tooth fragments is to confirm that the child has not aspirated them, which would necessitate a chest radiograph for verification. Additionally, it may be possible to reattach the fragment to the remaining tooth, as we declared earlier.

Unlike previous studies, our study found no significant correlation between age and TDI management knowledge levels. Alharbi *et al.* [15], however, reported higher knowledge levels among older parents, likely due to greater involvement in child-rearing in the Qatari population studied. In our cohort, younger respondents (under 25 years) reported feeling more capable of managing TDIs than their older counterparts, but this was not associated with improved knowledge accuracy regarding TDI care. Our study found no significant correlation between educational attainment and TDI knowledge levels, which is consistent with the findings of Alharbi *et al.* [16] and Alyahya *et al.* [22]. Although 69.9% of our participants held college degrees, higher educational attainment did not translate to a better understanding of preparedness in TDI management. This lack of association indicates the need for targeted TDI education across educational backgrounds.

Finally, while 84.4% of participants in our study indicated they would seek professional help for TDI management, there remains a knowledge gap in the appropriate emergency steps, such as correct storage and replantation timing. This mirrors prior research from Qatar and other regions where parents frequently sought assistance from hospital emergency departments over dental clinics despite limited access to trained staff in emergency

settings [15,25,26]. In our cohort, 87.3% expressed a desire for further education on TDIs, underscoring the need for readily accessible and comprehensive TDI educational resources.

To the best of our knowledge, this study is the first to examine the knowledge and awareness of parents in Hail, Saudi Arabia, regarding TDIs. This investigation provides insight into their understanding and highlights the need for targeted educational interventions on TDI. Additionally, our study was the first to consider potential confounding factors, such as age, marital status and educational level, in relation to TDI knowledge and awareness-a factor that previous Saudi Arabian studies had not addressed through such a comprehensive analysis and stratification. However, our study has limitations, primarily due to its cross-sectional design, which may introduce recall, non-response and underreporting biases. Furthermore, we have not extensively explored the knowledge of TDIs among parents.

Policy Implications

To bridge the knowledge gap, we recommend:

- School-based parental workshops on dental first-aid
- Training pediatricians and general physicians to provide TDI guidance during well-child visits
- Community-level awareness via PHCs, mosques and social media campaigns
- Inclusion of dental trauma modules in parenting classes and first-aid certification programs

CONCLUSIONS

Our study found that while parents in Hail frequently witness TDIs, there is a notable gap in their knowledge of proper TDI management. This highlights the need for targeted educational interventions. Although demographic factors such as age, marital status, and education level influenced awareness and knowledge, the study revealed that most parents lacked formal education on TDIs despite expressing a desire to learn more. The findings underscore the importance of addressing these gaps through tailored educational programs to enhance parents' knowledge and improve TDI management outcomes. We need further research, particularly longitudinal studies, to investigate the long-term impact of such interventions and enhance our comprehension of parental knowledge about TDIs.

Study Limitations

A self-reported cross-sectional survey design of this study could produce recall and social desirability bias effects. Our convenience sampling limits generalizability. Longitudinal interventional studies supported by random sampling methods and qualitative interviews need to be conducted in order to obtain comprehensive understanding of davranışal barriers and behavior modification.

Future research should:

- Evaluate the effectiveness of structured TDI training modules
- Explore barriers to accessing dental emergency care
- Conduct interventional studies measuring improvements in parental behavior post-training

Acknowledgement

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Conflicts of Interest

The authors declare no conflict of interest.

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