

"Emergency Department Utilization For Dental Conditions: Epidemiological Patterns And Nursing Interventions"

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Abstract

Dental emergencies as "potentially life-threatening circumstances that require immediate management to stop continuous bleeding of the tissue, relieve excruciating pain, or infection "It is crucial that nurses and dentists become knowledgeable about the symptoms and indicators of possible medical emergencies that could occur in the dental chair, as well as the standard treatment procedures to stabilize the situation. Dental conditions such as traumatic dental injuries

(TDI) are considered public health issues due to their frequency and associated consequences. Reliable clinical practice guidelines (CPGs) for dental conditions help doctors diagnose patients and direct them toward the best course of treatment. The emergency department visits were assessed in the review to evaluate the incidence of dental conditions related to ED. In addition, the Emergency procedures recommendation that commonly involved were breathing support, maintaining airway patency, and evaluating neurological and circulatory functions in order to stabilize a patient. It is important for the dentists and other health professionals receive rigorous and ongoing professional training in emergency procedures for utilization in emergency situation, in addition, the prompt and effective use of emergency drugs and equipment, on the grounds that dentists and auxiliary staff bear full responsibility for ensuring the safety of the patient who attends a dental appointment.

Key words: "Emergency department", "Dental injuries", "Nurses", "Epidemiology", "Intervention"

Introduction:

The term "dental emergency" is not generally understood. Conversely, the National Health Service of England Dental emergencies are described as "those requiring immediate attention in order to reduce the possibility of serious medical complications or prevent long-term dental complications. Dental emergencies are described as "those requiring immediate attention in order to reduce the possibility of serious medical complications or prevent long-term dental complications." Dental emergencies are defined by the American Dental Association (ADA) as "potentially life-threatening circumstances that require immediate therapy to reduce excruciating pain, cease continuous tissue bleeding, or infection." **(American Dental Association, 2020; Marshman, 2019)**

Emergency departments (EDs) play a crucial role in providing urgent care for a wide range of medical conditions, including dental emergencies. Dental conditions represent a significant portion of non-traumatic visits to the ED, posing challenges for

both patients and healthcare providers **(Al Habashneh et al., 2018)**.

Despite dental conditions being primarily managed in outpatient settings, EDs often serve as the initial point of contact for individuals experiencing acute dental pain or infection **(Cohen et al., 2019)**.

The utilization of EDs for dental issues presents a complex epidemiological landscape characterized by various demographic and socioeconomic factors. Studies have identified disparities in ED visits related to dental issues, with certain populations, such as individuals from lower-income backgrounds or uninsured individuals, being disproportionately affected **(Allareddy et al., 2014)**. Understanding the epidemiological patterns of visiting the ED with dental problems essential for informing targeted interventions and resource allocation strategies **(Friedman et al., 2017)**.

Due to the rarity of these situations, doctors gradually lose the abilities needed to handle and manage a medical emergency in the dental chair, which leaves patients feeling vulnerable, uneasy, and confused **(Somaraj et al., 2017)**.

Vulnerable populations, including individuals from low-income backgrounds and racial/ethnic minorities, are more likely to rely on EDs for dental care due to barriers to accessing routine dental services **(Vujicic et al., 2014)**.

The Socioeconomic status, access to dental insurance, accessibility to dentists, and public awareness of dental emergencies are among the factors influencing individuals' decisions to seek management in the ED rather than dental clinics **(Taylor et al., 2020)**.

Nursing interventions play a critical role in addressing the needs of patients presenting to the ED with dental complaints. Often, nurses are patients' initial point of contact seeking management in the ED and play a pivotal role in triaging, assessing, and managing dental emergencies **(Sheehy et al., 2018)**.

Effective nursing interventions aim to alleviate pain, prevent complications, and facilitate appropriate referrals to dental providers for follow-up care **(Cohen et al., 2019)**.

Despite the significant burden of dental-related ED visits, there is a paucity of literature comprehensively examining the epidemiological patterns and nursing interventions in this context. Existing studies have primarily focused on descriptive analyses of ED visits related to dental issues, with limited emphasis on nursing-specific interventions and their impact on patient outcomes (**Lee et al., 2016**).

The epidemiological landscape of ED visits related to dental issues is multifaceted, influenced by various demographic, socioeconomic, and healthcare-related factors. Studies have identified disparities in visiting the ED with dental problems based on factors such as age, gender, race/ethnicity, income level, and insurance status (**Cohen et al., 2019**).

This review will provide valuable insights for healthcare providers, policymakers, and researchers working to optimize the management of dental emergencies in the ED setting (**Allareddy et al., 2014**).

A systematic review of the literature is needed to synthesize existing evidence, identify gaps in knowledge, and guide the development of evidence-based nursing protocols for managing dental emergencies in the ED setting.

Review literature

1-purpose

In this systematic review, we aim to comprehensively analyze the epidemiological patterns of visiting the ED with dental problems and evaluate the role of nursing interventions in optimizing patient care outcomes. By synthesizing evidence from published studies, we seek to identify factors associated with ED visits related to dental issues, explore disparities in access to dental care, and assess the effectiveness of nursing interventions in addressing the needs of patients with dental emergencies

Methodology

There were 8 articles included in the review according to certain criteria using electronic research of the following databases of Crochrane library, PubMed, Medline and manual search of Google Scholar. In addition, the websites of dental centers. to locate publications offering advice and guidelines for treating dental

conditions in an emergency department. English is the language used for the studies. and a selection of bibliographies were searched using MeSH terms "dental care " "Nurses intervention," "emergency care," "healthcare," "epidemiology", To find more research, a manual review of the reference lists of the pertinent papers was done.

3-Inclusion and Exclusion Criteria:

Evaluate original research studies, randomized controlled trials, and systematic reviews evaluating the emergency department utilization and guidelines and the role healthcare staff include the nursing, dental. Public health and emergency medical service specialists Research released between 2011 to January 2021 that were written in English and include human subject, and concerns emergency care approaches, Research on various emergency utilization for dental., healthcare professional subjects collaborated were also included and no geographical restrictions were considered.

Publications, without peer review, webcasts, surveys, secondary data analysis, non-original reports, editorials, case study, letters, cost assessments, publication of pregnant populations, studies before 2011 were also rejected

4. Selection Process:

A subset of the authors perused all of the article titles and abstracts that turned up during the searches, in addition to the full texts of the pertinent papers that were found. The reviewers used the following criteria to evaluate the published full-text papers for inclusion; those that did not meet all the requirements were rejected. Conflicts that surfaced during the full-text evaluation, full-text review, and abstract and title screening were settled by adjudication by another party.

Data Extraction and Quality Assessment

The review's authors separately assessed and compiled the information from the 8 publications that satisfied the requirements for inclusion. Following a detailed analysis of the included studies, relevant data was extracted from each publication according to the following standards: An author extracted and recorded the study design, the setting and

demographics, the dental emergency that caused it, the details of other emergency department interventions, the outcome and the conclusion. The process included reviewing earlier research, and to select and evaluate the data from the literature search, the authors employed methodological, trustworthy, health worker interventional, and emergency department interventions.

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is a set of reporting guidelines for systematic reviews that authors adhere to in order to guarantee transparency and rigor in reporting methods and results. A standardized instrument appropriate for the various study designs was employed to assess the integrated research's quality. The narrative combination of the research findings from the included studies was done.

Result

There were 204 items located from 2011 to June 2021 of them, 151 did not meet the inclusion criteria, consequently 53 full-text publications were examined. After further revision, 12 articles were finally included in the systematic review but 4 studies were also excluded as they did not report the total number of dental visits. Eight studies published between 2011 and 2021 were included in the systematic review.

Seven Studies evaluate incidence of ED visits and included from 2011-2021 were from California, the USA, Canada, Australia and Taiwan. The sample size included in each article was different, which was dependent on the duration of the study, age groups involved and databases used to acquire the data most of the included articles include pediatric participants.

In California (2005-2011) through ED databases, the result found by the reviewers was both the quantity and frequency of ED visits related to dental-related issues have significantly increased recently (44,516 (in 2005) to 70,385 (in 2011)). (Ramba et al., 2016) while the study in USA of Owen et al that published in 2021 and determined visits to ED of dental condition in 2018 and estimated the result as the following: Ninety-five percent of the more than two million ED visits in 2018 that involved dental conditions/ ended with an ED discharge, Ninety-seven percent of treat-and-release ED visits with a primary dental diagnosis were

related to dental caries, diseases of the pulp and periapical tissues, tooth loss, and related disorders. In addition, 85.3% of ED visits that resulted in a hospital admission for a dental condition were related to diseases of the pulp and periapical tissues. The population rate of ED visits related to dental issues was highest among non-Hispanic Black people, those residing in low-income areas, and those between the ages of 18 and 44.02.

Four retrospective studies done the first was in Canada in (2020) in pediatric population one from period of 2004–2013 with the dental condition presented) (Dental caries, diseases of pulp and periapical tissues, gingival diseases, periodontal diseases and cellulitis), the Prevalence of NTDC from dental visits (%) = (67%) **(Ferraz Dos Santos and Dabbagh.,2020)**. And the second in Taiwan (2016) the study for period 2012–2013 with the dental condition presented Pulp-related problems, oro-dental trauma, eruption problems, orthodontic problems, bleeding and ulceration, the Prevalence of NTDC from dental visits (%) = (53%) **(Jung et al.,2016)**

The third retrospective analysis, demonstrated the medical records during the pandemic of SARS-COV-2 were 4158 dental emergency patients from 2019 and 2020 were separated into two groups based on the time of the analysis: the pre-SARS-COV-2 group and the SARS-COV-2 group., the number of dental emergency visits increased by 29.7%. During the pandemic, males (n = 286, 58.1%) were more likely to visit dental emergency centers for trauma than females (n = 206, 41.9%) (P < 0.05); females (n = 242, 60.8%) were more likely to visit dental emergency centers for acute gingivitis and acute pericoronitis than males (n = 156, 39.2%) (P < 0.05). Acute pulpitis (K04.0) and acute apical periodontitis (K04.4) were the subjects of a significant shift in diagnosis. (9.2%) **(Wu et al.,2021)**.

The fourth retrospective study in Australia examined the number of emergency visits for children each month from January 2008 to August 2010, analyzing the number of patients treated, the reasons for the visit, and the types of care given and their result were: A monthly average of 196 ± 86 cases were seen in emergency rooms. Over the course of the three years, the proportions of the various emergency types stayed relatively constant, with the majority presenting for caries-related issues (74–75%), trauma (8–9%), orthodontic treatment-related (2–5%),

and other reasons (16–11%) following. Preschoolers who were put on the waiting list for the public hospital's general anesthesia caries treatment accounted for 8–11% of the cases (**Wong et al.,2012**).

In USA from period of 2004–2013 (**Hong et al.,2011**) with the dental condition presented Dental caries, temporomandibular joint disorder, pulpitis/periapical abscess, cheek/jaw/tooth trauma and other the Prevalence of NTDC from dental visits (%) = (91%) and for TDC from dental (1.8%)

Table 1: A Qualitative study evaluation of the knowledge for NDHCP in ED for dental condition

Author / study	Country/ population	evaluation	outcome
(Tewari et al.,2021)	The qualitative synthesis (9 studies in Asia) (2009-2020)/ (TDI) among NDHCP	evaluate the global status of the knowledge of prevention and emergency management of traumatic dental injuries among NDHCP	overall level of knowledge. Less than 40% of the NDHCP, less than 36% of the participants were adequately aware of the correct approach towards management of avulsed permanent tooth in five studies.

Abbreviations: ED, Emergency Department; NTDC, Nontraumatic Dental Condition. Traumatic Dental Injuries (TDI), Non-Dental Healthcare Professionals NDHCP

Discussion

During the SARS-COV-2 pandemic Due to the high risk of dental treatment, which resulted in the closure or reduction of general outpatient clinics of stomatological hospitals or clinics in China, the number of emergency dental patients increased by 29.7%, and

the average number of daily visits increased by 14.8%. This resulted in fewer timely examinations and treatments of patients, exacerbating their conditions and increasing their pain and suffering. Consequently, there was a rise in the need for emergency dental services and the number of emergency visits **(Yang et al.,2020)**

Following the outbreak, there was a decline in the distribution of daily and weekly visits, which may have been caused by an increase in the need for emergency dental care. The pre-SARS-COV-2 group in this review and agree with another study on emergency visits in South Korea provide information regarding the visitation time **(choe et al.,2010)**.

The findings of this systematic review show that a sizable percentage of all pediatric dental visits to tertiary hospital EDs are NTDC. The percentage of children who came to EDs with NTDC is represented by the pooled prevalence, which ranges from 52.3% to 91% and comprehending the rationale behind the presentations is crucial. Dental caries was the most common reason for children to present, followed by oral lesions, facial cellulitis, gingival disorders, and periapical abscesses. The majority (55.4%) of the children presenting were male, and the largest age group consisted of those under five years old. These results demonstrate the burden that dental visits can have on tertiary hospital emergency departments (EDs) and the significance of developing plans to reduce avoidable presentations.

Children aged 0 to 5 accounted for the majority of NTDC cases, which may be related to an increase in ED visits related to early childhood caries. And this correlates with the study of **(Ladrillo et al.,2006)** and this disagree with the study of **(Owens et al., 2018)** that assumed That the population rate of ED visits related to dental issues was highest among non-Hispanic Black people, who also happened to be the lowest paid. communities, and those aged 18 to 44. Although the studies in this review did not specifically examine how prevalence changed over time, they did observe an increase in NTDC over time. When it comes to caries, gender is irrelevant as other risk factors have a greater influence than traumatic dental presentations, which are more common in men.

NTDC and TDI data were reported in certain studies. Out of the 8 articles, four specifically stated how common NTDC is. But TDIs were present in the remaining 4 articles, so there was little

difference between the two datasets. As a result, the percentage of NTDC in these 5 studies decreases, and the topic of NTDC's effects on the hospital system is not as prominently discussed. To determine the actual prevalence of NTDC presentations, future studies should try to report NTDC separately. These data may be utilized to develop strategies to prevent these avoidable ED presentations as well as to directly calculate the load on the ED system.

Dental diseases of pulp and periapical tissues were one of the most frequent group of dental conditions among dental-related ED visits that resulted in hospital admission (85.3 and 37.7 percent of visits, respectively), and dental caries was the most common group among visits with only a secondary diagnosis of a dental condition (37 % of visits). **(Owens et al., 2018)**

Despite the Medical emergencies they may seem uncommon in a dentist office, can have fatal consequences for patients if prompt medical attention is not provided and can also have legal ramifications. **(Rao et al.,2017).**

Hänsel et al. (2008) conducted a state-wide survey in Saxony, Germany, and found that 57% of dentists reported having up to three medical emergencies in a 12-month period. According to reports, vasovagal syncope is the most frequent medical emergency; these findings have been supported by additional research **(Elanchezhiyan et al.,2013; Marks et al.,2013; Durrani et al.,2015; Albelaihi et al.,2017).**

There have also been prior reports on the frequency of medical emergencies such as cardiac arrest, anaphylaxis, airway obstruction, stroke, hypoglycemia, asthma attacks, and epileptic episodes **(Leelavathi et al.,2016).**

Conclusion

This systematic review found that there is a significant number of dental presentations were linked to caries and could be overburdening tertiary hospital emergency departments; these cases should be treated in the community.

Also, the qualities of dental emergency patients changed as a result of the SARS-COVID-2 pandemic. Acute periodontitis, acute pulpitis, and trauma are the main causes of patient referrals to dental emergency centers. To increase the capacity for on-site

treatment and deliver sufficient dental emergency care, to urgent care dental facilities should optimize treatment protocols, optimize staffing levels, and allocate materials reasonably in accordance with changes.

In order to meet the rise in dental emergency patients' emergency requirements as a result of clinic closures, dental emergency centers in a region should enhance their staffing levels and material resources in the event of respiratory infectious disease emergencies.

Professional development training and emergency equipment knowledge for both dental practitioners and nurses can help with knowledge retention, enabling them to handle emergency situations in a dental practice with professionalism and confidence.

In most studies, the emergency treatment for severe dental trauma was not well understood by non-dental health care team, and their knowledge of prevention was not assessed. Studies from Europe and Australia were scarce and varied greatly in terms of study design, participant classification, and questionnaire attributes.

References:

- Cohen, L. A., Bonito, A. J., Akin, D. R., & Manski, R. J. (2019). State Medicaid Coverage and Access to Care for Children's Dental Services. *Pediatrics*, 138(4), e20161960.
- Gonsalves, W. C., & Pahel, B. T. (2011). Trends in dental emergency department visits in the United States: 1997 to 2007. *Journal of the American Dental Association* (1939), 142(5), 566–573.
- Sheehy, A. H., Spencer, D. P., Burden, A. M., Hohenberg, J. G., & Tawil, I. (2018). Emergency department management of patients with dental conditions: A cross-sectional study. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*, 125(2), 144–150.
- Vujicic, M., Buchmueller, T., & Klein, R. (2014). Dental care presents the highest level of financial barriers, compared to other types of health care services. *Health Affairs (Project Hope)*, 33(12), 2225–2232.
- Al Habashneh, R., Aljundi, S. H., Alwaeli, H. A., & Al-Omiri, M. K. (2018). Emergency management of dental trauma: Knowledge of Jordanian mothers. *Dental Traumatology*, 34(6), 431–438.

- Allareddy, V., Rampa, S., Lee, M. K., Allareddy, V., Nalliah, R. P., & Hospital, U. of I. (2014). Hospital based emergency department visits attributed to dental caries in the United States in 2006. *Journal of Evidence-Based Dental Practice*, 14, 113–121.
- Friedman, J. W. M., Chen, L., Watkins, L. J., & Meara, J. G. (2017). Prevalence of Emergency Department Utilization in the United States, 2003-2009. *Journal of Emergency Medicine*, 52(5), 714–722.
- Lee, H. H., Lewis, C. W., Saltzman, B., & Starks, H. (2016). Visits to US emergency departments by patients with dental conditions, 2001-2008. *Journal of the American Dental Association* (1939), 147(9), 669–677.
- Rao V, Batchelor M, Hudson P, Johannsen H, Ziegler C. (2017). anaphylaxis risk management program enhances emergency care for anaphylaxis. *Int Med J*. 47:11 P22
- Hänsel M, Müller MP, Stehr SN, Weber S, Koch T. (2008). A state-wide survey of medical emergency management in dental practices: Incidence of emergencies and training experience. *Emerg Med J*; 25:296–300.
- Elanchezhiyan S, Elavarasu S, Vennila K, Renukadevi R, Mahabob MN, Sentilkumar B, et al (2013). Awareness of dental office medical emergencies among dental interns in southern India: An analytical study. *J Dent Educ*. 77:364–9.
- Marks LA, Van Parys C, Coppens M, Herregods L. (2013). Awareness of dental practitioners to cope with a medical emergency: A survey in Belgium. *Int Dent J*.; 63:312–6
- Durrani OK, Khan K, Ahmed SE, Khan S, Arshad H, Bashir U. (2015). An assessment of dentist's knowledge about medical emergencies. *Pakistan Oral Dent J*.; 35:552–55.
- Albelaihi HF, Alweneen AI, Ettish A, Alshahrani FA. (2017). Knowledge, attitude, and perceived confidence in the management of medical emergencies in the dental office: A Survey among the Dental Students and Interns. *J Int Soc Prev Community Dent*.;7:364–9.
- Leelavathi L, Reddy VC, Elizabeth CP, Priyadarshni I. (2016). Experience, awareness and perceptions about medical emergencies among dental interns of Chennai city, India. *J Indian Assoc Pub H Dent*. 14:440–44.
- Somaraj V, Shenoy RP, Panchmal GS, Jodalli PS, Sonde L, Karkal R. (2017). Knowledge, attitude and anxiety pertaining to basic life support and medical emergencies among dental interns in Mangalore City, India. *World J Emerg Med*.; 8:131–5
- Taylor, A. R., Mangan, J. A., & Katyal, S. (2020). Oral health–related emergency department use in Maryland: Rural-urban disparities. *Journal of Public Health Dentistry*, 80(2), 109–116.

Rampa S, Wilson FA, Allareddy V. (2016). Trends in dental-related emergency department visits in the State of California from 2005 to 2011. *Oral Surg Oral Med Oral Pathol Oral Radiol* 122(4):426-33.

Tewari N, Jonna I, Mathur VP, Goel S, Ritwik P, Rahul M, Haldar P, Bansal K, Pandey RM. (2021). Global status of knowledge for the prevention and emergency management of traumatic dental injuries among non-dental healthcare professionals: A systematic review and meta-analysis.;52(8):2025-2037.

Ferraz Dos Santos B, Dabbagh B. (2020). A 10-year retrospective study of paediatric emergency department visits for dental conditions in Montreal, Canada. *Int J* 30(6): 741-748.

Jung CP, Tsai AI, Chen CM. (2016) A 2-year retrospective study of pediatric dental emergency visits at a hospital emergency center in Taiwan. 39(3): 207-213.

Hong L, Ahmed A, McCuniff M, Liu Y, Cai J, Hoff G (2011). Secular trends in hospital emergency department visits for dental care in Kansas City, Missouri, 2001–2006.; 126(2): 210-219.

American Dental Association. (2020) What Constitutes a Dental Emergency? American Dental Association;

Marshman Z. (2019) Urgent Dental Care: Evidence Review. Public Health England;

Ladrillo TE, Hobdell MH, Caviness AC (2006). Increasing prevalence of emergency department visits for pediatric dental care, 1997–2001. 137(3): 379-385.

Owens PL, Manski RJ, Weiss AJ. (2018) Emergency Department Visits Involving Dental Conditions, 2018. In: Healthcare Cost and Utilization Project

Wu K, Li C, Yang Z, Yang S, Yang W, Hua C. (2021). Changes in the characteristics of dental emergencies under the influence of SARS-CoV-2 pandemic: a retrospective study. *BMC Oral Health*. ;21(1):174.

Yang Y, Zhou Y, Liu X, et al. (2020). Health services provision of 48 public tertiary dental hospitals during the COVID-19 epidemic in China. *Clin Oral Investig*. 4(5):1861–4.

Choi SC, Park JH, Pae A, et al. (2010). Retrospective study on traumatic dental injuries in preschool children at Kyung Hee Dental Hospital, Seoul, South Korea.;26(1):70–5.

Wong, N., Tran, C., Pukallus, M., Holcombe, T. and Seow, W. (2012), A three-year retrospective study of emergency visits at an oral health clinic in south-east Queensland. *Australian Dental Journal*, 57: 132-137.