PSNet
PATIENT SAFETY NETWORK

Adverse Events in Dentistry

December 22, 2020
Kalenderian E, Walji MF, Fitall E, et al. Adverse Events in Dentistry. PSNet [internet]. 2020.
https://psnet.ahrq.gov/perspective/adverse-events-dentistry

Introduction

Similar to many other healthcare settings, dentistry carries with it inherent patient safety risks. Dental patients receive medications, tests, and procedures and many of the same patient safety risks are present as in medical care. In addition, there is the potential for adverse events (AEs) unique to dental care associated with the types of procedures dentists perform and the tools they use. However, AEs in dentistry are understudied and opportunities exist to consider how to improve patient safety in this care setting.[1]

Barriers to Evaluating Dental Harms

There are numerous barriers in dental care that will need to be incrementally overcome as patient safety professionals and researchers seek to better identify and address AEs. One such barrier, as has been mentioned in other perspectives, is that adoption of electronic health records (EHRs) has lagged behind other healthcare settings.[2] Additionally, even where they have been implemented in many instances the EHR is used for practice management, such as billing, and not for the documentation of direct patient care. Dentistry is a very procedure based profession and while rationale may be provided to the patient at the point of care, a diagnosis code may not be entered in the record. This is in part because dentistry has not be driven by the use of diagnostic codes as a billing requirement in the same way medicine has. These factors have resulted in a dearth of readily extractable data not only related to *what* care a patient receives, but also *why* they receive it. A final example of a barrier to the evaluation of harms is that dentistry is a very siloed profession, with the majority of dentists operating out of small private practices.[3] With this comes limitations with regards to the infrastructure and resources available to implement AE tracking and monitoring procedures, particularly as smaller practices are more likely to have more limited EHR capabilities than large dental groups or academic institutions.

Understanding Adverse Events in Dentistry

In recent years, researchers have attempted to understand the nature of errors experienced by patients receiving dental care. As a first step, researchers sought to develop a set of characteristics by looking at

the electronic health records (EHR), or EHR-based triggers, associated with dental AEs.[4] The advantage of using triggers is they provide a systematic way of alerting practices to patients who may have experienced- or may be at risk of experiencing- an AE, versus relying on manual chart review.2 Initial triggers identified focused on specific dental procedures and treatments and showed promise at identifying patient AEs.2

A retrospective case review has helped researchers better understand and characterize the types of AEs experienced during dental care. A review of published dental cases was conducted to identify the types of errors and harm that occurred in dental care, the most predominant of which were delayed treatment, unnecessary treatment, or disease progression after misdiagnosis.[5] Similarly, a chart review of nearly 1000 charts from academic institutions sought to classify dentistry adverse events, identify the most common type of events, and determine the proportion of events that were permanent vs. temporary harms. [6] From the results of this study, authors were able to develop an AE classification schema of AE types and a severity index, ranging from temporary minimal/mild harm to death. Pain is the most common type of AE identified, followed by hard tissue damage, nerve injury, and soft tissue damage.[5]

In addition to reviewing the literature and patient charts, an important component of reducing dental AEs is to understand how dental providers view AEs. Researchers used interviews and focus groups to ask 76 individuals at three university-based dental schools (including dental faculty, dental residents and students, and non-dentist clinical staff members) which AEs they thought were more and less common in dental care, and in particular which AEs should never occur. The most frequently cited AEs were aspiration/ingestion, wrong-site, wrong procedure, wrong patient errors, hard tissue damage, and soft tissue damage.[7] As noted in the study conclusions and supported by evidence from the other research already discussed, there are some overlaps between what providers perceive as the most frequent AEs, and those AEs that are actually documented most frequently in patient records. However, one of the notable exceptions is pain. Pain was the least cited AE in interviews despite pain being the most common AE to follow dental procedures.[5]

Where Does Dentistry Go From Here?

Education

As has been seen in safety improvement efforts in other healthcare settings, provider awareness and education around AEs is a critical first step towards improvement. Infection control and aspiration prevention are already key components of dental education and top of mind for many in clinical practice. However, expanding provider awareness to include other AEs observed in research would support improvement by increasing provider recognition of other aspects of care they should be mindful of.

Continuing Data Collection Measurement Efforts

Whenever possible, researchers should continue to place an emphasis on improving data collection in dentistry to not only more comprehensively identify when harms are occurring, but to also recognize patterns in care and patient demographics that may be risk factors for harm. This includes working to enhance the use of EHRs as well as defining appropriate measures and measurement approaches specific to dental care that can track harm rates, with the ultimate goal of assessing improvement.

Research Intervention Approaches

Finally, the identification and analysis of AEs is only the first stage in improving patient safety in dental care. As understanding of the causes and risk factors of AEs improves, next is furthering understanding of what interventions (beyond education and awareness) can promote improvements in care and patient safety. Targeted research activities into interventions in specific AEs can help to bridge that knowledge gap and spearhead innovation in the field.

Authors

Elsabeth Kalenderian, DDS, MPH, PhD is a professor at the University of California at San Francisco (UCSF). In her professional role, she leads research projects focused on using informatics approaches to improve the safety and quality of oral healthcare, with a particular focus on using data for electronic health records. Muhammad F. Walji, PhD is the Associate Dean for Technology Services and Informatics and professor for Diagnostic and Biomedical Sciences at the University of Texas Health Science Center at Houston, School of Dentistry. Additionally, he serves as the Director of the Texas Center for Oral Healthcare Quality and Safety. In his professional role, he oversees the BigMouth Dental Data Repository and research projects focused on using informatics approaches to improve the safety and quality of oral healthcare.

Elsbeth Kalenderian, DDS, MPH, PhD
Professor
University of California at San Francisco
San Francisco, CA

Muhammad F. Walji, PhD Professor
Associate Dean for Technology Services and Informatics
Professor for Diagnostic and Biomedical Sciences
Director, Texas Center for Oral Healthcare Quality and Safety
University of Texas Health Science Center at Houston, School of Dentistry
Houston, TX

Eleanor Fitall, MPH
Research Associate, IMPAQ Health
IMPAQ International
Washington, DC

Kendall K. Hall, MD, MS
Managing Director, IMPAQ Health
IMPAQ International
Columbia, MD

Bryan Gale, MA
Senior Research Analyst, IMPAQ Health
IMPAQ International
Columbia, MD

References

1. Raja S, Rajagopalan CF, Patel J, Van Kanegan K. Teaching dental students about patient communication following an adverse event: a pilot educational module. *J Dent Educ.* 2014;78(5):757-62. [PubMed]

2. Chauhan Z, Samarah M, Unertl KM, Jones MW. Adoption of electronic dental records: Examining the influence of practice characteristics on adoption in one state. *Appl Clin Inform.* 2018;9(3):635-645. [PubMed]

3. Vujicic M. Practice ownership is declining. *Features Health Policy Perspectives.* 2017;148(9):P690-692.

4. Kalenderian E, Walji MF, Tavares A, Ramoni RB. An adverse event trigger tool in dentistry: a new methodology for measuring harm in the dental office. *J Am Dent Assoc.* 2013;144(7):808-14. [PubMed]

5. Obadan EM, Ramoni RB, Kalenderian E. Lessons learned from dental patient safety care reports. *J Am Dent Associ.* 2015;146(5):318-26.e2. [PubMed]

6. Kalenderian E, Obadan-Udoh E, Maramaldi P, et al. Classifying adverse events in the dental office. *J Patient Saf.* 2018. [PubMed]

7. Maramaldi P, Walji MF, White J, et al. How dental team members describe adverse events. *J Am Dent Assoc.* 2016;147(10):803-811. [PubMed]