ORIGINAL ARTICLE

Analysis of reporting system for procedural errors in the endodontics departments of dental institutes of Punjab

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Biomedica - Official Journal of University of Health Sciences, Lahore, Pakistan
Volume 39(2):67-72
https://doi.org/10.24911/BioMedica/5-962

ABSTRACT

Background and Objective: A reporting system for procedural errors is important in healthcare departments. Adherence to the standard operating procedures is essential to ensure the safety and quality of care of the patients. Therefore, this study was conducted to determine the presence of an effective reporting system for procedural errors and their management in endodontics departments of private and public dental institutes in Punjab.

Methods: This questionnaire-based cross-sectional study was conducted from January 2022 to December 2022 on 205 consenting participants working in endodontics departments of six private and two public dental institutes in Punjab. The validated questionnaire consisted of 14 items targeting demographics, reporting systems for procedural errors, and ways to manage these errors. The chi-square test was used to compare the categorical variables. A *p*-value less than or equal to 0.05 was set as significant.

Results: There were 205 participants with a response rate of 98%. Of these, 68.5% were females and 31.5% were males. A total of 60.5% of colleges, both private and public, lacked a reporting system for procedural errors, and 70.1% did not have a hierarchical order for managing these errors. The most frequent approach was self-management of errors (86.5%), followed by referring to a senior endodontist (45%) and asking colleagues for help (36.5%). 13% and 6% of the participants did not inform about the procedural errors to their patients, and departments respectively. There was a statistically significant difference ($p = 0.007$) between house officers, postgraduate trainees, and demonstrators regarding self-management of errors and follow-up of the patients.

Conclusion: Most endodontics departments lack a reporting system for procedural errors and a hierarchical structure for their management in both private and public institutes. Therefore, policy making and implementation pertaining to the deployment of a standard but comprehensive error reporting system is pivotal for improving healthcare services and outcomes for the patients visiting the dental institutes in Punjab.

Keywords: Dentistry, endodontists, error reporting system, policy, Punjab.

Received: 19 April 2023 **Revised date:** 06 May 2023 **Accepted:** 08 June 2023

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Introduction

Endodontic procedures are technically sensitive and, hence, are prone to maltreatment of the patients. The procedural errors in endodontics are complications that a dentist experiences while performing the treatment. These errors can be unpretentious or problematic, leading to minor or irreversible consequences in many cases.[1]

A dentist is required to have a thorough understanding of the legal implications of procedural errors that may occur due to an increased patient load and awareness. A sound error reporting and management system, especially at the departmental level, contributes to the effective and efficient management of these complications without undue financial burden to the dentist.[2,3]

The Danish Dental Complaint Board categorizes malpractice as concealing errors and not informing the patient about the honest opinion on prognosis. Moreover, persistent infections, improper fillings and apical seals, file separations, furcation perforations, and treating the wrong

tooth are also considered malpractice. Furthermore, the use of chemicals during endodontic treatment has also been reported to cause serious soft tissue and bone damage.[1,4]

It is becoming common for general dentists to perform more complicated procedures, which may lead to an increase in the number of procedural errors. Furthermore, these errors are not reported due to their perception of insignificance and minority; as a result, there is limited information available on procedural errors and their effective reporting and management in dentistry, especially in endodontic clinics. Organizations that accept and recognize the unavoidable nature of errors and the importance of collecting information in order to improve their management may decrease the number and severity of adverse incidents. In order for an organization to be competitive, it must be able to manage such errors effectively, establish a voluntary reporting system, motivate the organization's senior managers, change its culture of blaming, and remove barriers to the reporting system.[2,5,6]

The National Reporting and Learning System, a national error-reporting system, established by the Departments of Health in England and Wales, is an effective step toward patient safety.[7] According to a World Health Organization (WHO) report, the European Policy for Health and Well-Being is essential for achieving high levels of patient safety and quality care. The concept of patient safety can be considered a constitutional legal good that includes the provision of effective healthcare, with the protection of the patient's physical and moral integrity, as well as the right to life of the patient.[8] It is unfortunate that the adverse event reporting system is deficient in Pakistan, especially in the field of dentistry. Moreover, no such system exists at the institutional or departmental level, particularly in endodontics departments, where the frequency of procedural errors is relatively higher.[9]

This study was, therefore, carried out to identify the methods adopted for reporting procedural errors and their management in the endodontics departments of leading private and public dental institutes in Punjab.

Methods

This cross-sectional survey study was carried out at the endodontics departments of six private and two public dental institutes in Punjab and Pakistan, from January 2022 to December 2022 after obtaining approval from the Institutional Review Board (IRB) of the Institute of Dentistry, Combined Military Hospital (CMH) Lahore Medical College, Lahore, Pakistan. An estimated sample size of 205 was calculated with 90% power of study, 95% confidence, and 5% desired significance level.

Demonstrators, postgraduate trainees, and house officers working in the endodontics departments of six private dental institutes (CMH Lahore Dental College, Lahore; Lahore Medical and Dental College, Lahore; Bakhtawar Amin Medical College, Multan; Akhter Saeed Medical and Dental College, Lahore; University College of Dentistry, Lahore; and Shahida Islam Dental College, Lodhran) and two public sector dental institutes (de'Montmorency College of Dentistry, Lahore and Dental Section, Faisalabad Medical University, Faisalabad) were included through nonprobability purposive sampling with a response rate of 98%. The questionnaire was designed and validated by the authors. The data were collected through voluntary participation with consent and confidentiality mentioned in the questionnaire. In CMH, the questionnaire was shared through the college portal on the emails of the faculty and house officers. In other colleges, focal persons who were working as faculty members were nominated from each institute. The web link of the questionnaire was shared with the focal persons, who distributed it among the consenting participants through WhatsApp groups or emails.

The questionnaire had 14 items and was divided into 2 parts. The first part included demographics (age, gender, institute, and designation), while the second part was about endodontic mishaps, procedural error reporting systems, and referral strategies.

Statistical analysis

The data were entered and analyzed using the IBM Statistical Package for Social Sciences (version 24, IBM corporation). Percentage and frequencies were calculated for qualitative variables. The chi-square test was used to compare the categorical variables. A *p*-value less than or equal to 0.05 was considered significant.

Results

A total of 205 participants were enrolled, with a 98% response rate. There were 137 (68.5%) females and 103 (51.5%) participants from private institutes, and 100 (50%) were house officers (Table 1).

A total of 45 (22.5%) participants frequently experienced procedural errors (Figure 1).

The reporting system for procedural errors in the endodontics departments has not been found in most of the dental institutes, both private [54 (52.4%)] and public [67 (69%)], as shown in Figure 2. There was a lack of hierarchical order for managing those errors in the majority of the institutes [140 (70.1%)]. Statistically, no significant difference was reported between private and public dental institutes ($\chi^2 = 5.92$, $p = 0.052$).

The frequency of reporting procedural errors to the patients and the department is illustrated in Figure 3. A total

Table 1. *Demographic profile of the study participants (n = 205).*

Demographics		Frequency (*n*)	Percentage (%)
Gender	Male	63	31.5
	Female	137	68.5
Institute	Private	103	51.5
	Public	97	48.5
Designation	House officers	100	50
	Post graduate residents	66	33
	Demonstrators	34	17

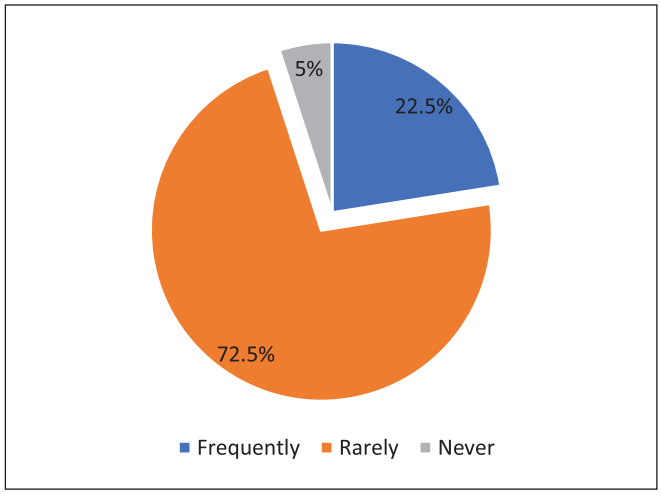

Figure 1. *This pie chart shows the frequency of occurrence of endodontic procedural errors.*

of 82 (41%) and 99 (49.5%) participants "always" informed the patients and their departments about the endodontic procedural errors, respectively.

Table 2 shows the management approaches adopted by the house officers, postgraduate trainees, and demonstrators for endodontic procedural errors. Participants used a variety of approaches to manage the procedural errors; however, the most frequent approach was self-management (86.5%), followed by referring to a senior endodontist (45%), and asking colleagues for help (36.5%). The least preferred option was referring patients to other departments (3.5%). There was a statistically significant difference between house officers, postgraduate trainees, and demonstrators regarding self-management of errors and follow-up of the patients (Table 2).

Discussion

Endodontic treatment is ingrained in uncertainty as it involves an intricate and complex procedure. Mishaps or errors can occur at any stage during the procedure and negatively impact the prognosis, thus endangering the patients' overall health. According to a local study in Pakistan, more than 80% of dentists have experienced endodontic mishaps during their practice.[10] The present study reports endodontic mishap occurrence by 25.5% of the participants at least once during their practical experience. However, two-thirds of the participants reported them as a rare event. Alghamdi et al.[11] reported that 404 endodontically treated teeth were performed by undergraduate dental students of King Khalid University College of Dentistry, Saudi Arabia. He reported obturation-associated mishaps (88%) as more common than the other endodontic errors.

It is imperative to follow ethical and legal protocols and principles while providing oral care. Communion with the patient, verbal or written consent before the treatment, cautioning the patient of the risks involved in the treatment procedure, and avoiding any iatrogenic insult might save grief for the patient and the dentist.[2] The dentist must inform the patient of the possible consequences, treatment options, and prognosis to evade any lawsuit on the part of the patient for negligence and/or dental malpractice.[12] Ba-Hattab et al.[13] found that the majority of the dentists experienced endodontic accidents during root canal treatment. Most of them did not hesitate to practice the correct ethical conduct of informing the patients, which is essential to maintain the confidence between patients and dentists.

Currently, patient safety research is evolving in dentistry because current evidence cannot accurately estimate the frequency of patient safety incidents or the burden of diseases associated with ambulatory dental care.[14] Moreover, in a Colombian study, 541 reports were evaluated against unsafe acts in dentistry, and found that 14% of these incidents occurred in the endodontic clinics.[15]

Medicine, particularly surgery, has long recognized the need to adopt patient safety initiatives by developing patient safety reporting systems to lessen the burden of iatrogenic harm. A few of the most important systems include the "World Alliance for the Safety of Patients," promoted by the WHO, and the Luxembourg Declaration of the European Union.[16,17]

A systematic review highlighted the importance of the implementation of the WHO multiprofessional patient safety

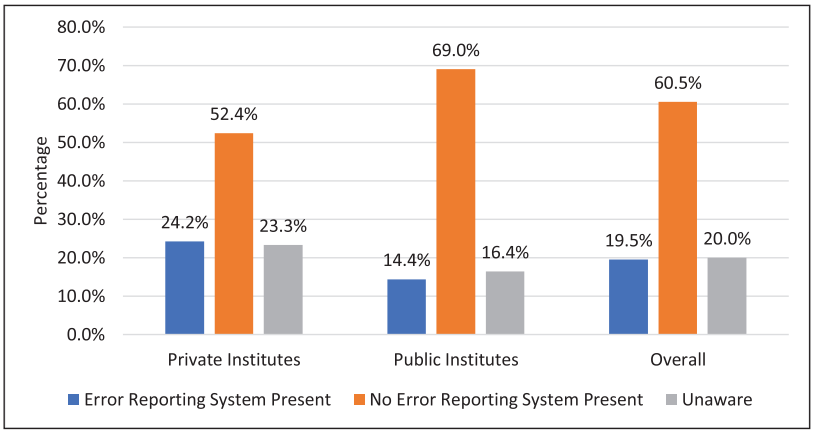

Figure 2. *Bar chart showing the frequency of reporting system for procedural errors in endodontics departments of private and public dental institutes in Punjab.*

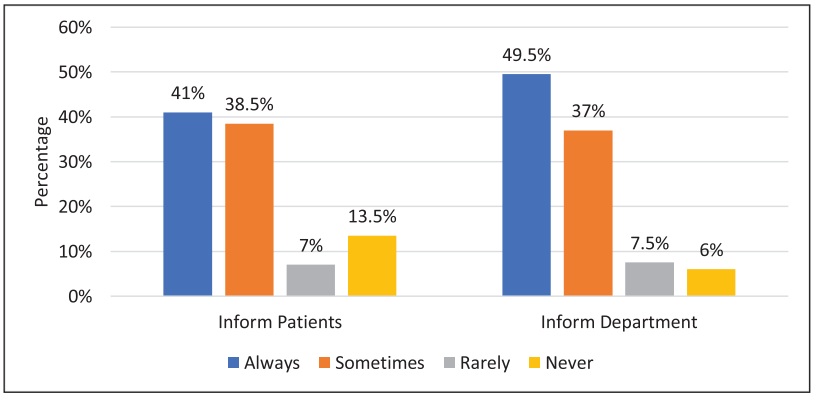

Figure 3. *The bar chart shows the distribution of informing the patients and departments about procedural errors.*

Table 2. *Distribution of referral strategies of endodontic procedural errors among house officers, postgraduate trainees, and demonstrators.*

Referral strategies	*n* (%)	House officers *n* (%)	Post graduate trainees *n* (%)	Demonstrators *n* (%)	χ^2	*p*
Self-management/no referral	173 (86.5)	79 (39.5)	63 (31.5)	31 (15.5)	9.98	0.007*
Set up follow-up appointments	29 (14.5)	12 (6)	15 (7.5)	2 (1)	6.14	0.04*
Refer to a colleague	73 (36.5)	35 (17.5)	24 (12)	14 (7)	0.41	0.81
Refer to a senior endodontist	90 (45)	48 (24)	25 (12.5)	17 (8.5)	2.05	0.35
Refer to other departments	7 (3.5)	4 (2)	2 (1)	1 (0.5)	0.14	0.92

*Chi-square test *p*-value < 0.05 taken as significant.

curriculum in all dental teaching institutions in the world in order to improve patient safety practices. It is important to take into consideration whether dental educational institutions promote a safe culture and environment in their organizations and curricula.[18]

Nevertheless, dentistry needs to catch up to its medical peers in this regard, as it includes invasive procedures that involve handling potentially hazardous chemicals and technical equipment and can pose a risk to the patient. A patient safety program with eleven steps has recently been presented by the General Council of Dentists in Spain to significantly decrease these preventable adverse events and establish certain protocols to ensure the quality of clinical records and authenticate the cleaning and sterilization procedures.[14,19]

In the current study, 60.5% of the participants from both private and public institutes denied the presence of any reporting system in their respective hospitals, indicating the urgency to establish procedural error reporting and documentation systems in dental clinics, especially endodontic clinics in Pakistan. An Iranian study found a lack of a reporting system for procedural errors in the hospital and also identified organizational, legal, regulatory, and financial factors as the main barriers. They highlighted the need for the development of a voluntary reporting system, the modification of the blame culture, the elimination of reporting barriers, and the establishment of an error reporting system as a unique procedure.[20]

Developing and implementing a reliable error reporting system can help in collecting information on the frequency of such incidents, the burden of harm, and areas of concern, which can help in the formation of a comprehensive framework for the identification of causal factors for prevention, and the course of management of unfortunate incidents.[4,14]

An increasing number of developing countries are adopting a standardized hierarchical order for reporting procedural errors that may affect the attitudes toward dental procedures and possible accountability for misconduct.[21] However, the results of the present study indicate an absence of hierarchical order for managing mishaps in private and public dental hospitals in Punjab. The most frequently chosen approach for management in the case of an endodontic mishap by the participants, particularly postgraduate trainees, was self-management and follow-up. A few participants would consult their colleagues or seniors.

Currently, people are more sensitive about their rights because of more awareness and the opulent information media. Negligence in the provision of healthcare can have severe consequences for the practitioners.[22] Due to recent significant revolutions, dentistry has evolved significantly, yet attention to moral principles and ethical concerns has remained relatively low. The dentist has a responsibility to provide dental care that meets a specified standard of care by abiding by moral, ethical, social, and legal norms.[23] Therefore, it is reasonable to create a comprehensive reporting system that could be implemented progressively and would ensure that the desired outcomes are attained due to the scope and complexity of the situation.

Conclusion

The endodontics departments of leading private and public dental institutes of Punjab lack a formal reporting system for procedural errors and a designated team or hierarchical structure for error management. This implies the urgent need for deploying a policy-based framework for identifying and reporting procedural errors with the goal of achieving better healthcare outcomes for patients with dental ailments.

Limitations of the Study

The study has many limitations. First, it is focused primarily on the reporting aspect of the endodontic procedural errors without conducting an in-depth analysis of the underlying causes or consequences of these errors. Further studies should be conducted to explore the root causes, impact on patient outcomes, and interventions to prevent or mitigate these procedural errors. Also, the time frame was limited for this study. A longer study duration could have allowed for a more comprehensive evaluation of endodontic procedural error reporting in other provinces of Pakistan as well.

Acknowledgement

The authors would like to acknowledge the administration and focal persons of the participating institutes; Dr. Syed Moiz Ali (CMH Lahore Dental College), Dr. Usman Mehmood and Dr. Usman Ashraf (Lahore Medical and Dental College, Lahore), Dr. Safi Ullah Khan (Bakhtawar Amin Medical College, Multan), Dr. Zenab Sarfraz (Akhter Saeed Medical and Dental College, Lahore), Dr. Irsam Shaheen (University College of Dentistry, Lahore), Dr. Muhammad Zahid Majeed (Shahida Islam Dental College, Lodhran), Dr. Sidra Riaz and Dr. Imran Ameer (de'Montmorency College of Dentistry, Lahore), Dr. Aamir Rafique (Dental Section, Faisalabad Medical University, Faisalabad).

List of Abbreviations

CMH	Combined Military Hospital
IRB	Institutional Review Board
WHO	World Health Organization

Conflict of interest

None to declare.

Grant support and financial disclosure

None to disclose.

Ethical approval

Ethical approval was granted by the IRB of the Institute of Dentistry, CMH Lahore Medical College, Lahore, Pakistan, vide Letter No. 649/ERC/CMH/LMC, dated 08-12-2021.

Authors' contributions

MIA, HH: Conception and design of the study, drafting of the manuscript with critical intellectual input.

ZFZ, MTA, MDQ: Acquisition and analysis of data, drafting of the manuscript.

SR: Acquisition and analysis of data, Critical revision of the manuscript with intellectual input.

ALL AUTHORS: Approval of the final version of the manuscript to be published.

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