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Research Paper: Prevalence and Contributing Factors of Dental Errors among Dentists in Rasht: A Cross-sectional Study

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ABSTRACT

Introduction: An organized error-reporting system plays a crucial role in alerting those involved in patient care. Addressing errors and negligence remains a significant challenge in healthcare. This study aimed to evaluate the types of dental malpractice and associated factors among dentists in Rasht City.

Materials and Methods: In this analytical cross-sectional study, all malpractice cases submitted to the Forensic Medicine Organization and the Medical Council of Rasht from 2018 to 2021 were reviewed. Data were collected using a researcher-designed checklist based on literature review and official case files. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize the data. Inferential analyses were performed using Fisher's exact test, Mann–Whitney U and Chi-square tests. All statistical analyses were performed using SPSS version 26 and $P<0.05$ was considered significant.

Results: Of the 159 reviewed cases, 20.7% resulted in acquittals, while 76.8% led to confirmed malpractice verdicts. The identified causes of malpractice included carelessness (30.2%), negligence (10.7%) and failure to follow clinical guidelines (35.9%). The majority of incidents occurred in private dental offices (85.5%). All complaints were related to treatment procedures. A statistically significant association was found with the plaintiff's professional background ($P=0.017$). No significant differences were observed based on the plaintiff's gender, age, education level, or occupation ($P>0.05$)

Conclusion: Given the high proportion of confirmed malpractice cases and the direct involvement of dentists in these incidents, there is a critical need to enhance dentists' clinical competencies and adherence to standard treatment protocols to reduce medical errors.

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1. Introduction

Health is a fundamental prerequisite for the development and prosperity of any society. Dentists, as key contributors to public health, shoulder the responsibility of maintaining and improving oral health through the acquisition of specialized knowledge and skills. Society consequently holds dentists in high regard, affording them respect and social status. However, with this elevated position comes an ethical and professional obligation to adhere strictly to medical and humanistic standards so as not to jeopardize this trust and stature (1).

Despite their best efforts, dental professionals, like other healthcare providers, are not immune to error. Medical errors may arise from professional negligence and typically result from actions or treatments that deviate from accepted standards of care, leading to avoidable harm or injury to patients. These errors often stem from insufficient skills, knowledge, or attentiveness, falling below the expected standard of practice among peers at a given time (2).

Although many disputes between patients and dentists are resolved informally, some escalate into formal legal action. In such cases, an expert is appointed to evaluate the validity of the claim. If the complaint is upheld, the dentist may face legal liability and disciplinary action (3).

According to the Institute of Medicine, any deviation from the expected standard of care—regardless of whether it results in harm—is classified as a medical error. Given the critical nature of healthcare services in safeguarding human life and well-being, such errors carry significant clinical, economic, and legal consequences, including elevated mortality rates (4, 5). A medical error can be broadly defined as an unintentional event resulting from a deviation in clinical judgment or procedural failure, which does not yield the desired therapeutic outcome (6, 7).

The cost of complaints—socially, economically, and emotionally—is considerable. They consume valuable time for patients, dentists, and the judicial system, while also placing a significant burden on legal and regulatory institutions (2, 8). Multiple factors contribute to the growing number of dental complaints, including the expansion of dental specialties, increased use of complex diagnostic and treatment technologies, growing public awareness of patients' rights, evolving expectations of healthcare services, and systemic issues such as clinician fatigue and the difficulty of keeping up with rapid advancements in medical knowledge (1, 3). The presence of mass media, legal services, and the increasing number of dental graduates—often operating under financial strain—also amplify the likelihood of errors and subsequent legal claims (2, 3).

In one study, Khosravi and Samani (1) investigated the prevalence and causes of dental complaints in Babol and Sari between 2006 and 2013. They reported that complaints were more frequently filed against male dentists (13.4%) than female dentists (6.8%). The primary causes included treatment methods, costs, behavior, and lack of informed consent. Similarly, Hashemipour et al. (2) examined dental complaints in Kerman Province between 2000 and 2011, finding that most were associated with fixed prosthetics and oral surgeries. Of these, 56.7% were clinical in nature and 40% non-clinical.

Despite the growing body of literature in various regions of Iran, no prior study has specifically examined dental complaints within Rasht. therefore, the aims of this study was to investigate the frequency and underlying causes of dental malpractice complaints filed in Rasht between 2018 and 2021.

2. Materials and Methods

This analytical cross-sectional study reviewed all complaint files submitted to the Forensic Medicine Organization and the Rasht Medical Council between 2018 and 2021, using a census sampling method. Data were collected using a researcher-designed checklist developed from a review of existing literature and case files. The checklist consisted of two sections: the first captured demographic and social data, while the second assessed the factors associated with the complaint.

The first section included variables such as the dentist's age, gender, level of education (general vs. specialist), and marital status, as well as the complainant's age, gender, education level, and marital status. Information on the dentist's workplace (hospital, private office, or clinic) was also collected. The second section recorded the verdicts issued by the Forensic Medicine Organization and the Rasht Medical Council, categorized into: (a) acquittal, (b) finding of negligence, or (c) ruling for blood money compensation.

Following ethical approval code (IR.GUMS.REC.1400.491), an official letter of introduction from the Deputy for Research and Technology was submitted to both institutions. Data collection was conducted during office hours

by a trained forensic officer and the lead researcher. Only those cases that had received a final verdict between 2018 and 2021 were included. Each case file was reviewed over approximately 20 minutes, during which data were extracted into the structured checklist. Incomplete or ambiguous files, as well as those lacking a final ruling, were excluded.

To ensure confidentiality, checklists were anonymized, and no personally identifiable information was recorded. Descriptive statistics (frequencies and percentages for categorical variables; means and standard deviations for continuous variables) were used to summarize the data. Inferential statistical analyses were conducted using Fisher's exact test, the Mann-Whitney U test, or the chi-square test, as appropriate. All statistical analyses were performed using SPSS version 26 and $p < 0.05$ was considered significant.

3. Results

Table 1 presents the frequency distribution of demographic variables for both complainants and accused dentists. Among the 159 cases reviewed, 33 (20.7%) resulted in a verdict of no negligence, while 122 (76.8%) involved findings of negligence. Specifically, 48 cases (30.2%) were categorized as carelessness, 17 cases (10.7%) as negligence, and 57 cases (35.9%) as failure to comply with standard procedures (Table 2).

Table 1. Demographic characteristics of complainants and the accused

Variable	Category	Number (%)
Accused Sex	Male	140 (88.1%)
	Female	19 (11.9%)
Accused Specialty	Specialist Dentist	17 (10.7%)
	General Dentist	120 (75.5%)
	Experimental Dentist	22 (13.8%)
Complainant Sex	Male	69 (43.4%)
	Female	90 (56.6%)
Complainant Age (years)	Mean ± SD	42.67±12.91
	Range (min–max)	(18–71%)
Complainant Education	Illiterate	9 (5.8%)
	Below Diploma	32 (20.7%)
	Diploma	65 (41.9%)
	Academic Degree	49 (31.6%)
Complainant Occupation	Self-employed	52 (33.5%)
	Employee	25 (16.1%)
	Housekeeper	51 (32.9%)
	Unemployed	16 (10.4%)
	Retired	11 (7.1%)
Relationship to Patient	Patient	152 (95.6%)
	Patient's Father	4 (2.5%)
	Patient's Legal Representative	3 (1.9%)
Complainant Residence	Urban	126 (79.2%)
	Rural	30 (18.9%)
	Outside Guilan Province	3 (1.9%)

Table 2. Frequency distribution of information on the type of misconduct and the verdict issued

Type of Negligence	Number	Percentage (%)
No negligence	33	20.7
Carelessness	48	30.2
Imprudence	17	10.7
Non-compliance with procedures	57	35.9
Under re-examination	4	2.5
Final Verdict		
Acquittal	33	20.7
Conviction for negligence	122	79.3
Failure rate		
Mean ± Standard Deviation	6.24 ± 1.76	

Most errors (136 cases, 85.5%) occurred in private dental offices. The cause of complaint in all cases was related to the method of treatment. The majority of complaints were initially filed through police stations (57.9%), followed by the Medical Council (20.8%) (Table 3).

The verdicts showed no significant association with the plaintiff's gender. However, a statistically significant association was found with the plaintiff's professional background (Fisher's exact test, P=0.017): negligence was more frequently established in cases where the complainant was an experimental dentist(non-academic), compared to those involving general or specialist dentists. No significant differences were observed based on the plaintiff's gender, age, education, or occupation. Nevertheless, a significant association was identified between the verdict and the plaintiff's relationship to the patient (Fisher's exact test, P=0.037): cases filed by patients' lawyers were more likely to result in a finding of negligence than those filed by the patients themselves or their family members (Table 4).

Table 3. Frequency distribution of additional information in complaint files

Category	Number	Percentage (%)
Location of the Error		
Private office	136	85.5
Private clinic	15	9.4
Government clinic	5	3.1
Government hospital	3	1.9
Reason for Complaint		
Treatment method	159	100.0
Place of Complaint Submission		
Police station	92	57.9
Medical Council	33	20.8
Prosecutor's office	34	21.4
Severity of Injury		
No injury	33	20.8
Minor injury	122	76.7
Major (serious) injury	4	2.5
Persons Involved		
Dentist only	45	28.3
Dentist and patient	92	57.9
Other healthcare professionals only	6	3.8
Other professionals and patient	16	10.1

Table 4. Frequency distribution of personal information of the complainant and complainants

Variable	Category	Innocence(n, %)	Negligence(n, %)	Total(n, %)	P-value
Accused Sex	Male	29 (20.7%)	111 (79.3%)	140 (88.1%)	0.999*
	Female	4 (21.1%)	15 (78.9%)	19 (11.9%)	
Accused Specialty	Specialist	7 (41.2%)	10 (58.8%)	17 (10.7%)	0.017**
	General dentist	25 (20.8%)	95 (79.2%)	120 (75.5%)	
	Experimental dentist	1 (4.5%)	21 (95.5%)	22 (13.8%)	
Complainant Sex	Male	14 (20.3%)	55 (79.7%)	69 (43.4%)	0.899*
	Female	19 (21.1%)	71 (78.9%)	90 (56.6%)	
Complainant Age	Median	42.5(36,49)	42(31,54)	42(32,53)	0.922***
Complainant Education	Illiterate	5 (55.6%)	4 (44.4%)	9 (5.8%)	0.062**
	Less than diploma	4 (12.5%)	28 (87.5%)	32 (20.6%)	
	Diploma	12 (18.5%)	53 (81.5%)	65 (41.9%)	
	University degree	9 (18.4%)	40 (81.6%)	49 (31.7%)	
Complainant Occupation	Employee	5 (20.0%)	20 (80.0%)	25 (16.2%)	0.083**
	Freelance	8 (15.4%)	44 (84.6%)	52 (33.5%)	
	Unemployed	0 (0.0%)	16 (100.0%)	16 (10.3%)	
	Retired	2 (18.2%)	9 (81.8%)	11 (7.1%)	
	Housewife	15 (29.4%)	36 (70.6%)	51 (32.9%)	
Complainant–Patient Relationship	Self (patient)	30 (19.7%)	122 (80.3%)	152 (95.6%)	0.037**
	Father of patient	3 (75.0%)	1 (25.0%)	4 (2.5%)	
	Legal representative	0 (0.0%)	3 (100.0%)	3 (1.9%)	

*Fisher's Exact Test **Chi-Square Test ***Mann-Whitney U Test

Based on the supplementary data, a statistically significant association was identified between the adjudicated decisions and the location of the medical error (P = 0.034), with the proportion of malpractice

rulings being highest in cases where the error occurred in government hospitals (100%). Moreover, the rulings demonstrated a significant association with the venue of complaint submission (P = 0.001), as malpractice findings were more prevalent in cases filed with the Medical Council (100%) and the Public Prosecutor's Office (75%) (Table 5).

Table 5. Frequency distribution of issued verdicts based on additional information in the complaint file

Variable	Category	Innocence	Negligence	Total	P-value
Location of the Error	Private Office	24 (17.6%)	112 (82.4%)	136 (85.5%)	0.034*
	Government Clinic	7 (46.7%)	8 (53.3%)	15 (9.4%)	
	Private Clinic	2 (40.0%)	3 (60.0%)	5 (3.1%)	
	Government Hospital	0 (0.0%)	3 (100.0%)	3 (1.9%)	
Place of Complaint	Police Station	23 (25.0%)	69 (75.0%)	92 (57.9%)	0.001**
	Medical Council	0 (0.0%)	33 (100.0%)	33 (20.8%)	
	Prosecutor's Office	10 (29.4%)	24 (70.6%)	34 (21.4%)	

*Fisher's Exact Test

4. Discussion

The present study investigated the patterns of dental malpractice complaints and their legal outcomes in Rasht, Iran. Out of 159 evaluated cases, a significant majority (76.8%) resulted in confirmed negligence, with only 20.7% leading to acquittal. Among the confirmed cases, non-compliance with professional instructions (35.9%), carelessness (30.2%), and negligence (10.7%) were the most prevalent categories of error. These findings underscore a notable burden of professional misjudgment or procedural lapses in dental practice, consistent with the growing concern over clinical accountability in dentistry.

Our results are in line with earlier studies conducted in other provinces of Iran. For example, Mehdizadeh et al. (2017) reported a 53.2% conviction rate among dentists in Qom, while Ranjbar et al. observed a 48% negligence verdict rate among dental practitioners in Kashan. The higher conviction rate in the current study may reflect stricter adjudication practices or increased awareness among patients and legal authorities in recent years. Similarly, Shahsavari et al. documented a 62.8% conviction rate in Tehran, reinforcing the trend that a majority of malpractice cases lead to accountability (9–11).

The location of the error was predominantly private clinics (85.5%), a finding consistent with previous literature, including the study by Shahsavari et al., where 87.7% of complaints originated from private settings. The lack of institutional oversight and documentation in private practices may contribute to a higher incidence of complaints and difficulty in defending against allegations (11).

Interestingly, the reason for complaint in all cases was related to the treatment method, suggesting that technical quality, communication, and patient expectations are central to litigation in dental practice. As noted by prior studies (12), key drivers of dental complaints include inadequate patient education about risks and complications, behavioral issues, high or unexpected treatment costs, and lack of thorough documentation. These findings highlight the need for enhanced patient–provider communication, informed consent processes, and rigorous record-keeping.

In this study, we observed a statistically significant relationship between the specialty status of the accused and the likelihood of a guilty verdict (p = 0.017). Experimental (non-academic) dentists were more frequently found guilty compared to general or specialist dentists. This pattern echoes Ranjbar et al.'s findings, where experimental dentists accounted for a higher proportion of complaints and convictions. It underscores the importance of formal training and continuous professional education in minimizing clinical errors and ensuring adherence to evidence-based practices (10).

Another important finding was the significant association between the complainant–patient relationship and the outcome of the verdict (p = 0.037). Cases filed by patient representatives—particularly legal representatives—had higher conviction rates compared to those filed directly by patients or their family members. This may be attributed to the professional legal presentation of the complaint and the strategic preparation of supportive documentation. It also raises concerns about potential disparities in outcomes based on complainant resources and advocacy capabilities.

Gender and occupation of the complainant did not significantly influence the outcome, which aligns

with Mehdizadeh et al.'s study. However, both studies observed a higher proportion of complaints being filed by female patients, suggesting a gendered pattern in perception of harm or willingness to seek legal recourse (9).

Importantly, the high frequency of confirmed errors may not necessarily indicate declining standards in dental care, but rather reflect increasing societal awareness of patient rights, greater legal literacy, and more active pursuit of accountability in healthcare. With the widespread access to medical information via digital platforms, patients today are more informed and assertive in defending their rights, which may partially explain the increase in legal complaints.

Despite these insights, this study is not without limitations. The analysis was confined to a single geographic area, which may limit generalizability. Furthermore, due to the retrospective nature of the data, the accuracy of documentation and subjective interpretation of case details may have influenced the classification of errors. Future research should expand to multicenter or national analyses, explore institutional practices, and assess the impact of legal representation on case outcomes. Equipping dental professionals with not only clinical competence but also ethical and communicative competencies is crucial in today's medico-legal climate.

5. Conclusion

Given the high rate of malpractice verdicts, particularly in private dental practices and among less formally trained practitioners, targeted interventions are imperative. These may include regulatory oversight, standardized training, and robust continuing education programs. Moreover, encouraging open disclosure of medical errors can not only strengthen patient–provider trust but also reduce litigation risk. Creating a culture of transparency and accountability is essential for protecting both patient rights and professional integrity.

Ethical Considerations

This study was approved by ethics committee of Guilan University of Medical Sciences (IR.GUMS.REC.1400.491).

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Authors' Contributions

Seyed Javad Kia: Conceptualization, Methodology, Writing - review & editing **Koroush Delpasand:** Resources, Investigation, Visualization **Morteza Rahbar Taramsari:** Methodology, Visualization **Masoumeh Ghandinezhad:** Writing - original draft, Data curation **Sahba Khosousi Sani:** Funding acquisition, Project administration, Supervision

Conflict of Interests

The authors declare no conflict of interest.

Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request. Moreover, the datasets supporting the conclusions of this article are included within the article.

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