Assessment of the Difference Between General Practitioners and Specialists in Antibiotic Prescription for Emergency Patients

Omar Rifat Alkhattab[1], Faisal Alghamdi[2], Ayman Moaz Abulhamael[3], Abdulaziz Bakhsh[4], , Alaa Jameel Kabbarah[5], Saeed Bahattab, Ayman Alsubhi

[1] *Department of Endodontics, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia*
[2] *Teaching Assistant, Oral Biology Department, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.*
[3] *Department of Endodontics, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia*
[4] *Department of Restorative Dentistry, Faculty of Dental Medicine, Umm Al-Qura University, Makkah, Saudi Arabia*
[5] *Assistant Professor, Department of Dental Public Health, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia.*

KEYWORDS
Endodontic, Antibiotic, Dentists, General Practitioners, Specialists

ABSTRACT
Background: Endodontic emergencies are one of the most common emergencies that dentists face during their career. **Objectives:** This study aimed to evaluate and assess the difference between general dentists and endodontists in managing endodontic emergency cases. Also, it highlights the risk of bacterial resistance due to an inappropriate antibiotic prescription. **Methods:** A cross-sectional study conducted at King Abdul-Aziz University Dental Hospital, a self-administered survey was distributed to 521 dental patients. The response rate was 82.9% (432 out of 521). The survey, available in both paper and electronic formats, comprised 24 questions organized into three main sections: the first section collected demographic and medical history data, the second focused on the patients' dental history related to emergencies, and the third detailed the treatment received during emergencies and the methods employed. A Fisher's exact test was utilized to assess significant differences between general dental practitioners and endodontic specialists regarding their initial steps, reasons for treatment, swelling conditions, biting and chewing conditions, and final treatments. Data analysis involved simple descriptive statistics, including percentages, frequency distributions, pie charts, and bar graphs. Statistical significance was determined with a p-value set at ≤ 0.05. **Results:** The study revealed that decay was the most prevalent reason for endodontic treatment, with immediate treatment being the preferred choice among dentists. Despite the well-documented issue of endodontic treatment failure due to inadequate coronal sealing, the majority of general dentists performed root canal treatments followed by either temporary or permanent restorations. Additionally, the study found that general dentists prescribed antibiotics more frequently than endodontists. **Conclusion:** The study findings indicate the need to develop intervention programs targeting clinicians to enhance knowledge about prescribing antibiotics for endodontic emergencies.

1. Introduction

Dental emergencies are among the most common emergencies encountered by practitioners, with their origins being caries, periodontal lesions, trauma, and medical causes (1). These emergencies often result in pulp and apical infections, usually driven by diverse bacterial populations (2). The severity of these infections is largely influenced by the patient's immune response, making effective removal of the source of infection a critical goal in endodontic treatment (3). Antibiotics play an important role in dental practice, both for prophylactic purposes and as an essential component of the management of dental emergencies (4). They are particularly important in cases involving medical conditions such as infective endocarditis or prosthetic heart valves, and in cases of systemic infection (4,5). The European Dental Association identifies specific indications for the use of antibiotics, including patients with medical problems with acute apical abscesses, localized swelling with systemic involvement, reimplantation of extracted teeth, facial cellulitis, and trauma requiring suturing. Despite established guidelines, overprescribing antibiotics remains a concern (2,6). Previous studies have highlighted that many dentists do not strictly adhere to guidelines, often prescribing antibiotics for conditions that may not warrant their use, such as localized swelling or symptomatic apical gingivitis. This inappropriate use fails to address the underlying problem and contributes to the risk of antibiotic resistance, a major public health challenge (6–8). This study aims to investigate and compare the practices of general dentists and endodontists in the management of endodontic emergencies, with a particular focus on antibiotic prescription. By examining differences in treatment approaches and antibiotic use, this research seeks to enhance understanding and raise awareness among general dentists about appropriate antibiotic prescribing. It will also assess patient

experiences to provide insights into current practices and highlight areas for improvement. Through this examination, the study aims to contribute valuable knowledge on improving treatment protocols and reducing the risks associated with inappropriate antibiotic use.

2. Methodology

A cross-sectional study was conducted among patients at King Abdul-Aziz University Dental Hospital (KAUDH), Jeddah city, Saudi Arabia. Ethical approval for this study was obtained from the research ethics committee of the faculty of dentistry at King Abdul-Aziz University, Jeddah city, Saudi Arabia. Questionnaires were distributed to 432 out of 521 King Abdulaziz University, Faculty of Dentistry (KAUFD) patients (204 males and 228 females) who fulfilled the inclusion criteria. Samples included in the study had to be of Saudi and non-Saudi patients who live in Jeddah city, Saudi Arabia. Inclusion criteria: any patient who had an endodontic treatment in one of their teeth or more and patients who are residents in Jeddah city, Exclusion criteria: patients who didn't reside in Jeddah city and patients that's didn't receive any endodontic treatment in their teeth.

Descriptive statistics were done. Questionnaires were anonymous and voluntary, and the response rate was 82.9%. The survey was pre-tested on 20 patients (10 males and 10 females) who were not part of the study sample to test validity and reliability. Modifications were made to the survey until an acceptable level of validity and reliability was reached. The questionnaire contains 24 questions in Arabic and English divided into three sections. The first section was the demographic data and medical history of the patients. The second section was about the patients' dental history of emergencies. The third section was about those treated during emergencies and how the treatments were administred. The reasons for these sections to save the time and effort of selected patients and also to determine the knowledge and awareness in treating endodontic emergencies and prescribing antibiotics based on the patients' experiences, concerns, and perceptions. The survey was available online and in paper format. The online survey was on a Google form with a QR code for those with smart devices and paper copies for those without smartphones or internet access. A Fisher exact test was used to analyze the difference between general practitioners and specialists in antibiotic prescription for emergency endodontic pain.

Data were collected, coded, and entered into a database for analysis using SPSS Version 20.0 for Windows (IBM Corp., Armonk, NY, USA). Data analysis included simple descriptive statistics in the form of percentages, frequency distributions, pie charts, and bar graphs. A Fisher exact test was used to investigate the significant differences between general dental practitioners and endodontic specialties regarding their initial steps concerning seeking treatment, swelling, chewing conditions, and final treatment. The p-value was set at ≤ 0.05.

3. Results and Discussion

Table 1 presents the basic demographic characteristics of the patients as follows:

The majority of the patients, 171 (39.6%), were aged 21-30 years, representing the peak age group in the study. The least represented age group was patients younger than 20 years, with only 32 patients (7.4%). In terms of gender, the study included 228 females (52.8%) and 204 males (47.2%). Regarding educational level, the largest group had a university degree, with 248 respondents (57.4%). Concerning profession, the majority were employed, with 235 respondents (54.4%). The most common annual income bracket was below 36,000 Saudi Riyals, with 182 patients (42.1%) falling into this category.

Table 1.basic demographic characteristics of patients

Variables	N	%
Gender		
Female	228	53
Male	204	47
Age		
<20 years	32	7

20-30 years	171	40
31-40 years	104	24
>40 years	125	29
Education		
Below high school	41	9.5
high school	118	27.3
Postgraduate studies	25	5.8
University	248	57.4
profession		
employed	235	54.4
student	107	24.8
unemployed	90	20.8
Annual income		
>36000	182	42.1
<120000	53	12.3
36000-72000	113	26.2
72000-108000	84	19.4

Table 2 presents the medical history of the patients in the study. Among the participants, 145 patients (34%) had a history of chronic diseases, while 287 patients (66%) reported no such medical conditions. Regarding medication usage, 147 patients (34%) had used medications related to their medical history, whereas 285 patients (66%) had not. Concerning the urgency of treatment, 213 patients (49.3%) required treatment within a week, 141 patients (32.6%) needed it within a month, 43 patients (10%) waited less than six months, and 35 patients (8.1%) had to wait more than six months. In terms of the percentage of patients respective to their reason for the treatment, the highest percentage reported for those who attended the clinic to get treatment for caries/decay reasons by 402 (93.1%), while 19 (4.4%) selected other options such as endo-crown or pulp exposure, and the fewest sought treatment for trauma by 11 (2.5%) patients.

Table 2. Medical history of patients

Variables		N	%
Do you have any chronic diseases?	yes	145	34
	no	287	66
Are you taking any medications?	yes	147	34
	no	285	66
What was the time spent before seeking dental treatment?	< 1 week	213	49
	< 1 month	141	33
	< 6 months	43	10
	> 6 months	35	8
What was the reason for seeking dental treatment?	Trauma	11	3
	Decay	402	93
	Others	19	4

Table 3 shows the percentage of patients with endodontically treated teeth who experienced pain. Of these, 322 patients (74.5%) were symptomatic but did not receive root canal treatment on the same tooth. In contrast, 80 patients (18.5%) with endodontically treated teeth experienced symptoms on the same tooth. Additionally, 26 patients (6.9%) had no symptoms in non-endodontically treated teeth, and 4 patients (0.9%) had no symptoms in endodontically treated teeth.

Regarding pain associated with chewing and biting, with or without swelling, 45 patients (10.4%) had gum and/or face swelling. Of these, 43 patients (9.9%) experienced pain while chewing and biting, and 2 patients (0.5%) did not. Among the patients with face swelling (32 patients, 7.4%), 29 (6.7%) had pain when chewing and biting, while 3 (0.7%) did not. For gum swelling, 113 patients (26.1%) were affected; 92 (21.3%) had pain when chewing and biting, and 21 (4.9%) did not. The

majority of patients, 242 (56.1%), had no swelling; of these, 145 (33.6%) experienced pain when chewing and biting, and 97 (22.5%) did not.

Table 3. Pain and Swelling Analysis in Patients with Endodontically Treated Teeth

Variables		N	%
History of endodontically treated tooth and symptoms	Tooth was previously treated with symptoms	80	18
	Tooth was previously treated with no symptoms	4	1
	Tooth was not previously treated with symptoms	322	75
	Tooth was not previously treated with no symptoms	26	6
What are the factors that increased the severity of pain	Cold / hot drinks and food	132	31
	There was continuous pain	138	32
	All the above	138	32
	There was no pain	24	6

Table 4 highlights the differences in antibiotic use and treatment approaches between endodontic specialists and general dentists based on swelling conditions. Of the 375 cases treated, 34% were managed by endodontic specialists and 66% by general dentists. Specialists did not initiate treatment directly for patients with facial swelling, while general dentists did so in 3 cases. For gum swelling, specialists treated 16 cases directly, compared to 17 cases by general dentists.

Specialists treated 51 cases without swelling directly, compared to 109 cases by general dentists. Antibiotics were prescribed and treatment started immediately in 38% of cases by specialists and 62% by general dentists. Specialists gave antibiotics and proceeded with treatment for 7 cases with facial swelling, while general dentists did so for 6 cases. Only 3 cases with gum swelling saw specialists prescribing antibiotics and starting treatment directly, versus 14 cases by general dentists.

Specialists and general dentists showed no significant differences in immediate treatment or referral decisions (P=0.641 and P=0.176), but there was a significant difference in antibiotic use and postponed treatment (P=0.000).

Table 4 Difference between the initial step taken by the doctor regarding swelling condition

Was there swelling	Endo specialist	General dentist	p-values
No treatment or referred			
Face swelling	0	1	0.64
Gums swelling	0	1	
No swelling	2	4	
Prescribed antibiotic and postponed treatment			
Face swelling	12	9	0.00
Gums and face swelling	19	11	
Gums swelling	4	38	
No swelling	7	35	
Prescribed antibiotic and start treatment immediately			
Face swelling	2	2	0.08
Gums and face swelling	5	4	
Gums swelling	3	14	
No swelling	3	1	
Start treatment immediately			
Face swelling	0	2	0.176
Gums and face swelling	0	1	
Gums swelling	16	17	
No swelling	51	109	

Table 5 compares how endodontic specialists and general dentists handle initial treatment for patients with chewing and biting issues. Out of 373 cases, specialists treated 124 (33%) and general dentists treated 249 (67%). For immediate treatment, 67 cases (34%) were managed by specialists, and 129 cases (66%) by general dentists. Of 82 cases without biting pain, specialists treated 29 (35%) and general dentists 53 (65%). Among 114 cases with biting pain, specialists managed 38 (33%) and

general dentists 76 (67%). In 34 cases where antibiotics were prescribed and treatment started immediately, specialists handled 13 (38%) and general dentists 21 (62%). For 135 cases where antibiotics were prescribed and treatment postponed, specialists treated 42 (31%) and general dentists 93 (69%). Referral or no action was taken in 8 cases, with specialists handling 2 (33%) and general dentists 6 (67%). The statistical analysis shows no significant differences between specialists and general dentists in their treatment approaches for chewing and biting conditions.

Table 5. Difference between the initial step taken by the doctor with pain on biting

Was there pain with chewing and biting?	Endo specialist	General dentist	p-values
No treatment or referred			
Face swelling	0	3	0.67
Gums swelling	2	3	
Prescribed antibiotic and postponed treatment			
Face swelling	6	16	0.86
Gums and face swelling	36	77	
Prescribed antibiotic and start treatment immediately			
Face swelling	1	1	1.00
Gums and face swelling	12	20	
Start treatment immediately			
Face swelling	29	53	0.88
Gums and face swelling	38	76	

Endodontic emergencies are the most prevalent type of emergency encountered in dental clinics. These emergencies can arise from various causes including caries, endo-perio lesions, trauma, and iatrogenic factors, with bacterial infection being the predominant cause (3). The severity of these emergencies is often influenced by the patient's immune response. The primary goal of endodontic treatment is to eliminate the infection (9). Typically, these emergencies are accompanied by dental pain that significantly impacts the patient's quality of life, impeding their ability to eat, speak, and sometimes leading to headaches or earaches. The damage can extend to facial swelling and cellulitis, conditions that are serious and potentially life-threatening due to the risk of compromised airways (2,10).

Antibiotics play a critical role in supporting the patient's immune system by reducing infection. According to the European Society of Endodontology (ESE) guidelines, antibiotics should be prescribed in cases of diffuse facial swelling, medically compromised patients, systemic involvement, soft tissue trauma requiring sutures, and replantation of an avulsed tooth (6,11). The American Association of Endodontists (AAE) provides similar guidelines with slight variations, including persistent symptoms, trismus, involvement of lymph nodes, and osteomyelitis (12).

A notable difference exists between general dentists and endodontists in their approach to antibiotic prescription and treatment postponement. General dentists prescribe antibiotics to 91% of patients with gum swelling, whereas endodontists prescribe antibiotics to only 9% of similar cases (15%). Additionally, general dentists tend to temporize cases more frequently (45.7%) compared to endodontists, who are more likely to provide permanent restorations (55.1%). Furthermore, 15% of endodontists prescribe antibiotics for non-essential reasons, while 36% of general dentists do so. This discrepancy indicates a lower awareness among some general dentists regarding appropriate antibiotic use.

This study reveals a clear difference between general dentists and endodontists in antibiotic prescription practices, particularly in cases of swelling. General dentists are more prone to prescribing antibiotics unnecessarily. Previous studies suggest that recent graduates may have better knowledge about antibiotic prescriptions compared to more experienced general dentists (7,13).

Although more research is needed, accumulating evidence suggests that dental practitioners' knowledge about the use of antibiotics is far from ideal (5,8,14,15). Rational prescribing based on thorough knowledge is an important objective. Some ways, that might play major roles in achieving

this issue, are dentists participating in the regularly continuing dental education courses in the field of antibiotics usage, re-evaluation and standardizing the teaching in the use of antibiotics. In addition, greater emphasis on the training of clinical students about antimicrobial agents could be beneficial in this crucial part of their work (14).

Limitations of this study include the fact that patients, not dentists, completed the questionnaires. Patients are unable to assess whether their dentists follow established guidelines. Other studies indicate that a significant percentage of dentists (42%) do not adhere to any guidelines and prescribe antibiotics based on personal judgment (10). Moreover, the study utilized a single-answer closed-ended questionnaire, which may not capture the full complexity of the patient's condition and symptoms.

4. Conclusion

The result shows a lack of knowledge from general dentists in prescribing antibiotics for endodontic emergency cases from patient experiences, concerns, and perceptions. We need more courses for revision about antibiotic prescription using the guidelines.

Reference

[1] Garispe A, Sorensen C, Sorensen JR. Dental Emergencies. 2024.
[2] Rodriguez JM, Kalsi H, Bavisha K, Darbar U. The Emergency Dental Appointment: Restorative Emergencies Part 1 – Tooth Related Problems. Prim Dent J. 2017 Jun 1;6(2):52–61.
[3] Wong J, Manoil D, Näsman P, Belibasakis GN, Neelakantan P. Microbiological Aspects of Root Canal Infections and Disinfection Strategies: An Update Review on the Current Knowledge and Challenges. Frontiers in Oral Health. 2021 Jun 25;2.
[4] Contaldo M, D'Ambrosio F, Ferraro GA, Di Stasio D, Di Palo MP, Serpico R, et al. Antibiotics in Dentistry: A Narrative Review of the Evidence beyond the Myth. Int J Environ Res Public Health. 2023 Jun 1;20(11):6025.
[5] Sneddon J, Thompson W, Kpobi LNA, Ade DA, Sefah IA, Afriyie D, et al. Exploring the Use of Antibiotics for Dental Patients in a Middle-Income Country: Interviews with Clinicians in Two Ghanaian Hospitals. Antibiotics. 2022 Aug 9;11(8):1081.
[6] Segura-Egea JJ, Gould K, Hakan Şen B, Jonasson P, Cotti E, Mazzoni A, et al. European Society of Endodontology position statement: the use of antibiotics in endodontics. Int Endod J. 2018 Jan 14;51(1):20–5.
[7] Nabavizadeh MR, Sahebi S, Nadian I. Antibiotic prescription for endodontic treatment: general dentist knowledge + practice in shiraz. Iran Endod J. 2011;6(2):54–9.
[8] B. Abraham S, Abdulla N, Himratul-Aznita WH, Awad M, Samaranayake LP, Ahmed HMA. Antibiotic prescribing practices of dentists for endodontic infections; a cross-sectional study. PLoS One. 2020 Dec 30;15(12):e0244585.
[9] Madarati AA. Preferences of dentists and endodontists, in Saudi Arabia, on management of necrotic pulp with acute apical abscess. BMC Oral Health. 2018 Dec 19;18(1):110.
[10] Fukuda K ichi. Diagnosis and treatment of abnormal dental pain. J Dent Anesth Pain Med. 2016;16(1):1.
[11] Buonavoglia A, Leone P, Solimando AG, Fasano R, Malerba E, Prete M, et al. Antibiotics or No Antibiotics, That Is the Question: An Update on Efficient and Effective Use of Antibiotics in Dental Practice. Antibiotics. 2021 May 9;10(5):550.
[12] Rossman LE. American Association of Endodontists. J Am Coll Dent. 2009;76(1):4–8.
[13] Gutiérrez JL, Bagán J V, Bascones A, Llamas R, Llena J, Morales A, et al. Consensus document on the use of antibiotic prophylaxis in dental surgery and procedures. Med Oral Patol Oral Cir Bucal. 2006 Mar 1;11(2):E188-205.
[14] Săndulescu O, Preoțescu L, Streinu-Cercel A, Șahin G, Săndulescu M. Antibiotic Prescribing in Dental Medicine—Best Practices for Successful Implementation. Trop Med Infect Dis. 2024 Jan 26;9(2):31.
[15] Ealla KKR, Kumari N, Sahu V, Veeraraghavan V, Peddapalegani P, Ramani P, et al. Antibiotics Knowledge, Usage, and Prescription Patterns Among Dental Practitioners in Hyderabad, South India. Cureus. 2023 Nov 28;