

Knowledge and Practice of Antibiotic Prescription Among Dentists for Endodontic Emergencies

Mengari L^{1*}, Mandorah A², Badahdah R¹

¹Ministry of National Guard, Jeddah, Saudi Arabia

²Department of Restorative and Dental Material, Faculty of Dentistry, Taif University, Saudi Arabia

ABSTRACT

Aim: To assess the level of knowledge and practice of dentists regarding antibiotic prescription for endodontic emergencies among three groups: General dentists, Endodontist and Other specialists.

Material and Methods: A cross-sectional study carried out and a structured electronic questionnaire was sent through emails to dentists working in governmental sectors, private sectors, and educational institutes. Responses were collected and data were analysed using the Chi-square test at $p < 0.05$. The data were statistically analysed using Statistical Package for Social Sciences (SPSS) version 20.0.

Results: Majority of respondents chose amoxicillin as the first of choice for patients without medication allergies (60%). The average duration of antibiotic prescription was 5-7 days (89.4%), while majority of respondents chose clindamycin as the first choice for patients with penicillin allergy (57.4%). There was statistically significant difference between the three groups regarding different situations related to the management of different endodontic emergencies.

Conclusion: This study emphasized that the three groups treated irreversible pulpal and periapical lesions differently. General dentists were prescribing antibiotics for unnecessary endodontic emergency situations compared to endodontist. The level of dentist knowledge and attitude towards antibiotic prescription for endodontic emergencies still needs to be improved.

Key words: Antibiotic prescription, Antimicrobial resistance, General dentists, Endodontists

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Corresponding author: Mengari L
e-mail ✉: lina.mengari@gmail.com
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INTRODUCTION

Antibiotics are defined as naturally occurring substances of microbial origin or similar synthetic substances that poses antimicrobial activity in low concentrations and inhibit the growth of or kill selective microorganisms. The role of antibiotic therapy is to aid the host defences in controlling and eliminating microorganisms that temporarily have overwhelmed the host defence mechanisms [1,2]. Among the several advantages of antibiotics is that they are non-injurious to tissues. Furthermore, antibiotics pose synergism which provides possibility of affecting large spectrum of bacteria, they provide reduction of time required for sterilization and they aid in rapid healing [3]. On the other hand, antibiotics do not reduce odontogenic pain or swelling derived from teeth with symptomatic apical lesion in the absence of systemic involvement signs and symptoms. Lack of blood circulation in the root canal as in necrotic teeth prevents antibiotics reaching the area, that is, they are ineffective in eliminating the microorganisms [4]. However, the major

disadvantage of systemic antibiotic overuse is building antimicrobial resistance the emergence of antibiotic-resistant bacterial strains [5].

Diagnosis and management of endodontic emergencies remain a challenge for clinicians [6]. Endodontic emergency can be defined as the pulpoperiapical pathosis associated with pain and/or with swelling which indicates unscheduled dental visit and requires immediate management. Based on the time of endodontic emergency occurrence, it can be classified into three main groups: Preoperative (dentin hypersensitivity, reversible/irreversible pulpitis, apical periodontitis, abscess, trauma and cracks), intra-appointment (pulp exposure, flare ups) and postoperative endodontic emergencies (over-instrumentation, under- or overextended root canal fillings). The cases of endodontic emergency require a clinician to have knowledge and skills for proper diagnosis, endodontic treatment, and clinical pharmacology. Understanding the biological process that causes the pain and infection can still be challenging. With a proper pulpal and periapical testing, along with the radiographic evaluation and history of the chief complaint, the clinician determine which procedure or combination

of procedures will most likely relieve the patient's pain and infection.

High incidence of endodontic emergencies was reported in recent studies which was ranging between 60-82% out of all dental emergencies. However, symptomatic irreversible pulpitis constitutes the greater number of all other emergency cases in dental clinics [7-9]. On the other hand, results of study done by Owatz et al, shows that above 50% of patients diagnosed with symptomatic irreversible pulpitis were also diagnosed by symptomatic apical periodontitis [10]. With the fact that the main chief complaint of patients in dental emergency clinic is either related to pain, swelling or trauma, majority of odontogenic pain can be eliminated successfully by dental treatment without the need for systemic antibiotics. However, Current literature shows different levels of dentists' compliance with the guidelines for endodontic practice [11].

Antibiotic resistance remains a pressing global public health problem. Unnecessary prescription of antibiotics was reported worldwide [12]. It was concluded in a recent Cochrane study that the quality of data assessing antibiotic effects of systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults are of low-quality and insufficient to determine its effects [4]. Prescription of antibiotics by dentists for localized infections without systemic signs and symptoms was also reported [13]. Although that general medical practitioners found to be prescribing antibiotics more likely, [14] approximately 10% of all antibiotic prescriptions were by dentists. This indicates that dentists are also contributing of the antimicrobial resistance problem.

There are few studies concerned about antibiotic prescription for endodontic emergencies. Therefore, the aim of the present research is to evaluate the level of knowledge and practice of dentists regarding antibiotic prescription for endodontic emergencies, and to increase awareness by improving the knowledge through providing updated review for management of endodontic emergencies.

METHODOLOGY

This is a descriptive cross-sectional study undertaken over 3 months from September to November 2019. A structured questionnaire was electronically conducted using google form then it was sent through emails to dentists working in governmental sectors, private sectors, and educational institutes. The data base of International Society of Dentists was used. The questionnaire composed of multiple-choice questions and other open-ended questions which were carefully chosen based on previous researches published in Journal of Endodontics and Journal of Endodontics [15,16].

The questions were concerning the antibiotic preference of each group for patients with or without drug allergy. It also consisted of listed situations in which the dentist had to decide where to perform certain procedures and what are the situations that they need to prescribe a specific antibiotic according to it.

Inclusion criteria

Participants must be either a general dentist, endodontists or postgraduate students.

Participants should be working/ studying at: Governmental sector, Private sector, or Educational Institute.

Participants must be able to treat emergency patients in their facilities.

Exclusion criteria

Undergraduate dental students or interns

Dentists who do not treat emergency patients at their facilities.

Any response of non-dental personnel was excluded.

Ethical approval

Consent study approval was obtained from the Institutional Review Board-IRB (research ethics committee) at Taif University.

Statistical analysis

Collected data were verified and coded before its entry to Statistical Package for the Social Science (SPSS) software version 25. Data were then analyzed by using frequency tables. Comparison between categories were done by a chi-square test of independence. Significant differences were considered when P value is below 0.05.

RESULTS

With a total number of 1500 of emails sent, 332 responses were received, and 310 responses were included (n=310) in the research as they matched the inclusion criteria. Response rate was 22.1%.

Respondents were 140 of Males and 170 of females with overall percentages of (45.2%) and (54.8%) respectively. They were classified according to specialty into three categories as follows: General Dentists (80%), Endodontists (11.3%), and Others (8.7%). They were also among the respondents there were (80%) with bachelor's degree, (0.6%) with Diplomate degree, (7.7%) with master's degree, (1.3%) were with Doctorate degree, and (10.3%) were Board certified. Respondents were mainly from Jeddah (40%), Riyadh (22.6%), and Others (37.4%). Most of the respondents (42.6%) were working in Governmental sectors. The ones working in private sectors were (35.5%) and only (21.9%) were

dentists working in educational institute but able to see patients in emergency settings. The details of demographic data are stated in Table 1.

Table 1: Demographic data.

		Count (%)
Gender	Male	140 (45.2)
	Female	170 (54.8)
Educational Level	Diploma	2 (0.6)
	Bachelor	248 (80.0)
	Masters	24 (7.7)
	Doctorate	4 (1.3)
	Board	32 (10.3)
Specialty	General Dentist	248 (80.0)
	Endodontist	35 (11.3)
	Others	27 (8.7)
Work	Governmental Sector	132 (42.6)
	Private Sector	110 (35.5)
	Educational Institute	68 (21.9)
City	Riyadh	70 (22.6)
	Jeddah	124 (40.0)
	Makkah	20 (6.5)
	Madinah	11 (3.5)
	Taif	12 (3.9)
	Dammam	11 (3.5%)
	Others	62 (20.0)

Majority of respondents chose amoxicillin as the first of choice for patients without medication allergies (60%). However, most of them (35.5%) chose the dose of 500 mg, (15.2 %) of 1 g, and (0.3%) of 750 mg. On the other

hand, majority of respondents chose clindamycin as the first choice for patients with penicillin allergy (57.4%), while clindamycin combined with metronidazole was the second most frequent choice (19.0%) (Table 2).

Table 2: Antibiotic preference for patients allergic to penicillin.

Antibiotic	Dose	Count	Column N%
Clindamycin 300 mg		178	57.40%
Azithromycin	250 mg	8	2.60%
	500 mg	22	7.10%
	1 gm	10	3.20%
Metronidazole+Spiramycin		4	1.30%
Erythromycin		16	5.20%
Lincomycin		1	0.30%
Clindamycin+Metronidazole		59	19.00%
Others	-	4	1.30%

The average duration of antibiotic prescription was 5-7 days (89.4%) and only (8.4%) chose less than 5 days and stated that the patient should take antibiotic until

symptoms subside. No statistical significance difference was found among the three groups (P>0.05).

Regarding performing incision and drainage, (68.4%) of respondents chose to perform this surgical procedure when only fluctuant cellulitis is present, while (10.0%) chose to perform incision and drainage when indurated cellulitis is present. However, (18.7%) chose to perform it

when both indurated and fluctuant cellulitis are present. Not surprisingly, low percentage of only (2.9%) chose not to perform incision and drainage whether indurated or fluctuant cellulitis is present (Table 3).

Table 3: Incision and drainage.

Specialty	None	Fluctuant Cellulitis	Indurated Cellulitis	Both	Total
General Dentist	8	163	28	49	248
	3.20%	65.70%	11.30%	19.80%	100.00%
Endodontist	0	28	1	6	35
	0.00%	80.00%	2.90%	17.10%	100.00%
Others	1	21	2	3	27
	3.70%	77.80%	7.40%	11.10%	100.00%
Total	9	212	31	58	310
	2.90%	68.40%	10.00%	18.70%	100.00%

Tables 4 and 5 illustrate the percentages of antibiotic prescription among the respondents regarding pulpal and periapical pathosis as well as some emergency situations.

In terms of continuous education and learning about endodontic emergency management, majority of

respondents attended courses related to this topic (43.2%). Thirty-eight percent of the respondents attended either a course, conference or a lecture concerning endodontic emergencies after 2015, (2.5%) attended on or before 2015, while the rest (59.5%) did not attend any educational activity (Table 6).

Table 4: Pulpal and periapical situations.

	Specialty					
	General Dentist		Endodontist		Others	
	Count	Column N %	Count	Column N %	Count	Column N %
IP; moderate/severe pre-op symptoms	35	14.10%	0	0.00%	2	7.40%
IP with SAP; moderate/severe pre-op symptoms	61	24.60%	0	0.00%	6	22.20%
NP with AAP; no swelling, no/mild pre-op symptoms	21	8.50%	0	0.00%	1	3.70%
NP with SAP; no swelling, no/mild pre-op symptoms	29	11.70%	1	2.90%	2	7.40%
NP with AAP; sinus tract present, no/mild pre-op symptoms	51	20.60%	1	2.90%	4	14.80%
NP with SAP; diffused swelling present, moderate/severe pre-op symptoms	204	82.30%	32	91.40%	23	85.20%
Previously initiated with SAP; diffused swelling present	196	79.00%	27	77.10%	20	74.10%

Table 5: Selected endodontic emergency situations.

	Specialty					
	General Dentist		Endodontist		Others	
	Count	Column N %	Count	Column N %	Count	Column N %
After replantation of Avulsed tooth	147	59.30%	22	62.90%	22	81.50%
Management of Sodium hypochlorite accident	87	35.10%	21	60.00%	9	33.30%
Management of Localized chronic abscess	87	35.10%	3	8.60%	5	18.50%
In multiple visits, as a prophylaxis to prevent flare ups after debridement of teeth with necrotic pulp	42	16.90%	2	5.70%	5	18.50%
Management of Radicular extrusion of root canal filling material	46	18.50%	0	0.00%	4	14.80%

With Perforations	65	26.20%	2	5.70%	3	11.10%
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Table 6: Continuing education in the field of endodontics.

	Count	Column N %
Attendance of a Courses/Conference/Lecture Related to Endodontic Emergencies	134	43.20%
Year of attendance of the Endodontic Emergency Course/Conference/Lecture	2019	43
	2018	48
	2017	23
	2016	4
	2015	2
	before 2015	6
Reading "AAE Guidelines on the use of systemic antibiotics in Endodontics 2017"	100	32.30%

Tables 7-12 illustrate the chi square results that show the significant differences between the three groups.

Table 7: Specialty* Incision and drainage.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.865 ^a	6	0.439	0.427		
Likelihood Ratio	7.678	6	0.263	0.314		
Fisher's Exact Test	4.929			0.501		
Linear-by-Linear Association	1.990 ^b	1	0.158	0.163	0.085	0.017
N of Valid Cases	310					

^a4 cells (33.3%) have expected count less than 5. The minimum expected count is .78.

^bThe standardized statistic is -1.411.

Table 8: Specialty * IP: Moderate/severe pre-op symptoms.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.389 ^a	2	0.041	0.035		
Likelihood Ratio	10.561	2	0.005	0.007		
Fisher's Exact Test	7.219			0.022		
Linear-by-Linear Association	3.541 ^b	1	0.06	0.063	0.031	0.018
N of Valid Cases	310					

^a2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.22.

^bThe standardized statistic is -1.882.

Table 9: Specialty* Management of Sodium hypochlorite accident.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.350 ^a	2	0.015	0.016		
Likelihood Ratio	8.065	2	0.018	0.02		
Fisher's Exact Test	8.036			0.018		

Linear-by-Linear Association	1.057 ^b	1	0.304	0.343	0.175	0.044
N of Valid Cases	310					
^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.19.						
^b The standardized statistic is 1.028.						

Table 10: Specialty* Management of localized chronic abscess.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	12.188 ^a	2	0.002	0.002		
Likelihood Ratio	14.333	2	0.001	0.001		
Fisher's Exact Test	13.152			0.001		
Linear-by-Linear Association	8.136 ^b	1	0.004	0.005	0.002	0.001
N of Valid Cases	310					
^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.27.						
^b The standardized statistic is -2.852.						

Table 11: Specialty* Management of Radicular extrusion of root canal filling material.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.838 ^a	2	0.02	0.018		
Likelihood Ratio	13.38	2	0.001	0.002		
Fisher's Exact Test	10.072			0.006		
Linear-by-Linear Association	2.534 ^b	1	0.111	0.132	0.065	0.029
N of Valid Cases	310					
^a 1 cell (16.7%) have expected count less than 5. The minimum expected count is 4.35.						
^b The standardized statistic is -1.592.						

Table 12: Specialty* With perforations.

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.595 ^a	2	0.008	0.008		
Likelihood Ratio	11.691	2	0.003	0.004		
Fisher's Exact Test	10.184			0.006		
Linear-by-Linear Association	7.104 ^b	1	0.008	0.007	0.003	0.002
N of Valid Cases	310					
^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.10.						
^b The standardized statistic is -2.665.						

DISCUSSION

Endodontic emergencies comprise one third of dental emergency cases [16]. One of the major causes of antibiotic resistance which may be lethal is the abuse of antibiotics with unnecessary prescription [17]. The emphasis on this point isn't to decrease and control the misuse of antibiotics and its resulted resistance only, but also to minimize exposing patients to unneeded side effects, to prevent potential fatal allergic reactions, to lessen unnecessary outcomes such as gastrointestinal disturbance or yeast infections in oral mucosa due to taking of certain types of antibiotic prescribed by dentists, and to preserve the economic status of health care systems [17-20]. By constricting antibiotic usage to its indications only, number of reported deaths resulting from antibiotic resistance will be decreased. Studies showed that antibiotic resistance (10 million) attributed the highest rank compared to other major causes of deaths worldwide such as cancer (8.2 million) and cholera (100,000-200,000) [21].

Up to the best knowledge of the author, the study showed lowest response rate yet the highest sample size among studies performed in Saudi Arabia 2000-2020 that only concerned about antibiotic prescription in endodontic emergencies by dentists with different professional ranks, for non-medically compromised patients. Furthermore, this study covered the groups who were working in private, governmental and educational institutes making it not limited to a single working area.

Antibiotic preference for patients with no drug allergy

Endodontic infections are polymicrobial, that involve a group of bacteria that includes Gram-positive, Gram-negative, facultative anaerobes and strict anaerobic bacteria. Multiple surveys performed in Saudi Arabia showed that systemic antibiotics were unnecessarily prescribed in dental practice [22-30]. Other studies with relatively large sample size also reported antibiotic abuse among dental patients [31,32]. In the present study, (41%) of respondents chose amoxicillin combined with clavulanic acid (CA) as their first choice which is comparable to other study done in Saudi Arabia [25]. Surprisingly, our results showed that (34.3%) Endodontists preferred amoxicillin with CA over amoxicillin alone, (40.7%) for GPs, and (40.7%) for Others. Unlike our study, the drug of choice for respondents of a study done in Turkey was Amoxicillin with CA 61.8% while the second drug of choice was Amoxicillin alone 46.5% [19]. It was suggested to not prescribe antibiotics in case of chronic apical periodontitis with sinus tract, acute apical abscess or pulp necrosis without systemic involvement besides irreversible pulpitis [33,34]. However, new recommendations of AAE 2019, stated that conditionally the dentist can prescribe systemic antibiotic to immunocompetent adult for pulp necrosis and localized acute apical abscess [35]. A 3-D approach was proposed by Fransisco *et al*, which basically consists of first D stands for the Differential diagnosis, the Second D stands

for the Definitive treatment and the third D stands for the systemic Drugs managing pain and infections [36].

Antibiotic preference for patients with penicillin allergy

About (30%) only of American Association of Endodontics (AAE) members preferred to prescribe clindamycin for allergic patients in 2000 [37]. However, in 2016, the percentage increased significantly to be over (95%) [38]. Our results showed that the first drug of choice for patients with penicillin allergy was clindamycin (57.4%) while the second drug of choice was the combination of clindamycin with metronidazole (19%). Endodontists primarily preferred clindamycin for allergic patients (74.3%) over the combination of it with metronidazole (5.7%). Similarly, GPs preferred clindamycin (56%) over the combination (21.8%). However, erythromycin was the second drug of choice for dentists with Other specialties (18.5%). It is strongly recommended that every dentists or dental student to update their knowledge regarding guidelines of antibiotic prescription in Saudi Arabia that was introduced by Ministry of Health (MOH) in 2018 and meets the AAE guidelines [39,40].

Duration

The key to treat endodontic infection is to perform adequate debridement and drainage of the infected tooth and soft tissues. Therapies lasting for 7 days using amoxicillin showed increase in antibiotic resistance rate [18]. Improvement in clinical symptoms must be the guide for the duration of antibiotic treatment. It is worth mentioning that antibiotics are not indicated also in certain traumatic cases such as tooth fractures, concussion, subluxation, luxation and intrusions [33,18].

Incision and drainage

It worth noting that incision and drainage is preferred by some authors when both fluctuant and indurated cellulitis were present [6] Our findings showed that there was no statistical significance among the three groups in regard to incision and drainage procedure as an endodontic emergency case. ($P > 0.5$).

Antibiotic prescription for pulpal and periapical pathosis

In this research, we compared between the three groups in terms of their decision of antibiotic prescription for specific pulpal and periapical pathosis situation. In the situation of irreversible pulpitis alone with irreversible pulpitis with periapical periodontitis, none of the endodontists prescribed antibiotics, while both GPs and Other specialist preferred to prescribe systemic antibiotic for this situation with presence of statistically significant difference between the three groups.

Majority of three groups preferred to prescribe antibiotic for the 2 situations of: 1. Necrotic pulp with symptomatic apical periodontitis; diffused swelling present, with moderate or severe pre-op signs and symptoms. 2.

Previously initiated with symptomatic apical periodontitis; diffused swelling present. No statistically significant difference was found ($P>0.05$). There were only 35 (14.1%) general dentists who preferred to prescribe systemic antibiotics for pulpitis condition while none of the endodontists preferred systemic antibiotics for irreversible pulpitis alone. In contrary to our study, a survey done by Vasudavan et al showed that 48% of general dentists would prescribe antibiotics for management of irreversible pulpitis pain. With regards to chronic apical periodontitis when sinus tract/fistula is present, only 2.9% of endodontists in our study prescribed antibiotics for management of this infection [41]. However, in a study done to assess antibiotic prescription for infections of endodontic origins by Brazilian endodontists, the study showed that 38.3% of endodontists preferred systemic antibiotic prescription for treatment of necrotic pulp with chronic apical periodontitis; when fistula is present and patient has no pain. [42].

Antibiotic prescription for certain endodontic emergencies

In endodontic trauma cases, replantation of avulsed permanent tooth/teeth requires antibiotic prescription

as a prophylaxis [33]. In our study, we compared the three groups in regard to prescription of antibiotics after replantation of avulsed tooth/teeth and the majority of all groups preferred to prescribe antibiotic in this situation with no statistical difference found. Similar to our findings, another study done in KSA showed that over 80% of general dentists preferred to prescribe antibiotics for management of avulsed teeth [43]. Antibiotic treatment after replantation was also recommended by most of the participants in the study done in Saudi Arabia by AlJazairy et al. [44].

Furthermore, no statistical difference was found among the groups regarding antibiotic prescription for the situation of multiple visits, as a prophylaxis to prevent flare ups after debridement of teeth with necrotic pulp. All the groups preferred not to prescribe systemic antibiotic in this situation. Moreover, there was a statistical significant difference among the groups in the following situations: Management of Sodium hypochlorite accident, Management of Localized chronic abscess, Management of Radicular extrusion of root canal filling material, with Perforations. Tables 13-16 illustrate the attitude of each group towards antibiotic prescription in the mentioned endodontic emergency situations.

Table 13: Management of Sodium hypochlorite accident.

Specialty	Count	Total
General Dentist	87	248
	35.10%	100.00%
Endodontist	21	35
	60.00%	100.00%
Others	9	27
	33.30%	100.00%
Total	117	310
	37.70%	100.00%

Table 14: Management of localized chronic abscess.

Specialty	Count	Total
General dentist	87	248
	35.10%	100.00%
Endodontist	3	35
	8.60%	100%
Others	5	27
	18.50%	100%
Total	95	310
	30.60%	100%

Table 15: Management of radicular extrusion of root canal filling material.

Specialty	Count	Total
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	46	248
General Dentist	18.50%	100.00%
	0	35
Endodontist	0.00%	100.00%
	4	27
Others	14.80%	100.00%
	50	310
Total	16.10%	100.00%

Table 16: With perforation.

Specialty	Count	Total
General Dentist	65	248
	26.20%	100.00%
Endodontist	2	35
	5.70%	100.00%
Others	3	27
	11.10%	100.00%
Total	70	310
	22.60%	100.00%

None of the above-mentioned data was conducted aiming to compare who was more accurate in answering questions among the three groups or to make the answers definite as guidelines. The major goal of it was to encourage dentists to read and stay updated whether through courses or reading literatures.

Pain and antibiotics

Many studies showed that dentists as well as endodontists were prescribing antibiotics for pain management [18]. Systemic antibiotics are not effective in terms of treating pain related to irreversible pulpitis or treating symptomatic apical periodontitis as well as localized acute apical abscess in case of adequate debridement of both soft and hard tissues. Interestingly, some studies showed that over 16% of endodontists prescribed antibiotic for irreversible pulpitis as a management [45-47]. In our study, none of the endodontists prescribed antibiotic to manage pain caused by irreversible pulpitis.

In the light of the findings, it is recommended that

All dentists should focus on continuing education with increased emphasis on local regulations for antibiotic prescription and indications specially that pulpal pain requires no antibiotic intervention.

It is suggested that educational institutes to perform evaluation of senior dental students before graduation concerning their attitude towards antibiotic prescription general, and for endodontic emergencies specifically.

Health care institutes are encouraged to increase patient education through lectures, or messages through electronic systems and printed pamphlets to facilitate access to information.

CONCLUSION

This study emphasized that the three groups treated irreversible pulpal and periapical lesions differently. General dentists were prescribing antibiotics for unnecessary endodontic emergency situations compared to endodontist. The level of dentist knowledge and attitude towards antibiotic prescription for endodontic emergencies still needs to be improved.

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