

# Evaluation of General Dentists' Attitude in Sanandaj Regarding Antibiotic Prescription in Root Canal Treatment and Related Factors

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## ABSTRACT

**Background and Aim:** One of the main concerns in dental society is the enormous prescription of antibiotics. Unnecessary prescription of antibiotics causes resistant bacterial species. The aim of this study was to evaluate the attitude of dentists toward antibiotic prescription in endodontic treatments and the role of related factors. The study was conducted in Sanandaj city, Kurdistan province, Iran, in 2017.

**Materials and Methods:** This quantitative cross-sectional study involved active dentists in Sanandaj city. Their attitude toward antibiotic prescription was evaluated using 20 questions (10 in favor of prescribing antibiotics and 10 against it) with the following options: "totally agree, agree, disagree, and totally disagree". The role of related factors including age, sex, work experience, level of interest in endodontic treatments, and the number of endodontic cases, were analyzed by Chi-square test.

**Results:** The study was conducted on 145 dentists (72.5% males and 27.5% females) in Sanandaj city. The mean age of the participants was 39±11 years, and their mean work experience was 13±8 years. 7.5±0.9% of the dentists chose the "totally agree" option, and 92.5±1.1% of them chose the "agree" option regarding antibiotic prescription in endodontic treatments.

**Conclusion:** It seems that the positive attitude towards antibiotic prescription in endodontic treatments was satisfactory among the studied dentists.

**Keywords:** Anti-Bacterial Agents, Dentists, Bacteria, Dental Care, Societies

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## Introduction:

One of the concerns of the dental community is the uncontrolled administration of antibiotics.

<sup>(1)</sup> Uncontrolled consumption of antibiotics eventually leads to a growing number of microbial resistance around the world.<sup>(2)</sup> Over time, resistant

around the world.<sup>(2)</sup> Over time, resistant genes are transmitted from a resistant species to other microorganisms, resulting in the inactivation of antibiotics for therapeutic and prophylactic uses, which is extremely worrying. In addition to microbial resistance, uncontrolled antibiotic

consumption causes other complications such as simultaneous infections, mutations, digestive problems, skin rashes, and anaphylaxis.<sup>(3,4)</sup>

Recent studies have shown that in some countries, more than 84% of dentists prescribe antibiotics despite a lack of clinical indication.<sup>(5)</sup> On the other hand, according to the Centers for Disease Control and Prevention (CDC), one-third of antibiotics prescribed for patients is unnecessary. Studies conducted in Kuwait, Greece, Yemen, Uganda, Saudi Arabia, and Jordan have shown that dentists' attitudes regarding antibiotic prescription were inappropriate.<sup>(6,7)</sup> Therefore, it is necessary to recognize the attitude of the medical and dental community regarding antibiotic prescription so that, if necessary, effective measures can be taken to increase their awareness and improve their attitude.

According to studies conducted in Iran, the highest rates of antibiotics are prescribed by dentists, followed by ophthalmologists and general practitioners.<sup>(2)</sup> On the other hand, recent studies in Iran have shown that the administration of antibiotics has little adaptation with instructions.<sup>(2)</sup> Therefore, considering the controversial statistics regarding knowledge and attitude toward antibiotic prescription and the information gap, this research was conducted to investigate the attitude of dentists regarding the use of antibiotics in root canal treatments and to evaluate the role of related factors. The study was conducted in Sanandaj city in 2017.

### Materials and Methods

In this quantitative cross-sectional research, data were collected through interviews and questionnaires. Active dentists in Sanandaj city, Kurdistan province, Iran, were consulted by referring to their workplace. After explaining the study plan and obtaining their consent for cooperation, their attitude towards antibiotic prescription in root canal therapy was evaluated by the interviewer.

The dentists' attitudes were graded based on the Likert scale, which is a psychometric scale commonly involved in research that employs questionnaires with 20 questions and the "totally

agree, agree, disagree, and totally disagree" options (Figure 1). The questionnaire was read by the dentists. They expressed their attitude using the four options mentioned above. The minimum score was 20, and the maximum score was 80. The scores 20 or less are indicative of "totally disagree", 20-40 are indicative of "disagree", 40-60 indicate "agree", and scores higher than 60 are indicative of "totally agree". The role of related factors, including age (higher than the mean and below the mean), sex, interest in root canal therapy, the number of root canal therapies performed in the office, and work experience (higher and lower than the mean), was assessed using Chi-square test.

Figure 1. The questionnaire distributed among the dentists

Questions	Totally Agree	Agree	Disagree	Totally Disagree
<u>1-</u> Because pain may be a sign of infection, if you have pain before your endodontic treatment ,I will prescribe antibiotics	4	3	2	1
<u>2-</u> With the onset of trauma and the exposure of the tooth pulp, there is a potential for contamination of the pulp, however, I do not prescribe antibiotics	1	2	3	4
<u>3-</u> Since the patient sees pain as a sign of infection and considers lack of prescription of antibiotics as an error by the dentist, I prescribe antibiotics for his satisfaction	4	3	2	1
<u>4-</u> Periapical lesions represent infection, however, I do not prescribe antibiotics	1	2	3	4
<u>5-</u> The patient's pain after completing the obturation session indicates that the canal is not completely cleared and some tissue remains in the canal. Therefore, I prescribe antibiotics to prevent recurrence of infection.	4	3	2	1
<u>6-</u> Although calcium hydroxide is not an antibiotic, I do not prescribe an antibiotic between sessions	1	2	3	4
<u>7-</u> Vital tooth is a good environment for the spread of infection, so I will prescribe antibiotics for treatment	4	3	2	1
<u>8-</u> Vital teeth have the power to interact with infection, so I do not prescribe antibiotics to treat them	1	2	3	4
<u>9-</u> The existence of a fistula indicates the presence of germs and the continuous production of pus, therefore, I prescribe antibiotics to treat it	4	3	2	1
<u>10-</u> Localized swelling prior to endodontic treatment indicates infection, but does not require antibiotics	1	2	3	4
<u>11-</u> Any accident during treatment can cause the germ to enter the PDL. So, I prescribe antibiotics	4	3	2	1
<u>12-</u> In Avulsion, I first wash the tooth and then put it in the socket, so there is no need to prescribe antibiotics	1	2	3	4
<u>13-</u> The presence of diffuse swelling prior to endodontic treatment is indicative of progressive infection, and I prescrib antibiotics	4	3	2	1
<u>14-</u> By doing drainage there is a way to pus extrusion, Therefore, there is no need to prescribe antibiotics	1	2	3	4
<u>15-</u> In one session treatment, there is still an inflammatory tissue around apex, so I will prescribe antibiotics for treatment	4	3	2	1
<u>16-</u> Although Gutta-percha is a foreign body, I do not prescribe antibiotics following gutta extrusion from root canal	1	2	3	4
<u>17-</u> If there is a necrotic pulp without swelling, I will prescribe antibiotics to reduce the chance of recurrence of infection	4	3	2	1
<u>18-</u> In endodontic surgeries, the root end and surrounding tissues expose and cause the patient to be in risk of infection, however, I do not prescribe antibiotics after endodontic surgeries	1	2	3	4
<u>19-</u> The presence of diffuse infection in facial spaces indicates the need to combine two antibiotics (amoxicillin-metronidazole)	4	3	2	1
<u>20-</u> Since dental infections are multi-microbial, it is advisable to initiate broad-spectrum antibiotics	4	3	2	1

**Results:**

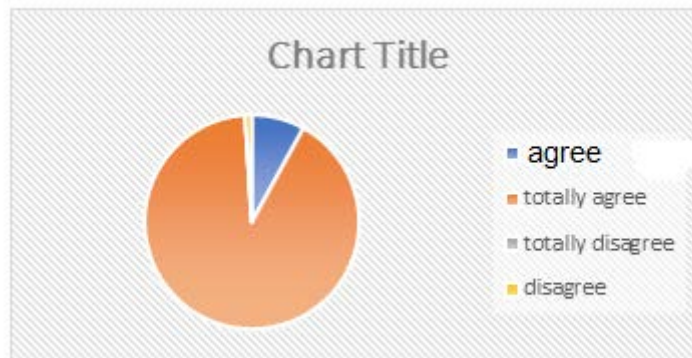
Data collection was based on three groups of questionnaires, including the personal profile of the dentists and their attitude toward antibiotic prescription. The total number of dentists was 150 with 150 completed questionnaires. However, because of the lack of access to 5 people (2 specialists and 3 general dentists) who did not succeed in interviewing, 145 dentists (99 men and 51 women) were assessed, including 134 general dentists and 16

specialists. The distribution of the dentists according to their attitude toward antibiotic prescription is presented in Figure 2, which shows that 11 dentists (7.5±0.9%) had the “totally agree” attitude, and 134 dentists (92.5±1.1%) had the “agree” attitude. The “disagree” and “totally disagree” attitudes were not noted. The distribution of the dentists according to the “totally agree” and “agree” attitudes is presented in Table 1.

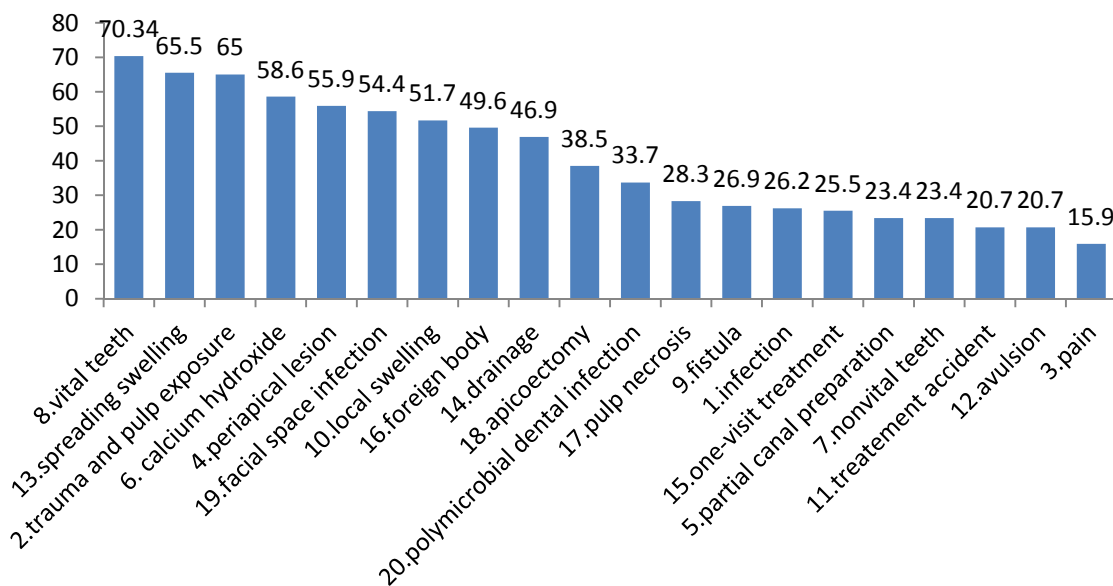
**Table 1: Distribution of 145 dental practitioners in terms of the “totally agree” and “agree” attitudes toward antibiotic prescription**

Related Factors	Attitude				Test Result	OR
	Totally Agree (11)	Agree (134)	Disagree	Totally Disagree		
Sex:						
Male	8(72%)	86(64%)	-	-	P=0.5	-
Female	3(28%)	48(36%)	-	-		
Age:						
Higher than the mean	5(46%)	57(43%)	-	-	P=0.9	-
Lower than the mean	6(54%)	77(57%)	-	-		
Work experience:						
Higher than the mean	4(37%)	50(38%)	-	-	P=0.9	-
Lower than the mean	7(63%)	84(62%)	-	-		
Interest in root canal therapy:						
High	6(54%)	104(77%)	-	-	P=0.08	-
Low	5(46%)	30(23%)	-	-		
Number of endodontic cases:						
High	5(45%)	91(70%)	-	-	P=0.4	-
Zero or low	6(55%)	43(30%)	-	-		
Education level:						
Specialist	2(28%)	12(9%)	-	-	P=0.4	-
General dentist	9(82%)	122(91%)	-	-		

**OR=Odds Ratio**



**Figure 2. Distribution of 145 dentists according to their attitude toward antibiotic administration in root canal therapy**



**Figure 3. Distribution of 145 dentists according to the “totally agree” and “agree” at titudes toward antibiotic administration**

**Discussion:**

The present research showed that the attitude of dentists in Sanandaj city is either "totally agree" (7.5%) or "agree" (92.5%) regarding antibiotic prescription. The "totally agree" and "agree" attitudes indicate the correct administration of antibiotics. The related factors (age, sex, level of interest in root canal therapy, the number of root canal therapies performed, work experience, and being a specialist or a general dentist) did not affect the attitude of the dentists.

Antibiotics are commonly used in dental practice for treatment and prevention of infection. We depend on their efficacy as clinicians and as consumers. The conscientious use of antibiotics is imperative for all practitioners, especially when considering the rapid development of antibacterial resistance and its consequences. Data reported from different countries indicate differences in the dentists' knowledge of clinical situations indicated for antibiotics. Almost half or more of the dentists investigated in England, Kuwait, and Turkey, would prescribe antibiotics for dry socket.<sup>(5)</sup> Another non-indicated condition is localized swelling, which was also among the conditions for which antibiotics were prescribed in Norway, South Australia, Kuwait, and England.<sup>(5)</sup> On the other hand, the figures for England show that antibiotic prescription for drainage of a dental abscess has doubled from just under 800 cases in 1998 to almost 1600 cases in 2006.<sup>(5)</sup>

Iqbal evaluated the attitudes of dentists towards the prescription of antibiotics during endodontic treatment in the north of Saudi Arabia.<sup>(8)</sup> It was reported that 77% of antibiotic prescription was for necrotic pulp with acute apical periodontitis, swelling, and moderate to severe preoperative symptoms, whereas 59% was for necrotic pulp with acute apical periodontitis, no swelling, and moderate to severe preoperative symptoms, which shows an over-use of antibiotics for this condition. In addition, 46.6% of antibiotic prescription was for necrotic pulp with chronic apical periodontitis, sinus tract, and no or mild preoperative symptoms. 27.3% of the dentists prescribed antibiotics for irreversible pulpitis with moderate to severe preoperative symptoms, which is totally unjustified and unnecessary.<sup>(8)</sup>

In our study, 70.3% of the dentists had "agree" and "totally agree" attitudes toward prescription of antibiotics for vital teeth. It would have been

better to compare related factors such as age, sex, work experience, and being a specialist or a general dentist, as well as their relevance to the prescription of antibiotics.

A study by Alkhabuli et al about the knowledge and attitude of Northern Emirates dental practitioners towards antibiotic prescription and its resistance showed that antibiotic prescription would be considered for pericoronitis (76.0%), cellulitis (90.9%), trismus (47.4%), pulpitis (26.3%), and endodontic surgery (71.9%).<sup>(9)</sup> These results show a high percentage of antibiotic prescription in endodontic surgery, which is unnecessary.

A similar study by Demirbas et al that examined the attitude of 186 dentistry attendees at the 50th annual dentistry congress of the country in the spring of 2010 showed that in total, 55% of the attitudes were "totally disagree" and "disagree", and 45% of the attitudes were "agree" and "totally agree".<sup>(10)</sup> For a positive attitude, there were no significant differences in terms of work experience, age, and interest in endodontic treatment.<sup>(10)</sup> The results of the cited study showed that the attitude of the participating dentists was not ideal. There were limitations in the mentioned research. For example, from 500 questionnaires, 186 were returned, which shows that the final result was not indicative of the attitude of all the participants. The positive aspects were that the items were determined based on the reference book, and in fact, the questionnaire was valid. We also used these items in our research. In contrast to our study, the most "agree" attitude in the cited study was with regard to the spread of swelling.<sup>(10)</sup>

Yaghini et al evaluated the attitudes and performance of general dentists in Isfahan regarding the administration of antibiotics for periodontal diseases.<sup>(11)</sup> A questionnaire, containing 9 attitude-related questions and 7 performance-related questions, was distributed among 140 dentists. The participants considered the systemic conditions before the antibiotic prescription. 70% of the attitudes were "agree" and "totally agree". With the history of fever, dentists prescribed antibiotics in more than 84% of the cases.<sup>(11)</sup> In our study, this rate was 54.4%. More than 60% of the dentists prescribed antibiotics for simple surgeries.<sup>(11)</sup> In our study, the rate of correct attitude was



38.5%. In response to the question regarding the antibiotic spectrum, about 80% of the dentists chose the “disagree” option, reflecting the participants’ correct attitude. Excessive use of broad-spectrum antibiotics increases the probability of bacterial resistance. The correct attitude was rated to be 33.7% in our research. In the mentioned study, more than 95% of the dentists chose the “disagree” option in response to the patient’s request for antibiotic prescription.<sup>(11)</sup> In our study, 92% of the subjects had the correct attitude. The limitations of the cited study were the small sample size and non-classification of the dentists based on age and work experience.

Mazaheri et al assessed the awareness of dentists about the administration of antibiotic prophylaxis for prevention of bacterial endocarditis.<sup>(12)</sup> The highest indication was related to surgery, suggesting the importance of prophylaxis in more invasive treatments, followed respectively by endodontic treatment, periodontal treatment, and reparative dentistry, which can be explained by the more conservative nature of the treatments.<sup>(12)</sup>

Tabrizzadeh and Alijani assessed the antibiotic prescription among general dentists in Yazd.<sup>(13)</sup> Questionnaires on the type and indications of antibiotics were distributed among 73 general dentists who participated in a retraining session. 14% of the dentists prescribed antibiotics in case of irreversible pulpitis, 21% in case of pulp necrosis, and 48% in case of a sinus tract, which resulted in a high percentage of inappropriate and unnecessary antibiotic prescription by the dentists.<sup>(13)</sup> In the abovementioned study, due to the lack of writing the medical history and the details of symptoms, the interpretation of the information has had unwanted limitations. In addition, some dentists did not answer some of the questions. The positive aspect of the cited study was that the questions were designed in such a way as to provide a variety of information about the study objectives.

In a relatively similar study by Zadik and Levin conducted in Israel, Eastern Europe, and Latin America in 2007, it was reported that 46% of the dentists prescribed antibiotics after third molar surgery.<sup>(14)</sup> The students of Latin America were more likely to prescribe

antibiotics than students in other countries. The cited research was not attitude-based.<sup>(14)</sup>

A similar study by Kakoei et al was conducted in Iran in 2006, and 113 questionnaires were completed by dentists participating in a specialized congress.<sup>(15)</sup> It was reported that 72% of the participants in the congress prescribed antibiotics for fever, and 88% prescribed antibiotics for prominent and diffuse masses.<sup>(15)</sup> In our research, about 98% of the dentists had the correct attitude, similar to the mentioned study. The limitation of the mentioned study was the small number of the participants, indicating the need for further work. Although further research is needed, accumulative evidence suggests that dental practitioners’ knowledge about the use of antibiotics is far from ideal. Rational antibiotic prescription, based on thorough knowledge, is an important objective. This can be achieved by the regular participation of dentists in the continuing dental education courses in the field of antibiotic prescription, by effective communication between microbiologists and practitioners, and by reevaluation and standardization of the instructions regarding antibiotic prescription. In addition, greater emphasis on the training of students about antimicrobial agents could be beneficial.<sup>(15,16)</sup>

In 2004, Salako et al conducted a similar study in Kuwait.<sup>(17)</sup> Two-hundred questionnaires were distributed among dentists of six dental health centers. Ninety percent of the respondents prescribed antibiotics with evidence of systemic involvement, massive disseminated mass, or inflammation in the proximity of the eye.<sup>(17)</sup> The problem with the abovementioned study was that some dentists referred to books and articles for antibiotic prescription. In our research, antibiotic prescription rates were 54.4% for spreading swelling and 15.9% for patient satisfaction.

One of the problems with the present research was that the 20 questions that were used to evaluate the attitudes of dentists about the use of antibiotics were associated with the same grades, while some questions were worth more. It is advisable to determine the exact scores for each of these questions so that the attitudes of dentists can be more accurately assessed. Of course, this requires more research, which is better to be included in another study. On the other hand, dentists may not answer the questions honestly; they may respond to the questions according to the scientific

principles and act differently in practice.

We included some positive aspects in the present study. Most previous studies have evaluated the knowledge (the initial phase) of dentists. In this research, the attitude (accumulated knowledge) was evaluated, which is followed by the action. It has also been tried to get more reliable results by responding to the questions in person and by avoiding bias.

Nonetheless, it is worrying to see a considerable percentage of practicing dentists still prescribing antibiotics even if they are uncertain of the diagnosis or the patients' demand. This trend of antibiotic abuse is common and well-reported. Although various excuses have been put forward to explain such practices, including dentists working in crowded clinics or lack of time, dental practitioners need to bear in mind the related adverse effects on the long run.

### Conclusion:

According to the results, it seems that the positive attitude towards antibiotic prescription in endodontic treatments was satisfactory among the studied dentists.

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