

Assessment of Antibiotic Prescription Patterns amongst Dental Practitioners: A Cross-Sectional Study

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Abstract:

Background: The most common prescribed medicines by dentists are the antibiotics along with analgesics. Antibiotics are a safe drug that only attacks microbes, and there is no direct effect on the host. Patients seeking dentists for treatment of endodontic infections often expect an antibiotic prescription, and it is often seen that there is an increasing habit of prescribing antibiotics which is totally inappropriate.

Materials and Methods: The study consisted of registered dental practitioners selected from six different private dental institutions in Karachi. They included graduates and post-graduates. A total of 400 questionnaires were distributed, out of them 350 filled questionnaires were returned, so a total of 350 remained for analysis. The collected data were analyzed by using Chi-square test SPSS 19 version.

Results: The data collected from the questionnaires were analyzed which showed that male respondents were 133 and 217 female respondents. The most frequent antibiotic prescribed was augmentin 92.3% (625 mg for 7 days) followed by metronidazole 92%, amoxicillin 84.1%, vibramycin 61%, cefalaxin 37.1% and clindamycin 36%. Respondents with post-graduate degree were the most frequent found in prescribing antibiotics in pulpitis (100%) whereas 65% of respondents with BDS degree prescribed antibiotics in pulpitis.

Conclusion: The current study concludes that there is a lack of prescribing antibiotics in endodontic infections amongst dentists working in teaching institutes.

Key Words: Antibiotic prescription, endodontic infections, irreversible pulpitis

Introduction

The most common prescribed medicines by dentists are the antibiotics along with analgesics. Antibiotics are a safe drug

that only attacks microbes, and there is no direct effect on the host.¹⁻³ Patients seeking dentists for treatment of endodontic infections often expect an antibiotic prescription and it is often seen that there is an increasing habit of prescribing antibiotics which is totally inappropriate.⁴ Side effects, resistance to bacteria and the rise of multi-resistant bacteria are increasing problems.⁵ Dentists often prescribe antibiotics lacking the knowledge regarding specific indications.^{6,7} Antibiotic resistance to bacteria nowadays has been a challenging issue for the dentists because these bacteria are resistant to all types of antimicrobial agents since these introduced in the market.^{8,9} Resistance is often developed when the dentists prescribe antibiotics inappropriately by wrong administration route, dosage and time duration.^{10,11} These resistant strains when once appear to the affected individual causes serious health problems and when whole community is affected, more expensive antibiotics are prescribed.¹² This increasing resistance problems developed is related to over or misuse of broad spectrum antibiotics. Today we have reached a stage where bacterial species are resistant to the full range of antibiotics presently available, with the methicillin-resistant *Staphylococcus aureus* being the most widely known example of extensive resistance.¹³ It is generally agreed that more the antibiotics prescribed; the more difficult would be the selection of the appropriate antibiotics and resistant strains began to emerge. Therefore, detailed and extensive information on antibiotic utilization has gained interest in many communities, and the antibiotic consumption measurement is increasingly being recognized as an important factor of monitoring emerging resistance.¹⁴ In spite of the effectiveness of antibiotics, treatment of endodontic infections can be achieved by mechanical and chemical cleaning of the root canal.¹⁵⁻²² Endodontic pain alone is not an indication for antimicrobial treatment. Endodontic infections can be managed without an antibiotic prescription.^{23,24} The most common problem encountered in decision making is the prescription of antibiotics, suitable for a particular clinical condition. Misuse of antibiotic prescription in dentistry may predispose secondary and super infections and may cause the drugs to be ineffective against potentially fatal infectious diseases.²⁵ It is seen that knowledge of prescribing antibiotics varies in different countries. A study in Australia reported a good knowledge of antibiotic prescription,¹ study results from Yemen showed considerable differences amongst dentists.¹⁴ The Norwegian study results showed that 5% of the dentists are prescribing

antibiotics more than 5 times a week and 32% of the dentists did not prescribe antibiotics.²⁶

The objective of the study is to analyze the knowledge and habits of dental practitioners prescribing antibiotics in endodontic infections.

Materials and Methods

Study type

Descriptive cross-sectional study.

Study population

The study consisted of registered dental practitioners selected from six different private dental institutions in Karachi. They included graduates and post-graduates. The research was approved by Ethical Committee, Baqai Medical University. A questionnaire was designed to investigate the habits of dentists in prescribing antibiotics in endodontic infections (Figure 1). A total of 400 questionnaires were distributed, out of them 350 filled questionnaires were returned, so a total of 350 remained for analysis. The respondents were asked about their academic qualification, their preferred antibiotics prescription in endodontic infections and in which endodontic infections they prescribe antibiotics. The antibiotics were prescribed for 3 days, 5 days, 7 days, and 10 days with different dosages.

Statistical analysis

The collected data were analyzed by using Chi-square test SPSS 19 version.

Result

A total of 400 questionnaires were distributed in six different institutions in Karachi, out of them 350 were returned and fully filled (Appendix 1). The data collected from the questionnaires were analyzed which showed that male respondents were 133 and 217 female respondents. Table 1 shows the description of respondents with their academic qualification. Table 2 shows different antibiotics prescribed with dosages and duration. The most frequent antibiotic prescribed was augmentin 92.3% (625 mg for 7 days) followed by metronidazole 92%, amoxicillin 84.1%, vibramycin 61%, cefalaxin 37.1% and clindamycin 36%. Table 3 shows the most frequent prescribed antibiotics with their respective dosage. Table 4 shows percentages of respondents who prescribed antibiotics in various endodontic infections. Respondents with post-graduate degree were the most frequent found in prescribing antibiotics in pulpitis (100%) whereas 65% of respondents with BDS degree prescribed antibiotics in pulpitis (Table 5).

Discussion

The present study was done to evaluate the knowledge of dentists prescribing antibiotics in endodontic infections. The overall response rate from respondents was 84%, these include BDS, FCPS, MSc, and MCPS.

Irreversible pulpitis is a painful condition which is managed by pulpotomy or pulpectomy and there is no need for prescribing antibiotics.²⁷ The results showed that 36.2% of respondents prescribed antibiotics in pulpitis and 56.2% in irreversible pulpitis moderate/severe. BDS was found to be the most prominent in prescribing antibiotics in pulpitis and irreversible pulpitis moderate/severe as compared to FCPS, MSc, and MCPS. Our study results differ from the study conducted in 1990 which reported that 4-15% of respondents prescribed antibiotics in irreversible pulpitis.²⁷ Results of a survey conducted in 2010 showed that only 2% of respondents prescribed antibiotics in irreversible pulpitis.²⁸ This percentage was much lower than the studies conducted in Turkey (60%),²⁹ Kuwait (20%),³⁰ England (13%),⁷ and USA (17%).³¹

The treatment of periradicular pathosis involves debridement of the necrotic pulp tissue and disinfection of the root canal. Antibiotics are prescribed to prevent further spread of infection and resolves inflammation. Segura-Egea *et al.* reported that

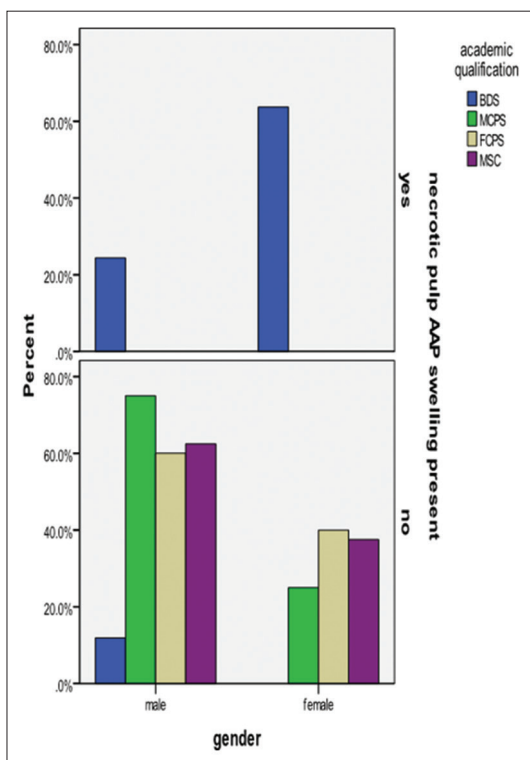


Figure 1: Percentage of antibiotic prescription in clinical condition by graduate and post-graduate.

Table 1: Description of respondents.

Variables	Percentages (%)
Gender	
Male	133 (38)
Female	217 (62)
Academic qualification	
BDS	328 (93.7)
FCPS	10 (2.9)
MSc	08 (2.3)
MCPS	04 (1.1)

Table 2: Prevalence of antibiotic prescription in endodontic infections.

Antibiotics	Percentage
Augmentin	
625 mg for 3 days	4.6
375 mg for 5 days	2
625 mg for 5 days	92.3
625 mg for 7 days	0.9
625 mg for 10 days	0.3
Amoxicillin	
250 mg for 3 days	4.4
500 mg for 3 days	7.2
1 g for 3 days	0.4
250 mg for 5 days	2.4
500 mg for 5 days	84.1
1 g for 5 days	0.4
500 mg for 7 days	0.8
500 mg for 10 days	0.4
Metronidazole	
200 mg for 3 days	0.6
400 mg for 3 days	2.8
200 mg for 5 days	2.5
400 mg for 5 days	92
400 mg for 7 days	1.6
Vibramycin	
100 mg for 3 days	61
200 mg for 3 days	2.4
100 mg for 5 days	31.7
100 mg for 7 days	4.9
Clindamycin	
150 mg for 3 days	9.1
300 mg for 3 days	31.8
150 mg for 5 days	18.2
300 mg for 5 days	36.4
150 mg for 7 days	4.5
Cefalaxin	
250 mg for 3 days	17.1
500 mg for 3 days	28.6
250 mg for 5 days	14.3
500 mg for 5 days	37.1
500 mg for 5 days	2.9

Table 3: Percentage of antibiotics most frequent prescribed.

Augmentin	92.30%
	625 for 5 days
Metronidazole	92%
	400 mg for 5 days
Amoxicillin	84.10%
	500 mg for 5 days
Vibramycin	61%
	100 mg for 3 days
Cefalaxin	37.10%
	500 mg for 5 days
Clindamycin	36.40%
	300 mg for 5 days

31% of the respondents prescribed antibiotics in necrotic pulp, chronic apical periodontitis (CAP), no swelling, 71% prescribed antibiotics in acute apical periodontitis (AAP) moderate/severe/no swelling, 60% prescribed antibiotics in necrotic pulp CAP with sinus tract and 95% prescribed antibiotics in necrotic pulp, AAP moderate/severe/swelling.³²

Table 4: Percentage of antibiotics prescribed in various clinical conditions.

Endodontic infections	Percentage
Pulpitis	36.2
Irreversible pulpitis moderate/severe	56.2
Irreversible pulpitis AAP moderate/severe	55.1
Necrotic pulp CAP no swelling	24.9
Necrotic pulp AAP no swelling	59.1
Necrotic pulp CAP sinus tract	64
Necrotic pulp AAP swelling present	76

AAP: Acute apical periodontitis, CAP: Chronic apical periodontitis

Table 5: Antibiotic prescription by dentists in various endodontic infections.

Clinical conditions	Percentage of antibiotics prescribed			
	BDS	FCPS	MSc	MCPS
Pulpitis	35.4	100	100	100
Irreversible pulpitis moderate/severe	65.4	0	0	0
Irreversible pulpitis AAP moderate/severe	64	0	0	0
Necrotic pulp CAP no swelling	22.3	100	100	100
Necrotic pulp AAP no swelling/mild/moderate	68.6	0	0	0
Necrotic pulp CAP sinus tract	74.4	0	0	0
Necrotic pulp AAP swelling present	88.1	0	0	0

AAP: Acute apical periodontitis, CAP: Chronic apical periodontitis

This study showed similar results when compared to the present study which reported that 76.6% of the respondents prescribed antibiotics in necrotic pulp AAP swelling present followed by 64% in necrotic pulp CAP sinus tract, 59.1% in necrotic pulp CAP no swelling and 24.9% in necrotic pulp CAP no swelling (Figure 1).

Endodontic infections require 2-7 days or less to resolve particularly if the cause is eliminated. Proper dosage and time duration of antibiotics are important when there is evidence that host defences gained control of infection and infection is resolved, antibiotics should be discontinued.^{31,33} A 6-7 days course would probably be appropriate for most endodontic infections.³⁴ The most common prescribed antibiotics in this present study was amoxicillin + calvulanic acid (augmentin). 98.5% BDS prescribed augmentin 625 mg for 5 days, 100% MCPS prescribed augmentin 625 mg for 3 days, 70% FCPS prescribed 625 mg for 3 days, and 87.5% MSc prescribed 625 mg for 5 days (Figure 2).

Traditionally β -lactam antibiotics have been used as first-line therapy in odontogenic infection.³⁵ In our survey 92.3% of respondents prescribed amoxicillin + calvulanic acid (augmentin) in endodontic infections. A study conducted in Spain 2007, reported that 61% of the respondents prescribed amoxicillin + calvulanic acid (augmentin) as first choice for treatment of endodontic infections.³⁶ The second most prescribed antibiotic in this present study was metronidazole (92%) followed by amoxicillin (84.1%), 31.7% vibramycin, 36.4% clindamycin and 37.1% cefalaxin.

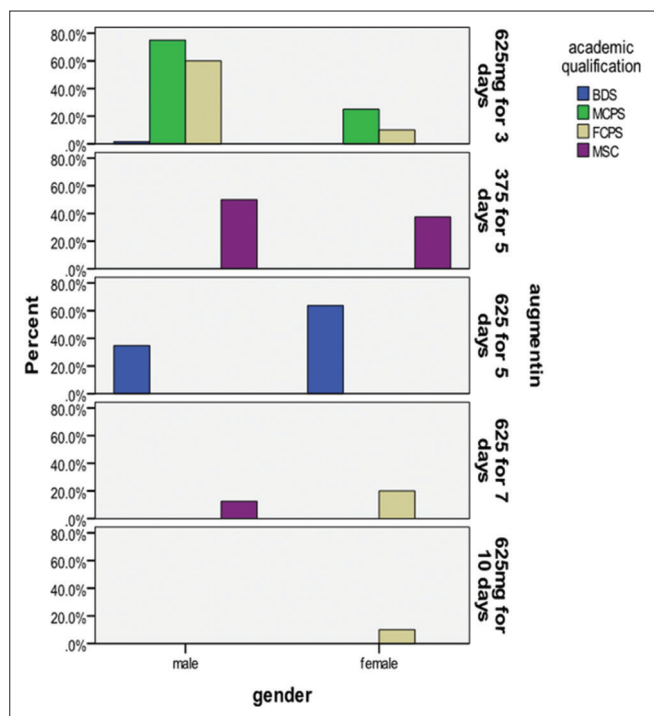


Figure 2: Percentage of prescribing antibiotics by graduate and post-graduate.

The present study showed that antibiotic prescription in Pakistan by dental practitioners is alarmingly increasing during the past years. Data showed that BDS were the most prominent in prescribing antibiotics this can be attributed to the lack of knowledge of current guidelines, patients satisfaction in prescribing antibiotics or lack of interest as they see more patients. It is predictable that there is heavy workload in dental teaching institutions and consequently lack of enough time to completely evaluate a patient.

Conclusion

The current study concludes that there is a lack of prescribing antibiotics in endodontic infections amongst dentists working in teaching institutes, therefore, there is a need to upgrade the undergraduate curriculum and training programs should be scheduled to keep dentists updated about the current guidelines in prescribing antibiotics. There is a further need to explore the pattern of dosage regime of antibiotics in endodontic infections.

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Appendix 1

Survey Form

- Gender: Male Female
- Year of graduation _____
- Academic qualification: BDS MSC MCPS FCPS MDS Others

1) Which antibiotic do you prescribe most often for an endodontic treatment?

a) **Augmentin** (Amoxicillin + clavulanic acid) 375 mg 625 mg 1 g

3 days 5 days 7 days 10 days More than 10 days

b) **Amoxicillin** 250 mg 500 mg 1 g

3 days 5 days 7 days 10 days More than 10 days

c) **Clindamycin** 150 mg 300 mg

3 days 5 days 7 days 10 days More than 10 days

d) **Vibramycin (Doxycycline)** 100 mg 200 mg

3 days 5 days 7 days 10 days More than 10 days

e) **Metronidazole (Flagyl/gramex)** 200 mg 400 mg

3 days 5 days 7 days 10 days More than 10 days

f) **Cefalaxin (cefadroxil monohydrate)** 250 mg 500 mg

3 days 5 days 7 days 10 days More than 10 days

g) Others

3 days 5 days 7 days 10 days More than 10 days

2) In which of the following situations would you prescribe antibiotics?

- | | Yes | No |
|--|------------------------------|-----------------------------|
| a) Pulpitis | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Irreversible pulpitis:
Moderate/Severe pre-op symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| c) Irreversible pulpitis with acute apical periodontitis:
Moderate/severe pre-operative symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| d) Necrotic pulp with chronic apical periodontitis;
No swelling, no mild pre-operative symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| e) Necrotic pulp with acute apical periodontitis;
No swelling, moderate/severe pre-operative symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| f) Necrotic pulp with chronic apical periodontitis;
Sinus tract present: No mild pre-operative symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| g) Necrotic pulp with acute apical periodontitis;
Swelling present: Moderate/severe pre-operative symptoms. | Yes <input type="checkbox"/> | No <input type="checkbox"/> |