

ANTIBIOTICS PRESCRIPTION HABITS AND KNOWLEDGE OF DENTISTS IN A LAHORE SAMPLE

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ABSTRACT

This study was conducted to document the antibiotics prescriptions habits of dentists working in two Lahore Dental Colleges and their knowledge regarding use of antibiotics for odontogenic infections and for endocarditis prophylaxis.

This cross sectional, descriptive, quantitative study comprised of a questionnaire administered to 101 house officers and faculty members of two dental colleges.

Amoxicillin was the most frequently chosen (61.4%) first line antibiotic for odontogenic infections and for prophylaxis against infective endocarditis (36%), with Clindamycin as the alternative (60.2%). Majority chose to prescribe post-operative antibiotics for implant placement, surgical exodontia and root canal treatment. Amoxicillin 2g, 1 hour before the procedure, was chosen by 22% as the dose for endocarditis prophylaxis. Endocarditis prophylaxis for root canal treatment and simple exodontia was not selected by the majority but it is recommended.

Antibiotics were unnecessarily prescribed in the cases of pulpitis, sinus tract infections, clinical features like facial swelling and fever, post-operatively for procedures like surgical extractions and implant placements and to be on the safe side. Dentists had inadequate knowledge about existing evidence on antibiotic use in dentistry and endocarditis prophylaxis.

Key Words: *Antibiotics; endocarditis prophylaxis; oral medicine.*

INTRODUCTION

What doesn't kill you makes you stronger, is probably truest for resistant strains of bacteria developing because of unjustified antibiotic prescriptions. Patients may self medicate due to over the counter availability of antibiotics.^{1,2} Unjust antibiotic use increases the incidence of antibiotic toxicity, nosocomial infections, and allergic reactions.^{3,4} Antibiotics may also be used by doctors as a temporary modality to treat odontogenic pain^{4,5} and perceived by doctors as curative rather than an aid in curing the patient.⁶

Antibiotics may be prescribed in situations where dentists fail to give sufficient time to patient evaluation.⁷ Dentists also prescribe antibiotics based on anecdotal experiences, hearsay or just-in-case, and not on scientific evidence.^{4,8-10} Medical practitioners in emergency

clinics may also provide antibiotics for dental problems, that they may not understand.⁹ Additionally, patients believing in the miracle of medicine, expect doctors to prescribe antibiotics whether indicated or not,¹¹ and may perceive the doctor as negligent if antibiotics are not prescribed¹² Dentists may prescribe antibiotics for orofacial pain, for localized signs and symptoms of infection without the presence of systemic effects, and when clinical treatment alone may suffice.^{3,4,13,14}

Prophylactic antibiotics are at times prescribed for procedures in order to cover for lack of an aseptic environment and failure to follow surgical principles.^{9,15} In Pakistan, there is no fear of accountability amongst clinicians when they prescribe antibiotics unjustly.^{8,16} There is a sense of confusion, amongst clinicians in Pakistan regarding current recommendations for prophylaxis. No national guidelines exist and there is lack of information about international guidelines. There is also, a lack of consistency among the international guidelines about antibiotic prescription.^{8,10} British guidelines recommend no antibiotic prophylaxis against endocarditis for any dental treatment,¹⁷ while the American and Australian guidelines suggest antibiotic prophylaxis in at least seven conditions, three of which are congenital heart diseases.¹⁸

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When indicated, penicillin and its derivatives are first line antibiotics for odontogenic infections.^{5,6,19} Penicillin is also recommended for prophylaxis against infective endocarditis and for prophylaxis in immunocompromised patients.¹⁹ Clindamycin is the drug of choice in case of penicillin allergy.¹⁸

There has been little research done in Pakistan on antibiotic use for odontogenic infections by dentists, and no study on antibiotic prophylaxis against endocarditis. This study was conducted to document the antibiotics prescriptions habits of dentists working in two Dental Colleges and their knowledge regarding use of antibiotics for odontogenic infections and for prophylaxis against infective endocarditis.

METHODOLOGY

This cross sectional, descriptive, quantitative study was conducted from December 2015 to June 2016. Permission to conduct the research was sought from the IRB of Institute of Dentistry, CMH Lahore Medical College (IOD CMH) and that of Lahore Medical and Dental College (LMDC). The institutes have been randomly been labeled as A and B. A survey instrument was designed with questions about first and second line antibiotics, antibiotic prescription for common odontogenic diseases, antibiotic prescription for signs and symptoms, antibiotic prescription after dental procedures and antibiotic prescription for special considerations. There were also questions about antibiotic prophylactic regimen for infective endocarditis, about the conditions where prophylaxis is necessary and about the procedures before which prophylaxis should be administered. The questionnaire was piloted on 5 dentists and then administered in person to all the dentists (faculty and house officers/dental interns) of the two institutes. Non respondents were reminded twice in person over 2 weeks. Data was analyzed using SPSS (V. 23 IBM corp. USA, 2016). Frequencies and means were calculated for univariate analysis. For bivariate analysis, chi-square test was used for comparison. A p-value of ≤ 0.05 was set as the level of statistical significance, with a 95% confidence level.

RESULTS

There were 101 respondents to the survey, 69 from institute A and 32 from institute B, including house officers (interns), PG trainees and faculty members including registrars, demonstrators, associate professors and assistant professors. For statistical analysis respondents were divided into students and dentists.

There were 72 (71.3%) female and 29 (28.7%) male respondents; 87 (86.1%) general dentists, and 13 (12.9%) specialists (Table 1). The mean age of participants was 25.03 (Sd=2.47). Median age was 24, IQR=2.

In healthy patients with no allergies, the first choice antibiotic for dental problems was amoxicillin (n=62, 61.4%), followed by combination drug Amoxicillin/Clavulanate (Augmentin) (n=36, 35.6%), followed by Clindamycin (n=3, 3%). For patients allergic to first line antibiotics, 60.2% (n=59) respondents chose Clindamycin followed by Calithromycin (20.4%) and Metronidazole (11.2%). For treatment of specific dental problems, respondents had the option not to prescribe antibiotics, to use antibiotics alone, or to use antibiotics as an adjunct to a procedure. Results have been summarized in Table 2.

Clinical signs and symptoms for which majority of respondents selected to prescribe antibiotics were extensive facial swelling (71.3%) and fever (57.4%, Table 3). The procedure for which majority of respondents chose to prescribe post-operative antibiotics was surgical extraction (68.3%), see Table 4. Other circumstances in which respondents considered prescribing antibiotics were, to be on the safe side (37.6%), anecdotal experience (21.8%), indefinite diagnosis (18.8%) and patient's insistence (4%).

When presented with an open ended question to list other reasons for antibiotic prescription, 15 respondents wanted to prescribe antibiotics for abscess, fever or any sign of infection; 14 respondents chose to prescribe antibiotics to immunocompromised patients.

When asked about the antibiotics and dose for endocarditis prophylaxis, 16 respondents failed to

TABLE 1: DEMOGRAPHIC OF RESPONDENTS

Institution	N (%)	Mean age years	Gender %		General Dentists %	Specialists %
			Male	Female		
Inst A	69 (68.3%)	24.6	27.5	72.5	91.2	8.8
Inst B	32 (31.7%)	25.95	31.3	68.8	78.1	21.9
Total	101 (100%)	25.03	28.7	71.3	88	13

TABLE 2: FREQUENCY OF ANTIBIOTIC PRESCRIPTION FOR DENTAL PROBLEMS. (N= 101)

Problem	Antibiotics alone (%)	Antibiotics as an adjunct (%)	Antibiotics not prescribed (%)
Acute necrotizing gingivitis	11	73	16
Acute periodontal abscess	16	58	26
Chronic Osteomyelitis	12	75	14
Dental abscess	17	71	13
Dry socket	7	10	83
Oro antral fistula	12	67	22
Orofacial pain	4	7	89
Pericoronitis	14	65	21
Pulpitis	8	27	65
Severe gingivitis	9	40	51
Severe periodontitis	14	59	27
Sinus tract	10	66	24

TABLE 3: FREQUENCY OF ANTIBIOTIC PRESCRIPTION FOR CLINICAL SIGNS AND SYMPTOMS

Signs and Symptoms	Respondents choosing to prescribe antibiotics % (n=101)
Extensive facial swelling	71
Fever	57
Localized intraoral swelling	27
Intraoral Erythema	6
Oral mucosal ulcers	5
Tooth mobility	0

answer the open ended question whereas 35.5% of the respondents chose the recommended regimen of 2g amoxicillin. The correct timing of dose was specified by 21.7% of the respondents. Amoxicillin 1g, 1 hour before procedure was selected by 7.9% of the respondents and 40.5% of the respondents chose Augmentin, ampicillin or penicillin with dose ranging from 500mg to 2g, 30 minutes to 2 hours pre-operatively.

TABLE 4: FREQUENCY OF ANTIBIOTIC PRESCRIPTION FOR DENTAL PROCEDURES

Procedures	Respondents choosing to prescribe antibiotics % (n=101)
Surgical Extraction	68
Implant Placement	56
Periodontal Flap Surgery	55
Root Canal Treatment	22
Biopsy	11
Root Planing	8
Simple Extraction	2
Crown Prep	1
Scaling	—
Restoration of Caries	—

TABLE 5: FREQUENCY OF ANTIBIOTIC PROPHYLAXIS FOR CARDIAC CONDITIONS

Problems	Respondents choosing to prescribe antibiotics % (n=101)
Previous Infective Endocarditis	73
Cardiac Transplant Recipient	72
Repaired Congenital Heart Defect with Residual Defects	60
Previous history of Rheumatic Fever	58
Unrepaired Cyanotic Congenital Heart Disease	57
Completely Repaired Congenital Heart Defect with Prosthetic material	56
Mitral Valve prolapsed	35
Coronary Artery Bypass	30
Hypertrophic Cardiomyopathy	15

Cardiac conditions for which respondents chose endocarditis prophylaxis were previous history of endocarditis (73.3%) and cardiac transplant recipient (72.3%). For the rest of the conditions see Table 5. Dental procedures for which participants selected to give endocarditis prophylaxis were surgical extractions (86.1%) and periodontal flap surgery (85.1%). For the rest of the procedures see Table 6.

TABLE 6: FREQUENCY OF ANTIBIOTIC PROPHYLAXIS FOR DENTAL PROCEDURES

Problems	Respondents choosing to prescribe antibiotics % (n=101)
Surgical Extraction	86
Periodontal Flap Surgery	85
Implant Placement	79
Scaling/root planing	46
Simple Extraction	42
Root Canal	36
Anesthetic injections	11
Orthodontic Band placement	6
Crown Preparation	5
Rubber Dam placement	5
Class 1 restoration	3
Recording Impressions	3
Suture Removal	3

DISCUSSION

In this sample, Amoxicillin was the most frequent first choice antibiotic for dental problems, while Clindamycin was chosen for those allergic to amoxicillin. These results are consistent with international preferences and standards.^{5,6,19}

Relatively large frequency of respondents chose antibiotics as adjunct to procedures like acute pulpitis (27%) and severe gingivitis (49%). The frequency is lower than the frequency reported by Ikram et al²⁰ but still of concern (Table 4). Antibiotics have been frequently misemployed for orofacial pain,^{3,5} however, in the sample, prescription for orofacial pain was low (11.3%).

Swelling and fever are indicators of infection but may be caused by trauma or surgery, where antibiotics may not be indicated.^{3,8} The high frequency of antibiotic prescription in fever (57%) and extensive facial swelling (71%), is of concern, indicating lack of knowledge and application.

The frequency of antibiotic prescription after procedures such as scaling, root planing, caries restoration, routine exodontia, biopsy and crown preparation was low amongst respondents (Table 6). After a root canal procedure, 21.8% chose to prescribe antibiotics, significantly lower than 50% reported by Goud et al.^{14, 21,22} For implants and surgical exodontia there is evidence to support prophylactic use of antibiotics,²³⁻²⁶ though

56% to 68% of our respondents opted for post-operative antibiotics. Half of the sample (54.3%) wanted to use post-operative antibiotics for periodontal flap surgery, for which there is little evidence.²⁷ Lack of awareness of current guidelines and of evidence based practice may be a reason.

About 1/3rd of our sample considered prescribing antibiotics to be on the safe side, on the patient's insistence, or based on anecdotal experience, which is not recommended.^{4,9,10,15} While not high, the frequency displays derelict ethical standards and lack of conformity to evidence.

For endocarditis prophylaxis the standard par-oral regimen i.e. 2g Amoxicillin, 1 hour pre-operatively was selected by a minority (21.7%) while 40% chose to prescribe other antibiotics. Additionally, respondents were not clear about the conditions and procedures where it is necessary to use endocarditis prophylaxis. These results highlight lack of awareness of guidelines and existing inconsistencies in international guidelines.

Respondents had adequate knowledge about the first and second line antibiotics for odontogenic infections and dental problems like dental abscess, dry socket, pericoronitis, chronic osteomyelitis, acute periapical periodontitis and orofacial pain. Information about prescribing antibiotics for clinical signs and symptoms such as localized intraoral swelling, erythema, mucosal ulcers and tooth mobility and dental procedures such as biopsies, scaling, root planing, simple extractions, crown preparation and restoration of caries was adequate.

For endocarditis prophylaxis, the respondents had adequate knowledge about the conditions where prophylaxis is indicated and moderate knowledge about procedures for which endocarditis prophylaxis is indicated.

Respondents had inadequate knowledge about antibiotic prescription for pulpitis, sinus tract infections, severe gingivitis, extensive facial swelling and fever. Respondents were giving antibiotics post-operatively for standard procedures of surgical exodontia, implant placement and periodontal flap surgery while current evidence is leaning towards prophylactic use only. Respondents also chose to prescribe antibiotics based on anecdotal experiences and to be on the safe side, which demonstrates inadequate knowledge about indications for use.

Despite availability of clear guidelines, it was seen that the knowledge regarding recommended dose for endocarditis prophylaxis was inadequate. Majority re-

spondents chose not to give endocarditis prophylaxis for dental procedures like root canal treatment and simple exodontia²⁸ which, according to the AHA guidelines, is indicated.

CONCLUSION

Results showed that there was over prescription of antibiotics for pulpitis, sinus tract infections and severe gingivitis, which may be treated by clinical therapy alone. Similarly, there was over prescription in the cases of clinical features like facial swelling and fever. Majority of dentists were prescribing post operative antibiotics for surgical extractions, implant placement, periodontal flap surgery where only prophylaxis is indicated. Dentists were still giving in to patient's expectations of being prescribed antibiotics and to be on the safe side, which indicates lack of knowledge and information. For endocarditis prophylaxis, there was inadequate knowledge about the dose and timings of antibiotics given, along with under prescription for simple exodontia and root canal treatments. Current inconsistency in international guidelines about endocarditis prophylaxis may be the cause, in addition to the lack of knowledge of these guidelines.

RECOMMENDATIONS

There is a strong need to convey current recommendations for antibiotic use in dental conditions and procedures and for prophylaxis against infective endocarditis in a clear and concise manner to dentists and dental students. Consistent international guidelines for antibiotic use in dentistry need to be formalized and kept up-to-date.

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CORRIGENDUM

December 2017 issue (Vol. 37; No. 4) article by Maryam Saeedullah page 655, right column para 3, line 2-3 should be read as density of a metal to as high as 10^{12} cm square