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Antibiotic Prescribing Profile in The Management of Oral Diseases Among Dentists in Istanbul

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ABSTRACT:

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Objectives: To determine the rational drug use and the pattern of antibiotic prescription for dental management and the information given to their patients about the use of these drugs by dentists in Istanbul.

Methods: A questionnaire was distributed to 250 dentists working in Istanbul. The questionnaires consist of open-ended questions about therapeutic and prophylactic antibiotic use in dentistry and were given by hand to dentists. The questionnaires were analyzed and the responses to each question expressed as absolute frequencies. The cases and the antibiotics prescribed by dentists for each case were determined by the descriptive statistics method; "frequency".

Results: Responses to questionnaire were received from 130 (52%) dentists. Primarily prescribed antibiotic for therapy was the combination of amoxicillin and clavulanic acid and for prophylaxis was amoxicillin. Although more than 80% of the dentists reported they gave information to their patients about the use of antibiotics, the content of the information was limited. Patients mainly informed to obey the dose and dose intervals of the prescribed drugs by dentists.

Conclusions: The results of the present study demonstrated that dentists most commonly prescribe the combination of amoxicillin and clavulanic acid for the therapy of periodontal, endodontic and surgical procedures. The results also showed that dentists informed their patients inadequately about antibiotic use. In the light of these data; inessential antibiotic use, insufficient informing of the patients about drug use and irrational use of drugs indicate that the renovation of graduate and postgraduate educations are required.

Key words: Dentistry, antibiotic use, questionnaire

ÖZET:

Oral hastalıkların tedavisinde, İstanbul'daki diş hekimleri arasında antibiyotik reçetelendirme profili

Amaç: İstanbul'daki diş hekimleri tarafından, akılcı ilaç kullanımını, dental tedavi amacıyla antibiyotiklerin verilme nedenlerini ve ilaç konusunda hastaya verilen bilgileri belirlemek.

Yöntem: İstanbul'da çalışan 250 diş hekimine anket dağıtıldı. Anketler, hekimlere elden verildi. Anketteki sorular; diş hekimliğinde, terapötik ve profilaktik antibiyotik kullanımı hakkında açık uçlu sorulardı. Anketler analiz edildi ve her bir soruya verilen yanıtlar, mutlak frekanslar olarak belirlendi. Vakalar ve diş hekimleri tarafından her bir vaka için reçete edilen antibiyotikler, tanımsal istatistik yöntemi olan sıklıkla analiz edildi.

Bulgular: Dağıtılan anketlerin 130 adedi yanıtlandı (%52). Başlıca yazılan antibiyotikler; tedavi amacıyla amoksisilin ve klavulanik asit kombinasyonu, profilaksi amacıyla amaoksisilin idi. Diş hekimlerinin %80'inden fazlası hastalarına antibiyotikle ilgili bilgi verdiğini belirtmesine karşın, verilen bilginin içeriği kısıtlıydı. Hastalar, yazılan ilaçların dozlarına ve doz aralıklarına uymaları konusunda bilgilendirilmişlerdi.

Sonuç: Mevcut çalışma, diş hekimlerinin; periodontal, endodontik ve cerrahi işlemlerin tedavisi için en fazla yazdıkları antibiyotiğin; amoksisilin klavulanik asit olduğunu göstermiştir. Sonuçlar ayrıca, diş hekimlerinin hastalarını antibiyotik kullanımı konusunda yetersiz şekilde bilgilendirdiğini göstermiştir. Bu verilerin ışığında, gereksiz antibiyotik kullanımı, ilaç kullanımı konusunda hastaların yetersiz bilgilendirilmesi ve akılcı olmayan ilaç kullanımı, lisans ve lisansüstü eğitimin yenilenmesi gerektiğini göstermektedir.

Anahtar sözcükler: Diş hekimliği, antibiyotik kullanımı, anket

INTRODUCTION

Antibiotics are commonly used in dental practice and the use of these drugs takes an important part in dental care. In dentistry antibiotics are typically prescribed for, as therapy for dental, oral and maxillofacial infections and as prophylaxis against focal infections in patients at risk (endocarditis and joint prostheses) and as prophylaxis against local infection and systemic spread in oral surgery (1,2).

There is widespread concern about the overuse of

antibiotics and the emergence of resistant bacterial strains. Use of antibiotics in dental practice is characterized by a number of particularities. Practically antibiotic prescribing in dentistry is generally empiric: i.e., the clinician does not know the responsible organism since the culture tests are not commonly made. As a result, broad-spectrum antibiotics are commonly used and the resistance development of the oral microorganisms increased (1-3). Such as; β-lactamase producing microorganisms are isolated from patients being treated with β-lactam antibiotics (4). A similar resistance example was also reported for Streptococcus viridans (which is a commonly isolated pathogen in dental infections) for macrolides, penicillin and clindamycin (5,6).

In addition to resistance development, adverse reactions (including gastrointestinal, allergic, hematologic reactions) are other problems of antibiotics use. For this reason, rational antibiotic use in oral or dental practice is important for decreasing the resistance development in oral pathogens and the risk of adverse affects while increasing the effectiveness.

Another increasing parameter of the effectiveness is to inform the patients adequately about the prescribed drugs. This information includes not only dose and dose intervals but also adverse reactions, drug interactions, storage conditions and the price of the prescribed drugs. When dentists informed their patients about these subjects, it also required briefing of these explanations by patients. This prevents misunderstanding of the information given. On the other hand perfect information given to the patient will increase the success ratio of the therapy, compliance of the patient, quality of the life and cost-effectiveness (7,8).

There have been some limited studies of antibiotic prescribing by dentists and these have shown wide variation in what is prescribed (1-3). The aim of this study is to evaluate the therapeutic and prophylactic antibiotic use in dental practice and the information given to their patients about the use of these drugs by dentists in Istanbul, Turkey.

MATERIALS AND METHODS

Questionnaire

A questionnaire was devised to examine dentists' antibiotic prescribing patterns. The questionnaire was anonymous but investigated the place of graduation, age (banded in decades from 21 to 65 years and 65 years and older), sex and whether any postgraduate education had been attended.

The questionnaire investigated: a) 5 of the most antibiotic prescribed indications (including prophylaxis) from dentists, b) The information they gave their patients about the use of prescribed drugs.

Sample and data handling

Before starting this study, the approval of the health authority and the list of the dentists were received from "Chamber of Dentists of Istanbul". The list of dentist group was chosen from different regions of Istanbul in order to make a homogenous distribution. The questionnaires were given by hand to the dentists. Delivering of the questionnaires started in the beginning of June 2007 and the delivery and collecting processes finished in the beginning of June 2008.

Table 1: Demographics and professional characteristics of participating dentists

Variables	n (%)
Gender	
Male	68 (53.3)
Female	61 (46.9)
Age (years)	
21-30	25 (19.2)
31-40	55 (42.3)
41-60	47 (36.2)
Over 60	3 (2.3)
Place of graduation	
Istanbul University	67 (51.5)
Marmara University	38 (29.2)
Hacettepe University	7 (5.4)
Ege University	6 (4.6)
Gazi University	4 (3.1)
Ankara University	4 (3.1)
Atatürk University	1 (0.8)
Süleyman Demirel University	1 (0.8)
Postgraduate education	
Yes	73 (56.2)
No	54 (41.5)
Postgraduate education taken (out of 73 respondents)	
Postgraduate courses	52 (71.2)
Doctorate	16 (21.9)
Master	2 (2.7)
Master and postgraduate courses	2 (2.7)
Doctorate and postgraduate courses	1 (1.3)

The questionnaires received were entered into Statistical Package for Social Science® (SPSS) version 15.0. From this database the overall response rate was calculated, together with the percentage responses for each question. The cases and the antibiotics dentists prescribe for each case was determined by the descriptive statistics method; "frequency".

RESULTS

A total of 130 replies (out of 250 questionnaires sent) were received giving a response rate of 52 %. Of those who did response, 68 (53.3%) were males and 61 (46.9%) were females. Demographic and professional characteristics of respondents are shown in Table 1. Analysis of the graduation showed that majority of the respondents graduated from dental schools of Istanbul University and Marmara University (67 out of 130; 51.5% and 38 out of 130; 28.9% respectively). The number of those who had attended any postgraduate education was 73 (56.2%) (Mainly includes postgraduate courses).

Table 2 shows the prescribing patterns of dentists in Istanbul. The answers given to our open-ended questions showed a wide variety. For this reason the indications given by dentists for therapeutic antibiotic prescribing were grouped as "periodontal procedures", "surgical procedures" and "endodontic procedures".

Periodontal procedures include; acute, chronic and

Table 2: Prescribing patterns of dentists in Istanbul

Cases	n (%)
1. Periodontal procedures (n = 150)	
Amoxicillin clavulonate	26 (17.3)
Amoxicillin	21 (14.0)
Ornidazole	21 (14.0)
Spiramycin	17 (11.3)
Doxicycilin	14 (9.3)
Metronidazole	14 (9.3)
Ampicillin	6 (4.0)
Ampicillin sulbactam	6 (4.0)
Bacampisillin	5 (3.3)
Tetracycline	4 (2.6)
Clindamycin	3 (2.0)
Ciprofloxacine	3 (2.0)
Benzatine phenoxymethyl penicillin	2 (1.3)
Eritromycin	2 (1.3)
Sulfomethoxazole trimetoprim	2 (1.3)
Azitromycin	1 (0.6)
Claritromycin	1 (0.6)
Lincomycin	1 (0.6)
Thiamphenicol	1 (0.6)
2. Surgical procedures (n = 127)	
Amoxicillin clavulonate	29 (22.8)
Amoxicillin	26 (20.5)
Clindamycin	19 (14.9)
Ornidazole	10 (7.8)
Spiramycin	8 (6.2)
Ampicillin sulbactam	7 (5.5)
Bacampcillin	5 (3.9)
Lincomycin	4 (3.1)
Ampicillin	3 (2.3)
Metronidazole	3 (2.3)
Benzatine phenoxymethyl penicillin	3 (2.3)
Doxycycline	3 (2.3)
Ceftriaxon	2 (1.5)
Ciprofloxacin	2 (1.5)
Claritromycin	1 (0.8)
Sulfometoxazole trimetoprim	1 (0.8)
Sefuroxim	1 (0.8)

Cases	n (%)
3. Endodontic procedures (n = 80)	
Amoxicillin clavulonate	25 (31.2)
Amoxicillin	16 (20.0)
Clindamycin	6 (5.3)
Spiramycin	6 (5.3)
Ornidazole	5 (4.4)
Benzatine phenoxymethyl penicillin	4 (3.5)
Eritromycin	4 (3.5)
Bakampicillin	3 (2.6)
Ampicillin sulbactam	3 (2.6)
Ampicillin	2 (1.7)
Azitromycin	2 (1.7)
Seftriaxon	2 (1.7)
Ciprofloxacin	1 (0.9)
Lincomycin	1 (0.9)
4. Prophylaxis (n = 53)	
Amoxicillin	24 (45.2)
Amoxicillin clavulonate	9 (16.9)
Clindamycin	5 (9.4)
Ampicillin sulbactam	5 (9.4)
Ornidazole	3 (2.6)
Ampicillin	2 (3.7)
Eritromycin	2 (3.7)
Benzatine phenoxymethyl penicillin	1 (1.8)
Penicillin	1 (1.8)
Vancomicin	1 (1.8)
5. Special conditions (n = 13)	
Dental infection in pregnant women (n = 9)	
Spiramycin	7 (77.7)
Amoxicillin	1 (11.1)
Benzatine phenoxymethyl penicillin	1 (11.1)
Dental infection in pediatric patients (n = 4)	
Amoxicillin clavulonate	2 (50.0)
Amoxicillin	1 (25.0)
Metronidazole	1 (25.0)

juvenile periodontitis, periodontal infection, periodontal abscess, gingival infection and inflammation, acute necrotizing ulcerative gingivitis.

Endodontic procedures include; acute and chronic apical abscess, periapical abscess, pulpitis, endodontic therapy, canal therapy.

Surgical procedures include; tooth extraction, inflammation, cellulitis, alveolitis, pericoronitis, acute submandibular abscess, trauma, operation.

Periodontal procedures were the most common procedures dentists prescribed antibiotics (150 out of 423 case given by dentists; 35.4%), followed by surgical and endodontic procedures (112 out of 423 case; 26.4% and 80 out of 423 case; 18.9% respectively). The other conditions dentists prescribe antibiotics were prophylaxis (53 out of 423 cases; 12.5%) and special conditions [including dental infection in pregnant women (9 out of 423 cases; 2.1%) and dental infection in pediatric patients (4 out of 423 cases; 0.9%)].

Amoxicillin clavulonate was the most favored antibiotic in periodontal, surgical and endodontic procedures and for children with dental infection. On the other hand for prophylaxis, respondents commonly preferred amoxicillin.

The cases which respondents preferred combined antibiotic therapy and the antibiotics they choose were given in Table 3. Periodontal procedures were similarly the most common procedures the respondents prefer combined antibiotic therapy (33 out of 82 cases given by respondents; 40.2%), followed by surgical and endodontic procedures (25 out of 82 cases given by respondents; 30.4% and 17 out of 82 cases given by respondents; %20.7 respectively). The most commonly preferred combinations for periodontal, endodontic and surgical procedures were combinations metronidazol or ornidazol with amoxicillin or amoxicillin clavulonate.

Table 3: Information given by dentists to their patients about analgesic us

Informed issues	n (%)
Use and administration of the drug and giving advice about obeying the using and administrating rules given	83 (63.8)
Whether the drugs should be taken fasting or fed and the interactions between food and these drugs	53 (40.7)
Adverse reactions of the prescribed drugs	42 (32.3)
Dental-medical interactions (examining the systemic illnesses (i.e. liver diseases, kidney diseases etc.) and systemic conditions of the patient (i.e. pregnancy, lactation etc.)	25 (19.2)
Interactions between analgesics prescribed and other drugs	10 (7.7)
Informing his/her dentist if an adverse reaction occurs while using these drugs	26 (20.0)
Storage conditions of the prescribed drugs	5 (3.8)
Preparing rules (i.e. suspension etc.)	1 (0.7)
Price of the prescribed drugs	1 (0.7)

Majority of the respondents (83.8%) reported they gave information to their patients about antibiotic use. Table 3 shows the information given by respondents to their patients about antibiotic use. As seen on the table; the most common information given by the respondents was "to obey the dose and dose interval rules given" (83 out of 130 respondents; %63.8). On the other hand the numbers of dentists informing their patients about drug interactions, adverse reactions, storage conditions and price of the prescribed drugs and also examine the medical-dental interactions of the patients were low (7.7%, 20%, 3.8%, 0.7% and 19.2% respectively).

DISCUSSION

The results of our study showed that antibiotic prescription pattern of dentists were accordance with some other studies (1-3,10). Penicillins, especially amoxicillin and amoxicillin clavulonate were commonly preferred among dentists in Istanbul. Similar to other studies, the results of our study showed that dentists commonly prescribed especially amoxicillin for prophylaxis and amoxicillin clavulonate for treatment of oral infections (1,10). The other antibiotic chosen for prophylaxis was clindamycin which can be used for prophylaxis in penicillin allergy and this data was also similar to those described in the literature (11,12). However some respondents also reported that they chose amoxicillin clavulonate, ampicillin sulbactam, ornidazole and eritromycin for prophylaxis which are not given in the current prophylaxis tables (10,11). This situation indicates that dentists do not follow the current prophylaxis regimen regularly and they rarely use inappropriate prophylaxis regimen.

In our study, periodontal, endodontic and surgical procedures and special conditions (i.e. antibiotic use in pregnant women and children) were the main dental

indications that the dentists used antibiotics for therapy . In general, these results were compatible with the literature; it was also found that some respondents chose antibiotic therapy in some cases although it is not always indicated.

In surgical procedures, antibiotic therapy is not always indicated in traumatic extraction of impacted third molar unless the patient has fever, malaise or the patient's immune system is compromised (10,15-17). In infectious edema, it is stated that the drainage of the edema is sufficient. However if drainage is not possible antibiotic therapy is suggested. In chronic apical infections unless the infection is spread in large area, antibiotic therapy is not always indicated. For this situation, if there is no systemic spread, the primary therapy is tooth extraction or root canal therapy. In addition in pulpitis which respondents reported they prescribe antibiotic and was grouped in endodontic procedures, antibiotic therapy is not indicated (1).

In periodontal applications such as periodontal abscess, chronic periodontal diseases and gingivitis local measures are sufficient unless there is widespread or systemic spread of the infection. For this reason in order to prevent the development of resistant bacteria strains, inessential antibiotic use in such cases should be avoided (1,10).

As mentioned before, an important particularity which should not be ignored about antibiotic use is "making susceptibility tests". Because of taking test results take a notable time, dentists choose antibiotic agents due to symptomatology and their knowledge and professional experience. The agents chosen for empiric therapy are generally broad-spectrum antibiotics and this causes antimicrobial resistance in oral pathogens (1,3). The results attained from this study unfortunately support this information.

Respondents most favored antibiotics in periodontal procedures were amoxicillin clavulonate, amoxicillin, ornidazole, doxcycline, metronidazole and spiramycin. Use of these antibiotics, except for spiramycin, is well supported in the literature (14-16). Spiramycin has reducing effect on plague and gingivitis and the drug also recovers the periodontal parameters. This agent is stated to be effective in periodontal procedures; however it's prohibited in the U.S. because of its high incidence of gastrointestinal problems and use of this drug in this branch is controversial. Results of the study also showed that, although clindamycin is an effective agent in periodontal infections, it was less preferred by the respondents (14).

In our study the most commonly prescribed antibiotics in endodontic procedures were amoxicillin clavulonate, amoxicillin, clindamycin, spiramycin and ornidazole. Penicillin VK continues to be the antibiotic of choice for its narrow spectrum which includes pathogens typically isolated in endodontic infections however it was not chosen by the respondents. Use of clindamycin in endodontic procedures is well supported by the literature however use of macrolides (including eriytromycin) is controversial. In addition, although use of amoxicillin clavulonate in the treatment of endodontic infections is not suggested it was widely chosen by the respondents (17).

In routine surgical procedures or tooth extraction, antibiotic use is not suggested due to lack of infection risk (13). Similarly, pericoronitis can be effectively treated by local measures and antibiotics are only indicated for large spreading infections, or systemic involvement (2). However results of our study showed that dentists commonly prescribe amoxicillin clavulonate, amoxicillin, clindamycin, ornidazole and spiramycin for surgical procedures including pericoronitis, operation and tooth extraction.

Antibiotics that will be used in therapy in pregnancy should be chosen due to Food and Drug Administration (FDA) pregnancy category (1,18). In our study respondents reported that they chose spiramycin, benzatine phenoxymethyl penicillin and amoxicillin in the treatment of dental infections in pregnant women. Penicillins especially amoxicillin can be used safely in dental infections in pregnant women. (1,18-20). On the other hand, spiramycin, the most frequently chosen antibiotic in pregnant women, is prohibited in the U.S. because of high incidence of the drug's gastrointestinal problems, and the use of this drug in this branch is controversial (14).

Use of antibiotics in the management of dental infections in pediatric patients is another special condition in dental care. Pediatric patients are more sensitive to orofacial infections and rapid spreading of these infections can cause brain abscess, septicemia, airway obstruction and mediastinit (21,22). The first choice antibiotic agent for orofacial infections in pediatric patients is penicillin V (21). However, elixir of amoxicillin is also being used more commonly due to its better taste and its better efficacy on gram negative bacteria than penicillin V. The other choices in the treatment of orofacial infections in penicillin allergic

pediatric patients are erythromycin or clindamycin (21-25). If periapical abscess doesn't respond to penicillin therapy (due to β lactamase), metronidazole can be used in pediatric patients (21,26). The result of our study showed that antibiotics chosen for "dental infection in pediatric patients" were amoxicillin clavulonate or amoxicillin and metronidazole, and were similar to those described in the literature (21).

Results of our study also showed that apprising of the patients about prescribed agents by dentists was limited. The most common information given by the respondents was dose and dose intervals of the drugs. This information has considerable importance on compliance of the therapy. On the other hand, it is of interest that the proportion of other information given by the respondents to their patients including adverse reactions, dug interactions, and storage conditions of the prescribed drugs was relatively low. Less or lack apprising about adverse reactions and storage conditions of the drugs and drug interactions will affect the success of the therapy, increase the risk of adverse reactions and the cost of the therapy (7-9). World Health Organization (WHO) declared a guide that includes the responsibilities of the practitioners in 1994. This guide includes not only good prescription but also other strategies about drug use. Apprising of the patients about the prescribed drugs was the insisted point of this guide (7).

In conclusion, the results of the present study have demonstrated incompatible antibiotic prophylaxis, inessential antibiotic use, and insufficient informing of the patients. Amoxicillin and amoxicillin clavulonate were the most commonly prescribed antibiotics for prophylaxis and treatment of oral infections among dental practitioners in Istanbul, respectively.

In the light of these data; resistance risk due to inessential antibiotic use, insufficient informing of the patients about drug use and irrational use of drugs indicate that the renovation of graduate and postgraduate educations are required. In these studies it was also shown that evidence-based guidelines tailored to local needs are also required. Same requirements were also determined in other countries and renovation studies in dental education have been started by Association of Dental Education in Europe (ADEE) and Association of Dental Education in America (ADEA) and Association of Basic Science Teachers in Dentistry (ABSTD) and in also our country since 1990s. For this purpose Bologna Declaration was prepared by Confederation of European Union Rectors' and the Association of European Universities (CRE). This declaration is a pledge by Turkey and other 28 countries to reform the structures of their higher education systems in a convergent way and revised education programme was started in 2010 in Turkey.

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