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Research Article

ANTIBIOTIC UTILIZATION PATTERN IN DENTAL PRACTICE IN AJMAN, UAE: A PROSPECTIVE STUDY

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ABSTRACT

This study was performed to investigate the utilization pattern of antibiotics in dental practice and to determine patient's perspective and involvement in the dental infection management in super specialty dental center in Gulf Medical College Hospital and Research Center (GMCHRC), Ajman, UAE. Information was collected via a questionnaire regarding the patient's reason of attendance and treatment undertaken at the dental clinic.

The majority of patients (81.7%) attending the dental clinics was complaining of pain and the main dental indications for which the dentists use antibiotic therapy were acute peri- apical infection was attributed to (47.9%), pericoronitis (12.7%), periodontitis (12%), pulpitis (10.6%). Statistical analysis shows that highly educated patients above 40 years with an average income were significantly aware towards their oral health ($P<0.05$). (77.5%) were received antibiotic alone or with analgesics. Amoxicillin and clavulanic acid (Agumentin) records the highest frequency (46.4%) followed by amoxicillin (27.3%) then metronidazole (18.2%). Patient awareness and perception towards AB therapy was low more than 50% were unaware about allergy, drug resistance and other side effects associated with AB therapy**.** However employed and educated patients' record significant awareness towards AB therapy $P< 0.05$.

In conclusion, the results of this study have demonstrated the utilization pattern of AB in dental practice in Ajman/UAE. Patients' perception and awareness towards AB therapy was low. Patient education about adverse reaction and complication associated with AB misuse is required. Intervention is required to improve patients' / dentist knowledge.

Keywords: Antibiotics, utilization pattern, oral health, patients' awareness

1. INTRODUCTION

Bacterial resistance to antibiotics (AB) is a serious public health problem. The National Center for Disease Control and Prevention estimate that approximately one-third of all outpatient AB prescriptions are unnecessary [1]. Dentists prescribe between 7% and 11% of all common AB (betalactams, macrolides, tetracyclines, clindamycin, and metronidazole) [2]. In dental practices, antimicrobial drugs are prescribed during treatment of particular clinical situations related to inflammatory processes in the periodontiumor bone. For this reason, AB account for the vast majority of medicines prescribed by dentists [3]. Evidence exists that the resistance of oral microflora to AB has increased during the past decades [4-6]. In addition to resistance development, adverse reactions (including gastrointestinal, allergic, hematologic reactions) are other problems of AB use. In dentistry AB 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 [7, 8]. Overuse of AB in dental practice has been observed [8-12]. For this reason, rational AB use in oral or dental practice is important for decreasing the resistance development in oral pathogens and the risk of adverse effects while increasing the effectiveness. The serious complications associated with AB use have encouraged studies investigating AB prescribing practices of dentists [11-20].

This study aims to identify the prescription pattern for AB in dental practice and to determine patient's perception and involvement in the dental infection management and the use of AB, as till today no study has been carried out in Ajman, UAE.

2. MATERIAL AND METHODS

This prospective study was undertaken over a period of six weeks at eight hours super specialty dental center in Gulf Medical College Hospital and Research Center (GMCHRC), Ajman, UAE. The dentists collected information for each patient who attends the clinic. A questionnaire was used to collect relevant information from the patient and prescription of AB. The questionnaire had different domains which include:

Socio demographic characteristics: age, gender, educational qualification, occupation and nationality. Clinical data: clinical diagnosis of relevant subjects and associated conditions. Patterns of AB prescription: type of AB in the prescription, name of the AB used (generic/brand), dose, frequency and duration of use. The nature of the patient complaint: pain, localized swelling, diffuse swelling, cavities, difficulty in swallowing, trauma, and others. A pilot study was done to test the feasibility of the study. For ethical consideration, this study was approved by the Gulf Medical University Ethical Committee before the start of the study. Verbal consent was obtained from the participants before enrollment in the study and confidentiality of the participants was preserved. Data analysis was performed using PASW version 18 (IBM Chicago, Ilinos). Chi square test and Fisher's exact test were used to examine the association between variables. Proportions and percentages and standard deviations were used to summarize categorical variables.

3. RESULTS

During the study period eight dentists worked in a dental clinic, five GP and three of them specialists, eight hours per day. A total 142 patients attended the clinics over a six week period. Table (1) shows the demographic distribution of patients by gender, age, occupation, nationality and education. The majority of participants were male (52.8%). The highest age group was <40 years (73.2%). Most of the participants were Asian (86.6%) and more than (54.9%) of them were educated. It can be seen that 55% of participants were employed and (89.4%) had an average income. Education level of patients was ranged between preliminary education (45%) and higher education -college and above (54.9%).

Table 1: Demographic distribution of patients

Gender	Number	Percent (%)
Total	142	100
Male	75	52.8
Female	67	47.2
Age (yrs)	Number	Percent (%)
*<40	104	73.2
>=40	38	26
Occupation	Number	Percent (%)
*Employed	78	54.9
Unemployed	64	45.1
Nationality	Number	Percent (%)
Asian	123	86.6
Non Asian	19	13.4
Education	Number	Percent (%)
Secondary Education	64	45.1
*Higher Education	78	54.9
Income	Number	Percent (%)
High	15	10.6
*Average	127	89.4

*P<0.05

Table (2) shows the reason for attendance at dental clinics. The majority of patients (81.7%) presenting at the dental clinics complained of pain, (21%) with localized swelling and (7.7%) with diffuse swelling, (18.3%) with cavities, (8.5%) with gingival bleeding and (4.9%) defect in the filling. There are no patients complaining from fracture, facial and dental trauma, bridge and persistent hemorrhage.

Table 2: Symptoms associated with patients' attendance at the dental clinics

Symptoms	Yes (%)	No (%)
Pain	116 (81.7)	26 (18.3)
Elevated Temp	4 (2.8)	138 (97.2)
Cavities	26 (18.3)	116 (81.7)
Defect in Filling	7(4.9)	135 (95.1)
Lost Crown	3 (2.1)	139 (97.9)
Gingival Bleeding	12 (8.5)	130 (91.5)
Localized Swelling	30(21.1)	112(78.9)
Diffuse Swelling	11(7.7)	131(92.3)
Others	2 (1.4)	137 (96.5)

Table (3) shows clinical diagnosis of patients by a dentist. Acute peri- apical infection was attributed to (47.9%), pericoronitis (12.7%), periodontitis (12%), pulpitis (10.6%) and posts surgical procedure (4.2%).

Table 3: Clinical diagnosis of patients to whom antibiotic has been prescribed

Diagnosis	Yes (%)	No (%)
Acute peri- apical infection	68(47.9)	74 (51.1)
Acute periodontal abscess	8(5.6)	134 (94.4)
Pericoronitis	18(12.7)	124 (87.3)
Infected socket	2 (1.4)	140 (98.6)
Acute ulcerative gingivitis	2 (1.4)	140 (98.6)
Sinusitis	1 (0.7)	141 (99.3)
Posts surgical procedure	6(4.2)	136 (95.8)
During root canal therapy	2(1.4)	140 (98.6)
After root canal therapy	2 (1.4)	140 (98.6)
Periodontitis	17(12)	125(88.0)
Cellulitis (diffuse &localized)	2(1.4)	140 (98.6)
Pulpitis	15 (10.6)	127(89.4)

Figure (1) shows the treatment therapy received by patients. (77.5%) (110/142) were received antibiotic alone or with analgesics.

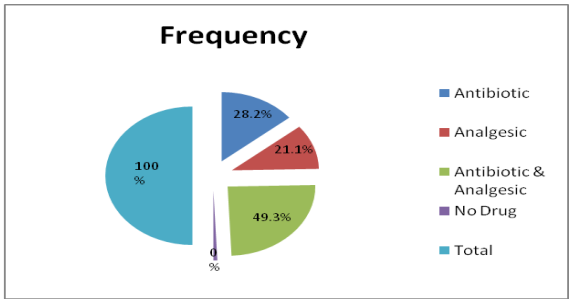

Fig. 1: Treatment therapy received by patients

Table (4) records the frequency of different AB prescribed. Amoxicillin and clavulanic acid (Agumentin) records the highest value (46.4%) followed by amoxicillin (27.3%) then metronidazole (18.2%).

Table 4: Type of antibiotic used in the treatment

Antibiotic Name	Frequency	%
Amoxicillin	30	27.3
Amoxicillin & clavulanic acid	51	46.4
Amoxicillin & Metronidazole	6	5.5
Metronidazole	20	18.2
Others	3	2.7
Total	110	100

Table (5) shows participants awareness and perception towards AB therapy. About 80% were unaware about possible drug interactions, 73.2% drug resistance and 74% AB kill normal GI flora**.**

Table 5: Awareness and perception of participants towards antibiotic therapy

Awareness	**Yes (%)**	**No (%)**
Drug resistance	38 (26.8)	104 (73.2)
Allergies/Adverse reactions	66 (46.5)	76 (53.5)
AB kills normal GI flora	37 (26.1)	105 (73.9)
Generally it is unhealthy to take AB	50 (35.2)	92 (64.8)
Overdose of AB	47 (33.1)	95 (66.9)
Drug Interaction	27 (19)	115 (81)

4. DISCUSSION

The study investigated the utilization patterns of AB in the dental clinic and perception of patients towards AB therapy. The majority of the patients attending the dental clinic were complaining from pain of different reasons. Statistical analysis shows that highly educated patients above 40 years with an average income were significantly aware towards their oral health ($P<0.05$). It was found by other researchers that socioeconomic factors are strongly associated with dental visits [21-23]. In this study the majority of patients visiting the dental clinic were complaining of pain 81% (Table 2). The main dental indications for which the dentists use antibiotic therapy were acute periapical infection, periodontitis and pericoronitis, pulpitis and post surgical procedure (Table 3). In general our results were compatible with other studies [7, 8, 11, 24]. In addition in pulpitis dentists were prescribed AB, although AB therapy is not indicated [7]. Moreover if infectious edema (pus) present, drainage is sometimes sufficient, if the patient is having good oral hygiene. However if drainage is not possible or the patient has bad oral hygiene AB is suggested. On the other hand it's required to give AB if the patient is medically compromised or to overcome the risk [25]. For appropriate prescription of AB, dentists should have a good understanding of the eitio-pathological processes involved in pulp and periapical area and good knowledge of the indications and effectiveness of AB usage. In this study pericoronitis, periodontitis and pulpitis recorded the highest frequency of AB prescribed by dentists after periapical infection (Table 3). In periodontal applications such as periodontal abscess, chronic periodontal diseases and gingivitis local measures are sufficient. Similarly, pericoronitis can be effectively treated by local measures and AB is only indicated for large spreading infections, or systemic involvement [8]. However this study shows that the most common prescribed AB was amoxicillin and clavulanic acid (Agumentin) followed by amoxicillin either alone or in combination with metronidazole according to the case diagnosis (Table 6). Other studies recorded the combination of amoxicillin and clavulanic acid as most commonly prescribed therapy for periodontal endodontic and surgical procedure [24]. Unessential AB use in such cases should be avoided [7, 20], otherwise it will help in the development of resistant bacteria strains. These AB should be used as adjunct to the management of diagnosed cases when it's indicated. Moreover in this study patient's awareness about complication associated with AB abuse is poor, more than 50% of participants were unaware about AB resistance, allergy and adverse reactions. This is supported by previous studies by the author in Ajman/ UAE [26].

This study shows a significant correlation between patients' education levels and occupation with their awareness and perception towards AB therapy ($P< 0.05$). The major resistance control strategies recommend education for the general public to promote the appropriate AB use [27, 28]. Better use of diagnostic services, surveillance and improvements in dental education are required now to lessen the impact of antibiotic resistance in future [29]. For this reason, appropriate antibiotic use in dental practice is important for decreasing the resistance development in oral pathogens and the risk of adverse effects and increasing AB effectiveness. Another increasing parameter of the effectiveness is to educate the patients adequately about the prescribed drugs. This information includes not only dose and dose intervals but also adverse reactions, drug interactions, storage conditions. On the other hand dentists should be educated for proper AB prescription.

5. CONCLUSION

In conclusion, the majority of patients attending the dental clinic complaint of pain and AB therapy were indicated for acute periapical infection, periodontitis, pericoronitis and pulpitis. The results of this study have demonstrated the utilization pattern of AB in dental practice. Patients' perception and awareness towards AB therapy was low. Patient education about adverse reaction and complication associated with AB misuse is required. Intervention is required to improve patients' knowledge. Mass education program by health authorities is required for public in one side and health

professional from the other side to control unwanted adverse drug reactions.

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