

## ORIGINAL ARTICLE

# An Insight into the Antibiotic Prescription Practices of Post-Graduate Dentists, Discerned through a Clinical Dental Audit

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## ABSTRACT

**Objective:** The aim of this study was to evaluate the reported practice of antibiotics prescribed by Post Graduate trainees, working in the Operative Department of Islamic International Dental Hospital (IIDH), Islamabad.

**Study Design:** A clinical audit study.

**Place and Duration of Study:** The study was conducted in the department of operative dentistry at Islamic International Medical College, Islamabad from April 2014 to July 2014.

**Materials and Methods:** A clinical audit evaluating the antibiotics prescription practice of Post Graduate trainees at IIDH was performed. All of the eight trainees working in the Operative department were included in the study. The prescribed antibiotic; its dosage, frequency and duration, as well as the clinical conditions and reasons for which the prescription had been given was investigated using questionnaires in eighty patients (ten patients per dentist). Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 17.0, (SPSS, Inc., Chicago, IL). Frequencies and percentages were described for the antibiotic prescriptions.

**Results:** Amoxicillin n=42 (53.5%) and Metronidazole n=37 (46.3%) were the most commonly prescribed antibiotics. Other prescribed antibiotics included Erythromycin n=1 (1.3 %), Penicillin n= 1 (1.3 %), Clindamycin n=1 (1.3 %), Cefalexin n=1 (1.3 %) and others n=2 (2.5 %). Tetracycline was also prescribed n= 14 (17.5 %).

**Conclusion:** This study identified gap between the antibiotics prescription practice of postgraduate trainees and recommended clinical guidelines. The findings suggest need for a re-assessment of the antibiotics prescription practice in accordance with evidence based guidelines.

**Keywords:** *Reported Practice, Antibiotic Prescription, Post Graduate trainees, Operative Department.*

## Introduction

Clinical audit has been known as the systematic and critical analysis of clinical care quality. Antibiotic prescription has been considered to be a "broad area" for audit analysis since the profession must clearly accept its responsibility "to use antibiotics sensibly". However, there has been a variation in how every healthcare practitioner view sensible prescription<sup>1</sup>.

Dental practitioners worldwide regularly prescribe antibiotics for dental infections and this treatment has been influenced by personal experience and knowledge.<sup>2-4</sup> Many times, antibiotics were prescribed inappropriately to patients.<sup>4-5</sup> Thus a need for an investigation of the conditions for which unnecessary antibiotics are prescribed.<sup>6</sup> There is a paucity of literature on dentists' antibiotics prescription practices and trends. Drug use evaluation, is a mean to determine the pattern of

antibiotic prescription for patients seeking treatment.<sup>4,7</sup> WHO described rational use of medicines as "Patients receive medicines appropriate to their clinical needs and in doses that meet the individual requirements, for an adequate period of time and at the lowest cost to them and their community".<sup>8</sup> Many cases of patient diagnosis showing both inappropriate and suboptimal reported practices of Antibiotic prescription, evidenced by worldwide 50% of inappropriately prescribed, dispensed, sold drugs<sup>2,3,8-10</sup> which are often substituted for operative intervention of a dental infection<sup>5</sup> or as an adjunct, without systemic involvement.<sup>10</sup> Such practices have long-term ramifications including anaphylactic reactions to Penicillin with an estimated incidence of 0.015%-0.004%.<sup>11</sup> The aim of this study is to investigate the multifaceted areas that play a pivotal role in dentists' antibiotics prescription. Secondly, this study also investigates the protocol of antibiotic prescription followed at Islamic International Dental Hospital (IIDH). More effort is needed to comprehend the patient expectations and educating them with relevant information in order to step out of "folie a duex".<sup>12</sup>

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## Materials and Methods

A cross sectional study was carried out in the Operative Department of Islamic International Dental College, Islamabad. Post Graduate (PG) dentists who were employed full time were asked to participate voluntarily in the study. A 'Clinical Dental Audit' tool<sup>13</sup> approved by the American Dental Association (2011) was used. The dental audit comprised of questions; (i) diagnosis and history of patients and the antibiotic protocol to be followed, (ii) clinical features present, (iii) antibiotics prescribed, (iv) influences on choice of antibiotic, and (v) influencing factors on decision to prescribe antibiotic. The aim of the Clinical Dental Audit<sup>14</sup> approved by the American Dental Association (2011) was to help dentists develop and follow a consistent rationale for prescribing antibiotics; to review their prescribing patterns in order to ensure an updated evidence based prescription practice. Confidentiality and supervision was assured.

Data was collected on the most recent ten patient records of each dentist. For each case, the prescription practice was assessed, according to the clinical diagnosis. Confounding factors, such as patients' condition at the time of arrival for appointment, drug history, and patient allergy; were considered. Factors like patients' expectations, time pressures, and uncertainty of diagnosis, patient failed to co-operate with other treatment that were included in the Audit. A total of eighty patients were selected for this study. Eight PG trainees of the Operative Department were asked about the ten most recent patients that they had treated. The results obtained were transferred from Audit Recording Form as percentages into Action Summary Form and discussed with the Head of the Department of the Operative Dentistry Department. Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 17.0, (SPSS, Inc., Chicago, IL). Method of data entry involved adding up the number of ticks in each row and then recorded as a percentage.

## Results

Eight PG trainees took part in this study and filled out the audit form for ten patients each. The most common clinical signs of the presenting patients were evidence of systemic spread (swelling and

pyrexia), pain, localized swelling, gross diffuse swelling, periodontal abscess and difficulty in swallowing. Analysis of the qualitative data required a thorough discussion with the Head of Department of Operative Dentistry.

**Table I: Antibiotic Prescription Information**

AB prescription information	Percentage (%)
Percentage of people who followed the AB protocol	91.3
Clinical diagnosis of the problem recorded	100
Type of AB, dose, frequency, and duration recorded in notes	92.5
Up to date medical history available	75

In 73 out of 80 (91.3%), the PGs followed the protocol for prescribing antibiotics. In 60 out of 80 cases (75%), the trainees had an up to date medical history available. For 74 out of 80 cases (92.5%) the dosage and frequency of antibiotics was recorded in contrast to the 80 out of a total 80 cases (100%) for which the records of clinical diagnosis were readily available.

**Table II: Clinical Features Present And Antibiotics Prescribed**

Clinical Features Present	Percentage (%)	Antibiotic prescribed	Percentage (%)
Evidence of systemic spread (swelling and pyrexia)	53.8	Penicillin	1.3
Pain	65	Amoxicillin	52.5
Localized fluctuant swelling	43.8	Erythromycin	1.3
Gross diffuse swelling	7.5	Metronidazole	46.3
A periodontal abscess	21.3	Clindamycin	1.3
Difficulty in swallowing	6.3	Cefalexin	1.3
		Tetracycline	17.5
		Others	2.5

Most of the patients in the Operative Department frequently presented with pain (n=52, 65%), and with (n=35, 43.8%) of the total 80 cases having a localized fluctuant swelling. A few patients also presented with a swelling without any pain (n = 28, 35%). 43 of the 80 cases (53.8%) came in with evidence of systemic spread (swelling and pyrexia). As opposed to the localized fluctuant swelling only 6 out of 80 cases (7.5%) of the patients were diagnosed

with gross diffuse swelling and 5 of the 80 cases (6.3 %) had difficulty in swallowing. Periodontal abscesses were found in 17 out of the total 80 patients (21.3 %). Major reigning antibiotic prescription with the PG trainees were Amoxicillin in 42 cases out of 80 (52.5%) and Metronidazole in 37 cases out of 80 (46.3%) specially prescribed in cases of systemic spread. Other classes of antibiotics were not so avidly prescribed. There were cases in Operative Department exclusively where

**Table III: Influence on Choice of Antibiotic**

Influences on choice of antibiotic	Percentage (%)
The patient’s condition	78.8
Other medication that the patient is taking	57.5
Any recent antibiotics	52.5
Patient allergy	53.8

Tetracycline was prescribed approximating to 14 out of 80 cases (17.5%).

In 1 out of 80 cases (1.3 %), the PGs felt the need to do something “active”. The time pressures did not account for most of the antibiotic prescriptions, the PG trainees of the Operative Department ticked the box in negative. In patients who had had previous endodontic treatments, n= 5 (6.3%) of the total 80 patients observed antibiotic prescription.

**Discussion**

This study evaluated various aspects that influenced antibiotic prescription practices of PG trainees. Response percentages were recorded in the audit recording form, and then transferred to an action summary form and responses discussed with the Head of Department, and variables that contributed were gauged. Significant percentage, in 80 (100 %) of the cases, the clinical diagnosis was recorded as well as the antibiotic drug dose, frequency and duration in 74 (92.5 %), reflective of professionalism within PG trainees. Consequently, the most common “go-to” antibiotic drug prescribed in the Operative Department by the PGs was Amoxicillin (n=42, 52.5%). In the past, Amoxicillin was not the drug of choice for odontogenic infections.<sup>15,16</sup> However, most of the dental abscesses contain anaerobic flora that may be resistant to Penicillin but only 5% are resistant to Amoxicillin making it an ideal for drug use in odontogenic infections.<sup>15,17</sup> This accounts for increased frequency Amoxicillin prescription for

patients, along with a combination of Metronidazole the most effective drug against anaerobes.<sup>18</sup> As recorded in the Action Summary Form, antibiotics were not prescribed until strong evidence existed to suggest that the infection was systemic and it was reiterated from previous findings that periodontal abscesses are hardly a case whereby antibiotics will be prescribed.<sup>15,19</sup> The rationale for prescribing Tetracycline however is still unclear as there has been a resistance against these drugs.<sup>15</sup> Similar trend was seen in present study. Consequently, the fact that Erythromycin and Cefalexin were prescribed in 1.3% of the cases each despite these drugs having any use in each of the clinical features.<sup>20</sup> Clindamycin was prescribed in 1.3% of the cases and other unspecified drugs accounted for 2 (2.5%) out of the total 80 cases (2.5%). Clindamycin has significant therapeutic properties prompting PGs to use this as an anti-infective with good oral absorption.<sup>21</sup> Most common presenting symptom was pain in 52 out of a total 80 cases (65%) and other symptoms; localized fluctuant swelling and gross diffuse swelling though not indicative for antibiotic prescription had been used as an indication to prescribe them. Most PGs kept the general condition of the patient under assessment. If patient was originally prescribed Amoxicillin or Metronidazole, failure to alleviate symptoms of systemic spread caused switching drug therapy to a more suitable antibiotic. This revelation comes despite the earlier conflicting evidence suggesting that PGs did not follow the correct guidelines. A Norwegian study carried out expressed that patients who presented with symptoms wanted fewer prescriptions and not vice-versa, necessitating dentists to eliminate “foliea deux” from influencing them.<sup>13</sup> The findings of this discussion clearly showed that there have been cases where antibiotics were unduly prescribed. But due to multifaceted nature of the factors, we cannot clearly say that there was no protocol followed. There is still, a substantial need for education resulting in behavioral changes in prescription practice<sup>22,23</sup> In cases where odontogenic infections exist, prudent use of antibiotics in conjugation with surgical procedures is necessary.<sup>24</sup> Certain limitations were also found in the study including what appeared to be prophylactic use of antibiotics in high risk endodontic dental procedures.<sup>25</sup> This study is a cross

sectional study but a longitudinal study would be of greater benefit. Cases where indication for use of

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