

## Antibiotic prescription patterns in a Dental college located in Northern India

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### Abstract

**Introduction:** Antibiotics are a boon for infection control; however, injudicious prescription of these drugs cause resistance and is a matter of concern. The assessment of awareness and knowledge of antibiotics prescription among clinicians is important for preventing the development of this resistance.

**Aim and Objectives:** To assess the knowledge, attitude and practice of dentists towards antibiotic prescription in a dental college located in Northern India.

**Materials and Method:** A total of 102 dentists divided into three groups – Faculty (n=17), Post-graduate students (n=27) and Interns (n=58) were invited to participate in the study. The participants belonged to various branches of dentistry.

**Results:** The study revealed that higher percentage of respondents prescribed antibiotics in localized dental infections that do not need antibiotic coverage under usual circumstances (acute periapical infection, reversible pulpitis, irreversible pulpitis, apical periodontitis). The results showed that 5.8% Post-graduates and 18.6% Interns would advise antibiotics for cases of herpes labialis, a viral infection. Majority of respondents, especially from the Post-graduates and Interns group reported that they prescribe antibiotics because of fear of post-operative complications.

**Conclusion:** The general awareness about appropriate use of antibiotics in various dental pathologies is generally limited even in the Pharmacology teachers because of their background in Medical field, rather than Dental backgrounds.

**Keywords:** Antibiotic, Dental infections, Viral infections, Drug Prescription.

### Introduction

Antibiotics are one of the most commonly prescribed drugs by dentists.<sup>(1)</sup> While hours spent in the subject of pharmacology delivers academic knowledge regarding different classes of antibiotics, their pharmacokinetics and pharmacodynamics, very little is instructed about the practical aspects of their daily usage. In India, pharmacology is taught in the second year of BDS curriculum when practical knowledge about various dental and orofacial infections as well as clinical judgement of a dental student is negligible.<sup>(2)</sup> Also, the lessons are taught by teachers from medical backgrounds who have considerably limited knowledge regarding various orofacial pathologies themselves. By the time the student is appraised with various orofacial infections in the clinic, most of his hard learnt concepts have evaporated.

Starting from dental caries through periapical abscess and finally space infection, all stages represent a pathologic continuum.<sup>(3)</sup> The riddle as to which stages of these processes need antibiotic coverage has not been eluded to majority of dentists world-wide because reviews and meta-analysis from various countries report antibiotic misuse by dental professionals and demand improvement in prescription practices.<sup>(4,5)</sup>

Another question that remains unanswered is whether antibiotic coverage during restorative or endodontic work or extractions actually improves the treatment outcome. Majority of the dentists in India prescribe antibiotics prior to starting a root canal treatment or an extraction.<sup>(6)</sup>

In order for improvement in antibiotic prescribing practices, which is imperative, all institutions must initiate audits within their institutions for controlling the patterns of antibiotic prescription. Internal audits, such as this, could help create a lot of awareness within the institution. Because all dental institutions render treatment and prescribe antibiotics they should consider their own role in preventing antibiotic resistance.<sup>(7)</sup>

The purpose of this survey was to reveal the current antibiotic prescription patterns at I. T. S. Dental College, Hospital and Research Centre, Greater Noida, Uttar Pradesh.

### Materials and Method

It is a questionnaire based study conducted at I.T.S Dental College, Greater Noida in June 2016 over a period of two weeks. Total 102 Faculty, Post Graduate students and Interns from various Clinical departments were part of the study. A questionnaire was circulated through various departments of the college pertaining to various questions regarding antibiotic prescription practices. All participants were given a self structured questionnaire. The questions in the form were to be answered in Yes or No. It was to be filled and returned on the same day. The questionnaire consisted of various questions regarding need of antibiotics in various orofacial infections. The study questionnaire and pattern was approved by the Ethical Committee of the institution.

## Results

The questionnaire given comprised of questions with different situations where the participant would prescribe antibiotics or not. The conditions given were localized infections or dental sequelae, spreading dental infections such as dentoalveolar abscess or cellulitis, chronic inflammatory periodontal conditions, before and after extractions or impaction surgeries, viral infections such as herpes labialis, pain, fear of post-operative complications, as short course antibiotic coverage, or prophylactically.

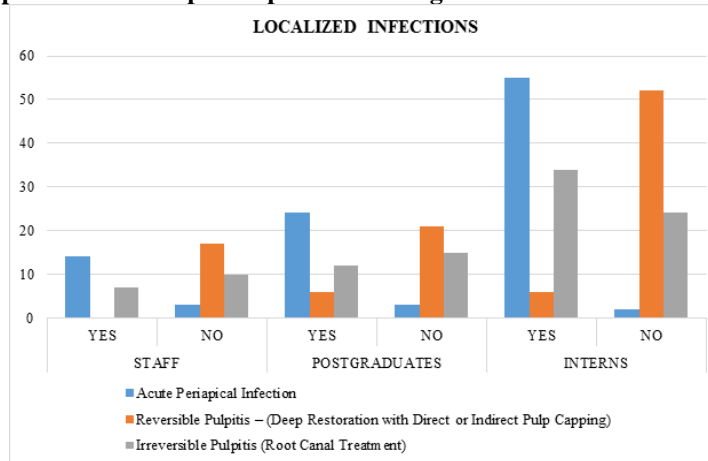
The responses to these questions were evaluated and the judgment of antibiotic prescription was evaluated for faculty, post graduate students and interns independently.

1. **Localized infections** (Graph 1) [acute periapical infection, reversible pulpitis, irreversible pulpitis,

apical periodontitis]: 14 (n=17) Staff, 24 (n=27) Post-graduates and 55 (n=58) Interns believed that antibiotics are required for acute periapical infections. No staff, 6 (n=27) Post-graduates and 6 (n=58) Interns reported that they would prescribe antibiotics for reversible pulpitis. 7 (n=17) staff, 12 (n=27) post-graduates and 34 (n=58) interns reported that they would prescribe antibiotics for irreversible pulpitis or during a root canal treatment.

The results revealed higher rates of antibiotic prescription by all three groups in stages of dental infection that does not need antibiotic coverage [Interns>Postgraduates>Staff]. This reveals the essence of antibiotic abuse, and seems to root from either influence of lack of adequate knowledge or accepting suggestions of equally uneducated peers, or fear of potential post-operative complications.

**Graph 1: Antibiotic prescription knowledge towards localized infections**

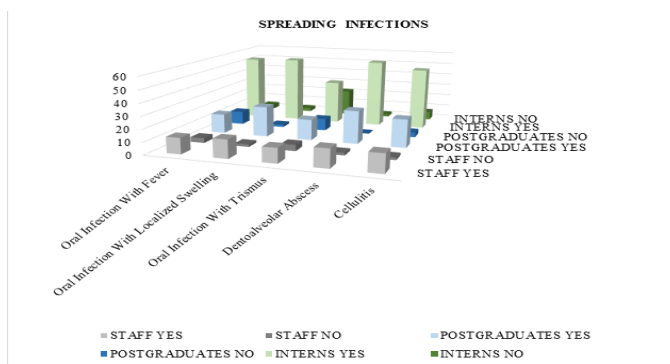


2. **Spreading dental infections** (Graph 2) [*Fever, localized swelling, trismus, dentoalveolar abscess, cellulitis*]: 4 (n=17) Staff, 11 (n=27) Post-graduates and 4 (n=58) Interns reported that they would not prescribe antibiotics for an Oral Infection with fever. 2 (n=17) Staff, 2 (n=27) Post-graduates and 3 (n=58) Interns reported that they would not prescribe antibiotics for an oral infection with localized swelling. 5 (n=17) staff, 10 (n=27) post-graduates and 22 (n=58) interns reported that they would not prescribe antibiotics for an oral infection with trismus. 2 (n=17) staff, no post-graduates and 2 (n=58) interns reported that they would not prescribe antibiotics for a dentoalveolar

abscess. 2 (n=17) Staff, 4 (n=27) Post-graduates and 7 (n=58) Interns reported that they would not prescribe antibiotics for a case of cellulitis.

Spreading of infection from the tooth pulp into surrounding regions requires antibiotic coverage along with incision and drainage through the root canal itself or through surgical intervention wherever possible. Many members from all the three groups maintained that antibiotics need not be given in these stages of infection [Interns=Postgraduates>Staff]. This represents that knowledge about principles of antibiotic prescription are significantly flawed as many respondents would rather not prescribe antibiotics in these cases, in face of 'antibiotic abuse'.

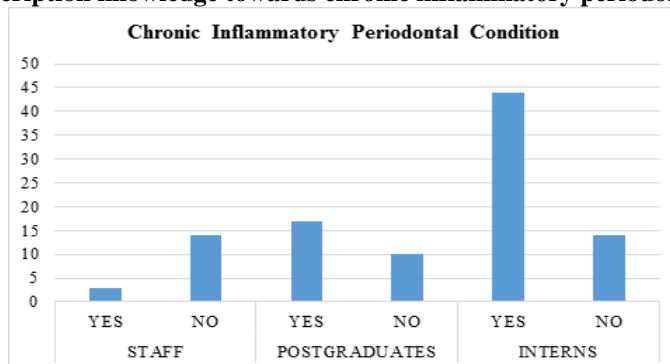
**Graph 2: Antibiotic prescription knowledge towards spreading dental infections**



**Chronic inflammatory periodontal conditions:** 0 (n=17) Staff, 6 (n=27) Post-graduates and 19 (n=58) Interns reported that they would prescribe systemic antibiotics to patients suffering from chronic inflammatory periodontal conditions.

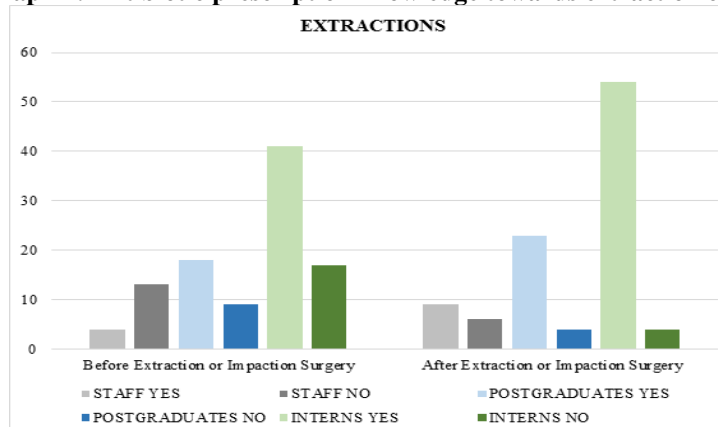
- Antibiotics do not have any role in chronic periodontal conditions and their prescription in such conditions is actually unwarranted.<sup>(8)</sup> [Interns>Postgraduates>Staff] The graphs reflect the poor knowledge and awareness of Interns as well as Post-graduates regarding the basics of antibiotics and disease processes involved in chronic periodontitis. (Graph 3)

**Graph 3: Antibiotic prescription knowledge towards chronic inflammatory periodontal conditions**



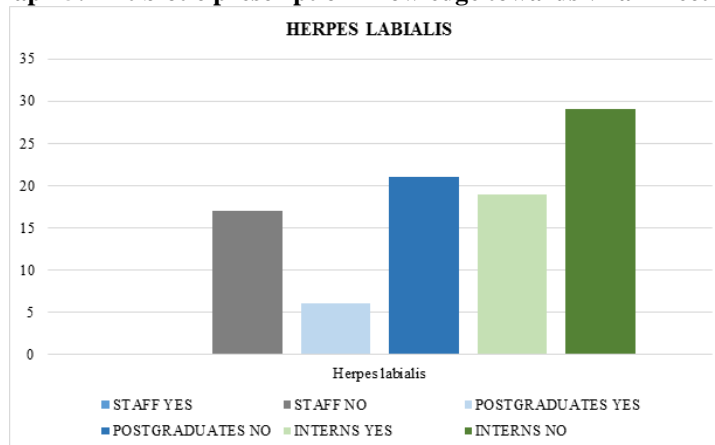
- Before and after extractions and impaction surgeries** (Graph 4): A large number of respondents (4 (n=17) Staff, 18 (n=27) Post-graduates and 41 (n=58) Interns) from all the three groups reported that they would prescribe antibiotics before and (9 (n=17) Staff, 23 (n=27) Post-graduates and 54 (n=58) Interns) after an extraction or impaction surgery [Interns>Postgraduates>Staff]. Prescribing antibiotics before and after a general out-patient dental surgery is a redundant practice, at least theoretically. But in India it is a common practice amongst many dental practitioners.

**Graph 4: Antibiotic prescription knowledge towards extraction cases**



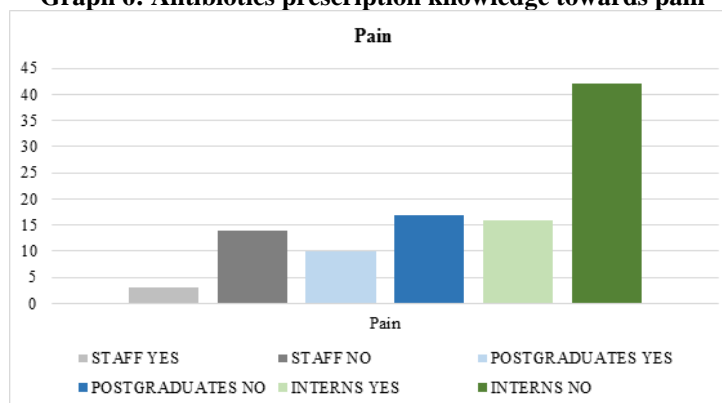
5. **Viral Infections** (Graph 5): 0 (n=17) Staff, 6 (n=27) Post-graduates and 19 (n=58) Interns reported that they would prescribe antibiotics for management of Herpes labialis. This illustrates the height of antibiotic abuse of antibiotics in Herpes labialis – a manifestation of a viral infection [Interns>Postgraduates {Staff=0}].

**Graph 5: Antibiotic prescription knowledge towards viral infections**



6. **Pain** (Graph 6): 3 (n=17) Staff, 10 (n=27) Post-graduates and 16 (n=58) Interns reported that they would prescribe antibiotics for management of pain complaints. According to a Cochrane review, Antibiotics do not have any analgesic effect whatsoever, and such prescription is uncalled for and represents antibiotic abuse.<sup>9</sup> Reduction in the spread of infection reduces inflammation which later reduces pain. Such an effect can also be attained by proper dosage of an analgesic alone.

**Graph 6: Antibiotics prescription knowledge towards pain**

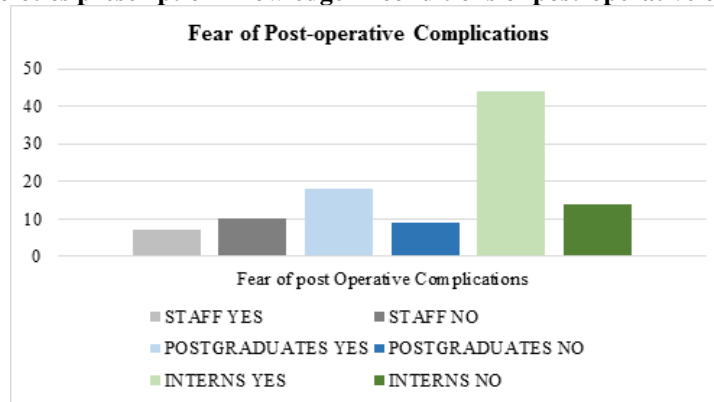


7. **Fear of post-operative complications** (Graph 7): 7 (n=17) Staff, 18 (n=27) Post-graduates and 44 (n=58) Interns reported that they would prescribe antibiotics because of fear of post-operative complications.

Fear of post-operative complications seems to be an important reason for antibiotic prescription [Interns>Postgraduates>Staff] among all the groups. Establishment of prognosis and predicting the possible

post-operative complications through appropriate investigations differentiates an average dentist from an astute oral physician. The way antibiotics are being prescribed due to 'fear of possible post-operative complications' seems to stem from a lack of clinical experience, knowledge or lack of confidence in the treatment that the dentist is rendering. Adequate knowledge as well as experience will abolish such fears and thus help reduce antibiotic abuse in our society.

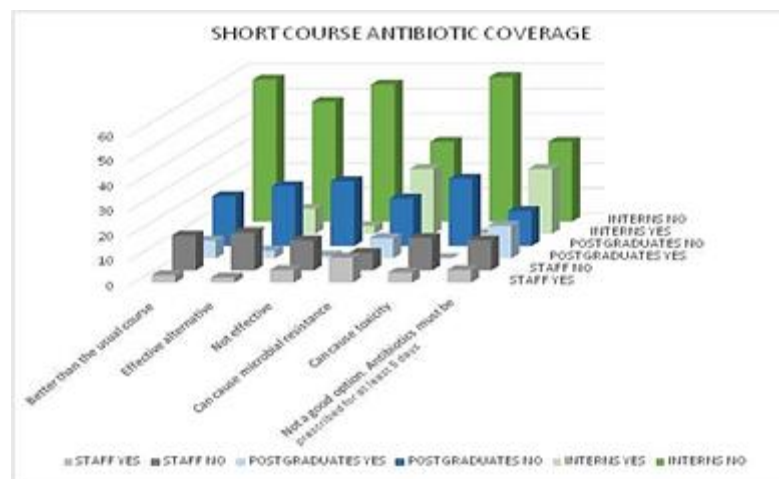
**Graph 7: Antibiotics prescription knowledge in conditions of post-operative complication fear**



8. **Short course antibiotic coverage** (Graph 8): 14 (n=17) Staff, 20 (n=27) Post-graduates and 57 (n=58) Interns reported that they do not consider short course antibiotic therapy to be superior to standard therapy. 15 (n=17) Staff, 24 (n=27) Post-graduates and 48 (n=58) Interns reported that they do not consider short course therapy to be effective. 10 (n=17) Staff, 8 (n=27) Post-graduates and 26 (n=58) Interns reported that they believe that short course antibiotic therapy could cause antibiotic resistance and only 4 respondents from the Staff group believed that it could cause toxicity.

Knowledge of many respondents seems to be limited regarding the short course antibiotic therapy i.e. two dose 3g amoxicillin in a day [Interns>Postgraduates>Staff]. Many of them feel that the short course could cause microbial resistance [Interns>Postgraduates>Staff]. Also, a large number of respondents believe that antibiotics should be prescribed for at least 5 days. The short course of antibiotic administration had been accepted to be rather better than the usual course as it reduces the chances of microbial resistance and improves compliance.<sup>(10)</sup> The earlier concept of administering antibiotics for a fixed number of days has now been abolished.

**Graph 8: Antibiotics prescription knowledge towards short-course antibiotic coverage**



9. **Antibiotic prophylactic coverage** (Graph 9): 15 (n=17) Staff, 22 (n=27) Post-graduates and 51 (n=58) Interns reported that they would prescribe prophylactic antibiotic coverage for Native or prosthetic Heart Valve disease. 9 (n=17) Staff, 16 (n=27) Post-graduates and 41 (n=58) Interns reported that they would use prophylactic coverage for patients with Cardiac pacemakers. 7 (n=17) Staff, 13 (n=27) Post-graduates and 22 (n=58) Interns reported that they would prescribe

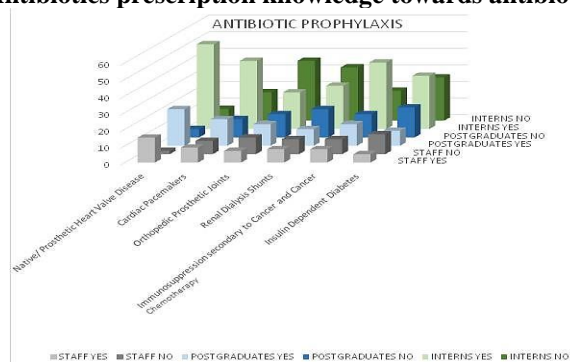
prophylactic coverage for patients with Orthopedic Prosthetic joints. 8 (n=17) Staff, 10 (n=27) Post-graduates and 26 (n=58) Interns reported that they would prescribe prophylactic antibiotic coverage for patients on renal dialysis. 8 (n=17) Staff, 13 (n=27) Post-graduates and 40 (n=58) Interns reported that they would use prophylactic coverage for patients who are Immunosuppressed secondary to cancer and/ or cancer chemotherapy. 5 (n=17) Staff, 9 (n=27) Post-graduates and 32 (n=58)

Interns reported that they would use prophylactic antibiotic coverage for patients with diabetes.

Antibiotic prophylactic coverage is another dimension of antibiotic prescription that represents inadequate utilization of the gift of antibiotics. Many respondents [Interns>Postgraduates>Staff] believe that there is no need of antibiotic prophylaxis in (Native/

Prosthetic Heart Valve Disease, Cardiac Pacemakers, Orthopedic Prosthetic Joints, Renal Dialysis Shunts, Immunosuppression secondary to Cancer and Cancer Chemotherapy, Insulin Dependent Diabetes). This could stem from either inadequate skill of taking past medical history or lack of knowledge about these conditions.

**Graph 9: Antibiotics prescription knowledge towards antibiotic prophylaxis**



## Discussion

This whole survey in its different segments thus represents that knowledge about antibiotics is generally poor among the various dentists in the institution. The general awareness about appropriate use of antibiotics in various dental pathologies is generally limited even in the Pharmacology teachers because of their background in Medical, rather than Dental backgrounds. Definitely, the knowledge of Staff and Postgraduates are specialists who render treatment according to their specialties must be adept, it is actually the Interns who will be treating the bulk of the populations. It is thus imperative that these students be clear about the proper prescription patterns of antibiotics.

It must be stressed that antibiotic prescription patterns should attend to three basic issues.

1. *Their intended use*: Antibacterial effects
2. *Their feared effects*: Microbial resistance
3. *Their possible effects*: Side effects

Most dental students are taught about the first issue, both academically as well as practically in the second year in Pharmacology as well in the respective clinical trainings in third and final years. Thus according to the clinical presentation at hand, most students are capable of prescribing antibiotics for disease control but their concerns for causing microbial resistance are almost non-existent. The process of microbial resistance because of unclassified prescription of antibiotics is an incipient phenomenon with no immediate consequences of personal interest.<sup>(11)</sup> It would take academic as well as social education to motivate a general dental student to make him or her appreciate these concerns.

Also, side effects of antibiotics are quite common even in healthy patients. Many patients with medical

comorbidities need dose adjustments.<sup>(12)</sup> Ability to make these adjustments require not only knowledge about the antibiotic to be prescribed, but also the particular medical comorbidity in question. This in turn requires good skills in recording a case history and good knowledge in General Medicine. At times it might seem cumbersome to a general dental student, but they should realize or be made so, that it is their responsibility to be aware of these basic questions in detail:

- a. To whom are they prescribing a drug?
- b. What drug are they prescribing?
- c. Why are they prescribing it?
- d. What are the possible complications at the individual as well as the community level?

## Conclusion

On a broader perspective it can be suggested that acquiring better knowledge about principles of antibiotics, will benefit doctors, patients and the whole community would be benefitted, because the emerging menace of microbial resistance is an ecological one, as stated in various international forums.

We as an institution are bound ethically to improve our knowledge, especially when it has been outlined in a tangible format through this survey. We could schedule extensive separate educational programs for students as they enter the clinics, as well as the postgraduates while they are attending their basic sciences lectures. Planning Continuing Dental Education programs regarding antibiotic use and abuse might be very well accepted by the dental fraternity and is actually the call of the hour.

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