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Research Article

KNOWLEDGE, ATTITUDE, AND PRACTICE ON ANTIBIOTIC THERAPY FOR PEDIATRIC PATIENTS AMONG UNDERGRADUATE DENTAL STUDENTS-A QUESTIONNAIRE SURVEY

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ABSTRACT

Objective: The objective of this study is to understand the knowledge, attitude, and practice on antibiotic therapy for pediatric patients among dental students.

Methods: A self-administrated questionnaire containing both open-ended and closed-ended questions was given to 100 participants. Questions were regarding the conditions, for which they routinely prescribe antibiotics, commonly prescribed antibiotics, its dosage adjustments and form, duration of administration, etc. The data were compiled and analyzed.

Results: Amoxicillin was found to be the most commonly prescribed antibiotic by the students followed by metronidazole. 14% of the students prescribe half the adult dose invariably for all pediatric patients, whereas 74% of them make their prescriptions based on the child's weight. 78% of the students reported that they are unsure about the pharmacokinetics and pharmacodynamics of the antibiotics they are prescribing. 34% of the students reported that their knowledge on antibiotic therapy for pediatric patients is inadequate.

Conclusion: Self-evaluation by the students and results of the survey suggest that the knowledge on antibiotic therapy for pediatric patients is inadequate among dental students. There should be more emphasis on antibiotic therapy in the curriculum of undergraduate dental students.

Keywords: Antibiotic resistance, Pediatric patients, Odontogenic infection, Pain.

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INTRODUCTION

Odontogenic infections are commonly encountered by dentists during their practice. Antibiotics are frequently included in the prescription for the prevention and treatment of these infections. An antibiotic can be called as a double-edged sword. Injudicious usage of antibiotics can lead to gastrointestinal irritation and antibiotic resistance. A practitioner has to be very careful during the prescription to avoid complications that can arise due to allergic responses to antibiotics. Most of the periapical and periodontal infections should be treated primarily by their definitive non-surgical or surgical therapy. The usage of antibiotics is only recommended as an adjunct if required. Yet, various antibiotics are frequently prescribed for short period by dentists [1].

Drug dosage for pediatric patient varies from that of an adult. The dosage is generally calculated based on the body weight of the child. Reports suggest that overuse of antibiotics in pediatric patients is causing incidence of fatal diarrhea and diminished sensitivity of gut microbes. The rise in resistance may be related to abuse of broad spectrum antibiotics. Some bacterial strains, which are resistant to the full range of antibiotics available today, have been identified. Overuse and abuse of antibiotics were recognized as a major problem by the WHO. The WHO theme for the year 2011 was "Antibiotic Resistance: No action today, No cure tomorrow" [2,3].

The knowledge acquired by a dentist during his training period can influence his pattern of dental practice throughout his career. The audit commission of the UK had reported that undergraduate medical courses do not provide thorough knowledge on prescription and administration of drugs to junior doctors [4]. This study was conducted to understand the awareness among dental students on antibiotic therapy for pediatric patients. No study had been conducted till date exclusively to analyze the knowledge and awareness about antibiotic therapy for pediatric patients among dental students.

METHODS

A cross-sectional survey was designed to determine the knowledge, practice, and awareness among undergraduate dental students on antibiotic therapy for pediatric patients. 100 students were randomly chosen from among the undergraduate dental students in Chennai. First year and second year dental students were excluded as they do not treat patients in the clinic. A questionnaire containing 15 questions were distributed among the students. The questionnaire contained both open-ended and closed-ended questions. Questions were regarding the number of pediatric patients each student attends per month, the conditions for which they routinely prescribe antibiotics, commonly prescribed antibiotics, its dosage adjustments and form, duration of administration, etc. There were questions about the level knowledge on the indications, contraindications, pharmacokinetics, and dynamics of the prescribed antibiotics. Students were also asked about antibiotic sensitivity tests, resistance, and the newer antibiotics approved by Food and Drug Administration. The data were compiled and analyzed.

RESULTS

A total of 100 students took part in the survey. Out of these, 60% attend an average of 3-5 pediatric patients per month, and 12% attend more than 5 children in the OP. All the students have prescribed antibiotics for their pediatric patients at least once. The drug, which all of them prescribe, is amoxicillin. 86% of the students prescribe antibiotics for a period of 3-day, whereas 6% of them prescribe a 5-day course of antibiotic. 6% of the students reported that they prescribe antibiotic only for 1-2 days. Table 1 shows the conditions, for which antibiotics are being prescribed by students along with the percentage of students prescribing it.

Around 56% of the students reported that their prescription would change if there is a periapical infection. Out of these 56%, the majority did not know what other antibiotics can be prescribed. Fig. 1 shows the self-evaluation of students on their knowledge and awareness of the indications and contraindications of the antibiotics they are prescribing.

All the students gave a negative response when questioned on whether they go for antibiotic sensitivity testing before prescription. None has encountered a case of antibiotic resistance till date. All the students prescribe antibiotics in the form of tablets. 4% of the students reported that they do not always question the patients for the history of adverse reactions to the drugs that are being prescribed to them. Regarding dose adjustments, 14% of the students prescribe half the adult dose invariably for all pediatric patients, whereas 74% of them make their prescriptions based on the child's weight and the rest based on the age of the child. 78% of the students reported that they are unsure about the pharmacokinetics and pharmacodynamics of the antibiotics they are prescribing. All of them reported that they are aware only about a few newer antibiotics. Fig. 2 shows the self-evaluation on their depth of knowledge and awareness about antibiotic therapy for pediatric patients.

DISCUSSION

Data from various studies have shown that unnecessary antibiotics are being prescribed in inappropriate conditions in dentistry. This may be due to the inadequacy of dentist's knowledge and patients expectations of an antibiotic prescription. It may also be linked to the lack of concern of the dentist over the long-term side effects of his prescription [5]. The injudicious use of antibiotics can lead not only to resistant bacterial strains and adverse reaction but also it adds to unnecessary economic burden to the patient [6]. It is very important to ensure that the knowledge on basics of antibiotic therapy is imparted into dental students right from the time they start their clinical practice. A failure to do so may produce dentists who overuse and abuse antibiotics.

Table 1: Antibiotic prescription rate among the respondents

Condition	Prescription rate (%)
Reversible pulpitis	30
Irreversible pulpitis	44
Periapical abscess	50
Dentoalveolar abscess	52
Extraction	66
Trauma	34

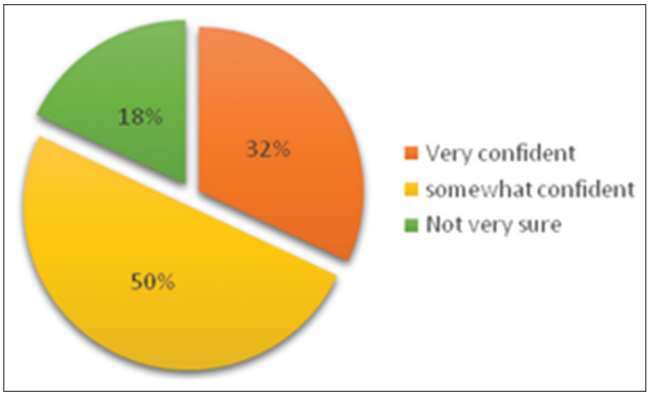

Fig. 1: Pie chart depicting the self-evaluation of students on their knowledge and awareness on antibiotic prescription

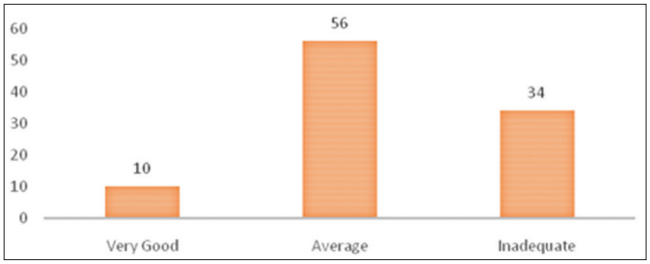

Fig. 2: Bar diagram depicting self-evaluation of students on their depth of knowledge and awareness about antibiotic therapy for pediatric patients

The most common encountered problem in a dental clinic is pain. The cause of the pain may or may not be an infection. If the cause of pain is not an infection, there is no point whatsoever in prescribing antibiotics. Not all odontogenic infections require antibiotic therapy. Pain from pulpitis can be managed by pulpectomy or pulpotomy. Antibiotics may be used as an adjunct in the treatment. But, it does not provide any additional benefit. Antibiotics are not effective in preventing and managing flare-ups [7]. In the present study, 74% of students prescribe antibiotics for patients with pulpitis. This may be with the intention of preventing systemic infections which are unlikely to occur. The use of antibiotics for inflammatory conditions such as pulpitis should be limited to immunocompromised patients [6]. Studies show that the periapical lesions associated with pulpitis in many cases are caused by immune mechanisms fighting against the toxins produced by the bacteria residing in the necrotic pulp. There is no adequate blood supply to the pulp in these cases for achieving therapeutic concentrations of these antibiotics. Hence, removing the source of infection is the best and definite way to treat these periapical infections [2].

In the current study, 66% of the students prescribe antibiotics following extractions. The evidence of antibiotics being helpful in preventing further infection from intraoral surgical wounds is considerably less. This suggests that antibiotic prophylaxis following surgical procedures such as extraction in an otherwise medically fit individual is unnecessary [2]. The non-indicated conditions for antibiotic therapy in dentistry include acute periapical infection, dry socket, and pulpitis. Chronic inflammatory periodontal conditions also do not require systemic antibiotic therapy. Only in acute periodontal conditions, where drainage and debridement are impossible, antibiotic therapy is indicated. Antibiotics should be prescribed if there are signs of systemic spread of infection such as fever [8].

A study conducted in Uttar Pradesh showed that the most commonly prescribed antibiotic is amoxicillin followed by metronidazole. This is coinciding with the findings of our present study. Penicillin, clindamycin, erythromycin, cefadroxil, metronidazole, and tetracycline are the drugs, which are active against various oral flora [9]. Erythromycin is ineffective in the treatment of dental infections. This is due the poor absorption of this drug and rapid emergence of antibiotic resistance. Prescription of erythromycin is indicated only in those who are allergic to penicillin. Furthermore, injudicious prescription of tetracycline is contraindicated, especially in children as it can give raise to staining [10]. Studies show that though the dentists prefer broad spectrum antibiotics, the commonly prescribed drug is amoxicillin which is extended spectrum penicillin. This is a contradiction and may suggest the lack of knowledge on the spectrum of activity of antibiotics [9]. A study conducted in Jordan showed that dentists prescribe unnecessary antibiotics in irrelevant clinical conditions for unscientific reasons such as "need to delay treatment" and "sterilization not guaranteed" [11].

Duration of antibiotic course showed the difference in various studies. However, a short course of antibiotic usage for 2-3 days is advisable as it has shown improvement in patient's condition as well as compliance from children [1]. Usage of subtherapeutic dosage for long duration can lead to the development of mutant strains [2]. In addition, this can lead to the destruction of normal flora in the gut and oral cavity and hence pave the way for superinfections which are undesirable [3].

Around 4% of the students reported that they do not always question the patient about the history of adverse drug reactions. Not questioning the patient on the history of allergy, wrong duration for an antibiotic prescription, and improper dosage can have adverse impact on patient's health and can lead to failure of therapy. Studies have shown that wrong drug posology is the most commonly seen prescription error among students. It is a serious issue that needs to be addressed as it can hamper patient's health [12].

Many studies suggest that antibiotic prescription by postgraduate dentists is much lesser when compared to that of undergraduate doctors. It is proposed that this difference may be due to better understanding of the disease conditions and superior diagnostic and treatment skills [2].

Dental students should be provided education on judicious administration of antibiotics. They should be educated to provide correct drug, at the correct dosage for the right duration of time. An antibiotic should be prescribed only when the benefits outweigh it adverse effects. Misuse of antibiotics can expose the patient to suboptimal doses of antibiotics and would create an environment that promotes the development of resistant strains. The prescription should be rational, and patient's financial status also should be considered while prescribing antibiotics [13-17]. American Academy of Pediatrics guidelines for antibiotic prescription should be made part of the curriculum and steps are to be taken to motivate students on updating their knowledge on antibiotics.

CONCLUSION

Self-evaluation by the students and results of the survey suggest that the knowledge on antibiotic therapy for pediatric patients is inadequate among dental students. There should be more emphasis on antibiotic therapy in the curriculum of undergraduate dental students. Small sample size and less number of open-ended questions were the drawbacks of the present study. Yet, it reveals the inadequacy of the curriculum to impart sufficient knowledge on antibiotic therapy among the budding dentists. If adequate steps are not taken now, the overuse and abuse of antibiotics are going to continue, and there is not going to be any cure for the antibiotic resistant strains tomorrow.

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