

Preference of antibiotics in pediatric dentistry

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ABSTRACT

Aim: This study aims to estimate the preference of antibiotics in pediatric dentistry. **Introduction:** Antibiotics are prescribed for oral conditions related to endodontic, oral surgical, and periodontal manifestations. Unwarranted use of antibiotics is reported in children, mostly for ear and dental infections. However, in children, increasing microbial resistance to antibiotics is a well-documented and is a serious global health concern. Antibiotic resistance is due to inappropriate use of antibiotics by clinicians. **Materials and Methods:** A set of questionnaire was framed and the survey was conducted among 85 dentists. This was done using Survey Planet. The answers given by dentists were studied and the use of antibiotics in pediatric dental practice was determined and the results were statistically analyzed. **Results:** There are many circumstances during dental treatment where antibiotics are prescribed by dentists to prevent further infection. When dentists were asked about whether they prescribe antibiotics to their pediatric patients, about 69.4% of them prescribed antibiotics and about 31.6% of them were not prescribing any kind of antibiotics for their pediatric patients. Amoxicillin is one of the most prescribed antibiotics in the field of dentistry. About 17.5% of dentists preferred amoxicillin as antibiotic to their pediatric patients. The most commonly used antibiotic in dental practice, penicillins, in general, were found to be the most commonly prescribed antibiotics by dentists, the most popular one being amoxicillin (24,25). About 13.1% of dentists prescribed penicillin as antibiotics. About 52.9% of dentists were unaware of the new generation of antibiotics and about 67.1% of dentists did not do any kind of antibiotic sensitivity test before prescribing antibiotics. **Conclusion:** Appropriate and correct use of antibiotics is essential to ensure that effective and safe treatment is available. Practices that may enhance microbial resistance should be avoided. To improve standards of care, dentists need to be up-to-date in their knowledge of pharmacology in dental education.

KEY WORDS: Pediatric dentistry, Antibiotics prophylaxis, Treatment

INTRODUCTION

Antibiotics are prescribed in dental practice for prophylactic and therapeutic reasons. Prophylactic antibiotics are prescribed to prevent diseases caused by members of the oral flora introduced to distant sites in a host at risk or introduced to a local compromised site in a host at risk.^[1] In most cases, prophylaxis is used for the prevention of endocarditis. Therapeutic antibiotics are prescribed, in most cases, to treat diseases of the hard and soft tissues in the oral cavity after local debridement has failed.^[2] Antibiotics are prescribed for oral conditions related to endodontic, oral surgical, and periodontal manifestations. Unwarranted use of antibiotics is reported in children,^[3] mostly for ear and dental infections. However, in children, increasing

microbial resistance to antibiotics is a well-documented and is a serious global health concern.^[3-5] Antibiotic resistance is due to inappropriate use of antibiotics by clinicians. One factor that may contribute is the inappropriate use of antibiotics in dentistry. According to Pallasch,^[6] antibiotic misuse in dentistry mainly involves prescribing them in “inappropriate situations” or for too long, which includes – giving antibiotics after a dental procedure is complete in an otherwise healthy patient to “prevent” an infection, which in all likelihood will not occur. The impression is that antibiotics continue to be prescribed by dentists as much or more as in the past, despite the scarcity of clinical trials demonstrating the need for antibiotics. Dentists want to make their patients well and to prevent unpleasant complications. These desires, coupled with the belief that many oral problems are infectious, stimulate the prescribing of antibiotics.^[7] Textbooks, continuing education lectures, and dental school instructors have likely directed that antibiotics be used

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(though empirically). There is also the impression that patients get better when given antibiotics. The reality is that signs and symptoms are usually cyclical and will often improve spontaneously, then deteriorate later. The temporary improvement is likely in spite of and not due to the prescribed antibiotic. The antibiotic prescribed most frequently is penicillin or an analog, especially amoxicillin.^[8-10] However, other new-generation antibiotics are becoming more widely used due to the belief that these are more effective, and they are more expensive. This belief may be based more on marketing than on the fact, as their effectiveness has not been demonstrated in clinical trials.^[11]

The goal of antibiotic treatment is to use the smallest amount of the agent most effective against the microorganism causing the infection.^[12] It is desirable to choose an agent with a narrow, specific spectrum of activity with as few adverse effects as possible. The surest way to determine which antibiotic will be most effective is to isolate the offending organism with culture and sensitivity tests of the infected area;^[13-16] however, it is not always possible to secure an uncontaminated sample from the diseased part, particularly when it is located in the mouth (with its own endemic diverse flora). Moreover, there will be certain instances when it is prudent to begin an immediate course of antimicrobial therapy. In such circumstances, a knowledge of the most likely organism is invaluable.^[17] The duration of drug therapy should extend at least 5 days past the point of substantial improvement or resolution of symptoms. The importance of completing a full course of antibiotic therapy must be emphasized to the patient.

It has been shown that wound infection rates after dental extractions, third molar surgery, and orthognathic surgery are lower than 1%.^[18] Therefore, antibiotic prophylaxis is not indicated in these situations unless the immune system of the patient is compromised. Whether the prophylactic use of antibiotics is justified in healthy patients in situations where the surgical site is highly contaminated with microorganisms (e.g., in periodontal surgery) remains controversial.^[19] Furthermore, extraction of several teeth under general anesthesia has been found to cause post-operative temperature elevation possible due to bacteremia. The use of antibiotics may be justified although the need is controversial.^[20] A factor that may suggest the use of antibiotics is the insertion or presence of foreign body, most commonly dental implants. Most data seem to suggest that the use of antibiotics may decrease the incidence of infection when foreign bodies, such as dental implants, are inserted into jaws. Autotransplantation of teeth is usually performed under antibiotic prophylaxis. In this situation, antibiotics are administered to reduce the incidence of root resorption. When prophylactic

antibiotics are used to prevent local wound infection, the antibiotic level in the plasma must be higher than when therapeutic antibiotics are used. The usual recommendation for prophylaxis is that the drug is given in a dosage at least 2 times the usual therapeutic dosage before the surgery begins. Unless the surgery is prolonged, a single dose is recommended.

MATERIALS AND METHODS

A set of questionnaire was framed and the survey was conducted among 85 dentists. This was done using Survey Planet. The answers given by dentists were studied and the use of antibiotics in pediatric dental practice was determined and the results were statistically analyzed.

RESULTS

A total of 85 dentists actively participated in this questionnaire study. The study was based on the use of antibiotics in pediatric patients and the following Table 1 contains the questions prepared and the number of responses given with percentage.

Table 1: Survey questionnaires

1. Do you prescribe antibiotics to your pediatric patients?		
Yes	59	69.4%
No	26	30.6%
2. How do you calculate the dosage of particular antibiotics?		
Based on age	33	25%
Based on weight	57	43.3%
Based on severity of disease	42	31.8%
3. Modes of administration?		
Oral route	49	29%
Intravenous	39	23.1%
Subcutaneous	17	10.1%
Intra-arterial	36	16.6%
4. What are the common antibiotics you prescribe to your pediatric patients?		
Acetaminophen	34	13.7%
Aspirin	44	24%
Penicillin	24	13.1%
Cephalexin	10	5.5%
Amoxicillin	32	17.5%
Ampicillin	25	13.7%
5. What are the common side effects of the antibiotics you prescribe?		
Gastric irritation	30	15.8%
Nausea	38	20%
Vomiting	46	24.2%
Headache, tinnitus, depression	33	17.4%
Rashes itching	17	8.9%
Hypersensitivity	16	8.4%
Aspirin-induced asthma	10	5.3%
6. Duration of antibiotics?		
2-5 days	23	17.1%
7 days	29	34.1%
More than 7 days	33	38.8%
7. Are you aware of new generation of antibiotics?		
Yes	40	47.1%
No	45	52.9%
8. Do you do antibiotic sensitivity test?		
Yes	28	32.9%
No	57	67.1%

DISCUSSION

There are many circumstances during dental treatment, where antibiotics are prescribed by dentists to prevent further infection. When dentists were asked about whether they prescribe antibiotics to their pediatric patients, about 69.4% of them prescribed antibiotics and about 31.6% of them were not prescribing any kind of antibiotics for their pediatric patients [Figure 1].

Different antibiotics have different effects on pediatric patients with different age group and also based on weight. Depending on this fact, the dosage of antibiotics is calculated and prescribed mainly to pediatric patients. And also, the dosage is defined based on severity of a disease. In this study, about 25% of dentists mainly calculated the dosage of antibiotics based on age and about 43.3% based on weight and about 31.8% based on severity of disease [Figure 2]. Antibiotics are usually administered through oral route. In many situations, where the pediatric patients are allergic to tablets or pills, other modes of administration such as intravenous, subcutaneous, intra-atrial, or any other modes of administration can be used. About 29% of dentists would administer the antibiotics through oral route and about 23.1% of them used intravenous mode of administration and in rare case, about 26.7% of dentist would use subcutaneous or intra-arterial mode of administration.

Amoxicillin is one of the most prescribed antibiotics in the field of dentistry. About 17.5% of dentists preferred amoxicillin as antibiotic to their pediatric patients. The most commonly used antibiotic in dental practice, penicillins, in general, were found to be the most commonly prescribed antibiotics

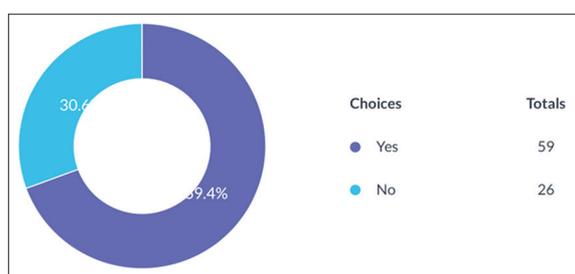


Figure 1: Prescription of antibiotics

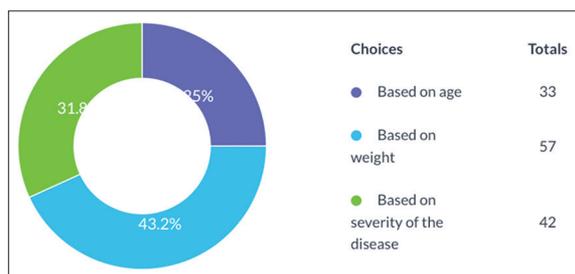


Figure 2: Dosage of antibiotics

by dentists,^[21-23] the most popular one being amoxicillin.^[24,25] About 13.1% of dentists prescribed penicillin as antibiotics. A survey in Canada found that the average duration of antibiotic use prescribed by dentists is 6.92 days.^[26] Another survey in the USA found that endodontists prescribe antibiotic use for an average of 7.58 days.^[27] In this survey, it was observed that about 39% of dentists prescribe antibiotics for more than 7 days and about 34% of them prescribed antibiotics on average of 2–6 days [Figure 3]. During the application, amoxicillin causes hypersensitivity, manifesting in cross-reaction and sensitivity toward degradation products with alkaline hydrolysis. Allergic reactions to penicillin are as frequent as 5–8% of cases, in contrast to penicillin anaphylactic shock, which occurs in the interval of 0.05%.^[28] It was also observed that gastric irritation, nausea, vomiting, rashes, and itching, headache, and depression were some of the other side effects associated with amoxicillin and penicillin. About 52.9% of dentists were unaware of the new generation of antibiotics [Figure 4] and about 67.1% of dentists did not do any kind of antibiotic sensitivity test before prescribing antibiotics [Figure 5].

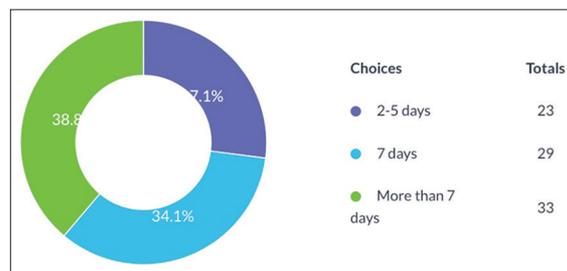


Figure 3: Duration of antibiotics

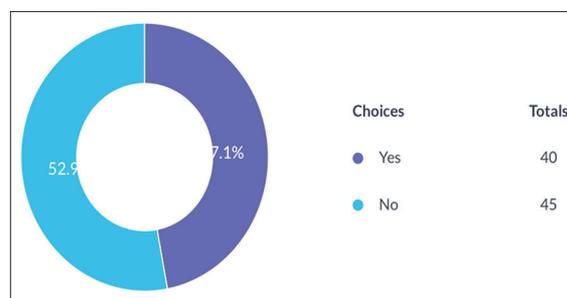


Figure 4: Awareness toward new generation of antibiotics

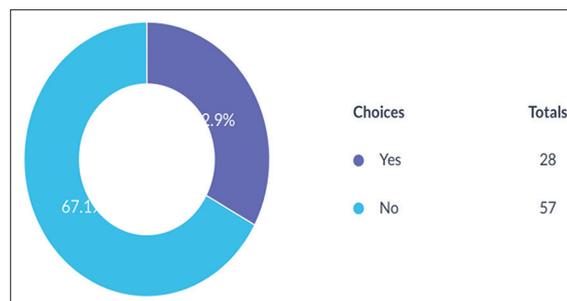


Figure 5: Antibiotic sensitivity test

CONCLUSION

The main challenges which are faced in prescription of antibiotics are to achieve a rational choice and appropriate use of antibiotics and to recognize their potential problems.

To reduce contribution to the worldwide problem of antimicrobial resistance, dentist requires clear guideline of appropriate prescribing antibiotic. To improve standards of care, dentists need to be up-to-date in their knowledge of pharmacology in dental education.

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