Post Endodontic Antibiotic Prescription In 3–5-Year-Old Children

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Abstract
Most commonly prescribed drugs in pediatric dentistry are "Antibiotics." Among Dentists, there is a trend toward overuse of antibiotics for non-indicated clinical conditions. This insufficient knowledge of the appropriate clinical indications for antibiotic prescriptions promotes the overuse of antibiotics and contributes to the emergence of antibiotic resistance among children. According to the various surveys done on the dental students, dentists and pediatric dentists on the antibiotic prescribing practices, overall, adherence to the professional clinical guidelines was low. There was a wide variation in dosages for all the antibiotics prescribed and for prolonged periods which were inconsistent with the recommendations. From the results obtained, we can see that Among the males and females who took antibiotics post endodontic therapy, about 41.61% Females and 58.39% of the Males were prescribed post endodontic antibiotics. [Figure 1] The antibiotics prescribed post endodontic therapy among 3-5 year old children revealed that Among Males, About 24.37% of them were prescribed ibugesic alone, 24.87% of them were prescribed a combination of ibugesic and paracetamol, and 3.55% of them were prescribed with paracetamol alone. Among females, about 18.27% of them were prescribed ibugesic alone, 27.92% of them were prescribed a combination of ibugesic and paracetamol, and 1.02% of them were prescribed with paracetamol alone [Figure 2].
Keywords: Pediatric Endodontics, Antibiotics, Dosage, Pulp Therapy.

1. Introduction

Dentists prescribe several categories of medications to manage a variety of oral diseases and conditions. Among these conditions are bacterial, fungal, and viral infections and pain. Antibiotics continue to be the most commonly prescribed drugs in children and adults(Srivastava, 2011). In England, for instance, it is estimated that 66.4% of dental prescriptions are antibacterial drugs.

Among Dentists, there is a trend toward overuse of antibiotics for nonindicated clinical conditions, like pain relief, irreversible pulpitis, and localized dentoalveolar abscess.[3,4,5] This insufficient knowledge of the appropriate clinical indications for antibiotic prescriptions promotes the overuse of antibiotics[4,6,7] and contributes to the emergence of antibiotic resistance among children.[8] Children as young as 4 years were found to harbor multidrug-resistant bacteria in their oral cavities.[9,10]

The prescription of antibiotics has now become more complicated than in the past with clinicians dealing with an increasing number of issues such as microbial resistance to prescribed antimicrobials[11,12] and drug interactions with an increase in the number of medications used by both adult and pediatric patients.[13] The administration of drugs to pediatric patients is further complicated by the necessity to adjust the dosages of medications to accommodate their lower weight and body size.[14]

As per the WHO, the ideal dentist-population ratio is 1: 7500. But, in rural India, this ratio of the dentist-population is about 1: 1,50,000.[15] According to WHO, minor facilities are available for oral health care of the rural population and the tooth-related problems of the patients are taken care of by the primary health care providers rather than the dentists due to their scarcity.[16,17] For the acute dental problems, general medical practitioners and nurses are more likely to prescribe antibiotics for which they are not even required. They should understand that most of the dental problems require local interventions for the treatment of the cause of the infection.

Oral infections are classified as odontogenic and non-odontogenic. Odontogenic infections are the

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most frequent and begin affecting periodontal and dental structures. Non-odontogenic infections start in extra dental structures, such as mucosa, glands, tongue, etc. These infections are usually localized and respond well to treatment. However, favored by children's special features, they can spread to remote regions and cause serious problems compromising even the patient's life. [18] A series of differential characteristics should be explained in relation to antibiotic treatment in children: [19] Young children tend to lack medical antecedents suggesting the possibility of drug allergies or adverse reactions. The greater proportion of water in the tissues of children, and their increased bone sponginess facilitate faster diffusion of infection. Hence, they require adequate dose adjustment of the prescribed medication. The deficient oral hygiene found in most children and the consumption of sugar-rich foods contribute to increasing the presence of microorganisms in the mouth and thereby increasing the risk of bacteraemia following oral treatments.

As dental practitioners the knowledge on antibiotics and its prescription is essential as it plays an important role in our day-to-day clinical practice for the treatment of oral and dental infections.

This research emphasizes on the use of antibiotics post endodontic treatment in paediatric patients. As a dental practitioner, it is important to ensure that the patient is aware of the antibiotics and the proper dosage along with their side-effects. Our team has extensive knowledge and research experience that has translated into high quality publications (Choudhari and Thenmozhi, 2016; Govindaraju, Jeevanandan and Subramanian, 2017; Ravi et al., 2017; Vikram et al., 2017; Gupta, Ariga and Deogade, 2018; Hannah et al., 2018; Kavarthapu and Thamaraiselvan, 2018; Pandian, Krishnan and Kumar, 2018; Ramamurthy and Mg, 2018; Ashok and Ganapathy, 2019; Ramesh et al., 2019; Sharma et al., 2019; Venu, Raju and Subramani, 2019; Wu et al., 2019; Samuel, Acharya and Rao, 2020). Aim of this study is to evaluate the post endodontic antibiotics prescribed commonly by dental practitioners.

2. Materials and Methods

This Study was carried out in a university setting which consists of subjects of predominantly South Indian population. Pros of this study include available data, similar ethnicity. Cons of this study is the fact that it is a uni centered study and the geographic locations, trends are not assessed. Approval for the study is by the ethical board of Saveetha University (applied). Number of people involved include 3 reviewers - A Guide, researcher and a reviewing expert. This is a retrospective study in which the radiographs were assessed from the DIAS (dental information archiving software). Radiographs reviewed for the research includes All those applicable for study and cross verification of the required samples were by a reviewing expert through photographs. Measures were taken to minimise the sampling bias. These are inclusion of only clear and readily available data Followed by simple random sampling. Both Internal and external validation was also obtained to carry out the study.

The required data for the study was obtained from DIAS (dental information archiving software) which is a patient management system that records all the patient's data. The required data- i.e, the post endodontic antibiotics prescribed for pediatric patients from 3-5 years of age were collected and entered in a methodical manner in an excel sheet for the tabulation of data and further statistical analysis. Data was validated by 1-2 external reviewers and all the nonspecific, unclear or incomplete data were excluded from the study.

Statistical software used for analysis is the SPSS (statistical package for the social sciences) by IBM and the statistical tests used were chi square tests, custom tables, frequency tables, bar graphs to analyse and compare the obtained results. The type of analysis performed was exploratory data analysis. Independent variables include ethnicity, gender, age and the Dependent variables include post endodontic antibiotics.

3. Results and Discussion

From the results obtained, we can see that Among the males and females who took antibiotics post endodontic therapy, about 41.61% Females and 58.39% of the Males were prescribed post endodontic antibiotics. [Figure 1] The antibiotics prescribed post endodontic therapy among 3–5-year-old children revealed that Among Males, about 24.37% of them were prescribed ibugesic alone, 24.87% of them were prescribed a combination of ibugesic and paracetamol, and 3.55% of them were prescribed with paracetamol alone. Among females, about 18.27% of them were prescribed ibugesic alone, 27.92% of them were prescribed a combination of ibugesic and paracetamol, and 1.02% of them were prescribed with paracetamol alone [Figure 2].

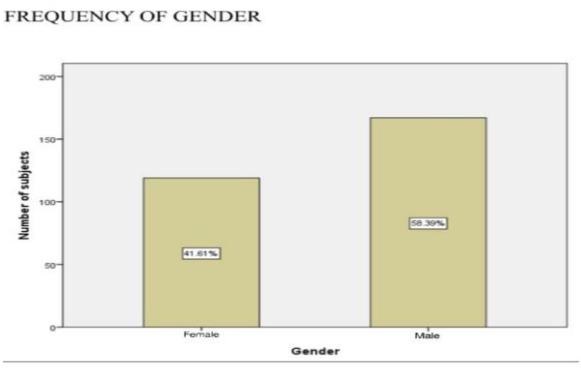

Figure 1- Bar graph representation of frequencies of males and females who took antibiotics post endodontic therapy - x axis represents gender and y axis represents the percentage of males and females who took radiographs for alveolar bone resorption on a scale of 1-100. About 41.61% Females and 58.39% of the Males were prescribed post endodontic antibiotics.

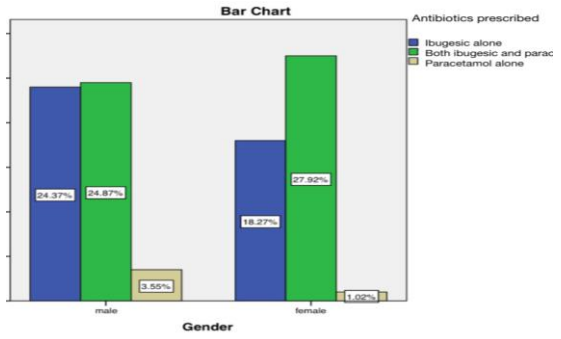

Figure 2- Bar graph representation of frequencies of various antibiotics prescribed post endodontic therapy among 3–5-year-old children - x axis represents various antibiotic combinations and y axis represents the percentage of patients for whom the respective antibiotics were prescribed on a scale of 1-100. Among Males, About 24.37% of them were prescribed ibugesic alone, 24.87% of them were prescribed a combination of ibugesic and paracetamol, and 3.55% of them were prescribed with paracetamol alone. Among females, about 18.27% of them were prescribed ibugesic alone, 27.92% of them were prescribed a combination of ibugesic and paracetamol, and 1.02% of them were prescribed with paracetamol alone.

Medication intake in children remains a challenge. However, no matter how effective medication regimens are, treatment outcomes would be compromised if children and parents do not follow instructions adequately. Children's behaviour may be characterised by lack of adherence to the prescription itself, so it is important that adherence and parents' cooperation is guaranteed, for successful treatment. Prescribing medications that can be given once or twice daily, will improve patient's compliance to the treatment [20,21]. Sugar-containing medications are expected to increase the patients' adherence. However, sugar increases susceptibility to dental decay, tooth erosion, and associated complications, such as pulpitis and dentoalveolar abscess, emphasizing the importance of performing optimum oral hygiene activities during antibiotic therapy and beyond. Children may also show lack of cooperation when receiving dental treatment. Operative interventions should remain the first line of treatment for management of dental/periodontal infections in children. However, these interventions are highly resisted by children especially when treatment entails performing local anaesthetic injections, extractions, and preparing cavities or root canals for fillings. The situation may get complicated when parents' faulty beliefs and perceptions encourage children's dental phobic attitudes. All the aforementioned factors may help initiate antibiotic prescriptions by dentists, particularly those who lack patience and training in dealing with difficult children. Other inappropriate clinical practices that must be avoided are antibiotic prescribing for viral infections. Although many childhood diseases, like primary herpetic gingivostomatitis and infectious mononucleosis, may present with oral and systemic manifestations, they are still viral infections that should be treated by palliative treatment, rather than antibiotics. Worried parents may sometimes complicate the problem by expecting antibiotics and putting pressure on dentists to meet their expectations. In addition, parents' lack of understanding of the diagnosis might hinder children's intake of medications [22].For children with little compliance, antibiotics with a long half-life like azithromycin become useful, as they only need to be taken once daily for three days and are well tolerated in children. On the other hand, azithromycin is more expensive than amoxicillin and clindamycin [23]. Furthermore, care should be taken when prescribing azithromycin, as it may lead to growth of azithromycin-resistant bacteria, and it may be associated with proarrhythmic effects [24]. Amoxicillin, on the other hand, is considered safer, especially when less frequent doses are used. A recent study found that using once or twice daily doses of amoxicillin, with or without clavulanate, were comparable with three doses for the treatment of acute otitis media in children [25]. The applicability of this finding in the treatment of dental infections needs to be further explored

Limitations of the study are the non-inclusion of some data in the study that were unclear of certain reporting parameters. The available evidence is from a range of countries and is applicable to patients within the age group of 3-5 years. Identified studies did not include patients without endodontic treatments. The results of this study may or may not be generalizable to these groups. All included studies were conducted in university clinics with a single operator, and data obtained were assessed by experts with minimal disagreement. Thus, the generalizability of this review results is possible. There was no limitation for external validity.

Future prospects of this study include overcoming the limitations and emphasis on Knowledge and association of post endodontic antibiotics with various parameters, as it is essential for a dental practitioner. 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, as well as in the continuing education, with a continuous assessment of dental practices, a better understanding of the pathogenesis of these infections, including the host immune response to bacteremia, along with prospective clinical trials, which will allow for more evidence-based decisions. Every dental professional must follow proper guidelines given by the American Association of Pediatric Dentistry (AAPD) which is based on scientific evidence to use antibiotics conservatively.

4. Conclusion

Our study assessed the post endodontic antibiotics prescribed for paediatric patients from 3-5 years of age. The overall results show that a combination of ibugesic and paracetamol are the most common antibiotic regimen prescribed post endodontic

therapy among children of 3-5 years.

5. Acknowledgement

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6. Conflict of Interest

The Authors declare no potential conflict of interest.

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