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Drug prescribing practices amongst Pediatric Dentists, General Dentists and Pediatricians in Parbhani District, Maharashtra - A Questionnaire Based Study

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ABSTRACT

Introduction:

Most of the dental infections are multibacterial in origin caused by Gram-positive, Gram-negative and Obligate anaerobes. Clinician must first diagnose the cause of the infection and then determine the appropriate drugs that will most benefits to the patients. Inappropriate prescription of antibiotics and analgesics by health care professionals has become a worldwide issue nowadays because of antibiotic resistance.

Aim: To assess the knowledge of prescribing pattern of antibiotics & analgesics amongst pediatric dentist, general dentists and pediatricians.

Material and methods: An electronic version of questionnaire for descriptive cross-sectional survey was designed for evaluating knowledge of prescribing antibiotics and analgesics. A total of120 doctors were included. Any dental practitioner holding BDS or MDS degree and registered with IDA, Parbhani branch and the other medical practitioners holding MBBS or MD/MCh degree with IMA registration were included and those who were not registered with IDA, Parbhani were excluded from our survey. A link was generated and e-mailed to these health professionals of Parbhani. A reminder e-mail was sent after 15days and the various responses was observed and evaluated. The study was conducted over a period of 1 month. Data was computed and was analysed using SPSS version 20 software.

Results: In this survey, out of 120 sample size; 83 were General Dentist out of which 51 completed the survey, there by achieving the response rate of 61.44%. 35 were pediatricians out of which 25 completed the survey, there by achieving the response rate of 71.42% and 2 were pedodontists, who both responded achieving a response rate of 100%. Majority of the respondents (70%) chose amoxicillin in nonallergic patients. Average minimum duration of antibiotic therapy was 5 days. The prime determinant of antibiotic use was facial swelling (72%). The prime determinant to select a particular brand of antibiotics was affordability of that brand (66%). If the Patient was allergic Penicillin, Paediatricians (76%) and General dentists (67%) preferred Ciprofloxacin as an alternative while pedodontists preferred Erythromycin and Ciprofloxacin equally. Almost all (99%) general dentist, Pedodontist and medical practitioners were aware of antibiotic resistance being a growing concern. As per their views, there was over prescription of antibiotics.Dental and Medical faculties prime determinant of analgesics use was severity of pain (100%) General dentist and Pedodontist commonly prescribed analgesics in condition of Acute pulpitis or Chronic pulpitis (98%) and Pediatricians prescribe analgesics for Renal disorder (68%) and all of them mostly prefer oral route (100%) It was observed that 68% of both general dentist and pediatricians prescribe Ibuprofen as primary analgesics.

Keywords: Analgesics, Antibiotics, Resistance.

I. INTRODUCTION

Infection remains a major problem in medical practice, and their rational treatment with drugs is of prime importance. Infection is a process in which bacteria, viruses, fungi or other organisms enter the body, attach to cells, and multiply. Oral infections are poly-microbial and mixed. They arise when normal flora changes from commensal to opportunistic due to a broken balance with the host in certain circumstances. The oral microbial flora starts to grow in the new born's mouth about eight hours after birth. This is followed by a continuous change in its composition from the time the child is edentulous until teeth appear. [1] Oral infections are classified as odontogenic and non-odontogenic.[1] Most human orofacial infections originate from odontogenic infections.[2] Odontogenic infections are the most frequent and begin affecting periodontal and dental structures. Non-odontogenic infections start in extra dental structures, such as mucosa,

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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.[1]

Proper use of antibiotics along with surgical therapy is the most appropriate method to treat various odontogenic infections. Alexander Fleming, who along with Howard Florey and Ernst Chain shared the Nobel Prize in 1945 in Physiology and Medicine, addressed in his lecture: "It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body."[3]

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.[1]

A series of differential characteristics should be explained in relation to antibiotic treatment in children: [4]

- 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 increase the presence of microorganisms in the mouth and thereby increasing the risk of bacteraemia following oral treatments.

Drug is generally prescribed by professional and qualified doctors and dentists.[5] Primary prevention by giving prescription may influence their patient's health. [6,7] It is an important skill which depends on the knowledge of drugs, pharmacodynamics, it benefits and adverse effects of drugs.[8] which may occur due to certain bacterial species developing resistance to antibacterial agents shortly after they are used (Jacinto et al. 2008).[9] In dental practices and medications such as antibiotics and analgesics are essential for management of pain and infection.[10] However, antibiotic prescribing in dentistry is generally empiric which means that the responsible organism is unknown. Thus, broad spectrum antibiotics are commonly used.[11]

Inappropriate prescription of antibiotics by health care professionals has become a worldwide issue nowadays.[12] Keeping in mind the results obtained from previous studies, we took up the present study to investigate antibiotic prescribing practices of dentists. The aim of the present study was to assess the knowledge of prescribing pattern of antibiotics & analgesics amongst pediatric dentist, general dentists and pediatricians.

II. MATERIALS AND METHODS

The present study was designed as a descriptive cross-sectional study performed among the registered practicing dentists in Parbhani district after obtaining ethical clearance from Ethics Committee, Saraswati Dhanwantari Dental College and Hospital, Parbhani. The sample size for this study was 120. (Table No. 1) The inclusion and exclusion criteria are as follows –

Inclusion Criteria –

1) Dental practitioner holding the Bachelor of Dental Surgery (BDS) and Master of Dental Surgery (MDS) degree and registered with IDA, Parbhani branch
2) Medical practitioners holding MD/Mch/Dch degree with IMA Parbhnai branch registered

Exclusion Criteria –

1. Those who were not registered with IDA and IMA, Parbhani were excluded from our survey

An electronic version of questionnaire for descriptive cross-sectional survey was designed for evaluating knowledge of prescribing antibiotics and analgesics. Out of total 120 doctors, General dentist and Pedodontist were 85 Pediatricians were 35 who registered with IDA and IMA Parbhani branch. A link was generated and e-mailed to various health professionals of Parbhani. A reminder e-mail was sent after 15days and the various responses were observed and evaluated. The study was conducted over a period of 1 month. Data was computed and was analysed using SPSS version 20 software

Table 1: Demographic characteristics

	Variable		Number of general dentists		Pediatric dentist	Gp as pediatricians	
			BDS	MDS		MD	DCH
1	Sex	M	24	5	2	9	12
		F	16	6	0	1	3
2	Age						
	Less than 30		20		1	10	

	years			
	More than 30 years	31	1	15
3	Years since practicing			
	<5	20	1	10
	5-10	8	1	4
	10-15	15	-	5
	>10	8	-	6
4	Educational qualifications			
	BDS	40		
	MDS	11		
	MD	10		
	MCH	15		
5	Practice type			
	Private practice	42	1	18
	Academic institution	9	1	2
	Hospital dentistry	-	-	-
	Health center/ Trust	-	-	5

Table 2: Questionnaire

Demographic information and characteristics of the participants

1)Gender:

I. Male
II. Female

2)AGE:

I. Less than 30 years
II. More than 30 years

3)Years Since practicing dentistry/pediatric dentistry/Gp as pediatricians

I. <5
II. 5-10
III. 10-15
IV. >10

4)Educational qualification:

I. BDS
II. MDS
III. POST GRADUATE STUDENTS
IV. MD
V. MCH

5)Practice type:

I. Private practice
II. Academic institution
III. Hospital dentistry
IV. Health center/ trust

USE AND MISS USE OF DENTIST AND PEDODONTIST PRESCRIBED ANTIBIOTICS AND ANALGESICS

1) Most commonly antibiotic used by you?

I. Amoxicillin
II. Amoxicillin + Metronidazole
III. Ofloxacillin
IV. Amoxicillin + clavulanic acid

2) In which dental condition you prescribe the antibiotics?

I. Pain
II. Swelling
III. Abscess
IV. Prevention of postoperative complications

3) which non clinical factor that makes you to prescribe antibiotics?

I. Patient satisfaction/parent satisfaction
II. Pressure of time and workload/Unavailable appointment
III. Unsure of diagnosis
IV. Delay/ unable to complete treatment

4) Which route of administration of antibiotics you prefer?

I. Oral

II. Intravenous

5) If a patient allergic to penicillin, which antibiotic you prescribe?
I. Cephalexin
II. Ciprofloxacin
III. Ofloxacillin + ornidazole
IV. Erythromycin

6) For how many days you prescribe antibiotics?
I. 3
II. 5
III. 7
IV. 10

7) For how many times a day prescribed antibiotic?
I. Once in a day
II. Twice in a day
III. Thrice in a day
IV. During bed time only

8) While prescribing antibiotics how do you calculate the dose of antibiotics?
I. Dose calculating with formula
II. Standard doses available
III. According to age
IV. According to weight and age

9) Which is the preferred form of medicine prescribed by you?
I. Tablets
II. Capsule
III. Syrup

10) Do you believe that antibiotic resistance is of growing concern?
I. Yes
II. No

11) Do you prescribe antibiotic in generic or brand name?
I. Generic name
II. Brand name

12) Are you well aware about the side effect of different antibiotics?
I. Yes
II. No

13) Are you aware of the certain medical conditions where antibiotics might be contraindicated?
I. Yes
II. No

14) what is the primary source of information of antibiotics acquired by you?
I. Journals
II. Articles
III. Books
IV. Social media

ANALGESICS

1) Most commonly used analgesics by you?
I. Ibuprofen
II. Acetaminophen
III. Ibuprofen + acetaminophen
IV. Ketorolac
V. Diclofenac sodium

2) In which condition you prescribe analgesics?
I. Severity of pain
II. Patient Medical Condition
III. Treatment had to be delayed
IV. Uncertainty of diagnosis

3) In which dental condition commonly you prescribe analgesics?
I. Acute Pulpitis or chronic pulpitis
II. Acute Apical Abscess
III. Chronic Apical Periodontitis with sinus tract
IV. Diffuse swelling

4) Which route of administration of analgesic you prefer?
I. Oral
II. Intravenous

5) For how many days you prescribe analgesic?
I. 3
II. 5
III. 7
IV. 10

6) For how many times a day you prescribe the analgesic?
I. Once in a day
II. Twice in a day
III. Thrice in a day

7) How do you calculate dose of analgesic?
I. Dose calculating with formula
II. Standard dose available
III. According to age
IV. According to weight and age

8) which form of analgesics do you prefer to prescribe regularly?
I. Generic name
II. Brand name

9) which is the preferred form of medicine prescribed by you?
I. Tablets
II. Capsule
III. Syrup

10) Are you well aware about the side effects of different analgesics?
I. Yes
II. No

11) Are you aware of the certain medical conditions where analgesics might be contraindicated?
I. Yes
II. No

12) what is the primary source of information of analgesics acquired by you?
I. Journals
II. Articles
III. Books
IV. Social media

USE AND MISUSE OF PEDIATRICIANS PRESCRIBED ANTIBIOTICS AND ANALGESICS

1) Most commonly antibiotic used by you?
I. Amoxicillin
II. Amoxicillin + Metronidazole
III. Amoxicillin + clavulanic acid
IV. Doxycycline
V. Cephalosporins

2) In which condition you prescribed the antibiotics?
I. Elevated temperature + evidence of systemic spread
II. Diagnosis not certain
III. Prevention of post-operative complication

3) which is the Non clinical factor makes you to prescribe antibiotics?
I. Patient satisfaction/parent satisfaction
II. Unsure of diagnosis
III. Prophylactic use

4) Which route of administration of antibiotics you prefer?
I. Oral
II. Intravenous

5) If a patient allergic to penicillin, which antibiotic you prescribe?
I. Cephalexin
II. Ciprofloxacin
III. Ofloxacillin + ornidazole
IV. Erythromycin

6) For how many days you prescribe antibiotics?
I. 3
II. 5
III. 7
IV. 10

7) For how many times a day prescribed antibiotic?
I. Once in a day
II. Twice in a day
III. Thrice in a day

8) While prescribing antibiotics how do you calculate the dose of antibiotic?
I. Dose calculating with formula
II. Standard dose available
III. According to age
IV. According to weight and age

9) which is the preferred form of medicine prescribed by you?
I. Tablets
II. Capsule
III. Syrup

10) Do you believe that antibiotic resistance is of growing concern?
I. Yes
II. No

11) which form of antibiotics do you prefer to prescribe regularly?
I. Generic name
II. Brand name

12) Are you aware of the side effect of different antibiotics?
I. Yes
II. No

13) Are you well aware of the certain medical conditions where antibiotics might be contraindicated?
I. Yes

II. No

14) what is the primary source of information of antibiotics acquired by you?
I. Journals
II. Articles
III. Books
IV. Social media

ANALGESICS

1) Which is the most commonly used analgesics?
I. Ibuprofen
II. Acetaminophen
III. codeine
IV. Ibuprofen + acetaminophen

2) In which medical condition you prescribe the analgesics?
I. Severity of pain
II. Patient Medical Condition
III. Treatment had to be delayed
IV. Uncertainty of diagnosis

3) In which condition commonly you prescribed analgesics?
I. Musculoskeletal pain
II. Recurrent abdominal pain
III. Headache
IV. Renal disorder

4) Which route of administration of analgesic you prefer?
I. Oral
II. Intravenous

5) For how many days you prescribe analgesic?
I. 3
II. 5
III. 7
IV. 10

6) For how many times a day you prescribe the analgesic?
I. Once in a day
II. Twice in a day
III. Thrice in a day

7) How do you calculate dose of analgesic?
I. Dose calculating with formula
II. Standard dose available
III. According to age
IV. According to weight and age

8) which form of analgesics do you prefer to prescribe regularly?
I. Generic name
II. Brand name

9) which is the preferred form of medicine prescribed by you?
I. Tablets
II. Capsule
III. Syrup

10) Are you well aware about the side effect of different analgesics?
I. Yes
II. No

11) Are you aware of the certain medical conditions where analgesics might be contraindicated?
I. Yes
II. No

12) what is the primary source of information of analgesics acquired by you?
I. Journals
II. Articles
III. Books
IV. Social media

III. RESULTS

In this survey, out of 120 sample size; 83 were General Dentist out of which 51 completed the survey, there by achieving the response rate of 61.44%. 35 were pediatricians out of which 25 completed the survey, there by achieving the response rate of 71.42% and 2 were pedodontists, who both responded achieving a response rate of 100%.

The most common updates source of information regarding the prescription of antibiotic and analgesics was from articles. (50% Pedodontists,30% General Dentist and 56% paediatrician). Most respondants from the pedodontists and general Dentist group chose Amoxicillin + Clavulanic acid as a preferred alternative while the Paediatrician chose Amixicillin + metronidazole as a preferred alternative.

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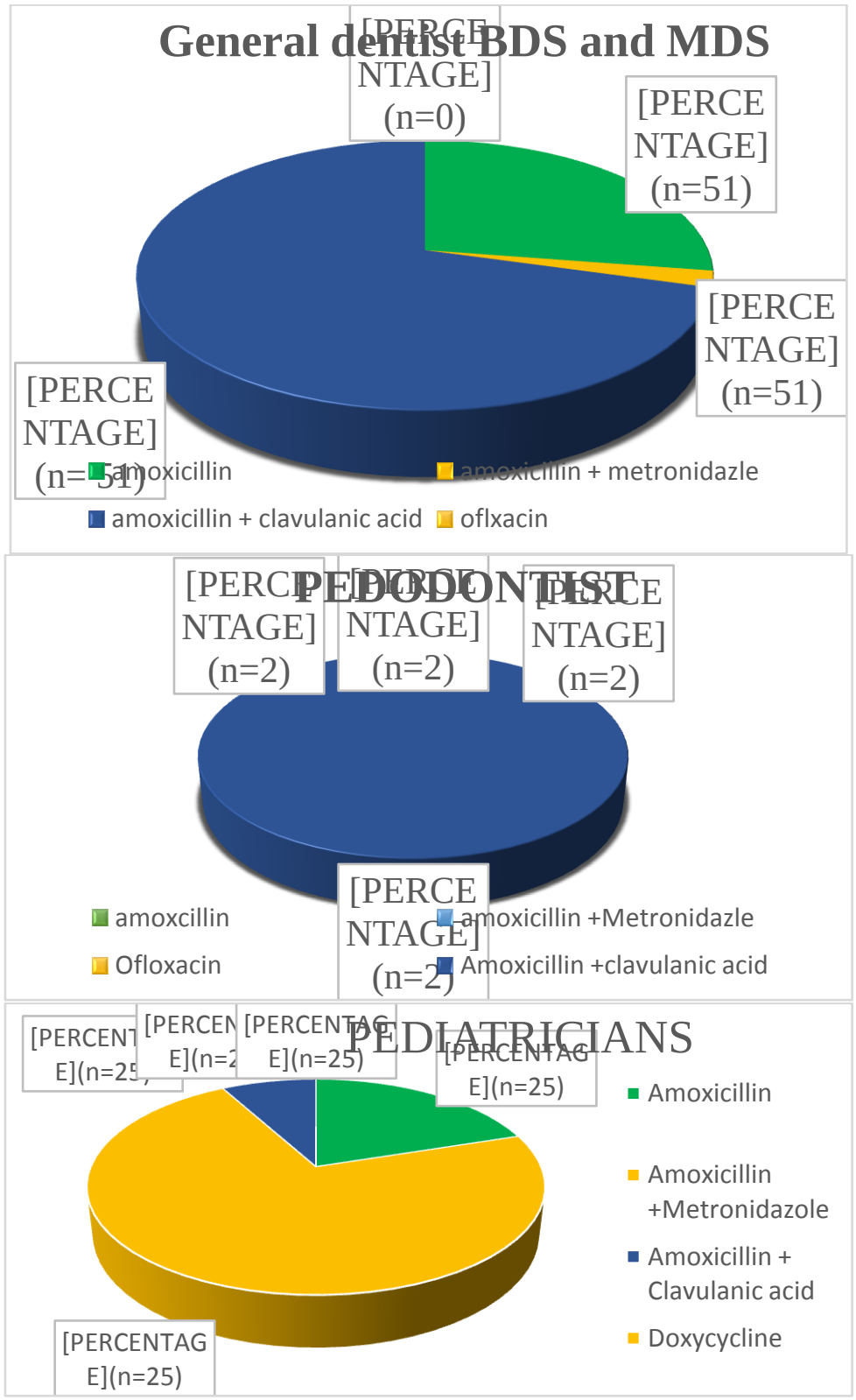

If the Patient was allergic Penicillin, Paediatricians (76%) and General dentists (67%) preferred Ciprofloxacin as an alternative while pedodontists preferrec Erythromycin and Ciprofloxacin equally. As per the current study, Paediatricians (76%) and General destist(57%)

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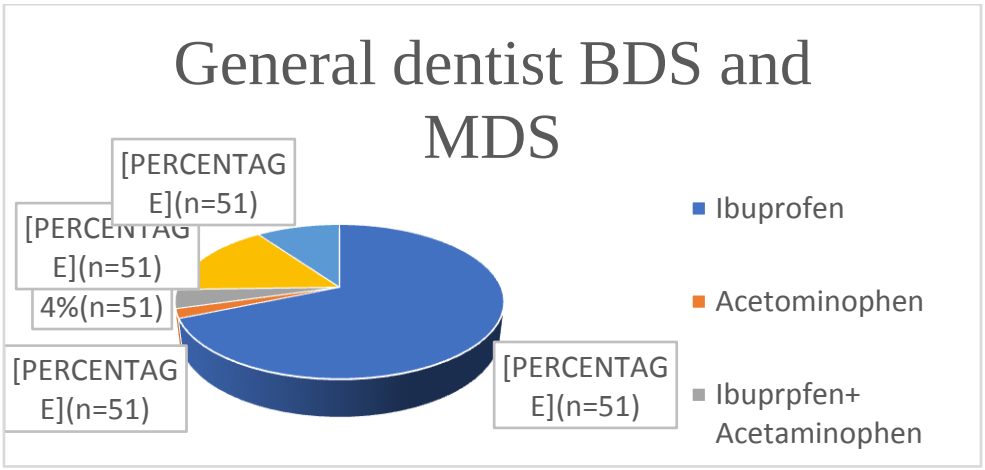
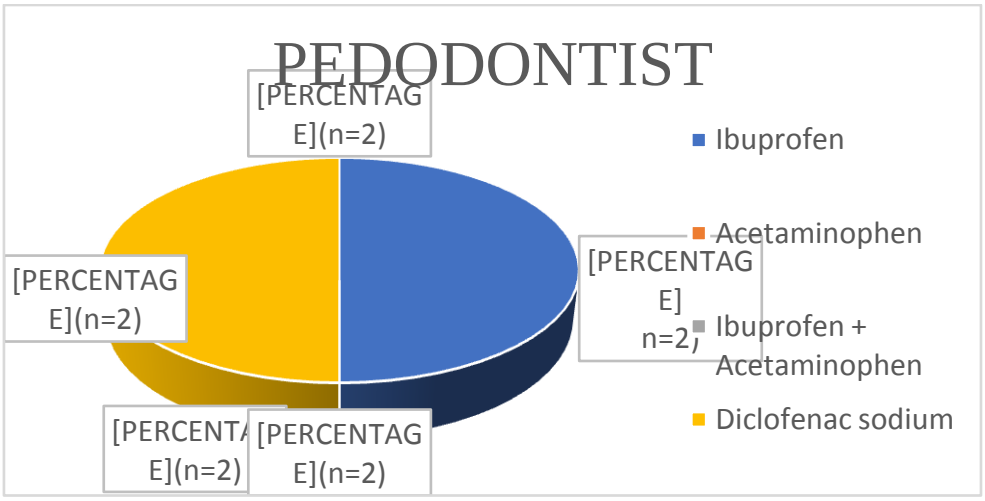
preferred a antibiotic course duration of 5 days. While Pedodontist mostly preferred a dose duration of 5 days. The principal determinant of antibiotic prescription was pain in Peadiatrician group. In General dentist group it was abscess while in Pedodontist group it was pain as well as the prevention of post-operative complications. All the three groups calculated the dose to be given to children on the basis of age and weight of the child. 100 % of all the participants in three group claimed that they were well aware about the use of anti-biotics and their side effects.

Dental and Medical faculties prime determinant of analgesics use was severity of pain (100%) General dentist and Pedodontist commonly prescribed analgesics in condition of Acute pulpitis or Chronic pulpitis (98%) and Pediatricians prescribe analgesics for Renal disorder (68%) and all of them mostly prefer oral route (100%) It was observed that 68% of both general dentist and pediatricians prescribe Ibuprofen as primary analgesics





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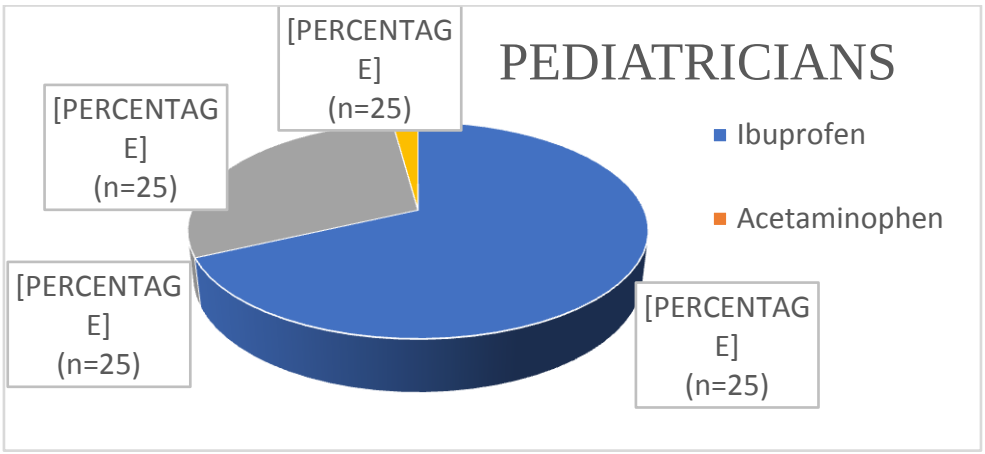

Most of the health professionals prefer to calculate the dose of analgesics according to weight and age. Prefer only particular brand of analgesics (96%) and they gathered information mostly from books. Almost all were aware of analgesic resistance being a growing concern**.**

IV. DISCUSSION

Prescribing the antibiotics and analgesics, clinician must first diagnose the cause of the infection and then determine the appropriate treatment. For conjunctive antibiotic therapy, various factors, including host defense mechanisms, severity of the infection, magnitude of the extension of the infection, and expected pathogen, have to be taken into consideration. Prescribing medicines is a complex task that requires theoretical and clinical knowledge combined with practical skills. This study is meant to have an idea about the manner in which the pharmacological concepts are learnt and can be applied to successful clinical practice. The most of the practitioner have less experience and they are practicing from 5 to 10 years in Parbhani district of Maharashtra. Amoxicillin + Clavulanic acid are commonly prescribed for Abscess (60%) and Amoxicillin + Metronidazole for Elevated temperature + Evidence of systemic spread (100%).

Ibuprofen was commonly prescribed for Acute pulpitis or Chronic pulpitis (94%) and Renal disorder (68%). They do not have knowledge of proper duration and days of prescribing antibiotics and analgesics. In the present study, the drug of first choice in Patients with an allergy to penicillins was found to be Ciprofloxacin (76%) contradicting to the study of Rahul Kaul et al in 2018 where Erythromycin was found to be as first choice. The British Society for Antimicrobial Chemotherapy states that inappropriate prescription of antibacterial drugs by dental practitioners is a significant contributing factor in the selection of drug-resistant bacterial strains. [13] Improper dosing, duration of therapy, and prophylaxis are all factors that may affect the development of antibiotic-resistant microorganisms. Antibiotic resistance patterns might vary according to geographic locations. Zadik & Levin (2008) evaluated the influence of geographic locations (Israel, Eastern Europe, Latin America) on decision-making regarding management of dental caries, periapical lesions and antibiotic prescribing routines. Latin American graduates prescribed more antibiotics following endodontic treatment and retreatment.

Garg et al. was carried survey in 2014 in India a cross-sectional survey among Indian oral health-care Providers, which revealed that the health-care practitioners Overprescribed antibiotics, which could pose the problem Of antimicrobial resistance**.**[14] Jayadev et al. was carried survey in 2014 in Hyderabad to assess the knowledge and pattern of antibiotic Prescription for pulpal/periapical pathologies among Dentists which concluded that there was lack of uniformity Among the dental practitioners regarding antibiotic Prescription.[15] In the contrast study, amoxicillin was the most Common drug of choice for dental infections, and in the present study, amoxicillin + clavulanic acid was observed. Combination of drugs often give rise to a synergistic effect thus increasing the analgesic efficiency of the drugs with minimal side effects of the individual drugs. Paracetamol is a centrally acting analgesic but has a weak anti-inflammatory property but good anti-pyretic property. The analgesic action of paracetamol is additive, contributing to a synergistic action when used in combination with diclofenac, which has an excellent analgesic property. This combination was commonly preferred among dentists in a questionnaire survey

conducted across various hospitals in India by Gauri Billa et.al.[16] Topical analgesics have various advantages such as convenience, low plasma levels, localized action at the site of pain, low systemic adverse effects thus indicating its widespread use in dentistry [17]. Therefore, various programs on handling medical emergencies can be established to improve the knowledge and skills of the dental and medical practitioner such as workshops and assessment on practical skill.[18] Thus, there is an ample scope of improving the prescribing pattern by keeping the number of medicines as low as possible, prescribing medicines by generic names, using medicines appropriately after selecting and consciously keeping the cost of therapy low.

STUDY LIMITATIONS

We need to consider the results of this study in light of some study limitations. Since the survey was self-administered, responses may have been subject to response bias. The dentists who participated may not be the representative of dentists of parbhani. Although a few trends were evident, the sample size was small and thus inferences were difficult.

Despite all these limitations, this study has several strengths, including being the first in the region to our knowledge to report on this topic of importance and clinical relevance. The study results provide preliminary data regarding extent to which professionals were adhering to professional guidelines. The data also included patterns among not only general dentists but also all specialties. The present study sets the stage for further scope and research about the practices of use of most commonly prescribed drugs and their iatrogenic ill effects.

V. CONCLUSION

Prophylactic antibiotics reduce the risk of infection, but rampant use of antibiotics has increased prevalence of bacteria which are resistant to treatment by currently available antibiotics. Hence, clinicians should carefully consider the requirement of antibiotic and class of antibiotic before prescription. Various factors such as the age, economic status, medical condition of the patient and type of procedure have been taken into account while prescribing analgesics with special care given for pediatric patients and pregnant women. Educational initiatives to rationalize the use of antibiotics and analgesics in health professional are highly required

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