

Knowledge and Pattern of Antibiotic and Non Narcotic Analgesic Prescription for Pulpal and Periapical Pathologies- A Survey among Dentists

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ABSTRACT

Aim: The objective was to assess the knowledge and pattern of antibiotic and non narcotic analgesic prescription for pulpal and periapical pathologies among dentists, registered with IDA, in and around Hyderabad.

Materials and Methods: Cross-sectional survey was conducted from January 2014 to February 2014 in and around Hyderabad, Andhra Pradesh, India. A questionnaire for this cross-sectional survey was designed for evaluating the knowledge and patterns of antibiotic and non narcotic analgesic prescription for pulpal and periapical pathologies. It included some demographic information, questions regarding clinical and non clinical factors, type of antibiotics and non narcotics analgesics prescribed were recorded. Data was computed and analysed using SPSS software. Descriptive statistics was performed.

Results: The response rate for the study was 85%, 51.4% being males and 53.9% were pursuing post graduation. Of the respondents, 44.3% would prescribe medication with elevated body temperatures and evidence of systemic involvement, while

42.8% would prescribe medication for non clinical factors such as unsure of diagnosis. Necrotic pulp with acute apical periodontitis with swelling present and mod/severe preoperative symptoms was the most common condition identified for antibiotic therapy (56.4%). The first antibiotic of choice in patients with no medical allergies is amoxicillin, followed by amoxicillin and metronidazole. The first antibiotic of choice in case of allergic to penicillin was erythromycin. 55.1% and 37.3% would not prescribe antibiotic and analgesic after Root canal treatment respectively. The most commonly prescribed NSAID is Diclofenac (51.1%). Factors influencing the choice of analgesics among respondents is severity of pain (61.4%). 31.7% remained informed of current prophylactic practices through pharmaceutical companies followed by university training sessions and scientific societies (30.7%).

Conclusion: The results of the present survey have demonstrated a lack of uniformity among the dental practitioners. All the clinicians should make themselves aware of the current guidelines available, to ensure highest degree of patient care.

Keywords: Amoxicillin, Apical periodontitis, Diclofenac, Hyderabad, Prescribing pattern, Pulpitis

INTRODUCTION

General population generally seeks dental treatment due to pain. Analgesics are "the drugs that selectively relieves pain by acting in the central nervous system (CNS) or on peripheral pain mechanism, without significantly altering consciousness". These are divided into two groups : Non opioid / aspirin like / NSAIDs analgesics and Opioid / narcotic / morphine like analgesics [1]. Nonopioids include acetaminophen and the nonsteroidal anti-inflammatory drugs (NSAIDs), which interrupt prostaglandin synthesis and have a maximal dose or ceiling for their analgesic effect. NSAIDs are particularly useful in the initial management of pain that has an inflammatory component including pain associated with musculoskeletal trauma and dentistry. NSAIDs inhibit cyclooxygenase (COX) activity thereby inhibiting synthesis of prostaglandins, thromboxanes, and prostacyclin. Acetaminophen is analgesic and antipyretic lacking anti-inflammatory efficacy [2]. Analgesic is administered considering the cause and nature of pain (mild , moderate or severe ; acute or chronic ; ratio of pain ; inflammation) along with risk factors in the given patient, considering past experience of the patient, acceptability to given drug and individual preference. Patients differ in their analgesic response to different NSAIDs [3].

Majority of endodontic and periapical pathologies originate from pulp which are generally diagnosed either during routine dental radiographic examination or following acute pain in a tooth [4]. Endodontic infections are polymicrobial in nature and obligate

anaerobic bacteria are dominant microflora in primary infections. The grounds for endodontic treatment is eradication of the infection and prevention of microorganisms from infecting or re-infecting the root and/or periradicular tissues. The presence of microorganisms in the dental pulp is directly associated with the development of periapical disease [5]. Broad spectrum antibiotics are typically prescribed for dental problems since pus or exudate cultures are not commonly made. Hence, based on clinical and bacterial epidemiological data, the germs responsible for the infectious process are suspected, and treatment is decided on a presumptive basis, fundamented on probabilistic reasoning [6].

An effective antibiotic regimen should be directed against the most likely infecting organism, with antibiotics administered shortly before the procedure. When procedures involve infected tissues or are performed on a patient with a compromised host response, additional doses or a prescribed postoperative regimen of antibiotics may be necessary. The decision to use antibiotic prophylaxis should be made on an individual basis.

The type of antibiotic chosen and its dosing regimen are dependent upon the severity of infection and the predominant type of causative bacteria.

Antibiotics, along with analgesics, are the predominant medicines prescribed by dentists, for management of dental and oral problems. The current study was taken to evaluate the knowledge and pattern of antibiotic and NSAIDs prescription for pulpal and periapical

Q.1	When do you prescribe medication (most commonly), according to, clinical symptoms and general considerations?		
	Elevated temperature + Evidence of systemic spread	141	44.2%
	Swelling	55	17.24%
	Pain	98	30.72%
	Diagnosis not certain	1	0.3%
	Prevention of postoperative complications	19	6.0%
	Presence of Periapical pathology in radiograph	4	1.3%
Q2	Non clinical factors that cause you to prescribe antibiotics?		
	Patient expectation of antibiotic	18	5.6%
	Pressure of time and workload	25	7.8%
	Unsure of diagnosis	115	36.1%
	Delay/ unable to complete treatment	111	34.79%
Q3	In which of the following endodontic conditions, do you prescribe antibiotics?		
	Irreversible Pulpitis, mod/severe preoperative symptoms	25	7.8%
	Irreversible Pulpitis with acute apical periodontitis, mod/severe preoperative symptoms	32	10.0%
	Necrotic pulp with chronic apical periodontitis, no swelling, no/mild preoperative symptoms	11	3.4%
	Necrotic pulp with acute apical periodontitis, no swelling, mod/severe preoperative symptoms	23	7.2%
	Necrotic pulp with chronic apical periodontitis, sinus tract present, no/mild preoperative symptoms	48	15.0%
	Necrotic pulp with acute apical periodontitis, swelling present, mod/severe preoperative symptoms	180	56.4%
Q4	Which is the most common type of antibiotic prescribed, with NO MEDICAL ALLERGIES?		
	Amoxicillin 500mg	138	43.3%
	Amoxicillin + Metronidazole 400 mg	93	29.2%
	Ofloxacin 200mg + ornidazole 500mg	26	8.2%
	Amoxicillin + clavulanic acid 625mg	51	16.0%
	Amoxicillin + Cloxacillin 500mg	11	3.4%
Q5	Which is the most common type of antibiotic prescribed with ALLERGY TO PENICILLIN?		
	Cephalexin 500mg	7	2.2%
	Ciprofloxacin 500mg	67	21.0%
	Ofloxacin 200mg + ornidazole 500mg	25	7.8%
	Erythromycin 500mg	215	67.4%
	Doxycycline 100mg	5	1.6%
Q6	Do you recommend to take antibiotic, post operatively, for root canal therapy?		
	Yes	143	44.8%
	No	176	55.1%
Q7	Which is the most commonly prescribed NON NARCOTIC ANALGESIC?		
	Ibuprofen	45	14.1%
	Acetaminophen	7	2.2%
	Ibuprofen + acetaminophen	60	18.8%
	Keterolac	44	13.8%
	Diclofenac	163	51.1%
Q8	Factors influencing the choice of prescribed analgesics?		
	Severity of pain	196	61.4%
	Patient Medical Condition	59	18.5%
	Age of patients	32	10.0%
	Treatment had to be delayed	13	4.1%
	Uncertainty of diagnosis	11	3.4%
	Patient request	8	2.5%
Q9	What do you recommend to take postoperatively, for root canal therapy?		
	No medication	120	37.6%
	400 mg Ibuprofen	27	8.4%
	600 mg Ibuprofen	14	4.4%
	Keterolac	94	29.4%
	Ibuprofen + Acetaminophen	18	5.6%
	Other	46	14.2%
Q10	Mechanism by which you remain informed of current prophylactic practices?		
	University training sessions	98	30.7%
	Scientific or professional societies	98	30.7%

Social security authorities	22	6.9%
Pharmaceutical companies	101	31.7%

[Table/Fig-1]: Questionnaire for the cross sectional survey and response received for each question

Age group of respondents	Number	%
21-30 years	225	70.5%
31-40 years	74	23.2%
41-60 years	20	6.3%
Gender		
Male	164	51.4%
Female	155	48.6%
Education		
MDS	147	46.1%
PG students	172	53.9%
Years of experience		
0-5 years	221	69.3%
5-10 years	76	23.8%
>10 years	22	6.9%
Areas of employment		
private	135	42.3%
Institution	144	45.1%
Both	40	12.5%
Number of questionnaires distributed	400	
completely filled	319	79.75
Incompletely filled	25	6.25
No response	56	14

[Table/Fig-2]: Demographics of dentists participating in study

pathologies among dentists, registered with IDA, in and around Hyderabad.

MATERIALS AND METHODS

Cross sectional survey was conducted from January 2014 to February 2014 in and around Hyderabad, Andhra Pradesh, India. A questionnaire [Table/Fig-1] for this cross sectional survey was designed to evaluate the knowledge and patterns of antibiotic and non narcotic analgesic prescription for pulpal and periapical pathologies. It included some demographic information, questions regarding clinical and non clinical factors, type of antibiotics and non narcotics analgesics prescribed were recorded.

Data was computed and analysed using SPSS software. Descriptive statistics was performed

RESULTS

Total 400 questionnaires were distributed to the dentists, out of which 79.75% were completely filled and 14% were not responded. Demographic details of dentists participated in survey, is given in [Table/Fig-2].

The response rate for the study was 86%. 51.4% being males and 53.9% were pursuing post graduation. Of the respondents, 44.2% would prescribe medication with elevated body temperatures and evidence of systemic involvement, while 36.1% would prescribe medication for non clinical factors such as unsure of diagnosis. Necrotic pulp with acute apical periodontitis, swelling and moderate/severe preoperative symptoms was the most common condition identified for antibiotic therapy (56.4%). The first antibiotic of choice in patients with no medical allergies, is amoxicillin, followed by amoxicillin and metronidazole. The first antibiotic of choice in case of allergic to penicillin was erythromycin. 55.1% and 37.6% would not prescribe antibiotic and analgesic after root canal treatment respectively. The most commonly prescribed NSAID is diclofenac

(51.1%). Most common factor, influencing the choice of analgesics among respondents, is severity of pain (61.4%). 31.7% remained informed of "current prophylactic practices" through pharmaceutical companies followed by university training sessions and scientific societies (30.7%).

DISCUSSION

Most oral diseases presented to the dentist are primarily inflammatory conditions that are associated with pain. More common dental infections present in the form of pulpitis and periapical periodontitis, which require only operative measures like fillings, root canal therapy, or extraction if the tooth is not restorable. A considerable percentage of dental pain originates from acute and chronic infections of pulpal origin, which necessitates operative intervention, rather than antibiotics [7].

In current study response rate was found to be 86%, amoxicillin being first antibiotic of choice in patients with no medical allergies, followed by amoxicillin and metronidazole (29.2%). The first antibiotic of choice, in case of patients allergic to penicillin, was erythromycin (67.4%).

In another similar study to determine the antibiotic prescribing habits for pulpal and periapical pathology among dentists in Hyderabad city, India. 87.8% response rate was recorded. 68.5% of respondents regularly prescribed antibiotics for endodontic management, the most common antibiotic, prescribed for patients with no history of medical allergies, was a combination of amoxicillin with metronidazole followed by amoxicillin alone [8].

Same trend in antibiotic prescription was observed in various other studies, reported from various region. The most commonly used antibiotic in dental practice, for patients without any medical allergy, was found to be amoxicillin followed by metronidazole and amoxicillin with clavulanate [9-13]. While in patients with allergy to penicillin, choice of drug were: clindamycin [11], macrolides followed by clindamycin [12] and erythromycin [8].

In given study 42.3% of respondents worked in private settings, 45.1% in public and 12.5% in both, 53.9% of respondents were pursuing post graduation. 44.2% would prescribe medication with elevated body temperatures and evidence of systemic involvement, while 36.1% would prescribe medication for non clinical factors such as unsure of diagnosis. Among registered dental surgeons and public health dental officers working in different parts of Uganda, 40% the respondents were working in public health facilities; 37.1% in private setting,; 12.9% in training institutions, 5.7% a combination of public and private. Forty percent of the respondents gave appropriate indication for prophylactic antibiotic use in dentistry while 44.3% were not considered right. Only 1.4% of the respondents reported the right guidelines in deciding which effective antibiotics to prescribe. Over 40% of the respondents routinely or frequently prescribed systemic antibiotics in periodontal therapy. However, 55.7% of the respondents gave correct indication for their use [10].

In a survey among members of the Spanish Oral Surgery Society The most frequent academic degree was DDS 88.2%. Only 4% of the respondents were both MD and DDS. In relation to post-graduate formation, only 47% of the respondents had completed post-graduate training in oral surgery [11]. In given study 46.1% of respondents were post-graduate and 53.9% were PG students. In another study in Hyderabad 39.5% of the respondents possessed master's degree [8]. In survey on Belgian dentists on "prescribing practices, and knowledge about antibiotic use" response rate was 89.3%. Only 3.7% of the dentists were qualified in periodontics or orthodontics [12].

Necrotic pulp with acute apical periodontitis, swelling and moderate/severe pre-operative symptoms was the most common condition identified for antibiotic therapy (56.4%) in current study. In another similar study among dentists in Hyderabad city, 92.1% of respondents identified same condition for antibiotic therapy [8]. In a study among members of the Spanish Oral Surgery Society, 95% of respondents prescribed antibiotics in similar case of a necrotic pulp, acute apical periodontitis, swelling and other moderate/severe symptoms [11].

"Patient expectation of antibiotic, pressure of time and workload, unsure of diagnosis and Delay/ unable to complete treatment" contributed to 5.6%, 7.8%, 36.1% & 34.79% of non-clinical factors responsible for prescription, respectively. A study in district of Larut Matang Selama, Malaysia, indicated that Infection was the most frequent indication for antibiotic prescription (62%) out of which 43.3% was for periapical abscess. 66% of subjects admitted to being influenced by non-clinical factors like patients expectations, pressure of time, uncertainty of diagnosis and delay in treatment [9].

In a study on dental practitioners in Rasht, combination of antibiotics and NSAIDs (Non-steroidal anti-inflammatory drugs) were the most common prescribed drugs. NSAIDs such as gelofen, ibuprofen was prescribed more than the other analgesics in the study [13].

In current study, diclofenac (51.1%) is the most commonly prescribed analgesic (NSAID) followed by Ibuprofen + acetaminophen (18.8%). Severity of pain was the predominant factors influencing the choice of analgesics among respondents. Patient Medical Condition was considered by 18.5% of respondents and 10% considered patients' age before prescribing analgesics.

Study on analgesics prescription among dental in Nigeria, 63.8% of the respondents had practiced for less than 10 years while in our study, 93.1% respondents had less than 10 years of experience. The most common prescribed analgesics by the respondents was paracetamol (39.1%). Only 26.1% exhibited correct knowledge about the suicidal dose of paracetamol. 27.5% of the respondents had good knowledge of contraindication to the prescription of NSAIDs analgesics [14].

In an analysis on disparities in the prescription of analgesics following dental procedures in Alabama, most commonly prescribed NSAID was found to be high-dose ibuprofen followed by naprosin. Drug allergies, medical conditions, and other medications were not considered before analgesic prescription. Students prescribed NSAIDs for 9% of their patients, whereas residents did not prescribe this class of analgesics at all or naprosin (43%) [15].

In a study to determine the pattern of drug utilization of analgesics (non-opioid and opioid analgesics) in dental outpatients in a referral hospital in western Nepal, the dental disorders most frequently reported in the study were diseases of pulp and periapical tissue (36.5%). In total, 74% prescriptions contained analgesics which are the second-most commonly prescribed drugs after anti-microbials (44.9%) in dental Out Patient Department (OPD). All the analgesics were administered orally which included 89.7 of non-opioid analgesics. The most commonly prescribed non-opioid analgesic was ibuprofen (41%) followed by nimesulide (22%) [16].

For management of moderate to severe pain, as caused by acute pulpitis, ceiling doses of ibuprofen, diclofenac and rofecoxib are considered to be suitable. While acute post-operative painful conditions like surgical removal of impacted third molars are best managed by ceiling doses of ketorolac and diclofenac, Acetaminophen-opioid combinations are the drugs of choice when NSAIDs are contraindicated. The best means of controlling pain is to remove the source of pain as quickly as possible. Each drug regimens should be individualized based on pain severity and medical history. Diclofenac Sodium is a newer NSAIDs with good tissue penetrability and its concentration in synovial fluid is

maintained three times longer time than plasma, exerting extended therapeutic effect in joints [1].

In their study on 30 healthy patients requiring surgical removal of four third molars, Lin et al., observed that preoperative administration of 50 mg of diclofenac could relieve pain and swelling more than the placebo [17].

Zuniga et al., too observed that pain relief was substantially better from diclofenac sodium softgel than from Cataflam and both were significantly more effective than placebo [18].

The majority of chronic or even acute dental infections can be successfully treated by eliminating the source of infection, pulp extirpation, drainage of abscess or tooth extraction without the need for antibiotics [19] Antibiotic prescribing may be associated with unfavorable side effects ranging from gastrointestinal disturbances to fatal anaphylactic shock and development of resistance [20].

Similar to antibiotics analgesics too are not free from associated risks. The most frequent side effects attributed to NSAIDs are gastrointestinal in nature, and include dyspepsia, gastric erosions, and mucosal ulcerations. Besides, NSAIDs exert antiplatelet effect prolonging bleeding time. NSAIDs should be avoided in patients taking anticoagulants, such as warfarin, or those suffering bleeding disorders. Acetaminophen may be toxic for patients having depleted glycogen stores, such as associated with dieting and anorexia, and for patients suffering primary liver dysfunction or receiving hepatotoxic medications [2].

CONCLUSION

In current survey, large proportion of respondents were found to prescribe antibiotics due to non-clinical factors also which included; uncertainty of diagnosis and patient expectation for antibiotics and request for analgesics. 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. Antibiotics should be used as adjunct rather than substitute to dental procedures.

Similar to antibiotics analgesics too have associated risks, related mostly to gastrointestinal and hepatotoxicity.

In current study, only 31.7% of respondents remained informed of current prophylactic practices through pharmaceutical companies followed by university training sessions and scientific societies (30.7%). Educational initiatives to rationalize the use of antibiotics and analgesics in dental practice are highly required.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Apr 14, 2014**
Date of Peer Review: **May 03, 2014**
Date of Acceptance: **May 21, 2014**
Date of Publishing: **Jul 20, 2014**