

# Antibiotic over Prescription in Irreversible Pulpitis; A Perception Based Study in Quetta, Pakistan

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<sup>1,3</sup>Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work, manuscript writing.

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## ABSTRACT

**Objective:** To determine the protocols for management of irreversible pulpitis cases in dentistry in Quetta.

**Methodology:** A cross sectional, questionnaire-based study was conducted at Sandeman Provincial Hospital and Bolan Medical Complex Hospital Quetta from March till August 2021. The questions section consisted of single question with 5 options. The responders were asked to select from options based on their perception. The population for this study was dental prescribers working in two areas i.e. endodontists and general dental practitioners (specialists of branches of Dentistry other than endodontics and Operative Dentistry were assumed as general dental practitioners). Cross tabulation and chi square were also applied to test association and significance.

**Results:** The majority 68(55.3%) of respondents were general dental practitioners followed by operative dentistry respondents 21(17.1%). Majority 54(43.9%) of prescribers were having perception that analgesic should be prescribed and perform concurrent pulpectomy while 25(20.3%) of prescribers had perception that in patients with irreversible pulpitis, prescribe antibiotics, analgesics and perform concurrent pulpectomy whereas majority (n= 6) of endodontists would immediately prescribes analgesic and schedule for RCT later. Prescribers having experience of 1 to 10 years would prescribe analgesic and perform concurrent pulpectomy.

**Conclusion:** This study concluded that majority of dental practitioners had perception of prescribing antibiotics in irreversible pulpitis while there were still a good number of those dental prescribers that had perception of prescribing analgesics and performing concurrent Pulpectomy.

**Keywords:** Antibiotics, Analgesics, Irreversible Pulpitis, Prescription, Management.

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## Introduction

In early phase of irreversible pulpitis, there are normally no clinically significant signs of odontogenic infection, specially bacterial infections, but still, there are a lot of dental practitioners who prescribe antibiotics in case of irreversible pulpitis, though there is limited data available to show that the antibiotic penicillin causes reduction in percussion sensitivity and pain associated with irreversible pulpitis.<sup>1</sup> Irrational prescription of antibiotics leads to antimicrobial resistance, and in the recent era,

resistance towards antimicrobial therapy is increasing at an alarming rate leading to multi drug resistance.<sup>2</sup> One of the reasons of antibiotic resistance is that the antibiotics are continuously being prescribed for conditions that can be treated without antibiotic therapy like localized abscess in patients who are not medically compromised and in case where there is no infection as in case of irreversible pulpitis (Rôcas & Siqueira Jr, 2013).<sup>3</sup> Reduction in antibiotic resistance can only be possible when there will be significant antibiotic usage reduction.<sup>4</sup> In this regard American Association of Endodontics and

European Society of Endodontology have developed suitable guidelines regarding the rational use of antibiotics in endodontic infections.<sup>5</sup>

Vast numbers of antibiotics are being prescribed by dental practitioners along with other commonly prescribed pain relieving medications while treating dental conditions.<sup>6</sup> Between 7% to 11% of antibiotics are being prescribed by dental practitioners only (Cleveland & Kohn, 1998).<sup>7</sup> There is increasing trend of dental practitioners regarding over use of antibiotics in the treatment of dental pain associated with irreversible pulpitis and the culture isolated from these irreversible pulpitis cases revealed that pathogens are multi drug resistant towards commonly prescribed antibiotics.<sup>3</sup> The aim of this study was to assess the perception of general dental practitioners as well as endodontists towards antibiotic prescription for the management of pain in irreversible pulpitis.

## Methodology

A cross sectional, questionnaire-based study was conducted at Sandeman Provincial Hospital and Bolan Medical Complex Hospital Quetta. Already developed tool was used in this study.<sup>8</sup> Duration of this study was 6 months, that is from March till August 2021. The tool comprised of two sections that is demographic and questions sections. The questions section consisted of single question with 5 options. The responders were asked to select from options based on their perception. The population for this study was dental prescribers working in two areas i.e. endodontists and general dental practitioners (specialists of branches of Dentistry other than endodontics and operative dentistry were assumed as general dental practitioners). Moreover, durations of their experience has also been recorded. 200 questionnaires were distributed among study population, out of which 146 were returned and out of 146 questionnaires, 23 had missing data. So, 123 questionnaires were included in study. Non-Probability convenience sampling technique was used in this study. All the prescribers who agreed to participate in study were included in study and all those who were no willing to participate or not responded were excluded from the study.

The analysis in this study was conducted using a software statistical package for social sciences (SPSS) version 21. The data were analyzed using descriptive statistics, and the resulted data were computed as frequency and percentage. Cross tabulation and chi square were also applied to test association and significance.

## Results

Majority (n=68,55.3%) of respondents were general dental practitioners followed by endodontics and operative dentistry respondents 21(17.1%). Majority 74(60.2%) of respondents were having full time academics with clinical practice as practice arrangements along with majority 109(88.6%) of respondents were having 1 to 5 years experience after graduation as mentioned in table no I. Perception of prescribers regarding antibiotic prescription in irreversible pulpitis is illustrated in table II. Majority 54(43.9%) of prescribers were having perception that analgesic should be prescribed and perform concurrent pulpectomy while 25(20.3%) of prescribers had perception that in patients with irreversible pulpitis, prescribe antibiotics, analgesics and perform concurrent pulpectomy.

**Table I: Demographics characteristics of participants.**

Description	N	%
<b>Specialty</b>		
General dental Practitioner	68	55.3
Endodontics and Operative Dentistry	21	17.1
Prosthodontics	3	2.4
Maxillofacial Surgery	19	15.4
Orthodontics	12	9.8
<b>Practice arrangements</b>		
Private Practice	5	4.1
Full time academics with clinical practice	74	60.2
Full time academics without clinical practice	35	28.5
Not Currently practicing clinical dentistry	9	7.3
<b>Practice Experience</b>		
1 to 5 years	109	88.6
6 to 10 years	9	7.3
11 to 15 years	2	1.6
16 to 20 years	3	2.4

**Table II: Antibiotic prescription in irreversible pulpitis**

Description	N	%
Immediately Prescribe Antibiotics and Schedule for RCT later	9	7.3
Immediately Prescribe Analgesic and Schedule for RCT later	18	14.6
Immediately Prescribe Antibiotics and Analgesic and Schedule for RCT later	17	13.8
Prescribe Analgesic and perform concurrent Pulpectomy	54	43.9
Prescribe Antibiotics, Analgesic and perform concurrent Pulpectomy	25	20.3

Prescribing Behavior with reference to specialty in irreversible pulpitis is illustrated in table III. Majority (n=30) of general dental practitioners, majority (n=14) of operative dentistry practitioners and majority (n= 2) of prosthodontics would prescribe analgesic and perform concurrent pulpectomy while majority (n=6) of maxillofacial surgery would Prescribe antibiotics and

analgesic and perform concurrent Pulpectomy. Majority (n= 6) of orthodontics would Immediately prescribes analgesic and schedule for RCT later. Prescribing behavior with reference to experience is illustrated in table IV. Majority of prescribers having experience of 1 to 10 years would prescribe analgesic and perform concurrent pulpectomy.

## Discussion

Dental caries if unchecked, results in irreversible pulpitis which can be considered as immune- mediated sequence of events affecting dental pulp. It is an inflammatory rather than infective condition.<sup>9</sup> The American Association of Endodontists (AAE) defines symptomatic irreversible pulpitis as a clinical diagnosis based on subjective and objective findings indicating that the vital inflamed pulp is incapable of healing. Additional findings can be lingering thermal pain, spontaneous pain, radiated/referred pain which can keep patient awake at night.<sup>10</sup> This pain is not accompanied by clinical signs of infection i.e. swelling and tenderness of adjacent mucosa, lymphadenopathy or trismus etc.<sup>11</sup>

Among endodontic emergencies, most patients report a chief complaint of severe dental pain caused by irreversible pulpitis. One way to relieve such kind of

severe pain is removing the teeth and other way of pain elimination is removal of inflamed pulp i.e. pulpectomy and subsequent root canal preparation and obturation. There is still significant number of dental prescribers who prescribe antibiotic in irreversible pulpitis associated pain.<sup>12</sup> By definition, pain in irreversible pulpitis is caused by inflamed vital pulp not from infected non vital pulp so antibiotic usage becomes unjustified.<sup>13</sup>

It is imperative to know that antibiotics are being prescribed due to misunderstanding of pathological process of pulpitis (as pain subsides when pulp becomes non-vital irrespective of antibiotic use) or perception that antibiotics can be used prophylactically. Either of these two approaches may have evolved the inadvertent use of antibiotics for the pain in irreversible pulpitis. Therefore, there is now emerging evidence to show that antibiotics are largely ineffective in controlling pain due to irreversible pulpitis because this pain is of inflammatory process rather than of infection.<sup>5</sup>

This study showed that 20.3% of prescribers would prescribe antibiotics, analgesics and perform concurrent pulpectomy whereas, study conducted in USA and published by Yingling et al showed that 16.7 % of specialist endodontics, in case of irreversible pulpitis,

**Table III: Prescribing Behavior with reference to specialty**

Specialty	Prescribing Behavior					P Value
	Immediately Prescribes Antibiotics and Schedule for RCT later	Immediately prescribes Analgesic and Schedule for RCT later	Immediately prescribes Antibiotics and Analgesic and Schedule for RCT later	Prescribe Analgesic and perform concurrent Pulpectomy	Prescribe Antibiotics and Analgesic and perform concurrent Pulpectomy	
General Dental Practitioners	3	11	9	30	15	
Endodontics and Operative Dentistry	2	0	2	14	3	
Prosthodontics	0	0	0	2	1	
Maxillofacial Surgery	4	1	4	4	6	
Orthodontics	0	6	2	4	0	

**Table IV: Prescribing Behavior with reference to Experience**

Experience	Prescribing Behavior					P-value
	Immediately Prescribes Antibiotics and Schedule for RCT later	Immediately prescribes Analgesic and Schedule for RCT later	Immediately prescribes Antibiotics and Analgesic and Schedule for RCT later	Prescribe Analgesic and perform concurrent Pulpectomy	Prescribe Antibiotics and Analgesic and perform concurrent Pulpectomy	
1-5 Years	9	14	16	48	22	
6-10 Years	0	3	1	4	1	
11-15 Years	0	0	0	1	1	
16-20 years	0	1	0	1	1	0.862

prescribed.<sup>14</sup> In our study, though 14% of the endodontists were found to manage irreversible pulpitis cases with analgesics and concurrent endodontic treatment but 3% specialists even endodontists were found to prescribe antibiotics for the relief of pain in irreversible pulpitis. Study conducted by Mainjot et al in Belgium reported that 4.3% of prescribers practicing as general dental practitioners prescribe antibiotic in irreversible pulpitis.<sup>15</sup> whereas a study conducted by Segura-Egea et al. in Spain reported that 86% of general dental practitioners prescribe antibiotics in irreversible pulpitis.<sup>16</sup> Almost 67% (Cumulative percentage) of prescribers in this study would perform immediate pulpectomy while study conducted by Waton et al. concluded that presently, the widely accepted practice, standard care, in case of irreversible pulpitis is immediate pulpectomy.<sup>17</sup> In our study, 15% of general dental practitioners were found to prescribe antibiotics, and overall, 20.3% prescribers were prescribing antibiotics unjustifiably to manage irreversible pulpitis cases.

A study conducted on prescribing behavior of not only general dental practitioners but also endodontists revealed that one in every four dentists prescribes antibiotics when there use is actually not indicated.<sup>8</sup>

It is important to know that the unnecessary use of antibiotics increases the risk of emergence of resistant bacterial species. It is estimated that economic burden of antibiotic- resistant infection (ARI) will be more than that of cancer. Among other hazards, the incidence of antibiotic-related colitis caused by clostridium difficile has increased to much extent.<sup>18</sup> This condition can in turn lead to significant morbidity which in turn can be life threatening in elderly or medically compromised patients.<sup>19</sup> Moreover, risk of anaphylaxis is always there with the use of antibiotics.<sup>20</sup>

Substandard prescribing of antibiotics by dentists can result from several factors including poor knowledge of pathological process of irreversible pulpitis, social factors or on high patient's demand etc.<sup>5</sup>

**Recommendations:** This study was to highlight the extent to which antibiotics are being prescribed unjustifiably at general dental practitioner level to specialist level for the management of irreversible pulpitis. One important finding of the study is that practitioners with working experience from 1 to 10 years are prescribing evidence-based treatment for irreversible pulpitis i.e. analgesics with concurrent endodontic treatment perhaps because of

their sound knowledge of pathological process in irreversible pulpitis and antibiotics.

Lastly, more extensive studies should be conducted regarding unjustified use antibiotic among dentists to manage severe pain of irreversible pulpitis and knowledge refresher trainings should be conducted for dental practitioners.

## Conclusion

This study concluded that majority of dental practitioners even some of the endodontists had perception of prescribing antibiotics to manage the pain of irreversible pulpitis while there were still good numbers of those dental prescribers who had perception of prescribing analgesics and performing concurrent Pulpectomy which is 'standard of care'

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