

## FREQUENCY OF REVERSIBLE AND IRREVERSIBLE PULPITIS IN PATIENTS VISITING DENTAL OPD OF SMDC COLLEGE OF DENTISTRY

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### ABSTRACT

**Objective:** *The main objective of study was to determine the incidence of reversible and irreversible pulpitis in patients coming for dental check-up in out-door patient department of College of Dentistry, SMDC.*

**Materials and Methods:** *About 443 patients were examined in dental OPD and data was collected on basis of especially designed questionnaire. All clinical findings, radiographical interpretations and objective pulpal testing were included within the patient assessment. The data was coded and entered into SPSS 20 for data analysis.*

**Results:** *Among 443 patients 304 patients were assessed for pulpal disease. (females 149, males 155). Total teeth examined were 1055 both clinically and radiographically for pulpitis and seen to be more common in males as compared to females with mandibular posteriors affected more. Irreversible pulpitis seen to be more common in females and caries being the number one cause of the disease. Pulpitis was seen to be significantly related with age  $p = 0.029$ .*

**Conclusion:** *Early diagnosis and treatment can reversal the condition and improve the oral health status preventing premature extractions and root canals and prosthesis applications.*

**Keywords:** *Reversible pulpitis, Irreversible pulpitis, Electrical pulp test, Laser Doppler flowmetry, Pulpal necrosis and dental abscess.*

### INTRODUCTION

Dental pulp present in the pulp chamber is a connective tissue consisting of nerves, blood vessels, odontoblasts, fibroblasts, interstitial fluid and other cellular components.<sup>1</sup> It is covered by three mineralized tissues: enamel, dentin and cementum.

These tissues protect pulp from microbial rich environment.<sup>2</sup>

Dental caries is the most common chronic infectious disease caused by *Streptococcus mutans* bacteria.<sup>3</sup> Cavity diagnosed by the mouth mirror and dental explorer is defined as the clinical caries. As in past, the definitions based on etiology and pathology have failed in some extent because of different situations in different countries.<sup>4</sup>

Access to dental pulp for infecting bacterial toxins is dental caries. As Microorganisms reach the dentino-enamel junction, the infection spread slowly laterally and pulpally as well. Pulp becomes

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inflamed as bacteria reach the dental pulp to infect it. Decalcified leathery dentin might provide pathway to pulp and cause infection. Reversible pulpitis would occur if bacteria does not reach the pulp otherwise irreversible pulpitis would occur.<sup>5</sup> Pulpitis can be defined as inflammation of the pulpal tissue in response to the irritants of microbial, chemical, mechanical or thermal origin. The one of most common cause of pulpitis, is the dental caries if not treated on an early stage can lead to irreversible pulpitis.<sup>6,7</sup> Pulpitis can be classified on the type and severity of inflammation as acute serous pulpitis, acute suppurative pulpitis and chronic ulcerative pulpitis. The most accepted classification of pulpitis is according to the treatment prognosis. According to which pulpitis is classified into reversible and irreversible pulpitis.<sup>6</sup>

According to classification, healthy pulp is vital and without inflammation. Healthy pulp will be asymptomatic, react to vitality tests such as heat, carbon dioxide, ice and electric pulp test (EPT).<sup>8</sup>

After proper patient history, signs and symptoms, radiographs and pulp testing, diagnosis is confirmed. Pulp testing include electrical pulp test EPT, cold test, heat test and percussion test.<sup>9,10</sup> To evaluate tooth vascular supply Laser Doppler flowmetry (LDF) or Pulse Oximetry is used. Thermal test includes the application of cold and heat stimuli to the tooth. Cold thermal test causes the contraction of the dentinal fluid in the dentinal tubules resulting the outflow of fluid because of hydrodynamic forces. Cold test may be used to differentiate the reversible and irreversible pulpitis. If the pain subsides after the removal of cold stimuli, diagnosis of reversible pulpitis is made. If the lingering pain present even after the removal of stimuli, irreversible pulpitis diagnosis is made. In some cases of irreversible pulpitis pain is subsided by introducing cold stimuli. The teeth which are previously treated do not respond to the thermal test and electric pulp test. There is no response of electric pulp test in pulpal necrosis and dental abscess.<sup>10</sup>

Distribution and severity of dental diseases varies not only in different parts of world but also in different regions of same country.<sup>11</sup> Pulpal and periradicular pain need emergency care.<sup>12</sup> It is considered as the serious public health problem in some countries as it can be worse experience in one's life.<sup>13</sup> Acute dental pain (pulpitis) is one of the major reasons for patients who seek emergency dental care.<sup>14</sup>

Pulpitis till today appears as a major chief complain of the patients visiting a dental clinic. If diagnosed at early stage we can prevent reversible pulpitis from entering into irreversible stage. Caries are the most common cause of pulpal inflammation if remained untreated.<sup>7</sup>

The various studies have been performed on prevalence of pulpal or/and peri radicular diseases at United States and other different countries. Most of these studies were based on the radiographic findings.<sup>9,15</sup>

Very few studies have been done on prevalence of reversible and irreversible pulpitis among the population of Pakistan, based on radiographic finding. There is a huge difference in oral health status among different population groups of Pakistan. These groups can be classified according to age, gender, awareness to dental health, income, lifestyle and race.<sup>16</sup>

The purpose of this study was to determine the frequency of reversible and irreversible pulpitis in college of dentistry SMDC. The frequency of reversible and irreversible pulpitis was determined through the percentage of patients not by the percentage of teeth with reversible and irreversible pulpitis.

## MATERIALS AND METHODS

A cross-section descriptive study was carried out on a total of 443 patients of different age groups from both genders using a convenient sampling technique. All patients advised periapical radiographs for the caries and pain associated with caries were included in the study. Peri apical radiographs for any other cause like impaction, tri germinal neuralgia etc were excluded from the study. Pulpal testing which included percussion, palpation and thermal test. However, Electric pulp test, cold test and other pulp test were excluded from the study. Patient with mental impairment were excluded from the study.

Patients were examined in the OPD of college of dentistry, SMDC. After the brief history, examination and radiographic analysis the confirmed diagnosis was made. For the diagnosis of diseased teeth following data was used: presenting complaint, history of presenting complaint, any past dental history, radiographic interpretation and pulpal testing (thermal test and percussion test). Suspicious teeth were defined as having Deep caries, Pain on percussion,

History of dental pain or presence of any sinus tract. Structured questionnaire was designed to gather the information from the patients on their demographics, tooth pain, nature of pain, history of pain and receiving any respective treatment. Immediate treatment of extraction and root canal treatment was given to those patients who were in pain.

Other detail information was collected with the help of radiographs as the periapical radiolucencies, extend of caries, proximity of caries to pulp, recurrent caries, widening of PDL, root resorption, crack, fractures, poor endodontically treated tooth causing re-infection and gap between tooth and restoration.

The clinical examiners were trained and briefed before the start of survey, the clinicians filled the survey form after verbal consent approval from the patient. At the end of survey, daily data was gathered and entered into SPSS software. The entered data was used to determine the frequency of reversible and irreversible pulpitis in relation to both genders and specific age group.

**Data Analysis**

Prevalence was determined and presented by simple descriptive statistics with the help of SPSS. Prevalence was also stratified using logical analysis of gender and age. Data on gender and age was collected from survey and data for the presence of reversible and irreversible pulpitis was collected from clinical examination confirmed by periapical radiograph. Variables were used for gender, age and presence of type of pulpitis.

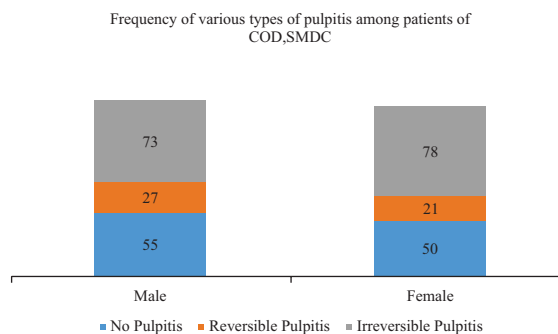
**RESULTS**

Total 443 patients were examined clinically in the OPD of college of dentistry SMDC of which 304 patients were advised for periapical radiograph among which 149 were females and 155 were males.

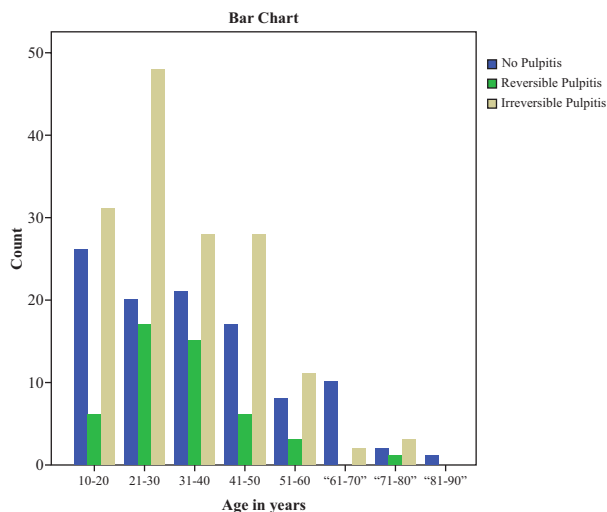
105 (34.53%) patients were seen to have no pulpitis (males=55, 52.38% and females=50, 47.61%). 48 patients (15.78%) with reversible pulpitis (males=27, 50% and females=21, 43.75%). 151 patients (49.67%) with irreversible pulpitis 73 males (48.34%) and females 78 (51.65%) as shown in figure 1. With age group 21-30 years 85 patients were examined, out of which 48 were diagnosed as ir-reversible pulpitis (56.4%) and 15 with reversible pulpitis (17.64%) as shown in figure 2.

Total 1055 teeth were examined radiographically, 545 teeth (51.65%) of males and 510 teeth (48.34%) of females. Out of 1055, 209 teeth (11.81%) were diagnosed with pulpitis, among which 4.26% with reversible pulpitis and 15.54% with irreversible pulpitis, remaining 846 teeth (80.18%) were normal teeth.

From the total of 1055 teeth assessed 5.971% were upper anterior teeth, male (4.360%) and female (1.611%) teeth, 36.49% were upper posterior teeth, males(18.10%) and female (18.38%) , 0.758% were lower anterior teeth, male (0.473%) and female (0.284%) and 56.77% were lower posterior teeth, males(28.72%) and female (28.05%). Mandibular posteriors are seen to be more affected by caries and pulpitis than the anterior dentition. Irreversible pulpitis is seen more common in females especially in the second to third decade of life. Pulpitis is seen to be significantly related with age  $p = 0.029$ .



**Fig 1: Frequency of different types of pulpitis between both genders**



**Fig 2: Frequency of pulpitis among different age group**

**Table: 1 Chi-square test showing relationship between pulpal disease and age**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.613a	14	.029
Likelihood Ratio	26.531	14	.022
Linear-by-Linear Association	2.560	1	.110
N of Valid Cases	304		

## DISCUSSION

Various studies had been done on the prevalence of pulpal diseases on basis of radiographs but not with the clinical examinations.<sup>9</sup>

The many clinicians do not agree with what they appreciate the radiographs.<sup>17</sup> Confirm diagnosis for the pulpal diagnosis required proper dental history, clinical examination, pulpal tests and radiographs. The short coming of these studies is that they determined the prevalence of pulpal or peri-radicular diseases on basis of radiographs only considering the tooth as a unit of measurement. Our study is based on dental history followed by the pulpal test including thermal and percussion test and peri-apical radiograph.

The various studies have been performed on the prevalence of pulpal or peri-radicular disease based on radiographic findings. According to an urban Danish population study, 15984 teeth were examined radiographically of 613 patients. 538 (3.4%) had apical periodontist and 773(4.8%) had been end-odontically treated.<sup>15</sup> In the given study, 1055 teeth were examined radiographically of 443 patients. In the study done at VCU School, Elle found that pulpal disease is present in 39.52% whereas in the present study, 15.78% patients were with reversible pulpitis and 49.67% were with irreversible pulpitis making a total of 65% which is way more than mentioned in the VCU School. Especially the younger age group individuals and lack of oral hygiene care causing progression of most caries to pulpal diseases can be postulated to increase sugar food intake.

According to the Elle's study, patients under-age of 40 years, were 60, 25 (37.88%) had pulpal disease.<sup>9</sup> In our study, there were 212 patients under-age of 40 years, 145 (68.39%) patients had pulpal diseases. The difference may be due to the lack of

dental awareness or the different type of diets.

Out of 92 patients of over 40 years, who were advised peri-apical radiographs 54 (58.69%) had pulpal diseases, which was higher than the Elle's study, who observed 40.28%.

Root canal infections start from crown and progress towards apex of root.<sup>16</sup>

In many cases of dental pain, in which pulpal tissue is infected root canal treatment is indicated.<sup>11</sup> According to Fransico et al study, 927 out of 1481 patients were reported with pulpal pain, with mostly irreversible pulpitis (563 cases), pulp necrosis (173 cases) and reversible pulpitis (191 cases).<sup>18</sup>

Comparing within the gender, men were more likely to have pulpitis than females, this observation was same with this study. This shows men take little interest to their dental health.

According to Elle's study, patients in 30-39 years age group are more likely to have pulpal and peri-radicular disease as compare to 18-19 years age group.<sup>9</sup> The present study shows more pulpal and peri radicular diseases in 21-30 years age group as compare to 10-20 years age group.

## CONCLUSION

Dental health has a strong relation with different ages but also with both genders. Different ages will have different detrimental factors affecting the dental health. Pulpitis is a predominant oral health disease affecting all age group especially younger age group with irreversible pulpitis surpassing reversible pulpitis. Early diagnosis and treatment can reversal the condition and improve the oral health status preventing premature extractions and root canals and prosthesis applications.

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