

## Estimation of the Prevalence of Pulpitis in the Tertiary Care Hospital in Nellore district- A cross sectional study

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**Abstract:Aim:** The objective of this cross sectional study was to estimate the prevalence of pulpitis among the adult population in the tertiary care hospital in south India.

**Methods:** Enumerated the data from the hospital records in the march month. And also identified the individuals who visited the department of conservative dentistry and endodontics. To estimate the prevalence of pulpitis all the subjects were subjected to clinical and radiological examination. The inclusion criteria were older than 18 yrs and younger than 75 yrs diagnosed with pulp inflammation [reversible and irreversible pulpitis] caused by dental caries.

**Results:** The total prevalence rate of pulpitis among the given population is 91%. The lowest prevalence rate of reversible pulpitis observed in the females of age group 46-75 years, and the highest prevalence rate is seen among females in the age group 18-30 years. In the case of irreversible pulpitis highest prevalence rate is seen among males of the age group 18-30 years, and the lowest was seen among the females of the age group 46-75 years. Overall observation exhibited a high motivation for undergoing dental treatment among both males and female patients.

**Conclusion:** The results demonstrated a high prevalence rate of pulpitis among the adult population of the rural area with mixed dietary habits. Also, the prevalence rate of pulpitis has been higher among females rather than the male population.

### **Clinical significance**

The inference of the study proves that there is a need to develop awareness and prevention strategies for dental caries aimed at improvising the dental health services among the rural areas in Nellore district.

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### **I. Introduction**

Factors such as caries or trauma causes irritation to the pulpal or periradicular tissues can result in inflammation. The inflammatory response to pulpal injury or infection has major clinical significance. Injury may be caused by dental procedures [iatrogenic] by trauma or by attrition. Infection may be caused by bacteria originating from caries, microleakage from restorations, or other routes of entry into the pulp. A healthy pulp has a tremendous capacity to repair itself and to heal; however, often over time and with exposure to irritants, pulp tissue becomes compromised due to a state of inflammation or fibrosis. Pulpal injury results in cell death and inflammation. The degree of inflammation is proportional to the intensity and severity of tissue damage. Slight injuries such as incipient caries or shallow cavity preparations cause little or no inflammation in the pulp [Seltzer and Bender 2012].

In contrast, deep caries, extensive operative procedures, or persistent irritants produce more severe inflammatory changes. Depending on the severity and duration of the insult, and the host capacity to respond to the pulpal response ranges from transient inflammation [reversible pulpitis] to irreversible pulpitis and then to total necrosis. These changes often occur without pain and even without the knowledge of the patient or the dentist [Seltzer and Bender 2012].

Caries is the most common cause of bacterial provocation of the pulp. In the process of destroying the tooth structure, a variety of substances are produced that evoke the inflammatory lesions. Most often the pulp can sustain the irritation mainly when caries is confined to primary dentin only. By contrast, once it progresses into reparative dentin or pulp tissue, proper severe inflammatory involvement jeopardizes the vital function of the tissue. In reality, dentin is often involved early on, even though the lesion may be detected only after plaque removal and air drying. Consequently, the pulp becomes altered and prompted to respond to caries at a very early phase. A major etiological factor for pulpal inflammation is the invasion of bacteria or bacteria derived elements from caries into the dental pulp. Bacterial invasion from a caries lesion is the most common cause of pulpal inflammation. Diagnostic tools to determine the extent of pulpal inflammation beneath a carious lesion are imprecise. Many factors play a role in determining the nature of the process so the individuality of each caries lesion must be recognized. The response of the pulp may vary depending on whether the caries process

progresses rapidly [acute caries] or slowly [chronic caries] or is completely inactive [arrested caries] [Walton, R.E. And Torabinejad 2002].

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Nevertheless, very few literatures available could present the procedure of pulpal inflammation and correlated factors correlating with dental caries among the population who were seeking dental treatment. The prevalence of pulpal inflammation was the percentage of patients with the condition. Therefore this cross sectional study intends to evaluate the prevalence of the pulpal inflammation among the adult patients seeking dental care at a tertiary hospital.

## **II. Methods:**

The present study recruited 1118 patients who visited the outpatient department of conservative dentistry and endodontics at Narayana dental college in Nellore district. This cross sectional study has been approved by the institution review board. After obtaining the informed consent for the participation from all the individuals. Enumerated the data from the hospital records in the march month. And also identified the individuals who visited the department of conservative dentistry and endodontics. To estimate the prevalence of pulpitis all the subjects were subjected to clinical and radiological examination. The inclusion criteria were older than 18 yrs and younger than 75 yrs diagnosed with pulp inflammation [reversible and irreversible pulpitis] caused by dental caries.

The outcome of the study was to find the patients with pulpal inflammation, which can be in either reversible or irreversible state. It was achieved by taking proper case history with detailed clinical examination. The patient's teeth were examined by asking regular questions regarding past and present toothache, nature & intensity of the tooth pain, by percussing the suspected teeth, and also by reviewing radiographically. To distinguish the state of pulpal inflammation that was either reversible or irreversible appropriate tests like palpation, percussion, tooth sensibility tests had performed. All the information about the teeth with pulpal inflammation [reversible and irreversible] was collected to establish an accurate clinical diagnosis. In the radiographical examination, teeth were examined for the presence of widening of pdl space, discontinuity of lamina dura, or presence of any periapical pathology.

Based on all these signs and symptoms, clinical diagnosis assigned to each tooth. The pulpal diagnosis was normal pulp, reversible pulpitis, and irreversible pulpitis.

## **III. Results**

This study included 1118 patients who were reported in the outpatient department seeking dental treatment in the OPD of conservative dentistry and endodontics at Narayana dental college and hospital. Among the 1118 patients based on clinical examination and radiographical interpretation, 864 [77.2%] patients were identified as having pulpal inflammation [both reversible and irreversible pulpitis] out of 864 patients, 487 [56.3%] were men, and 513 [59.3%] were women.

### **Prevalence of pulpitis [reversible and irreversible] based on age group and gender:**

Table 1 shows the age group of the population ranges from 18 to 75 years. Among the 1118 patients, 417 of them [men-219 & women -198] belonged to age group 18-30 years, 345 of them [men - 132 & women – 213] belonged to the age group of 31-45 years, and 356 of them belonged to the age group of 46-75 years [191 men and 165 men].

Table 2 shows the distribution of the sample according to rural and urban areas. There exists a dissimilarity in prevalence rates of both reversible and irreversible pulpitis in rural areas than urban areas.

Table 3 shows the distribution of prevalence of pulpitis among the sample based on dietary habits. The data showed dissimilarity in the prevalence rates among vegetarian diet and mixed diet. The prevalence of reversible and irreversible pulpitis rates are higher in population with mixed [both veg and non-vegetarian] diet. Prevalence of reversible pulpitis in males with a mixed diet is 58% and in the females is 56%, and the prevalence of irreversible pulpitis in males is 53%, and in females, it is 39%.

Table 4 shows the prevalence of pulpitis in three age groups among 1118 subjects. The prevalence of reversible pulpitis in men 30% and women is 33%, and the prevalence rate in both genders is 63%. The prevalence of irreversible pulpitis in men is 12% and in women is 19%, and the overall prevalence rate is 28%. Hence the prevalence rate of pulpitis in a given hospital population, 1118 is 91%.

## **IV. Discussion**

The outcome of the study was to calculate the prevalence of pulpal inflammation in patients was accomplished by the analysis of the data records which reported to the OPD of conservative dentistry and endodontics department at Narayana dental college in March and April 2019. There were not many studies on

the prevalence of pulpal inflammation in a given population level. In the context of our investigation, we found that the frequency of pulpitis among the three age groups, the young age group 18- 30 years is higher when compared to the other two. Also, the females in both 18-30, 31-45 years age groups showed a higher frequency of reversible pulpitis and irreversible pulpitis [Agha Ch et al 2011]. The results obtained from this study serve as ascertainment of our objective that pulpal inflammation widely distributed in the younger age interval. The values will confirm the high frequency of caries complications among the young age groups. The reason may be due to altered food habits, lifestyle, high stress, high sugar, and carbohydrates consumption, etc. [Silverstone LM et al 1981].

Regarding gender, pulpal inflammation detected in men and women in an unequal mode as the difference seen in reversible and irreversible pulpitis, which affected more females in both 18 – 30 and 31 – 45 age groups. There is a significant difference in irreversible pulpitis among female patients in both the age groups. The prevalence of pulpal inflammation was higher in younger age patients. And the most prevalent pulpal inflammation was reversible pulpitis. [Dobrinka Mitkova Damyanova et al 2018].

Caries is a prolonged process, and lesions progress slowly over the years. Consequently, pulpal inflammation evoked by caries lesions begins as an inadequate immunologic response to bacterial antigens rather than an acute inflammatory reaction. Not all pulpal inflammatory reactions result in permanent damage to the pulp. Chronic inflammation is generally regarded as an inflammatory reparative reaction, as all of the elements needed for healing are present. When the caries lesion is eliminated or becomes arrested before bacteria reach the pulp, inflammation undergoes resolution and healing will occur [Nanda A Ingle NA 2002].

Consequently, an essential goal of restorative dentistry should be to rid the dentin of bacteria so that the inflamed pulp may heal making it a rationale for the use of indirect pulp-capping techniques. The severity of pulpal inflammation beneath a caries lesion depends to a high degree on the depth of bacterial penetration as well as the extent to which dentin permeability has reduced by dentinal sclerosis and reparative dentin formation [Abdul Arif khan et al 2008, Bruna Paloma de olveria et al 2016].

As the caries exposure enlarges and an ever-increasing number of bacteria enter the pulp, the defending forces are eventually overwhelmed. We must remember that the pulp has a relatively limited blood supply about the volume of tissue present in the pulp chamber and root canal space. When there is adequate blood flow to the area of inflammation, demand for the inflammatory elements will remain unfulfilled. So the inflammatory response can no longer be sustained and leads to unopposed bacterial growth within the pulp chamber, which can ultimately lead to total pulp necrosis [Banday N et al 2001].

This difference in the prevalence among men and women patients may explain by the fact that women are having a high risk of caries than men. The reason may be due to the number of effects including first teeth eruption in girls compared to boys, differences in dental attendance due to lack of financial independence among female patients and fear of the dentist and also due to the difference in+ dietary patterns between homemakers and workers [Trowbridge HO 1981].

The results of this study provided relevant information on the prevalence of pulpal inflammation that most affect the subpopulation. These results can help dental professionals to define new treatment strategies and preventive methods for dental caries, which is the leading cause of pulpal inflammation.

Epidemiology of any disease is a beneficial tool to assess the actual status of the disease among the subpopulation. The data can help design preventive measures against dental caries based on factors associated with pulpal inflammation [Abdul Arif khan et al 2008].

Based on the data obtained in this study we conclude that in the evaluated population,

- Reversible pulpitis [63%] was the most prevalent diagnosed pulpal inflammation in all the age groups.
- Irreversible and reversible pulpitis affected more female patients than males in 18- 45 age groups
- In the 46 -75 age group male patients were more affected than female patients.

### **Limitations:**

As the study was conducted in tertiary hospital the generalizability becomes questionable. The collected data from the hospital was confined to only one month and the data can vary over months.

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**Table 1** sample distribution according to age groups

Age groups	Men		Women	
	frequency	Percentage	frequency	Percentage
18 – 30	229	42.2%	208	36%
31 – 45	132	24.3%	223	39%
46 – 75	181	35.2%	145	25%
Total	542	48.4%	576	52%

**Table 2** Sample distribution according to the area

Gender	Urban areas		Rural areas	
	Reversible pulpitis	Irreversible pulpitis	Reversible pulpitis	Irreversible pulpitis
Men	319 [38%]	109 [33%]	530 [62%]	218 [66%]
Women	359 [38%]	216 [48%]	564 [61%]	237 [52%]

**Table 3:** correlation of diet with the prevalence of pulpitis [reversible and irreversible pulpitis]

	Vegetarian diet				Mixed [both veg and non vegetarian] diet			
	Reversible pulpitis		Irreversible pulpitis		Reversible pulpitis		Irreversible pulpitis	
Gender	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Men	356	35%	143	32%	493	58%	184	56%
Women	433	47%	151	33%	490	53%	176	39%

**Table 4** shows the prevalence of pulpitis in three age groups among 1118 patients

Age groups	Men				Women			
	Reversible pulpitis		Irreversible pulpitis		Reversible pulpitis		Irreversible pulpitis	
	F	P	F	P	F	P	F	P
18-30	349	41%	152	46%	430	47%	172	38%
31 – 45	248	29%	72	22%	320	35%	184	41%
46 – 75	252	30%	103	31%	173	19%	97	21%

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