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## FREQUENCY AND PREDICTOR FACTORS OF IRREVERSIBLE PULPITIS

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**Abstract. Objective:** Referral pains are one of the most common challenges which dentists are faced with them during diagnosis and before treatment. Pain referral can take place in tooth and other craniofacial structures and influence the diagnostic process. The present study was accomplished to evaluate the prevalence of irreversible pulpitis in patients referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain. **Methods:** This study is a descriptive and cross-sectional type of study conducted on 100 patients (21 males and 79 females) referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain. Informed consent was taken from patients. Data obtained from medical history, dentistry history, clinical examinations, and radiography were recorded in questionnaire developed for this purpose. Finally, the data were analyzed using SPSS18 software, Chi-square and Fisher exact test. **Results:** In the present research, the prevalence of irreversible pulpitis was obtained to be 77%. This prevalence in female was significantly more than males (P-value = 0.021). Patients with irreversible pulpitis significantly reported more severe pain (p-value=0.000) and pain at the real site (p-value=0.028). The frequency of irreversible pulpitis showed no significant correlation with age and type of pain (P-value<0.05). **Conclusion:** Considering the findings of this research, the prevalence of irreversible pulpitis in patients referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain was three times more than that of other diseases. This frequency showed significant relationship with factors of gender, pain severity, and the pain feeling site.

**Keywords:** Irreversible pulpitis, pain, root canal treatment.

### 1. Introduction:

Pain, as a common and unpleasant phenomenon leaving many negative effects on individual and social life of human, forces the patient to seek treatment (1-3). Referral pain is a kind of pain felt in a site with a nerve different from the nerve causing initial pain (3-6). Many studies conducted on animals have indicated that neurons of different neighboring tissues such as muscles, joints, and viscera tissue are converged on similar neuron of Medulla posterior horn. This convergence causes that brain cortex response to a painful input to be felt simultaneously in these tissues and referral pain to be created (4, 7). As toothache is the most common pain experienced in the face area, non-odontogenic referral pains in the face area might be mistaken with toothache (8-10). Thus, dentists should have adequate information and knowledge on referral pain areas, so that they can diagnose timely and treat correctly. Musculoskeletal, neurovascular, neuropathic, and psychological pains can refer the pain to odontogenic structures such as pulp-dentin complex and periodontium. Misdiagnosis might result in unnecessary treatments, high costs imposed on patient, and finally patient dissatisfaction (11, 12). Given what was mentioned above and with regard to the importance of correct diagnosis, this research was carried out to evaluate the prevalence of irreversible pulpitis in patients referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain.

### 2. Materials and Methods:

This study was approved and justified by the human ethics review committee of Shahid Sadoughi University of Medical Sciences (IR.SSU.REC.1395.4517). To carry out this descriptive and cross-sectional study, 100 patients (21 males and 79 females) referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief

complaint of pain were investigated. The inclusion criteria of this research included all patients referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain, and the exclusion criteria of study included those patients who were not willing to participate in the study for any reason. After providing adequate information for patients, they were asked to sign informed consent if they were willing to participate in the research. A questionnaire including demographic data, medical history, dental history, and patient pain characteristics was completed for each patient. Demographic information included age, gender, education level and job. In medical history, presence of diseases such as Hypertension, Diabetes, heart disease, digestive diseases, Rheumatoid, and other diseases, history of hospitalization, history of surgery, history of blood transfusion, and history of drug use were examined. The patient pain characteristics such as site, severity and type of pain (spontaneous/ stimulated) were examined. After recording the information, a complete clinical examination of the patients was performed. This examination included observing the oral mucosa, gingiva, lips and teeth by direct observing or using a mirror, touching of teeth, performing pulp tests including thermal and electric pulp tests. An appropriate radiograph (often periapical) was prepared and findings were recorded in the questionnaire. To record the pain severity, Visual analogue scale, which is a globally-accepted method, was used. Accordingly, a diagram of a smiling to crying face was shown to patient and he was asked to show his pain severity in the form of a number ranging from zero to five. In the stage of the data analysis, grades 1 and 2 were considered as low pain, grade 3 was considered as moderate pain, and grades 4 and 5 were considered as severe pain. In addition, patients were asked to show the site of pain felt on a diagram indicates the organs of head, face, and neck. By accurate medical and dental history, radiography and clinical examinations of the patient, his problem was diagnosed and recorded in the questionnaire. Finally, the collected data were analyzed using SPSS 18 software, Chi-square and Fisher exact tests at significance level of 0.05.

### 3.Results:

In this research, the prevalence of irreversible pulpitis was examined in patients referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain. To conduct this research, 100 patients (21 males and 79 females) were examined. The mean age of the patients was obtained to be  $29.89 \pm 10.82$  years with an age range of 12 to 59 years.

The obtained data indicated that among all patients, 77 patients had irreversible pulpitis. Table 1 shows the relationship between the demographic variables and frequency of irreversible pulpitis. Significant difference was seen in the relative frequency of irreversible pulpitis in terms of gender (P-value = 0.021), but this difference was not significant between age groups (P-value = 0.353).

Table 1: Frequency of pain according demographic factors

		Irreversible pulpitis		Others diseases		p-value
		N	%	N	%	
sex	Male	12	15.6	9	39.1	0.021
	Female	65	84.4	14	60.9	
age	<20	12	15.6	6	26.1	0.353
	20-40	51	66.2	15	65.2	
	>40	14	18.2	2	8.7	

Chi-square test

Table 2 illustrates the frequency of pain feeling sites in patients examined. As Table 2 illustrates, patients with irreversible pulpitis reported the pain significantly more in the actual site (P-value = 0.028).

Table 2: Frequency of pain location

Pain location	Irreversible pulpitis		Other diseases	
	N	%	N	%
Actual site	62	80.5	13	56.5
Other sites	15	19.5	10	43.5

P-value: 0.028 Chi-square test

The frequency distribution of pain feeling severity in two groups is summarized in Table 3. This table illustrates that both groups of patients experienced severe pain more than low and moderate level (P-value = 0.000).

Table 3: Frequency of pain severity (VAS)

Pain severity	Irreversible pulpitis		Other diseases	
	N	%	N	%
Low	28	36.4	2	9
Moderate	15	19.5	6	27.3
Sever	34	44.2	15	68.1

P-value: 0.000

Chi-square test

Table 4 illustrates the relative frequency of pain in patients examined. As table illustrates, spontaneous pain was more than stimulated pain in both groups, and no significant difference was found between the two groups (P-value = 1.000).

Table 4: Frequency of type of pain

Pain type	Irreversible pulpitis		Other diseases		P-value
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	
Spontaneous pain	64(83.1)	13 (16.9)	20 (87)	3 (16.9)	1.000
Stimulatory pain	13 (16.9)	64 (83.1)	3 (16.9)	20 (87)	1.000

Chi-square test

#### 4. Discussion:

In the current research, 100 patients (21 males and 79 females) referred to Endodontic department of dental school of Shahid Sadoughi University in 2017 with chief complaint of pain were randomly selected and investigated.

In the past studies, VAS (Visual Analogue Scale) and NRS (Numeric Rating Scale) were used to record pain severity (7, 13, 14). Both methods have high speed (less than one minute) and the acceptance, accuracy and repeatability of both methods have been reported similar and well, but understanding the NRS method and matching the level of pain with one of the degrees might be difficult for some patients. Thus, VAS method was used in this research to record pain severity of patients. To record the pain site in different studies, schematic diagrams and mannequin were used (7, 15). While using mannequin provides three-dimensional picture of face; however, due to ease of work, availability and acceptable results of diagram, diagram method was used in this research, as Falace study (15).

The findings of current research indicated that among 100 patients, 77% of the patients had irreversible pulpitis and 30% of them suffered from pain due to other diseases. Relative frequency of irreversible pulpitis showed a significant relationship with gender, severity of pain, and pain feeling site.

Macfarlane in his research on 319 university students at Kosovska Mitrovica University, reported that the prevalence of mouth and face pains is higher in females than that in males (1.8 times). In the research conducted by Macfarlane, the prevalence of symptoms in females (30%) was higher than that in males (21%) (1). These findings are in line with findings of our research. More expression of pain and more admissions of females for treatment might justify this reason. Findings of several studies (9, 11, 13, 15) conducted on face and mouth pains indicated that the prevalence of pain in young people is higher than that in elderly people (8, 16, 17). In the current research, no significant relationship was found between frequency of irreversible pulpitis and age. This difference in findings might be attributed to merely investigating the irreversible pulpitis in this research, while other studies evaluated and orofacial pain characteristics.

In the current research, both groups of patients with irreversible pulpitis and other diseases experienced the severe pain more than moderate and low pain. Locker also reported that more than half of the people suffering from face and mouth pain feel relatively severe pain (17). However, in the research conducted by Nadimi, only 32% of patients admitted to root canal treatment ward severe pain. Considering two degrees of VAS scale in the class of "severe pain" in the current research justifies this difference in findings (13).

In this research, 80.5% of patients with irreversible pulpitis felt the pain in the real site (pain factor) and 19.5% of them complained from referral pain. Findings of the study conducted by Mardani et al showed that pain in 655 of the cases, the pains with origin of pulp are referred to other areas. The origin of pain is not same with site pain feeling site (7). The difference in inclusion criteria might lead into different findings, so that in the study conducted by Mardani, inclusion criteria included "complaints of pain in the head, face, and neck" and "confirming that pain has pulp origin" (7). These inclusion criteria of study might increase the pain referral.

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## 5. Conclusion:

Based on our results, the frequency of irreversible pulpitis in patients referred to Endodontic department with chief complaint of pain was three times more than other diseases. This frequency showed significant relationship with factors of gender, pain severity, and pain feeling site, so that frequency of irreversible pulpitis in females was more than that in males and patients with irreversible pulpitis reported severe pain and pain in real site.

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