

Evaluation of the Quality of Life, and Prevalence of Chronic Orofacial Pain, in Patients with Diabetes in Kermanshah, Iran, in 2019

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ABSTRACT

BACKGROUND

This study intended to evaluate the prevalence of chronic orofacial pain in diabetic patients and its characteristics.

METHODS

In this cross-sectional study, 1300 patients referred to the Diabetes Centre of Taleghani Hospital in Kermanshah in 2019 were studied. The data collection tool was a questionnaire including demographic sections, medical history, and clinical findings. Data analysis was performed using SPSS software version 18, and the significance level was considered 0.05.

RESULTS

The prevalence of chronic orofacial pain in diabetics was 11.8 %. Headaches with a prevalence of 6.7 % were the most common chronic pain, followed by neuropathic pain with 2.54 % and TMJ pain with 2.38 %. The results showed that with an increase in FBS (Fasting Blood Sugar) and HbA1c (Haemoglobin A1c) variables, the prevalence of chronic orofacial pain also increased ($P < 0.001$). People under 40 and over 60 years were more likely to have TMJ pain ($P < 0.001$). Also, the duration of pain showed a statistically significant relationship with age and FBS. In patients under 50 years of age, the highest frequency was related to pain persistence less than 30 minutes, and in older ages, the prevalence of pain lasting more than 3 hours was higher ($P < 0.02$). Also, with an increase in FBS, the duration of pain increased ($P < 0.05$). The relationship between perceived pain intensity and type of diabetes was significant ($P < 0.001$). There was also a statistically significant and inverse relationship between pain intensity and age ($P < 0.001$, $\rho = -0.473$).

CONCLUSIONS

Migraine headaches, chronic neuropathic pain, and TMJ complication have high prevalence in diabetic patients, and management of these pain should be put under consideration by clinicians.

KEY WORDS

Diabetes, Chronic Orofacial Pain, Prevalence

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DOI: 10.14260/jemds/2021/441

How to Cite This Article:

Rezaei F, Babaei S, Jamshidy L. Evaluation of the quality of life, and prevalence of chronic orofacial pain, in patients with diabetes in Kermanshah, Iran, in 2019. *J Evolution Med Dent Sci* 2021;10(29):2156-2161, DOI: 10.14260/jemds/2021/441

Submission 19-11-2020,
Peer Review 18-05-2021,
Acceptance 26-05-2021,
Published 19-07-2021.

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BACKGROUND

Diabetes is one of the biggest health problems in the global community. The prevalence of the disease was more than 382 million in 2014 and is projected to reach 592 million by 2035.¹ This disease has a prevalence of 5 - 8 % in different regions of Iran.² Chronic complications of this disease include macrovascular and microvascular diseases. One of the complications of microvascular is neuropathy.³ About 7 % of diabetic patients develop nerve involvement in the first year of diagnosis, which increases with the prolongation of the disease and after 25 years reaches more than 50 %, which is called diabetic neuropathy.¹ Diabetic neuropathy has the highest rate of disability as well as death among the complications of diabetes. Thus, the risk of amputation with diabetic neuropathy increases 1.7 times or the death rate increases by 25 to 50 %.⁴

Diabetic neuropathy directly affects the quality of life of patients and their daily functioning. Neuropathic pain is caused by a primary lesion or dysfunction of the nervous system and is often associated with peripheral neuropathy due to diabetes. Symptoms of neuropathic pain include an unpleasant burning sensation and Dysesthesia, increased sensitivity to painful stimuli, and a feeling of pain in the face of non-painful stimuli.⁵ Insomnia and depression are behavioural symptoms of neuropathic pain.^{6,7}

Manifestations of diabetic neuropathy in the lower extremities are common; However, in some patients, symptoms may also occur in the mouth and face, thereby causing chronic orofacial pain.⁸ Most cases of orofacial pain are due to dental causes, which are often acute in nature.⁹ In some cases, there are patients who, although underwent successful dental treatment, yet complain of persistent pain; These people can experience neuropathic pain. Neuropathic pain can be continuous or intermittent. Persistent neuropathic pain originates from the nerve structure and is a progressive pain without improvement.

This pain is perceived in dental structures and is known as Atypical Odontalgia.¹⁰ Periodic neuropathic pain is a sudden, severe pain that lasts from a few seconds to a few minutes and is called neuralgia.¹¹ The prevalence of neuropathic pain is unknown and is uncommon in the general population.¹² In one study, the prevalence of neuropathic pain was 0.03 % for persistent type and 0.03 % for neuralgia.¹³ Ram et al. reported a prevalence of atypical odontalgia in 2.1 % population.¹⁰

In addition to chronic neuropathic pain, patients with diabetes are prone to experience other types of chronic orofacial pain.¹⁴ Various studies have shown that the symptoms of orofacial pain are common in diabetics and among them, women are at higher risk.¹⁵⁻¹⁷

Despite the importance of chronic orofacial pain, especially neuropathic, in the quality of life of diabetics, and given that conventional treatments are not able to completely cure chronic orofacial pain in diabetic patients, a more complete understanding of the pain and related factors can be helpful in effective treatment to reduce pain in these patients. As a result, this study intended to investigate the prevalence of chronic orofacial pain in diabetic patients and its characteristics.

METHODS

This research was conducted as an analytical cross-sectional study. The study population was patients referred to the Diabetes Centre of Taleghani Hospital in Kermanshah from September 2019 to May 2020. Sampling was a convenient one. The results of previous studies were used to calculate the sample size. In the study of Jacovides et al.¹⁸ the prevalence of DPNP was $P = 0.303$. Considering $\alpha = 0.05$ and $d = 0.025$ (accuracy), the minimum sample size was equal to 1299 people. The sample size was calculated using the following formula.

$$n = \frac{Z_{1-\frac{\alpha}{2}}^2 P (1 - P)}{d^2}$$

Inclusion criteria in the present study included having one of the types of diabetes and the patient's consent to participate in the study. Exclusion criteria included the patients who were unwilling to participate in the study.

The variables of age, gender, type of pain, area of pain, duration of chronic orofacial pain, pain intensity, type of medication, and duration of pain in each period were recorded for each person with the help of the patient, physician, and patient's medical file (Documentary documents, Questionnaire, and Interview). Blood samples were also used to measure FBS and HbA1c. The questionnaire used in the present study included questions such as pain area, type of pain (trigeminal neuralgia, TMD, headache, imaginary toothache, and burning mouth syndrome) and pain intensity, how long has the patient been in pain, and how long does the pain last? The type of medication used to control pain was also recorded.

Ethical Considerations

In the research process, no additional costs were imposed on the subjects. All personal information was provided without the person's name. At any stage of the research, the samples could be excluded from the research by their own decision. Honesty and non-interference of personal tendency in publishing the results of the study were observed by researchers.

Statistical Analysis

To investigate the relationship between demographic and clinical variables with the prevalence of orofacial pain, chi-square test and multiple logistic regression were used. SPSS Version 18.0 software (Inc., Chicago, IL, USA) was used for data analysis. The significance level in this study was considered 0.05.

RESULTS

In the present study, 774 women (59.5 %) and 526 men (40.5 %) were present. 89.9 % of participants had type 2 diabetes, 5.4 % had type 1 diabetes and 4.8 % had gestational diabetes.

30.7 % had diabetes for less than 5 years, 34.3 % between 5 and 10 years, 10.6 % between 10 and 15 years, 19.7 % between 15 and 20 years, and 4.7 % had diabetes for more than 20 years. Headaches with a prevalence of 6.7 % were the most common chronic pain, followed by neuropathic pain with 2.54 % and TMJ pain with 2.38 %. The pain was mostly seen in the head area with 53 % and the lowest pain was in TMJ, 50 % of the pain lasted for 30 minutes and 22 % was more than 3 hours. Information on pain intensity is also reported in the table below (Table 1).

		Count	Percentage
Location of Pain	Head	70	53
	Face	31	23
	TMJ	10	8
	Teeth	0	0
	Face & TMJ	4	3
Pain Duration	Head & TMJ	17	13
	30 min	66	50.0
	1 - 3h	37	28.0
Intensity of Pain	> 3h	29	22.0
	Mild Pain	7	5.3
	Moderate Pain	68	51.5
	Severe Pain	57	43.2
	Total	132	100

Table 1. Variables Related to Chronic Orofacial Pain

There was a statistically significant relationship between age and TMD (P < 0.001). There was a statistically significant relationship between the type of diabetes and TMD (P = 0.004). There was a statistically significant relationship between TMD and history of diabetes, FBS, and HbA1c (Table 3). There was a statistically significant relationship between age and pain duration (P = 0.002).

There was a statistically significant relationship between the variable of pain duration with the variables of type of diabetes, but there wasn't significant relationship between the pain duration with history of diabetes and FBS (Table 4). There was a statistically significant relationship between pain intensity and type of diabetes (P < 0.001) (Table 5) and there was a statistically significant inverse relationship between age and pain intensity (P < 0.001, ρ = - 0.473). There was no statistically significant relationship between pain intensity and history of diabetes, FBS, and HbA1c (data wasn't shown).

There was a statistically significant relationship between pain location and type of diabetes, history of diabetes, and FBS (Table 6).

		Orofacial Pain				P - Value
		Count	Yes	Count	None	
			Percent (%)		Percent (%)	
Gender	Female	84	63.6	690	59.1	0.312 ^a
	Male	48	36.4	478	40.9	
Age	<40	23	17.4	217	18.6	0.961 ^a
	40 - 45	16	12.1	145	12.4	
	45 - 50	31	23.5	282	24.1	
	50 - 55	21	15.9	183	15.7	
	55 - 60	14	10.6	140	12.0	
	>60	27	20.5	201	17.2	
Diabetes Type	Gestational	6	4.5	57	4.9	0.468 ^a
	type1	10	7.6	60	5.1	
	type2	116	87.9	1051	90.0	
History of Diabetes	<5	45	34.1	354	30.3	0.416 ^a
	5 - 10	39	29.5	407	34.8	
	10 - 15	19	14.4	119	10.2	
	15 - 20	24	18.2	232	19.9	
	>20	5	3.8	56	4.8	
FBS	<140	41	31.1	631	54.0	< 0.001 ^a
	140 - 180	30	22.7	348	29.8	
	180 - 220	16	12.1	118	10.1	
HbA1c	>220	45	34.1	71	6.1	< 0.001 ^a
	7 - 7.5	68	51.5	73	6.3	
	7.5 - 8	46	34.8	1088	93.2	
	>8	18	13.	7	.6	
	Total	132	100	1168	100 %	

Table 2. Evaluation of the Relationship between Demographic Variables and the Prevalence of Chronic Orofacial Pain

^aChi - Square Test;

		TMD				P - Value
		Count	Yes	Count	None	
			Percent (%)		Percent (%)	
Gender	Female	17	54.8	67	66.3	0.244 ^a
	Male	14	45.2	34	33.7	
Age	< 40	13	41.9	10	9.9	< 0.001 ^b
	40 - 45	1	3.2	15	14.9	
	45 - 50	6	19.4	25	24.8	
	50 - 55	0	.0	21	20.8	
	55 - 60	1	3.2	13	12.9	
	> 60	10	32.3	17	16.8	
Diabetes Type	Gestational	5	16.1	1	1.0	0.004 ^b
	type1	3	9.7	7	6.9	
	type2	23	74.2	93	92.1	
History Of Diabetes	< 5	1	3.2	44	43.6	< 0.001 ^a
	5 - 10	15	48.4	24	23.8	
	10 - 15	0	.0	19	18.8	
	15 - 20	10	32.3	14	13.9	
	> 20	5	16.1	0	.0	
FBS	< 140	20	64.5	21	20.8	< 0.003 ^b
	140 - 180	0	.0	30	29.7	
	180 - 220	5	16.1	11	10.9	
HbA1c	> 200	6	19.4	110	8.7	0.000 ^b
	7 - 7.5	25	80.6	43	42.6	
	7.5 - 8	6	19.4	40	39.6	
	> 8	0	.0	25	2.0	
	Total	31	100	101	100	

Table 3. Relationship between Demographic Variables and Blood Glucose Factors by TMD Variable in Patients with Chronic Orofacial Pain

^aChi - Square Test; ^bMonte - Carlo Chi - Square Test

		Pain Duration						P - Value
		30 min		1 - 3h		> 3h		
		Count	Percent (%)	Count	Percent (%)	Count	Percent (%)	
Gender	Female	47	71.2	19	51.4	18	62.1	0.130 ^a
	Male	19	28.8	18	48.6	11	37.9	
Age	40>	13	19.7	5	13.5	5	17.2	0.002 ^a
	40 - 45	7	10.6	5	13.5	4	13.8	
	45 - 50	17	25.8	2	5.4	12	41.4	
	50 - 55	6	9.1	12	32.4	3	10.3	
	55 - 60	5	7.6	4	10.8	5	17.2	
Diabetes Type	60<	18	27.3	9	24.3	0	.0	0.044 ^b
	Gestational	6	9.1	0	.0	0	.0	
	Type1	6	9.1	4	10.8	0	.0	
History of Diabetes	Type2	54	81.8	33	89.2	29	100.0	0.016 ^b
	< 5	19	28.8	17	45.9	9	31.0	
	5 - 10	16	24.2	11	29.7	12	41.4	
	10 - 15	8	12.1	4	10.8	7	24.1	
	15 - 20	18	27.3	5	13.5	1	3.4	
FBS	> 20	5	7.6	0	.0	0	.0	0.118 ^a
	<140	25	37.9	8	21.6	8	27.6	
	140 - 180	18	27.3	5	13.5	7	24.1	
	180 - 220	8	12.1	5	13.5	3	10.3	
HbA1c	> 220	15	22.7	19	51.4	11	37.9	0.953 ^a
	7 - 7.5	32	48.5	20	54.1	16	55.2	
	7.5 - 8	24	36.4	12	32.4	10	34.5	
	> 8	10	15.2	5	13.5	3	10.3	
	Total	66	100	37	100	29	100	

Table 4. The Relationship between Demographic Variables and Blood Glucose Factors by Pain Duration Variable in Patients with Chronic Orofacial Pain

^aChi - Square Test; ^bMonte - Carlo Chi - Square Test

		Intensity of Pain						P - Value
		Mild Pain		Moderate Pain		Severe Pain		
		Count	Percent (%)	Count	Percent (%)	Count	Percent (%)	
Gender	Female	3	42.9	55	80.9	26	45.6	0.963 ^a
	Male	4	57.1	13	19.1	31	54.4	
Diabetes Type	Gestational	0	.0	1	1.5	5	8.8	0.001 ^b
	Type1	0	.0	7	10.3	3	5.3	
	Type2	7	100.0	60	88.2	49	86.0	
	Total	7	100	68	100	57	100	

Table 5. Relationship between Gender and Type of Diabetes by Pain Intensity in Patients with Chronic Orofacial Pain

^aChi - Square Test; ^bMonte - Carlo Chi - Square Test

		Head	Face	TMJ	Face & TMJ	Head & TMJ	P - Value ^a
		Count	Count	Count	Count	Count	
Gender	Female	44	23	4	3	10	0.371 ^a
	Male	26	8	6	1	7	
Age	< 45	19	6	5	3	6	0.139 ^a
	45-55	33	13	2	0	4	
	> 55	18	12	3	1	7	
Diabetes Type	Gestational	1	0	1	2	2	0.003 ^a
	Type1	6	1	0	0	3	
	Type2	63	30	9	2	12	
History of Diabetes	<5	31	13	0	0	1	0.001 ^a
	5 - 10	16	8	5	3	7	
	10 - 15	12	7	0	0	0	
	15 - 20	11	3	4	0	6	
FBS	>20	0	0	1	1	3	<0.001 ^a
	<140	16	5	5	4	11	
	140 - 180	15	15	0	0	0	
	180 - 220	10	1	3	0	2	
HBAIC	>220	29	10	2	0	4	0.027 ^a
	7 - 7.5	32	11	9	3	13	
	7.5 - 8	25	15	1	1	4	
	> 8	13	5	0	0	0	
	Total	70	31	10	4	17	

Table 6. Relationship between Pain Location and Gender, Age, Type of Diabetes, History of Diabetes, FBS and Haemoglobin A1C (HbA1c)

^aMonte - Carlo Chi - Square Test

DISCUSSION

In the present study, the prevalence of chronic orofacial pain in diabetic patients and its characteristics were investigated. In terms of pain area, the results showed that the majority of perceived pain was in the head (65.9 %), followed by the face (26.5 %) and then in the TMJ (23.5 %). Casellini et al.¹⁹ Tomoyasu et al.¹² Ebrahimi et al.²⁰ stated in their study that nerve damage in diabetic patients is more frequent in the facial area, especially in the eyes and around it. The examination of

the prevalence of chronic orofacial pain showed that 87 patients had headache, of which 50 had migraine headache and 37 had other types of headache. Also, 33 patients had chronic neuropathic pain, 2 patients had chronic trigeminal neuralgia pain and 31 patients had TMJ pain. In their study, Arap et al. reported a prevalence of orofacial pain in type II diabetic patients of 55.2 %, the most common of which was burning mouth syndrome with a prevalence of 17.2 %.²¹ The prevalence of chronic pain in diabetic patients in the present study (11.8 %) was much lower than that of Arap et al. Tomoyasu et al.¹² and Koopman et al.²² reported that the most

common chronic orofacial pain was trigeminal neuralgia with 82.1 %, which is not consistent with the results of the present study.

The examination of the relationship between demographic variables and diabetes factors with the prevalence of chronic pain showed that there was no significant relationship between the prevalence of chronic orofacial pain with gender and age; But its relationship with HbA1c and FBS variables was significant; With an increase in HbA1c and FBS levels, the prevalence of chronic orofacial pain also increased. By the type of pain, the findings showed that in chronic TMJ pain, there was no statistically significant relationship between gender and TMD; but its relationship with the age variable was significant; People under 40 and over 60 yrs. were more likely to have TMJ pain.

There was also a statistically significant relationship between the TMD variable and the variables of type of diabetes, history of diabetes, FBS, and HbA1c. In the present study, the results did not show a statistically significant relationship between gender and the prevalence of chronic oral pain and TMD, which is not consistent with the results of Riley and Gilbert⁸, Fillingim²³ and Tsang et al.²⁴ On the other hand, Ebrahimi et al.²⁰ did not mention gender as one of the factors influencing the type and prevalence of orofacial pain, which is in line with the findings of the present study. Riley and Gilbert⁸ have shown that chronic orofacial pain occurs between the ages of 45 and 64 and the relationship between age and the prevalence of chronic orofacial is significant. It is not consistent with the results of the present study. Tsang et al.²⁴ reported a significant relationship between chronic TMJ pain and age, which is in line with the findings of the present study.

There was a statistically significant relationship between age and duration of pain so that in under 50 years of age, the highest frequency was related to the duration of pain less than 30 minutes and in older ages, the prevalence of pain with a duration of more than 3 hours was higher. There was also a statistically significant relationship between the duration of pain with the variables of type of diabetes and history of diabetes. However, the result of this study indicated that there wasn't significant relationship between duration of pain with FBS and HbA1c values. ; Arap et al. in their study did not find a significant correlation between the duration of chronic orofacial pain and diabetes factors.²¹ However, Vernillo et al.²⁵ Manfredi et al.²⁶ and Casellini et al.¹⁹ showed that there is a significant relationship between FBS and HbA1c in diabetic patients and the duration of chronic orofacial pain. Overall, more investigation for determining the relationship between the control of FBS and HbA1c in diabetic patients and duration of chronic pain and the longer duration of each attack is advisable. Data analysis showed a statistically significant relationship between pain intensity variable and type of diabetes. There was also a statistically significant inverse relationship between age and pain intensity. Riley et al.⁸ and Tomoyasu et al.¹² have shown that gender causes significant changes in orofacial pain, which is not consistent with the results of the present study.

CONCLUSIONS

Due to the fact that migraine headaches, chronic neuropathic pain, and TMJ complications are very common in diabetic patients, it is recommended to pay more attention to prescribing analgesic treatments, drugs, and methods appropriate to this type of pain.

Data sharing statement provided by the authors is available with the full text of this article at jemds.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jemds.com.

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