

Exploring the Link Between Diabetes Mellitus and Oral Health Disorders in the Kingdom of Saudi Arabia

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Received: May 10 2024, Accepted: Jun 23 2024; Published: Jun 29, 2024, DOI: 10.59462/jodt.1.1.105

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Citation: Almegren R (2024) Exploring the Link Between Diabetes Mellitus and Oral Health Disorders in the Kingdom of Saudi Arabia. Journal of Oral Diseases and Treatment, 1(1):105.

Abstract

Aim: To investigate the relationship between Diabetes Mellitus and oral diseases in the Kingdom of Saudi Arabia.

Background and objective: Diabetes Mellitus is an autoimmune chronic endocrine disease where the pancreas does not produce enough insulin or the body cells become resistant to insulin. There are two types of Diabetes Mellitus: Type 1 DM and Type 2 DM. Diabetes patients often face oral conditions which lead to serious complications. The aim of this study is to investigate the relationship between Diabetes Mellitus and oral diseases in KSA.

Methods: We designed an online survey that contained eighteen questions which have been structured based on the relevant factors of our research. A total of 733 responses were obtained, among those 733 responses 344 participants have met our inclusion criteria. Collected data were reviewed and checked for competency and a statistical analysis was designed using IBM SPSS.

Results: The results obtained by the survey indicate a strong relationship between oral diseases and Diabetes Mellitus in KSA. The results have also revealed a stronger relationship between oral diseases and diabetic patients in the group with uncontrolled diabetes. Our results also showed a strong correlation between Saudi patient's awareness of diabetes and the oral diseases associated with it.

Hypothesis: We expect a strong relationship between Diabetes Mellitus and oral diseases.

Conclusion: Our findings revealed that there is a relationship between Diabetes Mellitus and oral diseases in the Kingdom of Saudi Arabia.

Keywords: Diabetes mellitus; Ulcers; Periodontitis; Awareness; Oral diseases

Introduction

Diabetes Mellitus is an autoimmune chronic endocrine disease where the pancreas does not produce enough insulin or the body cells become resistant to insulin [1]. Insulin is a hormone produced by the pancreatic beta cells that regulates the blood glucose levels [2]. There are two types of Diabetes Mellitus: Type 1 DM and Type 2 DM. Type 1 DM (Insulin dependent diabetes) where the pancreas does not produce insulin or produces a little which is not enough to regulate the blood glucose levels. Type 1 DM has two main risk factors which could be environmental (viral infection or nutritional deficiency) or genetic; however some people are more susceptible to an environmental factor caused by a genetic predisposition [3]. Type 2 DM (Non-insulin dependent) where the pancreas produces insulin but the cells are resistant which will cause the insulin producing ability of the pancreas to decrease [4]. The risk factors of type 2 DM include obesity, low physical activity, or diabetes in the family history [5]. Diabetic patients

have altered functions of polymorphonuclear leukocytes, bactericidal response, antigen exposure, and T lymphocytes [6].

Diabetic patients often face other conditions which lead to serious complications [7]. Examples of these complications are gingivitis or periodontitis, recurrent oral ulcers, continuous bleeding, teeth mobility, xerostomia, and continuous pain. The occurrence and aggressiveness of periodontitis in diabetic patients is much higher than in healthy patients due to the fluctuations in the levels of glucose which causes disturbances in the defense mechanism of the immune system and increase the number of periodontal pathogens [5]. Epidemiological studies have conducted that the severity of the complications are most frequently directly proportional to the degree and duration of hyperglycemia. The reason explaining why diabetic patients are susceptible to oral manifestations is due to the high risk of infection they are prone to; as well as delayed healing of infections [6]. To avoid and minimize facing oral manifestations [8], diabetic patients should receive special dental treatment and frequent checkups as shown in Table 1.

		Gender					Age (in years)									
		Male		Female		p¶	18-30		31-45		45-60		>60		p¶	
		n	%	n	%	n	%	n	%	n	%	n	%			
Did you treat these oral diseases?	Yes	29	29.90%	102	41.30%	0.05	20	28.20%	40	44.90%	54	36.50%	17		47.20%	0.104
	No	68	70.10%	145	58.70%		51	71.80%	49	55.10%	94	63.50%	19	52.80%		
Do you think your disease is the main problem of all oral diseases?	Yes	14	14.40%	35	14.20%	0.357	3	4.20%	21	23.60%	19	12.80%	6	16.70%	0.018*	
	No	32	33%	76	30.80%		30	23.90%	20	22.50%	45	30.40%	13	36.10%		
	May be	20	20.60%	73	29.60%		17	42.30%	21	23.60%	48	32.40%	7	19.40%		
	Don't Know	31	32%	63	25.50%		21	29.60%	27	30.30%	36	24.30%	10	27.80%		
Did you read any information about your Disease and its relationship with oral diseases?	Yes i did	30	30.90%	94	38.10%	0.215	20	28.20%	37	41.60%	55	37.20%	12	33.30%	0.35	
	No i did not	67	69.10%	153	61.90%		51	71.80%	52	58.40%	93	62.80%	24	66.70%		
Did you try to educate yourself about your disease in order to control all its relevant complications?	Yes a lot	42	43.30%	97	39.30%	0.102	33	46.50%	37	41.60%	53	35.80%	16	44.40%	0.256	
	Yes a little	49	50.50%	114	46.20%		31	43.70%	36	40.40%	78	52.70%	18	50.00%		
	No never	68	6.20%	36	14.60%		7	9.90%	16	18.00%	17	11.50%	2	5.60%		
How frequently you visit dentist	Every 3 Months	8	8.20%	36	14.60%	0.29	14	19.70%	5	5.60%	24	16.20%	1	2.80%	0.001*	
	Every 6 Months	28	28.90%	54	21.90%		24	33.80%	15	16.90%	30	20.30%	13	36.10%		
	Once a Year	46	47.40%	122	49.40%		26	36.60%	56	62.90%	67	45.30%	19	52.80%		
	Whenever there is a problem	15	15.50%	35	14.20%		7	9.90%	13	14.60%	27	18.20%	3	8.30%		
Did you ask your dentist about the relevant oral diseases with diabetes and how to avoid them?	Yes	20	20.60%	67	27.10%	0.212	18	25.40%	26	29.20%	37	25.00%	6	16.70%	0.542	
	No	77	79.40%	180	72.90%		53	74.60%	63	70.80%	111	75.00%	30	83.30%		
¶Chi-Square Test, *p<0.05																

Table 1: Relation between general health and oral health among study participants.

Materials and Methods

Uis cross-sectional study was conducted among the Saudi society in order to investigate the relationship between Diabetes Mellitus and oral diseases in Table 2. It was carried out from May to June 2020. We restricted inclusion criteria to Saudi diabetic patients, 18 or above, who don't have any other systematic diseases. Uen we designed an online survey that contained eighteen questions which have been structured based on the relevant factors of our research, which began by explaining the objectives of the study to all participants. Ue questions addressed demographic data, history of the disease which includes

types of Diabetes Mellitus and disease regulation, disease awareness, complications, and commitments. A total of 733 responses were obtained by the online survey, among those 733 responses 344 participants have met our inclusion criteria (Figure 1). Data were extracted from Google Form and an excel sheet was made. Collected data were reviewed and checked for competency and a statistical analysis was designed by a statistician using IBM SPSS. Ethical approval was obtained from the Institutional Review Board of Riyadh Elm University.

		Type of diabetes				Diabetic control				p¶			
		Type 1		Type 2		p¶		Controlled				Uncontrolled	
		n	%	n	%	n	%	n	%			n	%
Did you treat these oral diseases?	Yes	65	44.50%	66	33.30%	0.035	84	36.10%	47	42.30%	0.261		
	No	81	55.50%	132	66.70%		149	63.90%	64	57.70%			
Do you think your disease is the main problem of all your oral diseases?	Yes	26	17.80%	23	11.60%	0.4	26	11.20%	23	20.70%	0.008*		
	No	43	29.50%	65	32.80%		82	35.20%	26	23.40%			
	May be	40	27.40%	53	26.80%		56	24.00%	37	33.30%			
	Don't Know	37	25.30%	57	28.80%		69	29.60%	25	22.50%			
Did you read any information about your Disease and its relationship with oral diseases?	Yes i did	59	40.40%	65	32.80%	0.148	87	37.30%	37	33.30%	0.469		
	No I did not	87	59.60%	133	67.20%		146	62.70%	74	66.70%			
Did you try to educate yourself about your disease in order to control all its relevant complications?	Yes a lot	71	48.60%	68	34.30%	0.009*	108	46.40%	31	27.90%	0.005*		
	Yes a little	64	43.80%	99	50.00%		100	42.90%	63	56.80%			
	No never	11	7.50%	31	15.70%		25	10.70%	17	15.30%			
How frequently you visit dentist	Every 3 Months	20	13.70%	24	12.1	0.152	33	14.20%	11	9.90%	0.208		
	Every 6 Months	41	28.10%	41	20.70%		60	25.80%	22	19.80%			
	Once a Year	70	47.90%	98	49.50%		111	47.60%	57	51.40%			
	Whenever there is a problem	15	10.30%	35	17.70%		29	12.40%	21	18.90%			
Did you ask your dentist about the relevant oral diseases with diabetes and how to avoid them?	Yes	53	36.30%	34	17.20%	<0.001	59	25.30%	28	25.20%	0.985		
	No	93	63.70%	164	82.80%		174	74.70%	83	74.80%			
¶Chi-Square Test, *p<0.05													

¶Chi-Square Test, *p<0.05

Table 2: Relationship between diabetic type and control and oral health.

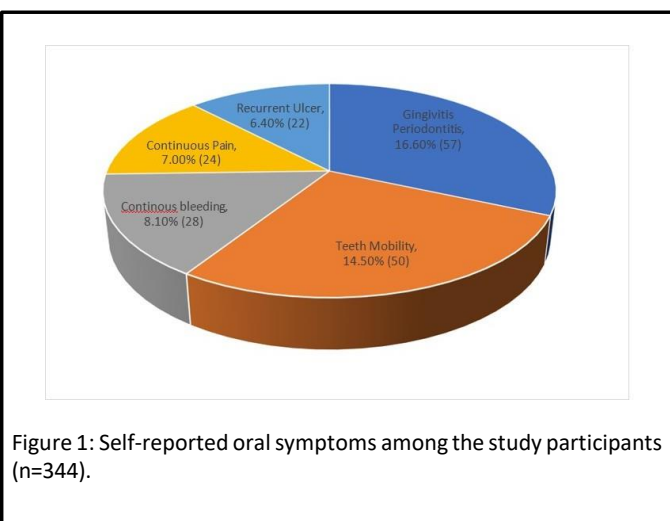


Figure 1: Self-reported oral symptoms among the study participants (n=344).

Discussion

In Our study aimed to investigate the relationship between Diabetes Mellitus and oral diseases in the Kingdom of Saudi Arabia. A statistical analysis was made on the results obtained by the survey indicates a strong relationship between oral diseases and Diabetes Mellitus in KSA. The results have also revealed a stronger relationship between oral diseases and diabetic patients in the group with uncontrolled diabetes that enhance the great impact of Diabetes on the progression of oral diseases.

Our results also showed a strong correlation between Saudi patient's awareness of diabetes and the oral diseases associated with it. The present study was in same line with a study conducted by Cabanillas et al. who indicated that the prevalence of periodontitis is high among diabetic patients, As our results stated that the majority of the reported oral symptoms were gingivitis, periodontitis, and teeth mobility [8]. On the contrary, we were in disagreement with Mauri-Obrador et al.

Mellitus and oral diseases is low among diabetic patients [6].

Conclusion

who stated that the awareness of the relationship between Diabetes

In conclusion, our findings revealed that there is a relationship between Diabetes Mellitus and oral diseases in the Kingdom of Saudi Arabia. In addition, its worth mentioning that our results showed high awareness of the relationship between Diabetes Mellitus and oral diseases among the Saudi population.

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