بسم الله الرحمن الرحيم

Erectile Dysfunction and Other Sexual Activity Dysfunctions among Saudi Type 2 Diabetic Patients

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Abstract:

Objectives: The aim of the study is to determine the prevalence of Erectile Dysfunction (ED) in Type 2 diabetic Saudi patients, to determine the effect of Type 2 diabetic on other sexual activities (intercourse satisfaction, orgasmic function, sexual desire, overall satisfaction), and to assess whether glycemic control and duration of diabetes have an influence on sexual activities or not.

Methods: A cross-sectional study was conducted among 376 of Type 2 diabetic male Saudi patients. Erectile dysfunction and other sexual activities dysfunctions were evaluated using the International Index of Erectile Function (IIEF) by a fill coded questionnaire. Additionally, the level of glycosylated hemoglobin was measured to classify the diabetes control status in patients.

Results: Erectile Dysfunction was reported by 83% of male Saudi diabetic patients. The results show that there was a significant association between the presence of ED and both the age and the duration of diabetes. Family income, occupation, and educational level of the patients show a significant association between them and erectile dysfunction (ED). Moreover, glycemic control did not show a significant association with ED in our sample.

Conclusion: The findings showed that prevalence of ED among male Saudi diabetic patients is high. It increases with age and duration of diabetes. Also, the study showed that the glycemic control did not correlate with ED. It is recommended that the family physician and diabetologist should ask routinely for this complication in patients with diabetes just like any other diabetes complication.

Key Words: Primary health care, family medicine, diabetes mellitus type 2, erectile dysfunction, glycosylated hemoglobin, Saudi Arabia.

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Introduction

Type 2 diabetes makes up to 85-95% of all diabetes in high-income countries and may account for an even higher percentage in low- and middle-income countries. [1] In addition, Type 2 diabetes is now a common and serious global health problem, which, for most countries, has developed together with rapid cultural and social changes, ageing populations, increasing urbanization, dietary changes, reduced physical activity, and other unhealthy behaviours.[1] It was estimated that the number of patients with diabetes in 2011 would be some 366 million people worldwide, or 8.3% of adults. About 80% live in low-and middle-income countries. If these trends continue, by 2030, some 552 million people, or one adult in 10, will have diabetes. Unfortunately, one of the world's top ten countries for highest prevalence of diabetes is Saudi Arabia with 20% prevalence among 20-79 years. [2] In 2004, Al-Nozha et al [3] reported that the overall prevalence of diabetes among adults in Saudi Arabia is 23.7%.

Hyperglycemia in diabetic patients can lead to short and long term complications and could be prevented or postponed by precise control of blood sugar level. However, it is clear that they are very common, with at least one complication present in a large proportion of people (50% or more in some studies) at the time of diagnosis. [2] The level of blood sugar can be monitored in long-term by glycosylated hemoglobin (HbA1c) checked. [4] HbA1c is a blood test that reflects the average blood glucose levels for the last 100 days. If more amount of glucose in the blood exists, we will expect more binding of glucose to hemoglobin. [4] Therefore, the range of HbA1c is an objective measurement for controlling diabetes in patients with the disease. Diabetes complications can affect the nervous system including a group of ailments that involve autonomic nervous system as one of them. Their prevalence is associated with age, weight, disease duration, HbA1c level, cholesterol level, hypertension, and smoking.

Erectile dysfunction (ED) as a diabetes-related difficulty is common among male patients. [5] Considering the increasing life expectancy and the high incidence of ED in the aging population, a further increase in patients with ED must be expected. [6,7] The prevalence of erectile dysfunction (ED) greatly increases with age. [8-11] However, in men with diabetes, ED is more frequent than in men of the same age who do not have diabetes. [12] The onset of ED also occurs 10-15 years earlier in men with diabetes than it does in those without diabetes. [13] A Dutch study claims that the prevalence of ED in patients with Type 2 diabetes was about 41.3 %. [14] Moreover, Ziaei-Rad *et al* [15] found a higher prevalence of ED among men with diabetes (77% of men). However, the prevalence of ED among diabetic patients varies; it is estimated to be between 35-85 %, [16,17,18] which is different from the claims of El-Sakka & Tayeb [19] who reported that the prevalence was 86.1%. Khatib et al [20] stated that there is a clear association between glycemic control and the prevalence and severity of ED, which has been stated in other studies, [21-23] but was not evident in other studies. [24-27] Ziaei-Rad *et al,* [15] for example, made their study on Iranian men with poor glycemic control. The researchers did not find a significant association with ED.

The aim of the current study is to determine the prevalence and severity of ED and other sexual activities dysfunctions (Orgasmic dysfunction, Sexual desire dysfunction, Intercourse satisfaction dysfunction, Overall satisfaction dysfunction) in noninsulin dependent diabetic male Saudi patients. In addition, the study aimed to discover if glycemic control and duration of diabetes have an effect on sexual activities or not.

Methodology

Study Design and Setting

A cross-sectional study was conducted among 376 Type 2 diabetic Saudi male patients who were registered in primary care clinics in King Khalid University Hospital, Riyadh, Saudi Arabia.

Study Sample and Population

The sample was selected in a consecutive procedure from mid-November 2012 to mid-April 2013, by a fill coded questionnaire that has a coded envelope in order to keep the privacy of the participants and to encourage them to answer the questions in an honest way and without being embarrassed. The sample size was estimated on: the average of erectile dysfunction prevalence among Type 2 diabetes in multiple studies, degree of precision (0, 8), and level of significance (0.05). The sample size obtained for this study was actually 370 men with diabetes.

The inclusion criteria were identified as: Saudi patient, male, aged 25 years or older, married, diagnosed with Type 2 diabetes, and

follow up in primary care clinics in King Khalid University Hospital for a year or longer (to check previous blood work). Exclusion criteria included: Organic sexual disorder, Benign Prostatic Hyperplasia (BPH), Chronic Renal Failure, and illiterate people (because the questions in the questionnaire deal with a sensitive issue and the questions in the questionnaire have to be answered by the patients themselves to keep the privacy, to avoid embarrassment, and to ensure confidentiality).

Study Variables and Measures

Demographic data was collected from the patients themselves. The data included patients' age, occupation, educational level, and the monthly income of the family (High: more than 15000 SR "> 4000 $", Middle: 7500 –15000 SR "= 2000 - 4000$", Low: less than 7500 SR "< 2000$"). The educational level is detected by getting the certificate of the level as Primary (grade 6 or less), Intermediate (grade 9), Secondary (grade 12), or Higher education (bachelor or postgraduate). The questionnaire included questions regarding the duration of diabetes, the coexistence of other medical conditions (hypertension, ischemic heart disease, dyslipidemia, psychological disorder), and medication for diabetes. Moreover, other conditions were recorded; for example, regular exercise, diet, smoking, and any treatment for ED. Coexisting medical conditions were verified by reviewing the medical records and verified the medication by checking the pharmacy system. Body mass index (BMI) was calculated by dividing the weight in kilogram (kg) by the squared height in meters (m^2). Patients were categorized as of normal weight (BMI = 18.5-24.9), overweight (BMI = 25-29.9), obese class I (BMI 30-34.9), or obese class II & more (BMI ≥ 35). Control of diabetes was determined by the glycosylated hemoglobin level (HbA1c); patients were categorized according to their HbA1C to 3 groups: ≤ 7%, > 7 - 8.50% and > 8.50%.

Data Collection Tools

Sexual dysfunction was measured by using a standard questionnaire. An Arabic translated version of the International Index of Erectile Function (IIEF) was used to assess the sexual function in men. The questionnaire of IIEF consists of 15 questions grouped into five domains that assess erectile function, intercourse satisfaction, orgasmic function, sexual desire, and overall satisfaction, the IIEF questionnaire is already translated into Arabic and the permission has been taken to use the Arabic version of the questionnaire, and the MAPI Research Institute has already conducted the linguistic validation of the IIEF into the Arabic language.

The score for each domain of the sexual function in the questionnaire was calculated and used to classify the severity of dysfunction as severe, moderate, and mild or no dysfunction; a higher score indicates better function. [28,29] The IIEF score < 26 "out of 30" in domain that assess erectile function (questions 1-5 and 15), was the criteria for accepting the presence of erectile dysfunction.

Statistical Analysis

Data were coded and entered using Microsoft excel 2010. All statistical analyses were calculated using SPSS software Version 20 (SPSS Inc. Headquarters, 233 S. Wacker Drive, Chicago, IL USA; http://www.spss.com).

The χ^2 test was used to evaluate the association of the prevalence and the severity of ED in relation to different risk factors. The odds ratio for individual factors was obtained as a measure of the association with ED. Significant factors were then subjected to a multivariate logistic regression analysis to assess the independent effect of each factor after controlling for potential confounders. P value of <0.05 was considered statistically significant.

Ethical Consideration

The patients were asked to participate anonymously. Participation in this study is completely voluntary. They were told that they could withdraw at any time while completing the questionnaire. Informed consent was provided with the questionnaire, and return of the survey was voluntary. No incentives or rewards were given to the participants. The survey was approved by institutional review board at King Khalid University Hospital of the Faculty of Medicine, King Saud University on 7th of October 2012.

Results

A total of 376 Saudi male patients with diabetes were the subjects of this study. Demographic characteristics of the study sample and its relation to Erectile Dysfunction (ED) are shown in **Table 1.** The results show that there was a significant association between the presence of ED and multiple demographic

factors. For example, the age groups show an increase in ED gradually as it increases by years where the prevalence is 60% in less than 40 years till it reaches 100% in age group more than 70 years (p<0.001), (**Figure 1**). Severity of ED increases with age, the patients who are diagnosed with severe ED in age groups (<40 and 40-49) are less than 20% when compared to age group (70 years and above) where 85% of patients diagnosed with severe ED (p<0.001), (**Table 2**). In addition, the severity of orgasmic dysfunction according to the age shows that the highest domain is effected by age; it shows that 91% of patients with age group more than 70 years are diagnosed with severe orgasmic dysfunction (as the highest percent of severity between five domains of IIEF), and on the other hand, 48% of the patients did not complain from orgasmic dysfunction in age group less than 40 years (as the highest percent of patients did not have a complaint from function between five domains) (p<0.001), (**Table 3**).

Table 1: Demographic characteristics and its relation to **E**rectile **D**ysfunction (**ED**):

	No	With **ED**		Without ED		**Chi square**	**P-value**
		No (312)	%	No (64)	%		
Age							
<40	35	21	**60.0**	14	**40.0**	38.613	**0.000**
40-49	71	48	**67.6**	23	**32.4**		
50-59	118	101	**85.6**	17	**14.4**		
60-69	118	108	**91.5**	10	**8.5**		
≥70	34	34	**100.0**	0	**0.0**		
Occupation							
Employee	168	120	**71.4**	48	**28.6**	29.069	**0.000**
Businessman	47	41	**87.2**	6	**12.8**		
Retired	142	133	**93.7**	9	**6.3**		
Unemployed	16	15	**93.8**	1	**6.3**		
Educational level							
Primary or less	93	88	**94.6**	5	**5.4**	24.185	**0.000**
Intermediate	46	39	**84.8**	7	**15.2**		
Secondary	91	80	**87.9**	11	**12.1**		
Higher education	143	102	**71.3**	41	**28.7**		
Family income							
Low	103	97	**94.2**	6	**5.8**	15.159	**0.001**
Middle	195	154	**79.0**	41	**21.0**		
High	63	46	**73.0**	17	**27.0**		
BMI							
18.5-24.9	67	65	**97.0**	2	**3.0**	12.470	**0.006**
25-29.9	136	106	**77.9**	30	**22.1**		
30-34.9	118	97	**82.2**	21	**17.8**		
≥35	46	36	**78.3**	10	**21.7**		

Duration of Diabetes*							
≤ 5 years	81	59	**72.8**	22	**27.2**	17.594	**0.001**
>5-10	102	79	**77.5**	23	**22.5**		
>10-15	79	71	**89.9**	8	**10.1**		
>15	97	90	**92.8**	7	**7.2**		
Smoking							
Yes	55	46	**83.6**	9	**16.4**	0.040	**0.841**
No	309	255	**82.5**	54	**17.5**		

Figure 1: The **prevalence of ED** in relation with **age** (p=0.001):

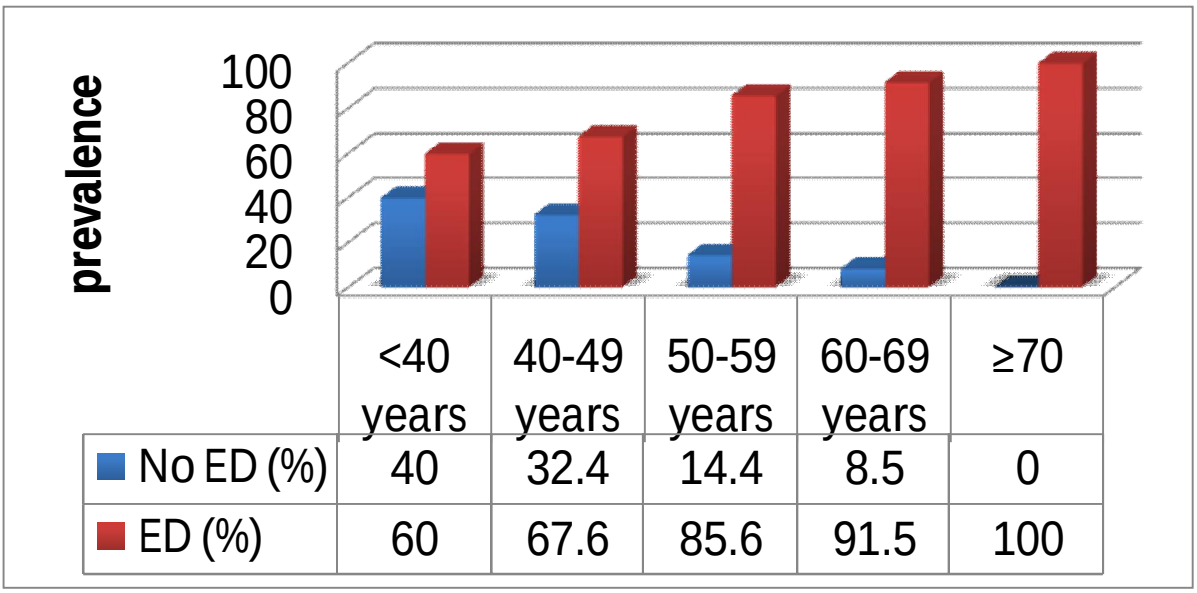

Table 2: Prevalence and severity of **E**rectile **D**ysfunction (ED) in diabetic patients according to age, duration of diabetes and glycemic control.

Parameters	No	Severity of Erectile Dysfunction								P-value
		Severe		Moderate		Mild		**No ED**		
		No (105)	%	No (95)	%	No (112)	%	No (64)	%	
Age										
<40	35	4	**11.4**	4	**11.4**	13	**37.1**	14	**40.0**	**0.000**
40-49	71	7	**9.9**	11	**15.5**	30	**42.3**	23	**32.4**	
50-59	118	23	**19.5**	35	**29.7**	43	**36.4**	17	**14.4**	
60-69	118	42	**35.6**	43	**36.4**	23	**19.5**	10	**8.5**	
≥ 70	34	29	**85.3**	2	**5.9**	3	**8.8**	0	**0.0**	
Duration of Diabetes (in years)*										
≤ 5	81	17	**21.0**	16	**19.8**	26	**32.1**	22	**27.2**	**0.000**
> 5-10	102	16	**15.7**	25	**24.5**	38	**37.3**	23	**22.5**	
>10-15	79	25	**31.6**	21	**26.6**	25	**31.6**	8	**10.1**	
>15	97	42	**43.3**	27	**27.8**	21	**21.6**	7	**7.2**	
Glycemic control (HbA1c)										
≤ 7	108	26	**24.1**	24	**22.2**	35	**32.4**	23	**21.3**	**0.309**
>7-8.5	138	47	**34.1**	32	**23.2**	37	**26.8**	22	**15.9**	
>8.5	130	32	**24.6**	39	**30.0**	40	**30.8**	19	**14.6**	
All patients	376	105	**27.9**	95	**25.3**	112	**29.8**	64	**17.0**	

*=17 cases missing in duration

Table 3: Prevalence and severity of **O**rgasmic **D**ysfunction (**OD**) in diabetic patients according to age, duration of diabetes and glycemic control.

Parameters	No	Severity of Orgasmic Dysfunction								P-value
		Severe		Moderate		Mild		**No OD**		
		No (170)	%	No (79)	%	No (45)	%	No(82)	%	
Age										
<40	35	7	**20.0**	7	**20.0**	4	**11.4**	17	**48.6**	**0.000**
40-49	71	18	**25.4**	16	**22.5**	13	**18.3**	24	**33.8**	
50-59	118	42	**35.6**	29	**24.6**	19	**16.1**	28	**23.7**	
60-69	118	72	**61.0**	27	**22.9**	7	**5.9**	12	**10.2**	
≥ 70	34	31	**91.2**	0	**0.0**	2	**5.9**	1	**2.9**	

Duration of Diabetes (in years)*										
≤ 5	81	22	**27.2**	20	**24.7**	13	**16.0**	26	**32.1**	**0.000**
>5-10	102	35	**34.3**	19	**18.6**	17	**16.7**	31	**30.4**	
>10-15	79	42	**53.2**	20	**25.3**	6	**7.6**	11	**13.9**	
>15	97	62	**63.9**	15	**15.5**	8	**8.2**	12	**12.4**	
Glycemic control (HbA1c)										
≤ 7	108	40	**37.0**	25	**23.1**	18	**16.7**	25	**23.1**	**0.174**
>7-8.5	138	66	**47.8**	26	**18.8**	11	**8.0**	35	**25.4**	
>8.5	130	64	**49.2**	28	**21.5**	16	**12.3**	22	**16.9**	
All patients	376	170	**45.2**	79	**21.0**	45	**12.0**	82	**21.8**	

*=17 cases missing in duration

Regarding the duration of diabetes and its effect on ED, it was found that 73% of the patients who are diagnosed with ED are diabetic for less than five years and 93% of the patients with ED are diabetic for more than 15 years (p<0.001) (**Table 1**). In case of the association between severity of ED and the duration of diabetes, **Table 2** shows that 21% of the patients with duration of diabetes of less than 5 years had severe ED, whereas 43% of the patients with duration of more than 15 years had severe ED (p<0.001). Additionally, the severity of dysfunction in sexual desire, in intercourse satisfaction, and in overall satisfaction is found to be affected by the increase of age and duration of diabetes (p<0.05).

When the association between family income and ED was checked, it was found that there is an increase in ED in patients with low income (p<0.001) (**Table 1**). Looking at the patients' occupations, it was found that there was a high correlation between businessmen and ED (87%) in comparison with employees (71%). For the retired and unemployed persons, it has the same percentage of ED (93%) (p<0.001). The higher education shows the least correlation to ED in men (71%) in comparison with the patients who have a primary education or less have 95% diagnosed as ED (p<0.001). In obesity factor, the normal weight class among men "according to BMI" shows the worst correlation with ED (97%) in comparison with the patients with overweight class (BMI = 25 – 29.9) who has the best correlation with 77.9% diagnosed as ED (p<0.01).

In this study, the prevalence of ED among Saudi male diabetic patients was 83%. According to the severity of dysfunction in various domains of sexual activity in men, 28% of diabetic patients were found to have a severe degree of ED, 25% had a moderate degree while 30% had a mild ED. When we compare the severity of different domains among IIEF, we found ED (as one of IIEF domains) is the least effect on sexual activity of diabetic men, while we found sexual desire, orgasmic function, overall satisfaction, and intercourse satisfaction (as other domains of IIEF) have the highest effect respectively (**Table 4**).

Table 4: Severity and prevalence of dysfunction in various domains of sexual activity in men with diabetes as assessed by IIEF (N=376 PATIENTS).

Dysfunction	Sexual Dysfunction Category			
	No dysfunction	Mild	Moderate	Severe
	Score (%)	Score (%)	Score (%)	Score (%)
Erectile function	26-30 (17.0)	17-25 (29.8)	11-16 (25.3)	1-10 (27.9)
Intercourse satisfaction	12-15 (12.5)	9-11 (24.7)	6-8 (30.1)	0-5 (32.7)
Orgasmic function	9-10 (21.8)	7-8 (12.0)	5-6 (21.0)	0-4(45.2)
Sexual desire	9-10 (19.4)	7-8 (13.8)	5-6 (32.4)	2-4 (34.3)
Overall satisfaction	9-10 (16.80	7-8 (20.2)	5-6 (16.5)	2-4 (46.5)

Furthermore, the worst function in all five domains of IIEF especially in orgasmic function always occurred in diabetic patients with uncontrolled HbA1c, as 49% of patient with HbA1c > 8.5 had severe orgasmic dysfunction in comparison with 37% of patients with HbA1c less than or equal to 7 (p=0,174) (**Table 3**), but was not significant in all the five domains of IIEF.

The distribution of the study population according to concomitant disease and its relation to ED shows that 89% of men diabetic patients with Hypertension had ED in comparison with 71% of patients without hypertension (p<0.001). In men diabetic patients with Ischemic heart disease (IHD), 98% had ED in comparison with 81% of patients without IHD (p<0.01). In men diabetic patients with Dyslipidemia, 86% of patients had ED in comparison with 76% in diabetic patients who did not have dyslipidemia (p<0.05). However in all the 7 patients (who mentioned that they have a psychiatric disorder) had ED but was not a significant. In addition all the 20 patients (who mentioned that he use antidepressants) had ED and was significant.

When we examine the correlation between diabetic medications and ED, we found a difference in the prevalence of ED among the patients but it was not significant (p=0.145). It was found that 18% of patients who use only oral medication did not have ED, 17% of the patients who were managed by insulin and oral diabetic management did not have ED, and only 3.6% of the patients who use only insulin as diabetic management did not have ED. The distribution of the study population according to medications and ED shows a significant association between ED and statins, aspirin, b-blocker, and antidepressant. Furthermore, 86% of patients using statins have ED in comparison to 71% of patients who did not use statins and had ED (p<0.005), 87 % of patients using aspirin have ED in comparison with 71% of patients who did not use aspirin and had ED (p<0.001), and 93% of patients using b-blocker have ED in comparison with 80.6% of patients who did not use b-blocker and had ED (p<0.01).

On univariate analysis, there is an association when examining one factor at a time. Moreover, we found that as age increases or more duration of diabetes the odds ratio starts to increase. We consider the age group < 40 as reference for age factor (odds ratio of 1). Based on that, the age group 40-49 (odds ratios of 1.4, p=0.439), age group 50-59 (odds ratios of 14, p<0.001), and age group 60-69 (odds ratios of 7, p<0.001).

Regarding the duration of diabetes, we consider the duration < 5 years as reference (odds ratio of 1), and based on that we found that duration more than 5 years to 10 years (odds ratios of 1.28, p<0.472), and duration more than 10 years to 15 years (odds ratios of 3.31, p<0.01) and duration more than 15 years (odds ratios of 4.79, p<0.001). Co-morbid disease was found to be significantly associated with erectile dysfunction, e.g. Hypertension (odds ratios of 3.33, p <0.001), IHD (odds ratio of 9.26, p < 0.01), and dyslipidemia (odds ratio of 1.93, p < 0.05). In BMI, we consider the

normal weight as reference (odds ratio of 1), and based on that we found that overweight (odds ratios of 0.11, p<0.001), obese class I (odds ratios of 0.14, p <0.005), and obese class II & more (odds ratios of 0.11, p<0.005). In glycemic control (HbA1c), the odds ratio in ascending level was associated with an increase in HbA1c level but was not significant (p=0.308).

We used multivariate logistic regression analysis that presents the odds ratio for the factors that remained significant (**Table 5**). Age, however, remained a significant factor after adjusting the other variables (odds ratio 3.366, p<0.001) between age groups <50 years and 50 years and above. In addition, the duration of diabetes is close to be statistically significant (odds ratio 1.896, p=0.078) between the patients with a history of diabetes for 10 years or less and other for more than 10 years. All co-morbid disease: Hypertension, IHD and Dyslipidemia lost their significance with p value (0.142, 0.144, and 0.302 respectively).

Table 5: Results of multivariate analysis of factors associated with **E**rectile **D**ysfunction (**ED**) in diabetic patients.

Factors	No	Erectile Dysfunction				Exp(B)	P-value
		With **ED**		Without ED			
		No (312)	%	No (64)	%		
Age							
<50	106	69	**65.1**	37	**34.9**	3.366	**0.000**
≥50	270	243	**90.0**	27	**10.0**		
Education							
Low	139	127	**91.4**	12	**8.6**	0.548	**0.116**
High	234	182	**77.8**	52	**22.2**		
Co-morbid diseases							
Dyslipidemia	278	238	**85.6**	40	**14.4**	1.441	**0.302**
Hypertension	253	225	**88.9**	28	**11.1**	1.708	**0.142**
IHD	41	40	**97.6**	1	**2.4**	4.643	**0.144**
Do you think that Antihypertensive medication effect on your sexual function							
Yes	172	155	**90.1**	17	**9.9**	0.708	**0.353**
No	192	147	**76.6**	45	**23.4**		
Duration of Diabetes (in years)*							
≤ 10	183	138	**75.4**	45	**24.6**	1.896	**0.078**
>10	176	161	**91.5**	15	**8.5**		

Discussion

Sexual dysfunction (SD) is commonly untreated complication of diabetes. It is a disorder that affects both the patients and spouses. In this study, the overall prevalence of ED was 83%. A study from the same community El-Sakka & Tayeb [19] used the same method to assess the ED and showed that the prevalence of ED was 86.1% in men with diabetes. By the same token, Al-Turki [30] conducted a study in the same community and used another method to assess ED (conducting interviews with patients). The results showed more than 75% of diabetic patients were diagnosed with partial and complete ED. By using a different questionnaire and checking the testosterone level, Hassan et al [31] reported that the prevalence of ED was 86.7% in Saudi diabetic men with low testosterone level of 8-12 nmol/L. Moreover, Khatib et al [20] reported that the prevalence of ED was 62% in men with diabetes in Jordan. In Giuliano FA et al study, [26] ED was reported in 67% of the patients with diabetes alone. In addition, Selvin & Burnett [32] reported that the prevalence of ED was 51.3% in men with diabetes in the U.S. A study from Iran Ziaei-Rad et al [15] found that 77% of diabetic Iranian men have ED.

According to the severity of ED in men, 28% of diabetic men patients were found to have a severe degree of ED, in comparison to 49.1% in El-Sakka & Tayeb [19] and 30.3% in Khatib et al. [20] The differences in the prevalence rates can be explained by the differences in the studied population, sample size, age groups included, and the methods used to assess ED.

Glycemic control does not show a significant association with prevalence and severity of ED and other sexual activities dysfunctions in the present study. However, the worst function in all five domains of IIEF especially in orgasmic function always occurred in diabetic patients with uncontrolled HbA1c and was not significant in all the five domains. Additionally, Khatib et al [20] stated that there is a clear association between glycemic control and both the prevalence and the severity of ED, which has been stated in some studies [21-23] and denied in other studies. [24-27] Ziaei-Rad et al [15] study, for example, conducted a study on Iranian men and women with poor glycemic control and did not show a significant association with SD in both genders. El-Sakka & Tayeb [19] discovered that men with poor metabolic control were 12.2 times likely to report erectile dysfunction in comparison with those with good metabolic control. On the contrary, Al-Turki [30] claims that men with poor glycemic control were alike in terms of ED or with a slight difference to those with good glycemic control. The differences in the glycemic control association to prevalence can be explained by the differences in methods to measure glycemic control, the difference in the cut-off between studies that used the same measure, the difference in categorizing the value of the same measure, and in the reading of HbA1c (e.g., Khatib et al [20] used the mean of four readings of HbA1c in the last year, while in other study, the last reading during the last three months of HbA1c was used. [19]

Age shows significant association in prevalence of ED and also shows relation for its severity. The age groups show an increase in ED gradually as it increases by years where the prevalence is 60% in *less than 40 years* till it reaches 100% in age group *more than 70 years*. El-Sakka & Tayeb [19] reported that 32% of diabetic male patients *less than 50 years* old had ED in comparison to 67.6% incidence in patients *over 50 years old*, and found a significant association between increase of age and severity of ED. [19] Furthermore, Al-Turki [30] reported that 21.4% of diabetic male patients *less than 40 years* old had partial ED in comparison to 75.3% incidence in patients between 40 and 60 years old.[30] This association between age and ED confirms what has been shown in Khatib et al [20] and Marumo et al. [33] However, Ziaei-Rad et al [15] did not find any significant statistical relationship between age and SD in both genders. Regarding the duration of diabetes and its effect on ED among men and its severity, there was a significant association between them which has been clearly stated in other studies. [24-26]

For occupation factor, there was a high relation between the retired and the unemployed patients and ED in comparison to the employees. It was found that patients who completed their secondary education or higher show the least relation to ED. The impact of occupation and education on ED go along with the findings of El-Sakka & Tayeb. [19] In obesity factor, the overweight class has the least class diagnosed with ED which confirms the findings of De Berardis et al. [34]

The concomitant diseases like hypertension, dyslipidemia, and ischemic heart disease and its relation to ED show a significant association in univariate analysis that was lost after multivariate regression. Hypertension and dyslipidemia were the most frequent

concomitant conditions associated with ED in patients with diabetes in El-Sakka & Tayeb, [19] and in the same study, they identified a significant association of ischemic heart disease with ED. It is well known that we have a list of medications affecting the sexual potency as part of their long term side effect. In this study, the relation between diabetic medications and ED was not significant. There is a significant association between ED and statins, b-blockers and antidepressants which are expected as part of their side effects. However, it was surprising to find a positive relation between aspirin and ED, and this relation cannot be explained. In El-Sakka & Tayeb, [19] there was an association with ED and medications commonly used for diabetes, especially diuretics, antihypertensive medications, and lipid lowering agents.

Major strengths of this study include the use of validated measures of erectile dysfunction and dysfunction in other sexual activities. Moreover, the relatively large number of subjects investigated is considered an additional strong point in this study. Furthermore, the prevalence of ED and its relation to major factors was not yet well investigated in our community.

Conclusion

The findings of this study showed that ED prevalence was high in type 2 diabetic patients (83%). The prevalence increases with the age and with the duration of diabetes. On the other end of the scale, no significant association was found between all five sexual activities measured by IIEF and glycemic control. However, the worst function in all those sexual activities occurred in men diabetic patients with uncontrolled HbA1c. Orgasmic dysfunction shows the worst function in all the five domains of IIEF that occurred in men diabetic patients with uncontrolled HbA1c. It is important for family physicians and diabetologists to diagnose the condition in diabetic patients and counsel them early. Because it is a sensitive issue, the family physician and diabetologist should try to remove the barrier between him/her and the patients with diabetes in order to improve the quality of life for the patients.

Recommendations

1. Because the study revealed that there is a high prevalence of ED among patients with diabetes, family physicians and diabetologists are advised to do their best to be close to their patients in order to be able to communicate openly with them about this sensitive issue.
2. There should be a routinely checkup for this complication in patients with diabetes just like any other diabetes complication.
3. The family physician and diabetologist should manage this complication with all lines of available management (medications, referral, psychological support, …etc.).

Limitations

The results of this study should be interpreted in the context of several possible limitations. One of the limitations is the lack of non-diabetic control group to compare with. Another limitation is that the study was carried out by patients from a hospital-based primary care setting. A third limitation is that the patients in this study were not asked if their family physician asked them about this complication or not, and if they were asked, were they provided with medicine or not. Therefore, future studies on this topic should overcome these limitations.

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