Prevalence of Risk Factors of Erectile Dysfunction among Men with Diabetes

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Objective: The aim of this study is to evaluate the prevalence of risk factors of Erectile Dysfunction (ED) among males with diabetes.

Design: A Cross-Sectional Study.

Setting: Four Primary Health Care Centers.

Method: Males attending diabetes clinics in 4 randomly selected health centers were screened by the Arabic version of International Index of Erectile Function 5 (IIEF5) questionnaire. In addition, participants' medical records were reviewed for the following ED risk factors: age, body mass index, waist circumference, duration of diabetes, glycated hemoglobin, smoking, chronic kidney disease, diabetic retinopathy, lipids, blood pressure, history of previous cardiovascular diseases and the presence or absence of previous ED.

Result: Four hundred fifteen questionnaires were analyzed. The mean age of the patients was 54.6 years. The prevalence of ED was 81.9%. Based on IIEF5 scoring, it was found that 136 (32.8%) patients had mild, 159 (38.3%) had moderate and 45 (10.8%) had severe ED. There was a statistically significant association between ED severity and age (P=0.000), diabetes duration (P=0.002), the presence of CVD (P=0.002), poor metabolic control (P=0.038), and retinopathy (P=0.040). Previous ED diagnosis was present in 51 (12.3%) patients.

Conclusion: ED is very common among our patients. However, the majority were undiagnosed. Regular screening and increasing awareness of the treating physicians of ED is needed.

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Erectile dysfunction (ED) is defined as a consistent or recurrent inability of a male to obtain and/or maintain a penile erection for sufficient sexual ability[1]. It is the major sexual arousal disorder in males. Approximately, the number of affected males worldwide would be 322 million by 2025 which is more than double that estimated in 1995[2].

ED is common among patients attending primary care settings[3-5]. In addition, it is associated with some clinical conditions and complications. It significantly increases the risk for coronary

heart disease, stroke, depression, and mortality[6-8]. Moreover, ED can markedly worsen the quality of life of the affected individuals[9].

Diabetes is an established risk factor for ED[10]. In addition, ED presenting earlier tends to be more severe and has a poor response to treatment and poor quality of life among patients with diabetes compared to ED patients without diabetes[11-13].

Routine screening for ED is important. This is particularly true among patients with diabetes for several reasons: while ED is common, it is usually overlooked, and affected patients usually do not disclose and/or are unaware of the problem unless pointed by the treating physician[5,14]. Furthermore, ED is commonly associated with microvascular and macrovascular complications[6,15,16]. In addition, ED is a good predictor for future cardiovascular events[17,18]. No study about ED among patients with diabetes has been performed in Bahrain previously.

The aim of this study is to evaluate the prevalence of risk factors for ED among patients with diabetes attending primary care clinics.

METHOD

Males ≥18 years were screened by the Arabic version of International Index of Erectile Function 5 (IIEF5) questionnaire from September 2014 to May 2015[19]. The Erectile Function (EF) domain included questions concerning erection frequency, firmness, penetration, maintenance frequency, maintenance ability, and erection confidence during the last four weeks. Each item was based on a 5-point Likert scale, and the responses to all items were summed to arrive at a total EF score ranging from 0 to 25. EF is classified into four: severe ED 0-7, moderate ED 8-16, mild ED 17-21 and normal 22-25[20]. The Arabic version has been validated[21]. The author of the latter study was contacted and permission to use this questionnaire was obtained.

Participants' medical records were reviewed for the following ED risk factors: age, Body Mass Index (BMI), waist circumference, duration of diabetes, glycated hemoglobin (HbA1c), smoking, chronic kidney disease (by recording the last estimated glomerular rate of the patient), diabetic retinopathy, lipids, blood pressure (BP), history of previous cardiovascular diseases [CVD] (previous myocardial infarction, angina, peripheral arterial disease, stroke, and revascularization), and the presence or absence of previous ED diagnosis. American Diabetes Association guidelines were used to define the Control of HbA1c and lipids[22]. Joint National Committee (JNC8) guidelines were used to define control of BP[23].

Data were analyzed using SPSS version 20. P<0.05 were considered statistically significant.

RESULT

Four hundred fifteen questionnaires were analyzed. In addition, no data was found regarding waist circumference for 83 (20%) patients; therefore, they were excluded from the analysis. All patients included were type 2. The mean age of patients was 54.6 years, BMI was 31.2 kg/m^2, and diabetes duration was 9.9 years. The age distribution, BMI, smoking and diabetes duration are presented in table 1.

Table 1: Patients' Personal Characteristics and Diabetes Duration

Patients' Characteristics		
Age Group (Years)	<40	40 (9.6%)
	40-49	88 (21.2%)
	50-59	147 (35.4%)
	≥60	140 (33.8%)
	Total	**415 (100%)**
Body Mass Index (kg/m2)	<25	40 (9.6%)
	25-29.9	156 (37.6%)
	30-34.9	104 (25.1%)
	35-40	41 (9.9%)
	≥40	74 (17.8%)
	Total	**415 (100%)**
Smoking History	Current	71 (17.1%)
	Former-smokers	30 (7.2%)
	Never	305 (73.5%)
	Missing data	9 (2.2%)
	Total	**415 (100%)**
Diabetes Duration (Years)	<5	106 (25.5%)
	5-<10	117 (28.2%)
	10-<15	68 (16.4%)
	15-<20	56 (13.5%)
	≥20	56 (13.5%)
	Missing data	12 (2.9%)
	Total	**415 (100%)**

Based on IIEF5 scoring, 136 (32.8%) patients had mild ED, 159 (38.3%) had moderate ED, and 45 (10.8%) had severe ED. Therefore, the prevalence was 81.9%, see figure 1.
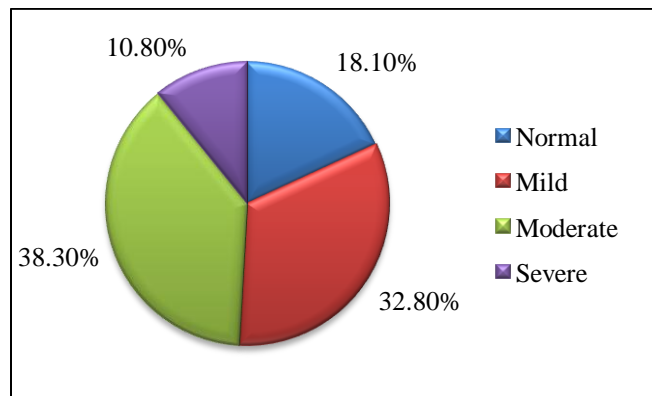

Figure 1: Erectile Dysfunction among Patients

There was a highly significant statistical association between ED severity, age, and diabetes duration, see table 2.

Table 2: Age, Diabetes Duration, and Erectile Dysfunction

		ED Severity					
		Normal	**Mild**	**Moderate**	**Severe**	**Total**	**P-Value**
Age Group	<40	22 (29.3%)	11 (8.1%)	7 (4.4%)	0 (0%)	40 (9.6%)	
	40-49	15 (20%)	38 (28%)	31 (19.5%)	4 (8.9%)	88 (21.2%)	
	50-59	26 (34.7%)	55 (40.4%)	57 (35.8%)	9 (20%)	147 (35.4%)	0.000
	≥60	12 (16%)	32 (23.5%)	64 (40.3%)	32 (71.1%)	140 (33.7%)	
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	
Diabetes Duration (Years)	<5	30 (41.1%)	34 (26.2%)	37 (23.6%)	5 (11.6%)	106 (26.3%)	
	5-<10	23 (31.5%)	47 (36.2%)	39 (24.8%)	8 (18.6%)	117 (29%)	
	10-<15	8 (11%)	18 (13.8%)	32 (20.4%)	10 (23.3%)	68 (16.9%)	
	15-<20	5 (6.8%)	19 (14.6%)	23 (14.6%)	9 (20.9%)	56 (13.9%)	.002
	≥20	7 (9.6%)	12 (9.2%)	26 (16.6%)	11 (25.6%)	56 (13.9%)	
	Total	**73 (100%)**	**130 (100%)**	**157 (100%)**	**43 (100%)**	**403 (100%)***	

*Missing data for 12 (2.9%) patients

There is a linear relationship between severe ED and age. More than 70% of patients ≥60 years had ED. Similarly, diabetes duration for ≥20 years increases the risk for severe ED significantly.

Two hundred forty-eight (59.8%) were hypertensive. There was no association between ED and hypertension (P=.267). Patients with ED were significantly more likely to have poor metabolic control. Approximately 70% of mild and moderate and more than 80% of severe ED patients had HbA1C>53 mmol/mol (P=.038), see table 3.

Table 3: ED Severity, Metabolic Control, Blood Pressure and Lipids Control

		ED Severity					
Variable	**Control Level**	**Normal**	**Mild**	**Moderate**	**Severe**	**Total**	**P-value**
HbA1c (mmol/mol)	≤53	32 (42.7%)	41 (30.1%)	49 (30.8%)	8 (17.8%)	130 (31.3%)	
	>53	43 (57.3%)	95 (69.9%)	110 (69.2%)	37 (82.2%)	285 (68.7%)	.038
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	
Blood Pressure	≤140/90	57 (78.1%)	95 (72%)	108 (69.2%)	30 (66.7%)	290 (71.4%)	
	>140/90	16 (21.9%)	37 (28%)	48 (30.8%)	15 (33.3%)	116 (28.6%)	.480
	Total	**73 (100%)**	**132 (100%)**	**156 (100%)**	**45 (100%)**	**406* (100%)**	
Total Cholesterol (mmol/l)	≤4	44 (58.7%)	82 (60.3%)	100 (62.9%)	28 (62.2%)	254 (61.2%)	
	>4	31 (41.3%)	54 (39.7%)	59 (37.1%)	17 (37.8%)	161 (38.8%)	.927
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	
LDL (mmol/l)	≤2.6	41 (54.7%)	81 (59.6%)	81 (50.9%)	27 (60%)	250 (60.2%)	
	>2.6	34 (45.3%)	55 (40.4%)	58 (49.1%)	18 (40%)	165 (39.8%)	.634
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	
HDL (mmol/l)	>1	20 (26.7%)	24 (17.6%)	34 (21.4%)	7 (15.6%)	85 (20.5%)	
	≤1	55 (73.3%)	112 (82.4%)	125 (78.6%)	38 (84.4%)	330 (79.5%)	.364
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	
Triglycerides (mmol/l)	≤1.7	39 (52%)	65 (47.8%)	78 (49.1%)	28 (62.2%)	210 (50.6%)	
	>1.7	36 (48%)	71 (52.2%)	81 (50.9%)	17 (37.8%)	205 (49.4%)	.381
	Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	

*Missing data for 9 patients

Chronic Kidney Disease (CKD) was present in 22 (5.3%) patients. Diabetic retinopathy was present in 52 (12.5%) patients and history of CVD was present in 49 (11.8%) patients.

The study found no association between BMI (P=.804), smoking (P=.095), the presence of CKD (P=.082), and ED severity. However, the presence of CVD and diabetic retinopathy significantly increased the risk for severe ED (P=.002 for CVD, P=.040 for diabetic retinopathy).

Previous ED diagnosis was present in 51 (12.3%) patients. Around 82% of moderate and 62.2% of severe ED patients were not diagnosed previously, see table 4.

Table 4: Previous ED diagnosis among Patients

Previous ED Diagnosis	Normal	Mild	Moderate	Severe	Total	P value
Yes	1 (1.3%)	4 (2.9%)	29 (18.2%)	17 (37.8%)	51 (12.3%)	
No	74 (98.7%)	132 (97.1%)	130 (81.8%)	28 (62.2%)	364 (87.7%)	.000
Total	**75 (100%)**	**136 (100%)**	**159 (100%)**	**45 (100%)**	**415 (100%)**	

Age and diabetes control were found to be significant predictors for erectile dysfunction as shown in table 5.

Table 5: Multiple Logistic Regression of Risk Factors for Erectile Dysfunction

Risk Factor	P-Value	Odds Ratio (Confidence Interval)
Age	<0.00	0.50 (0.39-0.64)
Diabetes Control	0.001	0.38 (0.23-0.67)

DISCUSSION

In this study, the prevalence of ED was 81.9%. Its severity was significantly associated with age, duration of diabetes and poor metabolic control. There was no statistically significant association with hypertension and control of lipids parameters. It showed that ED is undiagnosed in the majority of patients.

The prevalence of ED in this study is high, but it is similar to other studies[3-5,24,25]. The prevalence in these studies ranges from 72.7 % to 82.6%[3,4]. High prevalence of ED in our study was due to the presence of many risk factors, namely: age, long diabetes duration, obesity, and poor glycemic control.

Approximately 70% of the patients were above 50 years. Age is an important risk factor for ED as consistently found in several studies[4,25,26]. In one study, the probability of having ED was 94% for those aged 60 to 69 years and 100% for those 70 years and older[27].

There was a significant association between ED severity and duration of diabetes. Approximately 45% of the patients had diabetes for more than 10 years. A positive association exists between duration and the probability of having ED[25,26,28]. We found that not only the probability, but also the severity of ED significantly increases after 20 years. This is probably explainable as many of these patients would be having co-existent microvascular and macrovascular complications, mainly CVD which are strong predictors/risk factors for ED[6,7].

Although we did not have complete data about waist circumference to assess the metabolic syndrome (MS), more than 90% were either overweight or obese; 79.5% had HDL <1 mmol/l and around 60% were hypertensive[29]. Patients with MS are at higher risk for ED as it is negatively correlated with serum testosterone and hypogonadism[30,31]. In addition, it has been found that as the number of MS components increases, the prevalence of ED increases because of the existence of an inverse relationship between the number of components of MS and vascular endothelial function[32]. This could also explain the finding of the association between poor metabolic control and the probability of ED severity. More than 80% of patients with severe ED had poor control of AIC, only 17.8% had good control. In fact, it has been found that both undiagnosed hyperglycemia and impaired fasting glucose increase the risk for ED[27]. Hyperglycemia is detrimental to endothelial function which is vital for initiation of erection[33].

ED was largely undiagnosed among the patients in this study. Approximately 82% of moderate and 62.2% of severe ED patients were not diagnosed previously. This could be related to lack of awareness of ED in these patients[5,14]. In a recent study, only 54.7% thought they had ED, but 18.5% of severe to moderate ED thought they had no ED and <10% of the subjects with ED had ever sought help from any physician regardless of the degree of severity[5]. This indicates the importance of screening, especially in this high-risk group.

CONCLUSION

Erectile dysfunction is very common among our patients. However, the majority were undiagnosed. Regular screening and increasing awareness of the treating physicians of ED is needed.

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