

Erectile Dysfunction in Diabetic Patients in the Holy Kerbala/Iraq in 2018

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Abstract

Background

Erectile dysfunction affects more than 50% of diabetic patients and results in miserable couple's life, especially for young adults. Possible predictors are proper therapy and patient's compliance with treatment, in addition to the warning signs and symptoms of sensory neuron and motor deficits. Therefore, this study was conducted to determine the prevalence of Erectile dysfunction and its predictors among diabetic patients in Kerbala. Material and methods

The study included a convenient sample of 61 patients with diabetes mellitus type I and II. They were chosen through a systematic sampling among patients at the diabetes mellitus clinic at Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018. All participants were interviewed using standard questionnaire. Analysis of data used descriptive and analytic tools including t-test, chi-square test, logistic regression and structural Equation modeling through the statistical Package of social sciences and Amos and Excel software at a significance level of <.05.

Results

The mean age of patients was 53.5 ± 10.18 years and mean duration of disease was 10.9 ± 6.90 years. One half of the participants complained of erectile dysfunction. Good glycemic control may hinder this complication induction. Motor neuron changes, discovered on clinical examination, might be the earliest warning signs and sensory deficits are also predictors of erectile dysfunction. Similarly, autonomic changes discovered through orthostatic hypotension might also represent its early sign.

Conclusions

Erectile dysfunction is a common complication of diabetes and health care providers need to investigate for early signs of this occurrence through sensory and motor neurone deficits.

Keywords: diabetes mellitus, erectile dysfunction, Autonomic changes, sensory and motor changes, glycemic control.

Conflict of interest: none

Introduction

Diabetes mellitus (DM) is a common chronic disease in every part of the world and has now assumed epidemic prevalence (1, 2). There are many factors contributing to the rise in DM prevalence in industrialized and developing countries. The prevalence of DM in Iraq was reported to be 10.4% in a national survey in 2006 ?Non-communicable diseases survey (3).

The main factor is increased caloric consumption leading to overweight and obesity. In addition, physical inactivity has been shown to be a major risk factor for type-II DM

regardless of gender and age (4).

Diabetes mellitus has been associated sexual dysfunction in women and men. This dysfunction might be found in three forms: disorder of libido, ejaculatory problem or erectile dysfunction (ED) (5, 6). The Erectile dysfunction (ED) is a common male sexual dysfunction. It is defined as "an inability to achieve and maintain an erection sufficient to permit satisfactory sexual" (5).

All these problems can cause significant bothers to the patient and affect their quality of life (7). Despite this, health care providers often do not ask their diabetic patients about sexual function and this lead to s this condition. In addition, the patients are often reluctant or embarrassed to initiate discussion of these sensitive issues themselves. These reasons are behind missing an important opportunity for health care providers to improve patients' quality of life.

Erectile Dysfunction is documented to be major problem and occurs in up to 50-75% of men with type 2 DM (8-10). In men, DM increases erectile dysfunction by three folds compared to non-diabetic men (11).

Several studies showed an association between ED and other risk factors for cardiovascular like hypertensive, diabetic hyperlipidemia, smoking, metabolic syndrome, depression and poor health state (7).

The ED pathogenesis mechanism in diabetes is mainly through vasculopathy, neuropathy, visceral adiposity, hormone deficiency and insulin resistance (8, 10, 12).

As autonomic neuropathy is mostly asymptomatic; ED is the only presentation in about one half of the patients with autonomic neuropathy. When ED developed, it indicates a generalized vascular disease in diabetic patient (13). Advanced age and long duration of DM will increase risk of ED. The prevalence of ED is age-dependent. According to a recent analysis by the international consultation committee for sexual dysfunction, the prevalence of ED was 1%--10% in men younger than 40years 2--9% in men 40—49y and increased 20--40% among men60y—69y and 50--100% older than70 years (14, 15).

The responsible condition for ED might be related to endothelial dysfunction and delayed repair mechanisms (16-19). Low level testosterone and luteinizing hormone is seen in 25-40% of men with type2 DM (6, 20, 21). Several studies reported a positive association between ED and glycemic control and life style changes of diabetic patients. However, some other studies reported is no clear association (8, 22).

Studies suggest that 25–40% of men with type 2 diabetes mellitus (T2DM) have hypogonadism (6).

In Iraq, a hospital based study among 69 diabetic patients in the National Diabetic center in Baghdad/Iraq reported that ED prevalence was 69.2% and increased with advancing age, duration of diabetes and rising HbA1c level (23). While a study in Babylon city/ middle part of Iraq among three hundred health males reported that 28.3% suffered from diabetes mellitus, 25.7% had hypertension and 46% were smokers (24). While a study among 200 patients with type 2 DM in Iran, the prevalence of ED was 59.5% and the only predictors were age and taking antihypertensive (calcium channel blockers) (25).

Patients and methods:

A cross-sectional study subjects consisted of adult male patients (aged 30–80 years) with DM attending the diabetic clinic at Al Hussein teaching hospital in Holy Kerbala /Iraq. Patients were included if they complained of an inability to get or sustain a satisfactory erection causing them distress. A systematic random sampling technique was used to

select a sample of 61 patients between 1st January 2018 to 30th November 2018. Interview filled standard questionnaire based on a valid questionnaire; modified Index of Erectile Function Questionnaire (IIEF). It addressed the main five domains erection function, orgasmic function (ejaculation), sexual desire (libido), intercourse satisfaction and satisfaction ejaculation domains. Literature review revealed that the IIEF-5 is an excellent diagnostic test (26). However, the questionnaire was ameliorated to fit the cultural conditions in Iraq. Additional information about the demographic characteristics of the participants, clinical examination findings and investigation results were included. Clinically, blood pressure and pulse rate were measured in sitting and standing after at least five minutes to check whether the patient has autonomic neuropathy (27). Then neurological examination was conducted for each patient: sensory neuron changes that depend on modified McGill Pain questionnaire evaluating: pain, vibration, position, temperature sense and touch; and motor examination (biceps reflex triceps reflex, supinator reflexes knee reflexes, ankle reflexes). Laboratory tests included Fasting blood Sugar (FBS); glycosylated hemoglobin (HBA1c); serum vitamin D level -25 Oh-Cholecalciferol- and serum lipid profile (cholesterol high density lipoprotein , low-density lipoprotein serum and triglycerides). Additionally, Electro-Myography (EMG) and nerve conduction study (NCS) -including median, ulnar nerves Sural, and tibial nerves-were performed for all participants. The present study tried to find the prevalence of ED among diabetic patients (Type I and II) and the main associated factors in the holy Kerbala/Iraq in 2018.

Results

The mean age of patients was 53.46 ± 10.18 years with a range of 30- 80 years (figure 1), and the mean duration of DM was 10.88 ± 6.90 years with a range of 0.5-25 years.

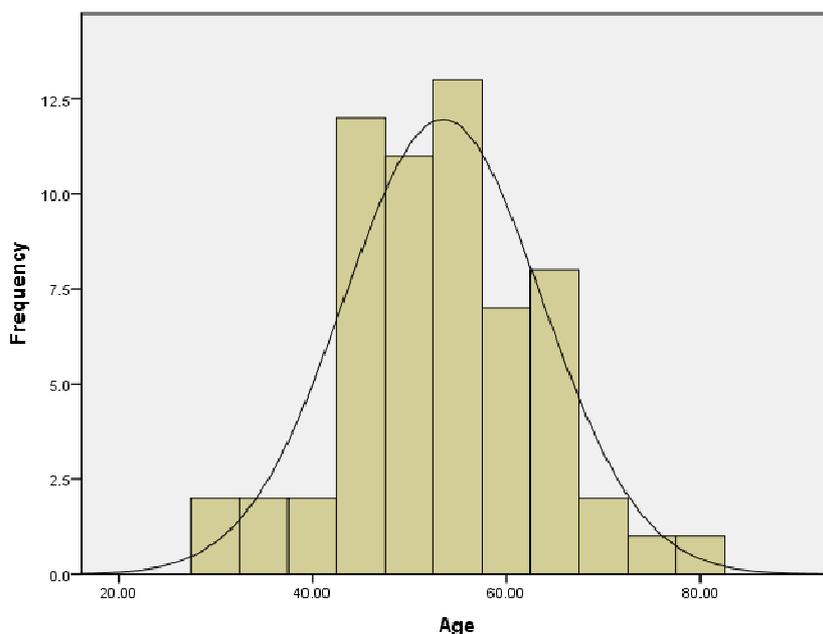


Figure 1: The age distribution of diabetic patients at the diabetes mellitus clinic at Al

Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61)

About equal proportions of the sample were below 50, between 50 and 60 and above 60 years (figure 2).

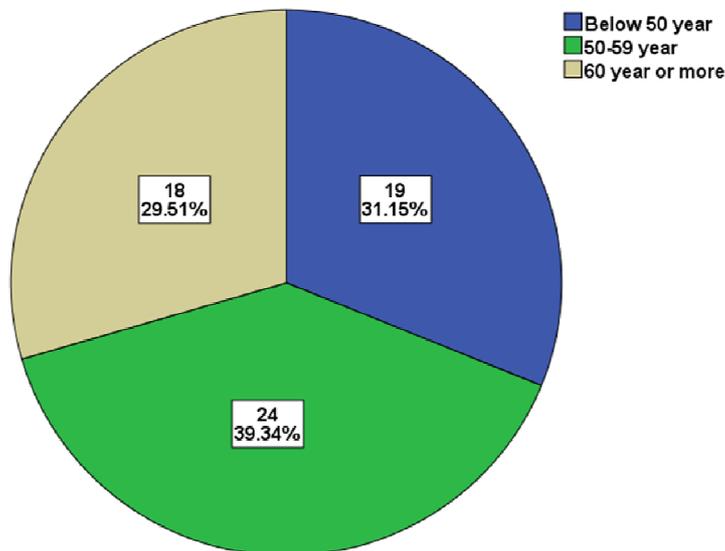


Figure 2: The age category distribution of diabetic patients at the diabetes mellitus clinic at Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61)

The duration of disease was ten years or more in about one half of the cases, while one third had the disease for five to ten years and the remaining complained from diabetes mellitus for less than five years (figure 3). Noticeable findings were the clear highly significant association between the duration of DM and clinical findings (sensory, motor and autonomic changes-orthostatic hypotension-) and EMG positive findings (delayed nerve conduction). However, there was no significant association between the age category and clinical findings; except for the type of DM ($p=.036$).

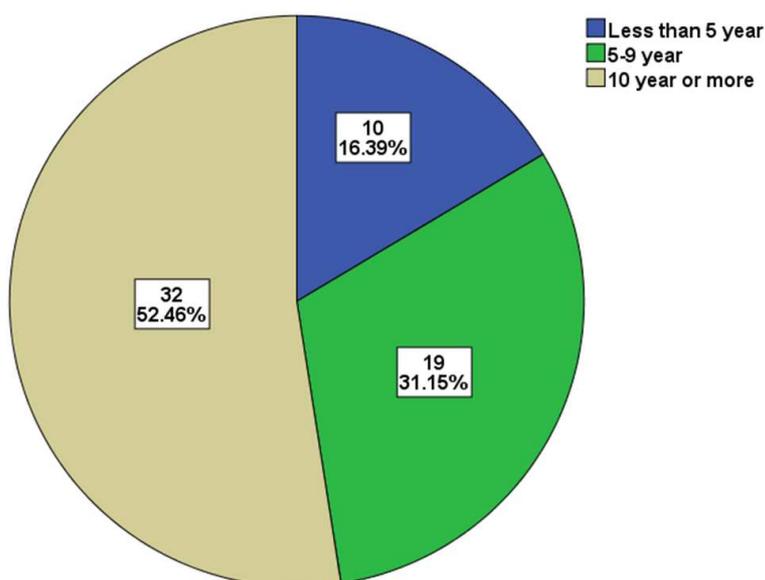


Figure 3: The disease duration category distribution of diabetic patients at the diabetes mellitus clinic at Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61) Three quarters (75.4%, 46 patients) of the patients were complaining of adult onset (type II) diabetes, while only 24.6% complained from juvenile (type I) diabetes.

The majority of the participants (75.4%) were on oral anti-diabetic therapy and eleven patients (18.0%) were on Insulin and the remaining patients were not using medication. The compliance of these diabetic patients with treatment was not good as the mean Hemoglobin A1c was 9.80 ± 2.44 mg/dl and the mean serum vitamin D3 (25 Hydroxy cholecalciferol) was 16.97 ± 9.59 ng./dl.

Clinical examination revealed that a great majority of the patients (91.8%) suffered sensory abnormality (delayed nerve conduction), while more than three quarters (77%) has motor neuron abnormality; including 52.5% with areflexia and 24.6% with weak reflexes. A great majority (89.7%) got orthostatic hypotension discovered through measuring sitting and standing blood pressure.

Sensory deficit was classified according to the level of impairment of nerve conduction in to mild, moderate and sever. Nerve conduction was mildly impaired in 39 patients (78.3% of cases), moderate impairment in 25 patients (41.0%) and mild impairment in 14 patients (23.0%), while sever impairment was detected in 9 patients (14.8%).

Table 1: The age, type and duration of disease and clinical findings distribution of diabetic patients at the diabetes mellitus clinic at Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61)

Variable	Groups	Frequency	Percentage
Age category	Below 50 years	19	31.15
	50-59 years	24	39.34
	60 years or more	18	29.51
Duration of DM	Less than 5 years	10	16.39
	5-9 years	19	31.15
	10 years or more	32	52.46
Type of DM	1	16	26.23
	2	45	73.77
Treatment type	Insulin	3	4.92
	Oral Medication	46	75.41
	Mixed	8	13.11
	No Medication	4	6.56
Sensory changes according to delayed nerve conduction impairment.	Negative	5	8.20
	Positive	56	91.80
Motor changes according to tendon reflex responses	Negative	14	22.95
	Weak	15	24.59

	reflexes		
	Areflexia	32	52.46
Autonomic changes (orthostatic hypotension)	Negative	52	85.25
	Positive	6	9.84
EMG findings	Negative	13	21.30
	Mild changes	14	23.00
	Moderate changes	25	41.00
	Severe changes	9	14.80
Total		61	100.00

One half (49.2%) of male diabetic patients complained of ED (figure 4).

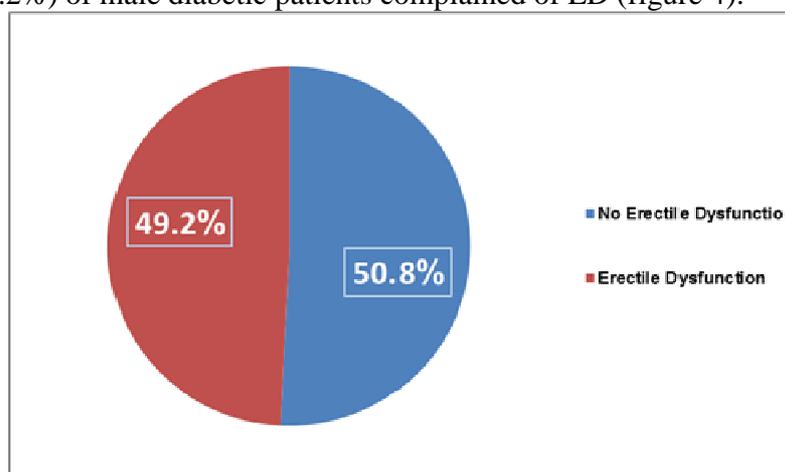


Figure 4: The distribution of erectile dysfunction among patients at the diabetes mellitus clinic Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61). Comparison of the group of patient with ED to those without ED revealed that 14.3% of ED patients got orthostatic hypotension compared to 6.7% of those without ED (odds Ratio= 2.33). For the duration of DM; the patients with ED reported longer duration of disease (mean 10.93 ± 6.051 years vs. 9.63 ± 6.68 years). However, the difference was not significant.

A positive significant association was found between ED and sensory neuron changes ($p=.022$). More than one half (53.6%) of patients with ED showed sensory neuron compared to 46.4% of those without ED. On the other hand, motor neuron changes so showed a highly significant difference between the two groups ($p<.001$).

Only a small minority (3.3%) of ED patients showed no EMG changes compared to of those without ED. Almost the exact proportions were true for motor reflexes.

Similar findings were noticed for sensory changes where all Ed patients showed EMG abnormalities compared to 83.9% of those without ED.

In spite of the clear difference in the mean serum vitamin D level between ED patients and non ED patients ($17.26 \text{ ng./dl} \pm 11.878$ and $14.89 \text{ ng.7dl} \pm 6.37$, respectively), no significant difference was found and this might be related to the general low level in both groups (normal level is above 30 ng./dl).

Table 2: The Electromyography changes distribution by Erectile Dysfunction among diabetic patients at the diabetes mellitus clinic at Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61)

Erectile Dysfunction n	Electromyography changes (according to delayed nerve conduction impairment)		
	No changes	Mild changes	Moderate changes
Present	12 (38.7%)	6 (19.4%)	7 (22.6%)
Not present	38.7 (1.0%)	19.4 (8.0%)	22.6 (18.0%)
Total	1 (3.3%)	8 (26.7%)	18 (60.0%)

p<.001

There was a positive association between glycemic control and Ed. One quarter of those with good glycemic control complained of ED compared to 51% of those with poor glycemic control (table 1), and the odds ratio for glycemic control was 3.12, however the correlation between the two conditions was weak (Correlation coefficient 0.041).

Table 3: The distribution of the Diabetes mellitus control by Erectile Dysfunction among patients at the diabetes mellitus clinic Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61)

Diabetes mellitus	Erectile Dysfunction		Total
	Present	Not present	
Controlled	3 (75.0%)	1 (25.0%)	4 (100.0%)
Uncontrolled*	49 (49.0%)	26 (51.0%)	51 (100.0%)
Total	28 (50.9%)	27 (49.1%)	55(100.0%)

*B1c \geq 7mg. /dl

Logistic regression model showed that type the type of diabetes and sensory neuron changes were the only significant predictors (OR: 1.88, p= .048, OR: 3.33, p= .009, respectively).

To determine the correlation coefficient weight of each potential predictor simultaneously, a Structural Equation Model (SEM) was constructed through AMOS software which showed that the main effect was for Motor Neuron changes followed by Autonomic changes and then DM type and type of treatment (figure 5).

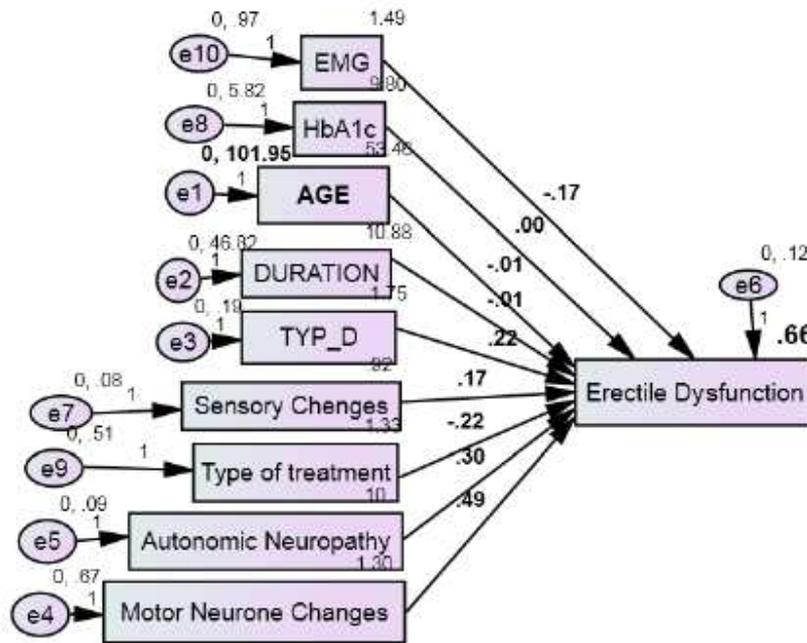


Figure 5: The Structural Equation Model of potential predictors of Erectile Dysfunction among patients at the diabetes mellitus clinic Al Hussein Teaching Hospital in Holy Kerbala /Iraq in 2018 (n=61).

Discussion

The present study included patients in a wide age range (24-80 years in order to compensate for any potential role for age in ED pathophysiology.

The prevalence of ED was about 50% and this is consistent with the previous study among 69 diabetic patients in Baghdad (23), and the study among 200 patients in Iran (25). The prevalence of ED among diabetics in the present study was within the range reported by most published papers (8-10).

For DM type; the majority of participants were of type II DM as it represents than main type of DM associated with ED (28). However, no significant difference in ED prevalence was discovered in the present study between the patients in the two groups of DM in the present study. Additionally, the SEM model showed that DM type carries a high correlation coefficient within potential predictors of ED (figure 5).

Literature review showed that the longer the period of complaint of DM, the higher is the prevalence of ED and the mean duration of disease was higher in ED patients in the present study. A large sum of literature showed a positive correlation of ED prevalence and parents' age and duration of disease (14, 15).

In addition, all clinical and EMG positive findings were significantly higher as the duration of disease is extended in the present study, and this is consistent with most published literature (6, 20). It was noticed that motor neuron changes were more potent as a predictor of ED than sensory changes. Glycemic control was a dominant significant predictor of Ed (table 3).The negative association of ED with better diabetes control was clear in a large bulk of studies (6, 20, 21), and this was finding was consistent with the results in the present study. The odds ratio of ED in the present study was 3.12 and this

was similar to the risk reported in the study by Dye and Shepherd in 2002 (11) On the other hand, absence of significant differences for clinical findings between the different age categories in the present study might be related to the right shift of participants' age in the sample (mean age 53.46 years).

Logistic regression model predicted DM type and Motor neuron changes (diminished reflex responses) as the only significant predictors. A regression model for 200 diabetic patients in Iran predicted only two independent predictors of ED; age (OR: 2.8, p=.01), and taking calcium channel blockers (OR: 4.1, p= .01)

The pathophysiological changes responsible for ED involve complex neurological and vascular damage in addition to hormonal deficiency. This fact was reflected in the major abnormal sensory motor changes (as described) discovered in ED patients in the present study compared to those without ED (table 2). However, these changes had occurred in a great majority of both groups. In addition, autonomic neuropathy was also found in more than double the proportion of ED patients compared to those without ED. Autonomic neuropathy was also the main and most frequent presenting clinical feature(43%) among 200 diabetic patients in Lahore/ Pakistan (13).

Conclusions

Erectile Dysfunction is very common in men with DM. Its independent predictors are type of disease and treatment, duration and clinical and laboratory findings.

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