



## Trends of Erectile Dysfunction in Type 2 Diabetic Subjects at a Tertiary Care Unit of Karachi Pakistan

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### Authors' contributions

*This work was carried out in collaboration between all authors. Author ZK managed the concept and design the study, researched data, edited and reviewed the manuscript. Author IAS performed the concept and design the study, researched data and reviewed the manuscript. Author AF wrote the manuscript, performed the analysis of the study and data processing. Author NM performed the analysis of the study and data processing, edited, reviewed the manuscript. Author MSU researched data and reviewed the manuscript. Author AB managed the concept of the study, designed and reviewed the manuscript. All authors read and approved the final manuscript.*

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### ABSTRACT

**Objective:** To compare the occurrence of erectile dysfunction (ED) in male type 2 diabetic subjects with healthy control using IIEF questionnaire at a tertiary care unit of Karachi Pakistan.

**Methods:** It was a single centered case control study with cross sectional study design. A total of 325 subjects comprising of 75 healthy non-diabetic and 250 diabetic males were selected for the study. Male type 2 diabetics of age 18-55 years without hypertension and hormonal problem, smoking, psychological disorder & alcohol habits were included as cases in this study. ED was assessed by using IIEF-5 questionnaire. SPSS-20 was used for analysis.

**Results:** Diabetics are 3.6 times more prone to develop ED than non-diabetic subjects. Severe ED

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category was more prevalent in diabetic group (17.2%) as compared to non-diabetic group. (P-value=0.003). IIEF scores of diabetic subjects showed inversely correlation with age, testosterone, duration of diabetes and fasting blood sugar at  $p < 0.05$ .

**Conclusion:** Occurrence of ED is high amongst type 2 diabetes subjects at older age. Further larger scale community based studies are required to ascertain the findings of this study.

*Keywords: Erectile dysfunction; type 2 diabetes mellitus; the international index of erectile function.*

## 1. INTRODUCTION

Insufficient secretion of insulin and its resistance to action resulting in wide collection of dysfunctions leading to type 2 diabetes mellitus. Glycemic disorders, macro vascular, microvascular & neuropathic complications are major characteristics of diabetes mellitus.

Erectile dysfunction is a common problem present in diabetic subjects which occur markedly as the age and duration of diabetes progress [1]. This complication leads to perturbed sexual life. Decrease testosterone level is observed often in men having type 2 diabetes mellitus [2]. ED is a continuous inability to achieve and retain a penile erection of adequate quality for satisfactory intercourse [3]. The problem of ED intensifies as the age increases and is usually frequent in men having other problems like hypertension, heart diseases or diabetes mellitus [4]. ED is a stressful complication of diabetes mellitus and its presence in diabetic men varies from 35-75% [5]. ED and diabetes mellitus are significantly related with anxiety, stress, depression, alcohol, medications, smoking, dyslipidemia, anger, obesity and fear of sexual dysfunction [6,7,8,9,10]. ED appears 10 years earlier in diabetic men than in general population [11,12].

The objective of this research study is to compare the occurrence of erectile dysfunction (ED) in male type 2 diabetic subjects with healthy control using IIEF questionnaire at a tertiary care unit of Karachi Pakistan. The secondary aim is to correlate the IIEF score with BMI, HbA1c, lipid profile, testosterone and age.

## 2. MATERIALS AND METHODS

This study was a single centered, case control study with a cross sectional study design. conducted at Baqai Institute of Diabetology and Endocrinology (BIDE) Karachi Pakistan from April 2015 to October 2015. This study was endorsed by ethical committee of BIDE. A total of 325 males with age group of 18-55 years,

comprising of 75 healthy non diabetic and 250 diabetics were randomly selected. The subjects suffering from hypertension, thyroid / hormonal problems, smoking, psychosocial disorders, alcoholics and medications especially anti-hypertensive, anti-depressants were excluded. Patients were assessed for ED through interviews based on IIEF-5. The IIEF-5 sexual health inventory for men (SHIM) questionnaire, a self-evaluated scale comprised on 5 questions used for erectile function assessment. Each question has different score in counting. A total count from 01-21 score has certain degree of erectile dysfunction. The cut off value is 22 means 'No ED'. (1-7 Severe ED, 8-11 Moderate ED, 12-16 Mild Moderate ED, 17-21 Mild ED, 22-25 No ED) [13].

The height and weight were recorded by a stadiometer with subjects in light clothing and without shoes. Height was recorded to the nearest centimeter and weight to the nearest 0.1 kg. Body Mass Index (BMI) was calculated by the formula, Weight in kilogram / (height in meter)<sup>2</sup>. Blood pressure was measured using mercury sphygmomanometer.

HbA1c, blood sugar (fasting & random) and lipid profile were recorded only for cases. Estimation of blood sugar (fasting & random) done with GOD PAP (Glucose oxidase phenol aminophenazone) method. Blood collected after 12 hours of fasting in sodium fluoride vacutainer tube. With selectra pro S analyzer automatically calibrated in sample rotor and result noted [14]. For lipid profile total cholesterol estimated with CHOD-PAP (Cholesterol oxidase) method. Triglycerides estimated with GPO-PAP (Glycerol 3 phosphate oxidase) method [15,16]. The HDL cholesterol was estimated with HECM (Homogenous enzymatic colorimetric method). The LDL was estimated with ECSM (Enzymatic colorimetric selective detergent) method [17]. For HbA1c estimation, the HPLC (High performance liquid chromatography) method was used. Blood in EDTA (ethylene diamine tetra acetic acid) loaded in d-10 analyzer. Result noted after processing [18]. Total testosterone was estimated by ELISA (Enzyme linked

Immunosorbent assay) method. With QM lab, read-well plate ELIZA analyzer, the blood was calibrated in wells. By dispensing testosterone HRP (Horseradish peroxidase) conjugate reagent into each well incubated for 90 minutes. Read absorbance at 450nm within 15 minutes [19].

The data analysis was conducted on SPSS statistics version 20. All study variables, height, weight, age, BMI, IIEF scores and other biochemical variables were presented as mean±SD. Odds ratio was reported. P-value was considered 0.05 as baseline significance for comparison. The correlation coefficient value of 'r' calculated with Pearson correlation coefficient for quantitative data of two individual variables. Qualitative variables in the study were described by frequency, percentage and mean.

### 3. RESULTS

Table 1 presents demographic data as well as biochemical indices among type 2 diabetic subjects (cases) and non-diabetic individuals (controls) with a mean age of 43.7±10.06 and 34.85±5.2 years respectively whereas average score of IIEF was found to be 12.85±4.76 and

16.35±7.10 respectively which was significantly different among groups.

Among cases, mean duration of diabetes was 7.76±5.99 years with mean HbA1c of 9.56±2.34%. Mean value for testosterone was reported to be 2.7 ± 0.3 ng/dl in the cases. Mean cholesterol and triglycerides levels were 180.36±47.54 mg/dl and 219.16±146.34 mg/dl in diabetics respectively.

Table 2 shows frequency of erectile dysfunction among both case and control. Most of the subjects in control group either had mild (37.3%) or mild moderate (42.7%) ED. Results were similar in case group with most of the subjects having mild moderate (38.7%) ED. However, very few subjects in the control group had moderate (5.3%) or severe (4.0%) ED compared to case group with 21.2% had moderate and 17.2% had severe ED (p<0.05).

Table 3 estimates odds of having erectile dysfunction in diabetes mellitus compared to those without diabetes. This table confers that diabetic subjects were 3.6 times more likely to develop erectile dysfunction than non-diabetic subjects.

**Table 1. Basic demographic and biochemical information of study subjects**

Basic information	Control	Case	P-value
n	75	250	
Age (years)	34.85±5.2	43.7±10.06	<0.0001
BMI (kg/m <sup>2</sup> )	26.2±6.58	28.57±4.57	0.0005
IIEF score	16.35±7.10	12.85±4.76	<0.0001
Duration of diabetes (years)	-	7.76±5.99	-
Fasting plasma glucose (mg/dl)	-	194.59±75.99	-
Random plasma glucose (mg/dl)	-	263.1±119.43	-
HbA1c (%)	-	9.56±2.34	-
Serum cholesterol (mg/dl)	-	180.36±47.54	-
Triglycerides (mg/dl)	-	219.16±146.34	-
HDL (mg/dl)	-	35.52±7.15	-
LDL (mg/dl)	-	106.22±36.7	-
Testosterone (ng/dl)	-	2.57±1.96	-

*Data presented as mean ± standard Deviation, Statistically significance at p-value<0.05*

**Table 2. Frequency of ED status among case and control accomplished by IIEF score**

ED status	Control	Case	Overall	P-value
No ED	8(10.7%)	8(3.2%)	16(4.9%)	0.008
Mild ED	28(37.3%)	49(19.6%)	77(23.7%)	0.001
Mild moderate ED	32(42.7%)	97(38.7%)	129(39.7%)	0.540
Moderate ED	4(5.3%)	53(21.2%)	57(17.5%)	0.001
Severe ED	3(4.0%)	43(17.2%)	46(14.2%)	0.003

*Data presented as n (%), Statistically significance at p-value<0.05*

**Table 3. Risk of having ED among type 2 diabetic subjects**

Erectile dysfunction	Type 2 diabetes	Healthy Control	OR (p-value)
n	250	75	-
Present	242(96.8%)	67(26.8%)	3.61 (0.008)
Absent	08(3.2%)	08(73.2%)	

Here, OR= Odds Ratio

**Table 4. Correlation of IIEF score of diabetic subjects with bio chemicals, demographic and clinical variables**

Variables	Correlation	P-value
Age (years) *	-0.456	<0.0001
Duration of diabetes *	-0.235	<0.0001
Body mass index (kg/m <sup>2</sup> )	0.043	0.497
Fasting blood sugar (mg/dl) *	-0.253	0.016
Random blood sugar (mg/dl)	-0.145	0.211
Cholesterol (mg/dl)	-0.049	0.528
Triglycerides (mg/dl)	0.025	0.746
HDL (mg/dl)	0.034	0.658
LDL (mg/dl)	-0.112	0.127
HbA1c (%)	-0.022	0.763
Testosterone (mg/dl) *	-0.201	0.001

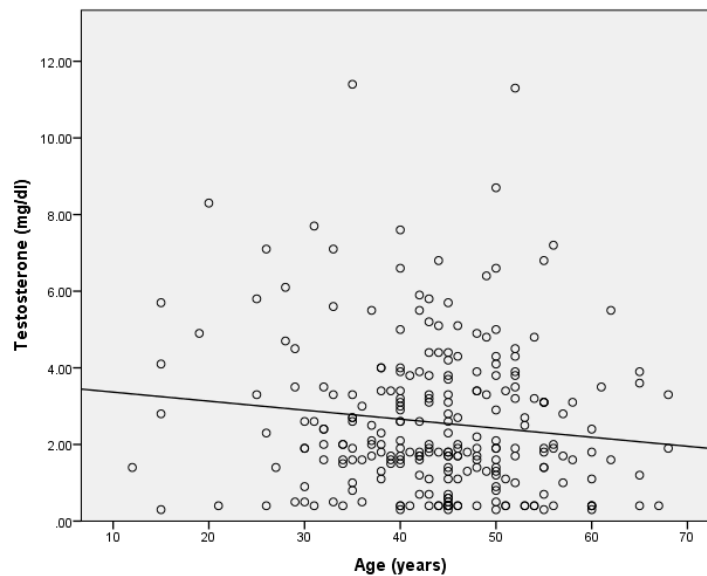
Here \* denotes statistically significant at p-value<0.05

Correlation of IIEF scores with demographic and biochemical variables is presented in Table 4. Significantly negative correlation of IIEF scores was observed with age (-0.456), duration of diabetes (-0.235), fasting blood sugar (-0.253) and testosterone (-0.201).

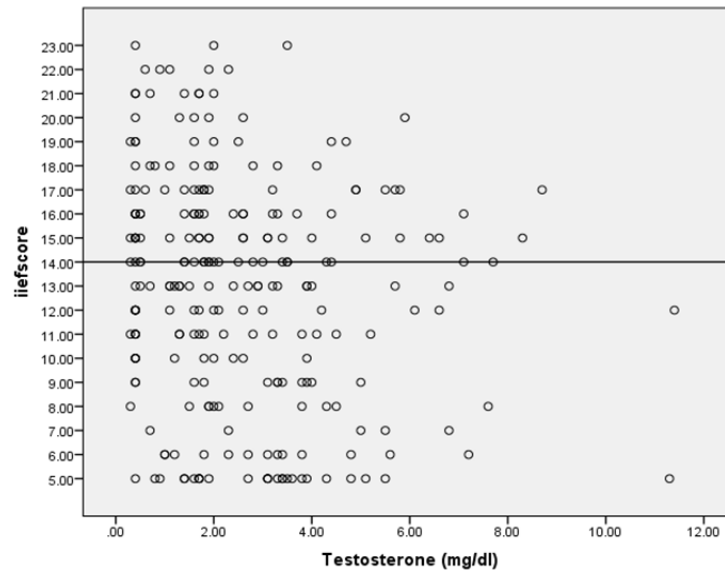
decrease in age did not impact on testosterone level.

Fig. 2 presents negative correlation of IIEF score to testosterone level. Decrease in testosterone level shows an increase in IIEF score.

Fig. 1 shows no significant correlation between age to testosterone level. Any increase or



**Fig. 1. Scattered plot with regression line for age to testosterone level**



**Fig. 2. Scattered plot with linear regression of IIEF score to testosterone level**

#### 4. DISCUSSION

This study was intended to assess the erectile dysfunction among type 2 diabetic male patients attending an urban tertiary care unit of Karachi Pakistan. Sexual life can be a precious part of men’s life and health. The role of testosterone is pivotal in metabolic and male reproductive functioning. Association of low testosterone level with array of disorders like type 2 diabetes mellitus, heart diseases, obesity and psychosis is present [20].

In present study ED is 3.6 times more common in type 2 diabetic subjects than in control group. The frequency of ED in type 2 diabetic subjects is found to be 96.8% while only 40 % are having moderate to severe problem. Almost similar findings (35-75%) have been reported by other authors from different part of the world [21]. Hyperglycemia and its complications specially the autonomic neuropathy along with other metabolic abnormalities are the causative factors in this regard [6,7,8,9,10].

The frequency of erectile dysfunction increases with age and mostly men are diagnosed with diabetes mellitus in middle age group [5]. Almost the similar findings have been reported in this study where the advancing age is found to be a contributing factor for ED. However, the decrease in testosterone levels with age can be one of the contributing factor [22].

Glycemic control and erectile dysfunction are mostly associated with each other [23]. while some reports are against this notion, stating that presence of ED is not entirely associated with glycemic control [1]. Similarly, the current study did not prove any association on the basis of HbA1c while FPG showed highly significant correlation.

The frequency of moderate and severe ED, as defined by IIEF questionnaire is significantly more common in diabetics than in control suggesting the presence of this condition as a notable risk factor for ED. Studies from other parts of the world support the findings of this study. Metabolic derangements and its sequel i.e. complications, especially autonomic neuropath can be considered as among the causal factors [21,24].

There are some limitations of this study; mainly because of lack of funding as the study was planned and executed in a resource constraint society. Small sample size, lack of generalizability, inability to perform all hormonal assays in diabetics are among the few points. The biochemical tests for controls were not performed due to lack of funding but. However, this study is amongst the very few reports, conducted on this topic in this part of the world.

#### 5. CONCLUSION

Erectile dysfunction is more common in type 2 diabetics as compared to healthy individuals.

Further larger scale community based studies are required to ascertain the findings of this study.

## 6. RECOMMENDATIONS

It is recommended to screen for ED in male diabetic subjects for early detection and identification in routine clinical practice.

## CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this paper.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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