

Clinical and Laboratory Profile of Men with Erectile Dysfunction in a Tertiary Care Referral Andrological Center

ABSTRACT

Introduction: The incidence of erectile dysfunction (ED) is rising, even among men in their reproductive age group. The main objective of this study is to analyze the profile of ED and address the concerns in treating them. **Methods:** A prospective observational study was conducted in the Andrology unit of a tertiary care center in South India over 2 years in men seeking treatment for ED. Demographics, clinical history, and physical examination findings, erection hardness score, and intravaginal or masturbatory ejaculation latency time were noted. Blood investigations mainly included glycosylated hemoglobin or fasting blood sugar, lipid profile, serum testosterone, and estradiol. Erectile function (EF) was assessed by office sildenafil test and intracavernosal injections when necessary. **Results:** Out of 1012 patients, majority ($n = 851$, 84.1%) were married; 161 (16.7%) were premarital; and 44 (4.3%) patients had unconsummated marriage. The median (IQR) stretched penile length was 9 (2.5) cm. Low testosterone (<3 ng/dl) was found in 108 (10.7%) patients and elevated estradiol (estradiol >50 pg/ml) was seen in 190 (18.8%) men; 231 (22.8%) had prediabetes; and 222 (21.9%) were diabetics or newly detected diabetics. The improvement in erection hardness was better in non-diabetic men. The concerns in premarital men included short phallus, thin semen, semenuria, and anxiety regarding erection. **Conclusions:** ED may be an early indicator of heart disease. A standardized algorithmic approach, use of objective tools, and office assessment of EF will improve the overall outcomes in management of ED.

Key words: Diabetes mellitus, Erectile dysfunction, Erection, Premature ejaculation, Testosterone

INTRODUCTION

Erectile dysfunction (ED) is becoming a global health problem and of late more men and couples are seeking treatment. ED is no longer, only a problem associated with aging and atherosclerosis, because it also affects men in the reproductive age group.^[1] The profile of ED patients on Indian men is sparse. The main objective of this study was to bring out the demographic profile, the incidence of comorbidities associated with ED, applicability of standard assessment tools to quantify erectile function (EF) and understand the concerns to be specifically addressed while treating these men.

METHODS

This was a prospective observational study conducted in the Andrology unit of a tertiary care referral urology department in South India for 2 years after obtaining approval from the Institutional Research Committee and Ethics Committee. Data collection was done following the principles outlined in the Declaration of Helsinki. Informed consent was obtained from all patients participating in the study agreeing to share their own anonymous information for other future studies.

The study population included only those men seeking treatment for ED. Patients unable to decipher or not ready for complete evaluation or in whom the entire set of basic work up

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was not available, homosexual men, and ejaculatory disorders such as retrograde ejaculation or anejaculation after urological or abdominal surgeries or those men who had already undergone a penile prosthesis for ED were excluded from analysis.

Important data included age, relationship status (married/unmarried/second marriage), penetration (not attempted/consummated/unconsummated) smoking status, comorbidities, drug history including previous treatment for ED, and prior surgeries/procedures.

Detailed clinical history was obtained from all patients regarding EF and erectile hardness was assessed using an erectile hardness score (EHS) tool [Figure 1].^[2] Men who comprehended the IIEF-5 questionnaire filled it.^[3] The intravaginal ejaculation latency time (IELT) or masturbation ejaculation latency time lower urinary tract symptoms, dysuria, post-ejaculatory, and perineal pain were also noted.^[4,5]

Patient's body mass index (BMI), blood pressure in sitting position, stretched penile length (SPL), penile plaques and deformity, testicular size, and volume assessment using Prader's orchidometer, epididymal size, and tenderness were recorded.^[6] Physical examination for clinical varicocele and digital rectal examination was done wherever indicated.

Office sildenafil test (OST) was performed with 100 mg of sildenafil citrate and intracavernosal injections (ICI) were performed after careful patient selection. Drugs were standardized and uniform. All the responses were assessed and graded using EHS by the principal investigator.^[2] In case, men were unable to complete the OST, they were asked to perform it at familiar conditions (house sildenafil test – HST) and report in the outpatient department (OPD) using the EHS scale. Routine investigations included lipid profile, serum creatinine (and estimated glomerular filtration rate – to categorize renal failure), glycosylated hemoglobin (HbA_{1c}), or random or fasting (\pm postprandial blood glucose) and urine analysis.^[7-9] Culture and sensitivity of urine and expressed prostatic secretions, uroflowmetry, ultrasound of kidneys, ureters, and bladder with post-void residue assessment were done as necessary.

Hormonal profile included serum total testosterone and estradiol; thyroid-stimulating hormone, luteinizing hormone, follicle-stimulating hormone, and prolactin were done wherever indicated. Serum testosterone was strictly estimated in venous blood samples collected between 7 and 11 AM, especially in men <50 years of age or those who had a low testosterone test report.^[10] Low testosterone (hypogonadism) was defined as serum total testosterone <3 ng/ml (<300 ng/dl).^[11] Based on the American Diabetes Association criteria, HbA_{1c} of 5.7–6.4% was taken as prediabetes; fasting plasma glucose \geq 126 mg/dL (7 mmol/L) or 2-h postprandial plasma glucose \geq 200 mg/dL (11.1 mmol/L) or HbA_{1c} \geq 6.5% or a random plasma glucose \geq 200 mg/dL (11.1 mmol/L) was taken as diabetes mellitus (DM).^[9,12]

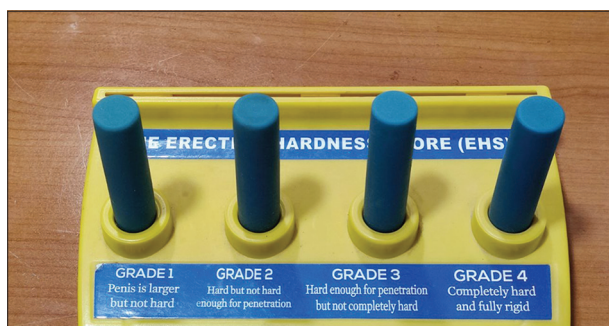


Figure 1: Erection hardness score tool

Statistical analysis

Data entry was done in Microsoft Excel 2016. Data analysis was carried out by IBM SPSS (Statistical Package for the Social Sciences) for Windows Version 25.0, Armonk, NY: IBM Corp. Based on the normality and nature of data, continuous variables were expressed as mean and standard deviation or median with interquartile range. Categorical variables were represented by percentages and proportions.

RESULTS

A total of 1012 patients presented to the Andrology OPD for ED during the study period.

Baseline characteristics and examination

The mean (\pm SD) age of men presenting with ED was 38.61 (\pm 10.2) years and the mean duration of symptoms was 12.73 (\pm 30.75) months. Majority ($n = 851$, 84.1%) of the men were married, 153 (15.1%) were premarital, and 8 (0.8%) were planning for their second marriage; 44 (4.3%) had severe ED and were not consummated; specifically, ten patients had not attempted penetration due to fear of severe ED. Furthermore, 716 (70.8%) men reported premature ejaculation in addition to ED, with a median (IQR) IELT of 30 (120) s. On examination, the median (IQR) SPL was 9 (2.5) cm (range: 7–14 cm). The mean (\pm SD) BMI was 22.5 (\pm 10.2) kg/m².

Laboratory parameters

The mean (\pm SD) creatinine was 0.7 (\pm 0.77) mg/dl, testosterone (total, serum) was 3.12 (\pm 2.6) ng/dl, and estradiol was 26.06 (\pm 25.46) pg/ml. The median (IQR) HbA_{1c} was 5.4 (6) % (range: 4–15). Among our patients, 20 (2%) had renal failure (eGFR < 60 ml/min/m²). Hypogonadism (total testosterone <3 ng/dl) was found in 108 (10.7%) patients and elevated estradiol (estradiol >50 pg/ml) was seen in 190 (18.8%) men. However, the testosterone: estradiol ratio was <10:1 only in 29 (29/108; 26.8%) men and the mean (\pm SD) BMI in these men was 26.2 (\pm 4.2) kg/m². We observed that 231 men were prediabetics (22.8%) and 222 (21.9%) were diabetics or newly detected diabetics and 55.2% (559/1012) were non-diabetics based on HbA_{1c} values [Table 1].

Based on lipid profile values, we observed that 468 (46.2%) of men with ED had dyslipidemia or were on treatment already; 87 (8.6%) patients had hypertriglyceridemia alone. Among those men with dyslipidemia, the mean (\pm SD) of values of total cholesterol was 270 (\pm 45) mg/dl, triglycerides 302 (\pm 91) mg/dl, LDL 178 (\pm 80) mg/dl, and HDL 35 (\pm 29) mg/dl at the time of diagnosis. We found that 129 (12.7%) of them were hypothyroid (TSH >10 mIU/L).

Assessment of erection

Men were requested to estimate their erection hardness on the EHS scale, during penetrative vaginal intercourse or

masturbation; 357 (35.2%) had EHS grade 2, 270 (26.7%) had EHS grade 3, 108 (10.7%) had EHS grade 4, and 221 (21.8%) had EHS grade 1. A subset of population 56 (5.6%) were unable to grade themselves as these men were not performing intercourse at all due to poor erection.

Estimated of erection hardness on the EHS scale among the non-diabetics revealed that most men had EHS 2 [224 (40.1%)] or EHS 3 [189 (33.8%)]. Among the prediabetic group, the reported erectile grades were, most of them had EHS 1 [54 (23.4%)] or EHS 2 [85 (36.8)] grades, and the same trend followed in diabetic men as well [EHS 1–56 (25.2%) and EHS 2–73 (32.9%)] [Table 2].

ICI was performed with bimix in men with EHS 1 or 2 on OST or HST and no improvement with medications (bimix: in units; stock solution containing 0.1 ml of chlorpromazine in 4 ml of papaverine). The mean (±SD) dose requirement was, 5 ± 3 units in premarital, 8 ± 4 units in married, 16 ± 7 units in diabetic and 12 ± 4 units in the prediabetic subgroups. In the entire study cohort, 55 (5.4%) patients with true arteriogenic ED.

Cardiac status and evaluation

In our study, 78 (7.7%) had coronary artery disease (CAD). Among the group with CAD, 36 (46.2%) had a coronary angiogram and was on medical management, 29 (37.1%) underwent percutaneous intervention and 13 (16.7%) underwent CABG. The indications for cardiac evaluation were, shortness of breath (New York Heart Association

class 1, 2), longstanding DM, no improvement beyond EHS 1 after OST and ICI, and abnormal treadmill test and whenever deemed necessary by a cardiologist.

In the cohort, 55 men underwent cardiac evaluation; 49 (89.1%) were identified to have CAD based on positive treadmill test for inducible ischemia 28 (57.2%), hypokinetic LV on ECHO in 11 (22.4%), and coronary angiogram in 10 (20.4%). Based on CAG, 3 (30%) had single vessel, 4 (40%) had double vessel, and 3 (30%) with triple vessel disease.

Premarital checkup

We identified that 161 (153; 15.9% + 8; 0.8% for second marriage) were premarital. The median (IQR) EHS at presentation was 2 (IQR 1). In premarital men (first marriage), the mean (±SD) age was 26 (±13) years, with mean (±SD) duration of symptoms of 14 (±12) months and they were mainly concerned about short phallus 40 (26.1%), thin semen 39 (25.5%), semenuria 28 (18.3%), reduced early morning erections 37 (24.2%), and reduced libido 19 (12.4%). The mean (±SD) BMI was 24.8 (±12) kg/m² and mean (±SD) testosterone was 4.08 (±1.2) ng/dl. In men coming in before their second marriage, the mean (±SD) age was 40 (±12) years with a mean (±SD) duration of symptoms of 28 (±13) months. The mean (±SD) BMI was 28.1 (±6.1) kg/m² and mean (±SD) testosterone was 3.11 (±0.7) ng/dl.

Unconsummated marriage

Around 44 (4.3%) patients had non-consummation of their marriage, with a mean (±SD) age of 29 (±12) years, for a mean duration of 23 (±10) years. The mean (±SD) BMI was 24 (±13) kg/m², testosterone was 5.1 (±1.9) ng/dl, and EHS at presentation was 2 (±1). The most possible causes identifiable on interviewing the patient with or without the spouse revealed that few patients had more than one issue. The most common cause was anxiety (40; 57.1%) during the intercourse; premarital ED (17; 24.3%), vaginismus (12; 17.1%), and poor knowledge of the anatomy (6; 8.5%) were the other reasons. The mean (±SD) age of the spouse was 24 (12) years.

Table 1: Baseline demographics and laboratory values of the entire cohort

Parameter	Values
Age, years, Mean±SD	38.61 (±10.2)
Body mass index, kg/m ² , Mean±SD	22.5 (±10.2)
Glycosylated hemoglobin (HbA1C), percentage, Median (IQR)	5.4 (6)
Testosterone, ng/dl, Mean±SD	
Creatinine, mg/dl, Mean±SD	0.7 (±0.77) mg/dl
Diabetic men	
No of diabetics n (%)	222 (21.9%)
No of prediabetics n (%)	231 (22.8%)

Table 2: Comparison of erection hardness score based on diabetic status

Diabetic status	No of patients n (%)	EHS 1 n (%)	EHS 2 n (%)	EHS 3 n (%)	EHS 4 n (%)
Prediabetes	231 (22.8)	54 (23.4)	85 (36.8)	75 (32.5)	17 (7.3)
Diabetes mellitus	222 (21.9)	56 (25.2)	73 (32.9)	36 (16.2)	57 (25.7)
Non-diabetics	559 (55.2)	75 (13.4)	224 (40.1)	189 (33.8)	71 (12.7)
Overall	1012	185 (18.3)	382 (37.7)	300 (29.6)	145 (14.4)

DISCUSSION

This data gives an overall and comprehensive idea about the present profile of ED in men presenting to the Andrology OPD, the issues to be looked into and ideas, concerns, and expectations of patient and partner.

Age distribution

The age of the men affected clearly shows that even young men are affected and the duration of symptoms is longer in older men. It was also observed that premarital men also presented to the OPD and this signifies the current trend, what young men are going through, the anxiety associated with their performance and the expectations of the partners.^[13]

Office assessment of EF

The EHS was actually proposed in 2007 and it has not been widely used.^[2] The usage of a standardized model with rubber cylinders of various hardness levels gives an instant and appropriate assessment of erectile hardness in men, especially when filling up the IIEF-5 questionnaire is cumbersome and difficult. The role of OST in assessing the improvement in EHS after oral sildenafil is also not a very prevalent practice but needs to be introduced in at least specific subgroup of patients to have an idea about the status of ED.^[2] The role of diagnostic ICI guides the clinician to decide the therapy and need for further testing especially in anxious men, unconsummated marriages and men with DM as it bypasses neurologic and hormonal influences in assessing objective status of penile vascularity.^[14]

DM, ED, and cardiovascular risk

The role of DM and prediabetes as a risk factor for vasculogenic ED, and that ED can be a macrovascular complication of DM, with a significant risk for heart disease cannot be overemphasized.^[15-17] The importance of BMI, testosterone levels, estradiol, and T: E ratio should be inculcated into the specialized practice of ED.^[18] Men with poor erection should be evaluated for diabetic control or new onset DM and should also be counseled for cardiac evaluation. The use of Princeton-3 guidelines in management of ED also can help in stratifying these men into distinct risk categories and plan further treatment.^[19] A poor response to OST, ICI, and a weak erection (EHS 1 or 2) at presentation, along with factors such as DM, obesity, and sedentary lifestyle are good indications for upfront cardiac evaluation and can even pick up occult cardiovascular disease as observed in our cohort.

Unconsummated marriages

The subgroup of unconsummated marriage, which is defined as inability to successfully penetrate into the female partner's vagina, deserves attention. This problem is increasing in the OPD and can be due to poor knowledge of male and female reproductive anatomy and physiology, anxiety about EF, ED, and vaginal tightness. With increasing obesity and stress, identifying this pathology and formulating protocols for treatment can help these couples overcome their problems.^[20]

Premarital assessment

Premarital health check is a valuable tool to help men allay their anxiety and fear of having a successful intercourse after marriage. This can address the concerns of men such as doubts regarding the length and girth of penis, EF, preoccupied about performance anxiety, and scrotal content pain, thus enabling him to enter their married life more confidently.^[21]

CONCLUSIONS

ED is a harbinger for heart disease. Differentiating psychogenic from organic ED and performing steps using a standardized

algorithm can give good confidence to these men and it improves response to treatment. More objective assessment tools to quantify ED such as EHS tool and office assessment of ED can go a long way in delivering good outcomes.

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