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Anxiety and erectile function in men with urological disease: A cross-sectional couple-based study

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Summary *Aim: This study examined psychological and clinical predictors of erectile function in men with urological conditions using a cross-sectional couple-based framework.*

Methods: This cross-sectional secondary analysis included 109 men presenting with varicocele, erectile dysfunction as primary complaint, chronic prostatitis, or urinary stone disease, together with their partners. Male participants completed the International Index of Erectile Function-5 (IIEF-5), whereas both members of each couple completed the Hospital Anxiety and Depression Scale. They were classified using an IIEF-5 cut-off score of 17. Group comparisons were conducted using chi-square tests and t-tests. Patient-related and partner-related psychological variables were assessed using a couple-based multiple linear regression model controlling for diagnosis and demographic variables.

Results: Patient anxiety scores differed significantly between the lower and higher erectile function groups and showed a negative correlation with IIEF-5 scores. In the regression model, patient anxiety remained independently associated with lower erectile function. No significant partner-related psychological associations were observed. The proportion of men with lower erectile function differed across the four diagnostic groups. Primary presenting urological diagnosis was also associated with IIEF-5 score, although this finding should be interpreted cautiously because erectile dysfunction itself was a diagnostic category. Conclusions: Erectile function severity in this sample was mainly associated with patient anxiety and clinical characteristics, whereas partner psychological variables were not independently associated with IIEF-5 scores. Because of the cross-sectional design and the partial overlap between erectile dysfunction diagnosis and the IIEF-5 outcome, these findings should be interpreted as associative rather than causal.

KEY WORDS: Erectile dysfunction; Anxiety; IIEF-5; Urological conditions; Couple-based study.

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INTRODUCTION

Erectile dysfunction (ED) is among the most prevalent male sexual disorders and has important implications for sexual

functioning, psychological well-being, and relational quality. Epidemiological evidence indicates that ED affects men across the lifespan, with prevalence increasing with age although remaining clinically relevant among younger and middle-aged populations (1). ED is also increasingly viewed as a marker of broader systemic health, particularly cardiovascular and metabolic disease, and its evaluation is emphasized in contemporary urological guidelines (2-4). Historically, ED was often divided into psychogenic and organic subtypes. Contemporary perspectives, however, emphasize a biopsychosocial framework in which biological vulnerability, psychological processes, and relational context interact dynamically (5-8). Vascular pathology, endocrine disturbances, neurological impairment, and urological conditions are well-established biological contributors. At the same time, psychological factors, particularly anxiety and depression, have demonstrated consistent associations with erectile impairment (6-8). Rather than operating independently, biological and psychological mechanisms may reinforce one another, creating reciprocal cycles in which physiological symptoms increase distress and distress further disrupts sexual functioning.

Among psychological factors, anxiety appears especially relevant. Performance-related anxiety and cognitive distraction during sexual activity may interfere with erectile response by increasing sympathetic activation and disrupting parasympathetic processes necessary for erection (7, 8). Although depression is also linked to sexual dysfunction, its influence may be less direct and may partly operate through reduced desire, fatigue, and general distress (6). Sexual functioning also occurs within a relational context. Partner experience and couple-level adjustment may influence the way sexual symptoms are perceived, managed, and discussed (9-11). Couple-based approaches allow the simultaneous consideration of patient-related and partner-related variables. However, evidence regarding the independent contribution of partner psychological distress to male erectile function remains inconsistent, particularly in clinical urological samples.

Despite extensive research, several gaps remain. Few studies examine patient and partner psychological variables while also controlling clinical diagnosis within a single ana-

lytical framework. In addition, contextual variables such as marital status and number of children are rarely incorporated. Therefore, this study aimed to examine whether patient anxiety, depressive symptoms, partner psychological variables, and clinical characteristics are associated with erectile function severity in men with urological conditions using a cross-sectional couple-based analytical approach.

METHODS

Study design and participants

This cross-sectional secondary analysis included 109 men evaluated during 2025 at the Republican Specialized Scientific and Practical Medical Center of Urology and the Asab va Ruhiyat clinic, together with their partners. Four diagnostic groups were included in the analysis on the basis of their primary diagnosis at presentation: varicocele, erectile dysfunction, chronic prostatitis, and urinary stone disease. The sample should therefore not be interpreted as representing the distribution of diagnoses among consecutive urology outpatients. Among the 27 men with varicocele, 10 presented with infertility although the available anonymized dataset did not retain a reliable distinction between primary and secondary infertility.

Patients with less frequently represented diagnoses, including pyelonephritis and renal failure, were not included in the present analysis.

Inclusion criteria required participants to be married or cohabiting in a stable heterosexual relationship and capable of completing self-report questionnaires independently. Patients with severe psychiatric disorders, neurological conditions affecting sexual function, or current use of medications known to substantially impair erectile functioning were excluded.

Twenty of 129 initially assessed participants were not included because of ineligibility, other diagnoses, or incomplete questionnaires; a more detailed numerical breakdown could not be reconstructed reliably from the anonymized dataset. All participants provided informed consent before participation, and the study procedures complied with the principles of the Declaration of Helsinki.

Measures

Erectile function was assessed using the *International Index of Erectile Function-5* (IIEF-5), a validated five-item measure of erectile dysfunction severity (12). Total scores range from 5 to 25, with lower scores indicating greater impairment. For categorical analyses, participants were classified into a lower erectile function group (IIEF-5 ≤ 17) and a higher erectile function group (IIEF-5 > 17). The cut-off of ≤ 17 was selected to distinguish participants with more pronounced erectile impairment from those with relatively higher IIEF-5 scores. For regression analyses, the IIEF-5 total score was treated as a continuous variable to preserve statistical power and variability.

Psychological distress was assessed using the *Hospital Anxiety and Depression Scale* (HADS), which includes separate subscales for anxiety and depressive symptoms (13). Patients and partners completed the questionnaires independently and could not view each other's responses. Confidentiality was explained before questionnaire admin-

istration. In addition, female partners completed the 24-item Marital Satisfaction Questionnaire developed by Stolin, Romanova, and Butenko. Total scores range from 0 to 48, with higher scores indicating greater perceived marital harmony. An Uzbek-language version was used. Because a formal validation source for this translation was not available, findings involving this measure have to be interpreted as exploratory. The variable was treated as a female partner-reported indicator rather than a fully dyadic measure.

Demographic and clinical variables included patient age, number of children, marital status, and primary presenting urological diagnosis.

Diagnosis was categorized into the four groups (varicocele, erectile dysfunction as the primary complaint, chronic prostatitis, and urinary stone disease) based on the available clinical evaluation. In particular, the erectile dysfunction diagnoses were based on clinical assessment together with the available questionnaire findings. Some men with an erectile dysfunction diagnosis had IIEF-5 scores above 17 because the clinical assessment also considered situational erectile symptoms. Because erectile dysfunction itself was one of the diagnostic categories, all the associations between diagnostic category and IIEF-5 scores were interpreted cautiously.

The category labelled as "unmarried" referred to men cohabiting with a stable partner.

Statistical analysis

Before analysis, the dataset was screened for missing values, normality, and multicollinearity. Normality of continuous variables was assessed using the Shapiro-Wilk test and visual inspection of Q-Q plots. Although minor deviations from normality were observed, distributions were considered sufficiently normal to justify parametric testing. Multicollinearity diagnostics indicated acceptable variance inflation factors across predictors.

Group comparisons between lower and higher erectile function categories were conducted using Pearson chi-square tests for categorical variables and independent-samples t-tests for continuous variables.

For pairwise post-hoc comparisons between diagnostic groups, Fisher's exact tests were used because of small cell counts, with Holm adjustment for multiple comparisons.

For the categorical analysis presented in Table 1, the number of children was regrouped into 0, 1-2, and 3-4 children to reduce sparse categories. In the multivariable regression model, the original categories (0, 1, 2, 3, and 4 children) were retained. However, several groups were small and, consequently, these coefficients were considered exploratory and were not used to support the main conclusions.

Bivariate associations between psychological variables and erectile function were examined using Spearman rank correlation, which assesses monotonic relationships without requiring strict normal distribution.

To evaluate patient-related and partner-related psychological associations with erectile function, a couple-based multiple linear regression model in wide format was used. Each couple was treated as a single observational unit, and patient erectile function assessed by the IIEF-5 total score served as the dependent variable.

Predictors included patient anxiety, patient depression, patient age, partner anxiety, partner depression, female partner-reported marital satisfaction, primary presenting urological diagnosis, marital status, and number of children. Categorical predictors were entered using appropriate reference groups. For number of children, the original categories were retained in this model although, given the small numbers in several groups, these estimates had to be interpreted as exploratory. All statistical analyses were conducted using jamovi. Statistical significance was set at $p < 0.05$ (two-tailed). Unstandardized coefficients, standard errors, standardized coefficients, and p values were reported to facilitate interpretation.

RESULTS

Preliminary analyses

The total sample consisted of 109 male patients and their partners. Participants were classified according to the IIEF-5 cut-off score of 17 into two groups: lower erectile function (IIEF-5 ≤ 17 ; $n = 66$) and higher erectile function (IIEF-5 > 17 ; $n = 43$). Normality was evaluated using the Shapiro-Wilk test. Although minor deviations were observed, Q-Q plot inspection supported approximate normal distribution; therefore, parametric analyses were retained.

Group comparisons by erectile function status

Participants were classified using the IIEF-5 cut-off score of 17. Associations between erectile function category and categorical variables were examined using Pearson chi-square tests.

A significant overall difference was observed across the four primary diagnostic groups ($\chi^2(3) = 16.00$, $p = 0.001$).

Pairwise Fisher's exact tests with Holm correction showed significant differences between the erectile dysfunction and varicocele groups (adjusted $p = 0.048$) and between the erectile dysfunction and prostatitis groups (adjusted $p = 0.012$); the remaining adjusted comparisons were not significant.

The proportion with lower erectile function was 44.4% in the varicocele group, 77.3% among men presenting primarily with erectile dysfunction, 38.5% in the chronic prostatitis group, and 83.3% in the urinary stone disease group.

Marital status was associated with erectile function category ($\chi^2(2) = 6.84$, $p = 0.033$). After regrouping the number of children into 0, 1-2, and 3-4, no association was observed ($\chi^2(2) = 0.054$, $p = 0.974$).

Independent-samples t -tests indicated that only patient anxiety differed significantly between groups. No significant differences were found for age, patient depression, partner anxiety, or partner depression (Table 1).

Table 1.

Clinical and psychological characteristics according to erectile function category (IIEF-5 cut-off = 17).

Variable	N° with lower erectile function (IIEF-5 ≤ 17 ; $n = 66$)	N° with higher erectile function (IIEF-5 > 17 ; $n = 43$)	Within-category rate of lower erectile function, n/N (%)	Test statistic	p
Primary urological diagnosis at presentation				$\chi^2(3) = 16.00$	0.001
Varicocele	12	15	12/27 (44.4%)		
Erectile dysfunction as primary complaint	34	10	34/44 (77.3%)		
Chronic prostatitis	10	16	10/26 (38.5%)		
Urinary stone disease	10	2	10/12 (83.3%)		
Post hoc results					
Varicocele vs ED: Holm-adjusted $p = 0.048$					
ED vs prostatitis: Holm-adjusted $p = 0.012$					
Other pairwise comparisons: not significant					
Number of children				$\chi^2(2) = 0.054$	0.974
	26	16	26/42 (61.9%)		
1-2	28	19	28/47 (59.6%)		
3-4	12	8	12/20 (60.0%)		
Marital status				$\chi^2(2) = 6.84$	0.033
Married	54	35	54/89 (60.7%)		
Unmarried/cohabiting	2	6	2/8 (25.0%)		
Remarried	10	2	10/12 (83.3%)		
Continuous variables, mean $\pm$ SD					
Age (patient)	32.91 $\pm$ 7.55	33.09 $\pm$ 5.92		$t(107) = -0.14$	0.893
HADS-anxiety (patient)	8.64 $\pm$ 3.26	7.21 $\pm$ 2.52		$t(107) = 2.43$	0.017
HADS-depression (patient)	8.39 $\pm$ 2.10	7.72 $\pm$ 3.16		$t(107) = 1.34$	0.185
HADS-anxiety (partner)	7.11 $\pm$ 1.92	7.21 $\pm$ 1.79		$t(107) = -0.28$	0.779
HADS-depression (partner)	10.20 $\pm$ 4.13	8.84 $\pm$ 3.95		$t(107) = 1.71$	0.090

Values are presented as n (%) for categorical variables and mean $\pm$ SD for continuous variables. Pairwise diagnostic comparisons used Fisher's exact tests with Holm correction. The term higher erectile function does not imply absence of mild or situational erectile symptoms.

Table 2.
Significant Spearman correlations between key study variables.

Correlated variables	rho (Spearman)	p	Strength
IIEF-5 - anxiety (HADS)	-0.301	0.001	Moderate inverse
IIEF-5 - depression	-0.248	0.009	Weak inverse
Anxiety (HADS) - depression	0.393	< 0.001	Moderate

Values represent Spearman rank correlation coefficients. Only statistically significant correlations ($p < 0.05$) are presented. Negative coefficients indicate an inverse association.
The IIEF-5 score reflects erectile function, with lower values indicating greater impairment.

Correlation analysis

Spearman correlation analysis revealed a significant negative association between patient anxiety and erectile function severity. Patient depressive symptoms showed a weaker but statistically significant negative correlation with erectile function. Partner psychological variables were not significantly correlated with IIEF-5 scores (Table 2).

Couple-based regression model

To evaluate patient-related and partner-related psychological associations, a couple-based multiple linear regression model was estimated. Patient erectile function was regressed on patient psychological variables, partner psychological variables, and clinical covariates. Higher patient anxiety was independently associated with lower erectile function after controlling for partner and clinical factors. In contrast, patient depressive symptoms and age were not significant predictors. No significant partner-related associations were detected. Partner anxiety, partner depression, and partner satisfac-

tion with family life were not independently associated with patient erectile function.

Compared with the varicocele group, patients presenting with erectile dysfunction as the primary complaint showed a lower IIEF-5 score, although this finding should be interpreted cautiously because erectile dysfunction was itself one diagnostic category (Table 3).

Although number-of-children category (3 vs 0) reached nominal significance in the multivariable model, this isolated finding has not to be emphasized because numbers of some groups were small and no association was observed after regrouping number of children.

DISCUSSION

The present study examined erectile function within a cross-sectional couple-based bio-psycho-social framework. Three main findings emerged.

First, higher patient anxiety was consistently associated with lower erectile function across group comparisons, correlation analysis, and multivariable regression.

Second, men presenting primarily with erectile dysfunction had lower IIEF-5 scores than those with varicocele.

Third, partner anxiety, partner depression, and female partner-reported marital satisfaction were not independently associated with patient erectile function after adjustment for patient-level and clinical variables.

Patient anxiety showed a moderate negative association with IIEF-5 scores and remained independently associated with erectile function after controlling for depression, partner variables, and clinical covariates. This finding is consistent with previous studies demonstrating that anx-

Table 3.
Couple-based linear regression predicting IIEF-5.

Predictor	B	SE	t	p	beta
PATIENT-RELATED VARIABLES					
Patient anxiety	-0.305	0.144	-2.12	0.037	-0.217
Patient depression	-0.050	0.162	-0.31	0.758	-0.030
Patient age	-0.075	0.076	-0.99	0.324	-0.121
Partner-related variables					
Partner anxiety	0.054	0.198	0.27	0.786	0.023
Partner depression	-0.128	0.092	-1.40	0.166	-0.121
Female partner-reported marital satisfaction	0.004	0.042	0.09	0.931	0.008
CLINICAL AND DEMOGRAPHIC VARIABLES					
Diagnosis: ED complaint vs varicocele	-2.878	1.056	-2.73	0.008	-0.666
Diagnosis: prostatitis vs varicocele	1.415	1.172	1.21	0.230	0.328
Diagnosis: urinary stone disease vs varicocele	-0.536	1.512	-0.35	0.724	-0.124
Marital status: unmarried vs married	3.516	1.539	2.29	0.025	0.814
Marital status: remarriage vs married	-0.688	1.457	-0.47	0.638	-0.159
Children: 1 vs 0	2.455	1.308	1.88	0.064	0.568
Children: 2 vs 0	0.724	1.185	0.61	0.543	0.168
Children: 3 vs 0	3.412	1.484	2.30	0.024	0.790
Children: 4 vs 0	-0.572	2.097	-0.27	0.786	-0.132

B = unstandardized coefficient; SE = standard error; beta = standardized coefficient.
Reference categories: varicocele for diagnosis, married for marital status, and no children for number of children.
The marital satisfaction variable represents female partner-reported satisfaction and should be interpreted as exploratory.
For the regression model, the original number-of-children categories were considered although several groups were small and uneven.
Consequently, these findings are exploratory and should not be interpreted as confirmatory evidence.

ity, performance-related concerns, and psychological distress are closely related to male sexual difficulties (7, 8, 14, 15). Anxiety-related hyperarousal may interfere with erectile response through increased sympathetic activation and excessive attentional monitoring during sexual activity. These findings support the clinical importance of assessing anxiety symptoms in men presenting with erectile complaints or urological conditions associated with impaired sexual function.

Patient depressive symptoms were negatively correlated with IIEF-5 scores in the bivariate analysis but were not independently associated with erectile function in the multivariable model. Depression and erectile dysfunction have a well-established bidirectional relationship, although their association may partly overlap with anxiety and other clinical factors (6). In the present sample, anxiety appeared to be the stronger psychological correlate of erectile function. No significant independent association was found for partner anxiety, partner depression, or female partner-reported marital satisfaction. However, these findings should not be interpreted as evidence that partner-related factors are unimportant. Sexual functioning develops within a relational context, and variables such as sexual communication, partner sexual function, relationship satisfaction in both partners, and dyadic coping may be more informative than general psychological distress alone (9-11, 16). Future couple-based studies should assess these factors using validated measures completed by both partners.

Men presenting primarily with erectile dysfunction had lower IIEF-5 scores than those with varicocele. This result is clinically expected, but it must be interpreted cautiously because erectile dysfunction was itself one of the diagnostic categories, creating partial overlap between the predictor and the outcome. Differences between the remaining diagnostic groups were not independently significant in the regression model. In addition, erectile function may vary over time, and spontaneous improvement or remission has been described in some men with erectile dysfunction (17).

Psychological disturbances may also accompany urological conditions other than erectile dysfunction. Chronic prostatitis is frequently associated with chronic pelvic pain, anxiety, depressive symptoms, and impaired sexual function. Varicocele may likewise affect psychological well-being, particularly when it is associated with infertility or concerns about reproductive potential. Varicocele is common in adult men and is associated with impaired spermatogenesis and reproductive dysfunction, which may contribute to psychological distress (18, 19). Disease-specific clinical and psychological factors should therefore be considered when comparing patients with different primary urological diagnoses.

Marital status and number of children were explored as contextual variables. No consistent association was observed between the number of children and erectile function. Although one category reached nominal significance in the multivariable model, this isolated finding should be interpreted cautiously because of the small subgroup sizes. The association with marital status should also be interpreted cautiously because several categories included few participants.

Several limitations should be acknowledged. The cross-sectional design does not permit causal inference, and the relationship between anxiety and erectile dysfunction may be bidirectional. Because this was a secondary analysis of anonymized data, some detailed clinical and questionnaire information could not be reconstructed. Individual IIEF-5 item responses were unavailable, which prevented a more detailed reassessment of participants with scores above 17. The sample was not a consecutive series of all urology outpatients, and the diagnostic groups were defined during analysis, which limits generalizability. The sample size was modest, and several diagnostic and demographic subgroups were small. Erectile dysfunction as a diagnostic category partially overlapped with the IIEF-5 outcome. In addition, the Uzbek-lan-

DECLARATIONS

Ethical approval and consent to participate: The study protocol was reviewed by the Institutional Ethics Committee of Tashkent State Medical University, which waived the requirement for formal ethical approval because the study involved anonymous questionnaire-based data collection with minimal risk and did not include any intervention or identifiable personal data. No approval number was assigned. Written informed consent was obtained from all participants before inclusion. The study was conducted in accordance with the Declaration of Helsinki.

Consent for publication: Not applicable.

Availability of data and material: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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guage marital satisfaction measure lacked a retrievable formal validation source, and internal consistency could not be evaluated because item-level responses were unavailable. Finally, although partner variables were included, a full dyadic model such as the Actor-Partner Interdependence Model was not performed.

CONCLUSIONS

In this cross-sectional couple-based study, lower IIEF-5 scores were associated with higher patient anxiety and with primary presenting urological diagnosis. Partner anxiety, partner depression, and female partner-reported marital satisfaction were not independently associated with erectile function. These findings suggest that erectile function in this sample was mainly related to patient-level psychological distress and clinical characteristics. Because of the cross-sectional design, non-consecutive analytical sampling, small diagnostic subgroups, and partial overlap between erectile dysfunction diagnosis and the IIEF-5 outcome, the results should be interpreted as associative rather than causal.

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