

Early traumatic experiences are linked to hypersexual behavior and erectile dysfunction in men through the mediation of body uneasiness and general psychopathology

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Abstract

Background: Childhood traumatic experiences have been associated with hypersexuality and sexual dysfunctions. However, the mediators of the interactions between these variables should be clarified in men.

Aim: This study aimed to investigate the interaction of early traumatic experiences, psychopathology, and sexuality with respect to erectile dysfunction (ED) and hypersexual behavior. The hypothesized model expected that traumatic experiences would be associated with hypersexual behavior and reduced sexual functioning through the mediation of body uneasiness and psychological distress.

Methods: The study was cross-sectional and observational. A total of 317 men were enrolled. Male patients with a primary complaint of ED and an indication for psychiatry referral represented the clinical sample ($n = 116$; mean $\pm$ SD age, 42.82 ± 16.89 years). Clinical classification was assessed with the Structured Interview on Erectile Dysfunction. The second sample ($n = 201$, 30.82 ± 11.94 years) was recruited from the general population. All participants were administered the following questionnaires: Brief Symptom Inventory, Childhood Trauma Questionnaire–Short Form, Hypersexual Behavior Inventory, Body Uneasiness Test–A, and 5-item International Index of Erectile Function.

Outcomes: Psychopathology and sexual functioning were assessed by a dimensional approach, and a multivariate model was computed by structural equation model analysis.

Results: When compared with the sample from the general population, the clinical sample exhibited a higher prevalence of early traumatic experiences, as measured by scores on the Childhood Trauma Questionnaire–Short Form (45.08 ± 14.25 vs 39.03 ± 10.22 , $F = 17.63$, $P < .001$), and a higher tendency to engage in hypersexual behaviors (34.63 ± 13.55 vs 30.79 ± 12.44 , $F = 6.97$, $P < .01$). Structural equation model analysis showed excellent fit indices indicating that early traumatic experiences predicted hypersexual behaviors and ED through the exacerbating mediating effect of body uneasiness and psychopathology.

Clinical Implications: Clinicians should not limit their attention to the behavioral level when assessing sexual dysfunction in men; rather, they should also consider the complex psychopathologic consequences of childhood trauma. Integrated treatments that address the potential presence of childhood trauma with its wider psychological correlates (eg, emotion dysregulation, body uneasiness) might improve treatment response.

Strengths and Limitations: The study reports novel data on the relationship among childhood maltreatment, male sexuality, and psychopathologic mediators with a dimensional assessment. However, the assessment was cross-sectional, and causality was mainly derived from previous studies.

Conclusion: The present study enriches the current literature, strengthening the hypothesis that childhood traumatic experiences significantly shape development and sexuality. Body uneasiness and psychopathology can both tax sexual functioning, as assessed by erectile functioning or hypersexuality.

Keywords: hypersexuality; childhood trauma; psychopathology; body uneasiness; erectile dysfunction.

Introduction

Sexual dysfunction refers to any difficulty experienced by an individual during any stage of the human sexual response, including arousal, plateau, orgasm, and resolution. In general, this term concerns a person's inability to participate in a sexual relationship or experience sexual activities, as desired.¹

To date, there is a clear disproportion between the great number of articles focusing on “hypoactive” dysfunctions and the relatively few studies on the domain of hypersexuality (prior to *DSM-5*, the former were represented by “hypoactive sexual desire disorder” across sexes and are now classified as either “male hypoactive sexual desire disorder” or “female

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sexual interest/arousal disorder"). *Hypersexuality* refers to a group of clinically relevant sexual behaviors in relation to their frequency and intensity, such as normophilic sexual fantasies, arousal, urges, and behaviors associated with personal distress and social role impairment.² Thus, the source of suffering among persons experiencing hypersexuality might be due to time consumed by sexual fantasies or engagement in sexual behaviors in response to mood states (eg, dysfunctional emotion regulation strategies) or stressful life events. Furthermore, the consequences of these fantasies might increase the likelihood of physical or emotional harm to self or others, as well as risky sexual behaviors.²⁻⁴

Among men, one of the most common sexual impairments is erectile dysfunction (ED): the inability to achieve and/or maintain an erection long enough for sexual intercourse.⁵ Several explanatory models for the role of psychological factors in ED have been proposed,⁶⁻⁸ with most describing an interaction between psychological and biological components under the influence of social and cultural factors.⁷ For instance, in the Sexual Tipping Point model, Perelman discusses the role of positive and negative factors in determining a sexual response, which could be represented by physiologic and psychosocial characteristics.⁷ The presence of certain organic or psychiatric conditions (eg, mood or anxiety disorders) could represent an inhibitor of sexual response, while being in good physical health or in a positive relationship could have a beneficial effect on sexual functioning. Thus, the role of specific psychological factors is considered by the current scientific consensus.

In this regard, a central role in determining sexual dysfunctions is played by general psychopathology (ie, a comprehensive psychological assessment beyond single clinical entities, such as depression or anxiety), which has been previously associated with ED and hypersexual behavior.^{9,10} Psychopathology is often caused and shaped by early traumatic experiences,¹¹ with different degrees of severity based on types of maltreatment, frequency, and duration of the events (henceforth, in accordance with the operational definition given by the Childhood Trauma Questionnaire–Short Form [CTQ], *childhood* refers to the phase of life before 18 years of age).¹² Childhood maltreatments include the following: *sexual abuse*, defined as offensive sexual behavior perpetrated by an adult or older person against a child aged <18 years; *physical abuse*, physical assaults on a child by an adult or older person that are risky or harmful to the child's physical safety; *emotional abuse*, any humiliating behavior directed at a child by an adult or older person; and *neglect*, the failure of caregivers to meet a child's basic physical or emotional needs.^{13,14} Childhood traumatic experiences have been reported as common risk factors for psychopathology and sexual dysfunction in women,¹⁵⁻²² and in a mixed sample of men and women, Fontanesi et al found that depressive symptoms acted as mediators in the association between early trauma and hypersexuality.²³

Furthermore, research conducted on women suggested that body uneasiness is positively correlated with sexual dysfunction, characterized by hypo- and hyperfunction.¹⁵ The term *body uneasiness* refers to the affective dimension of body image, a psychological construct embodied by "the image of our own body that we form in our minds, that is to say the way in which our body appears to ourselves."²⁴ Therefore, *body uneasiness* refers to a general dissatisfaction toward one's body.²⁵ According to objectification theory, women would be primarily defined in relation to their bodily features or

functions, thus losing their unique personality and subjectivity, which could lead to a greater amount of body image issues than men.²⁶ However, more recent research shows that worse body image is also associated with sexual dysfunctions in men, with a particular reference to hypoactive sexual desire.²⁷ Moreover, a recent study showed that, for men and women, satisfaction with one's physical appearance is associated with reporting fewer sexual problems and, specifically, with a higher probability of experiencing sexual enjoyment, excitement, and/or orgasm.²⁸

Childhood sexual abuse has been associated with body image disturbances.²⁹⁻³¹ Bödicker et al²⁹ suggested that individuals with a history of childhood abuse are more exposed to sociocultural pressures on body image standards and engagement in social comparisons of appearance. From one side, internalization of body-related social comparisons may determine increased body dissatisfaction, and it could reinforce feelings of shame and guilt in those with a history of sexual abuse.^{11,32-34} From the other side, these individuals could experience internalized stigma,^{35,36} especially when their social support network may be ineffective,³⁷ thus experiencing feelings of emasculation and marginalization.^{38,39}

The complex interplay among body image concerns, early traumatic experiences, psychopathology, and sexual functioning has been addressed from different perspectives.^{29,40,41} However, it is important to provide further evidence of comprehensive explanatory models, considering that patients with underlying sexual dysfunctions have been observed to exhibit not only a poorer quality of life⁴² but also worse recovery rates from medical conditions.⁴¹ When the general concept of health actually encompasses overall well-being and moves beyond a mere definition of lack of illness,⁴³ the relevance of sexual functioning emerges as a neglected topic in current research or clinical practice.⁴⁴⁻⁴⁸ For these reasons, the present study attempted to test an integrated model of interplay among sexuality, traumatic experiences, body uneasiness, and psychopathology. The model proposed that early trauma exposure is a significant predictor of body uneasiness and general psychopathology and that these 2 domains mediate the relationship between early trauma and ED/hypersexuality. According to the study's objectives, all the possible mediation pathways were investigated (parallel and serial). Additionally, an indirect mediation mechanism of body uneasiness on ED was expected through an elevation of general psychopathology. Moreover, a direct effect of body uneasiness and psychopathology on hypersexual behaviors was hypothesized due to their role as dysfunctional coping.

Methods

Study design, setting, and participants

The present study was a cross-sectional observational study. Since the study aimed to investigate psychopathologic correlates of sexual disorders, 317 men were enrolled from the clinical and general population. Participants were recruited from January 2020 to December 2021.

The first group (n = 116) consisted of individuals attending the outpatient clinics for sexual psychopathology at the Careggi University Hospital, Florence, Italy. All patients received an indication for referral to psychiatry services by the Andrology Unit of the same hospital, having the primary complaint of ED. The referral was proposed after organic causes for ED were ruled out through a general medical assessment and an andrologic evaluation, as supplemented

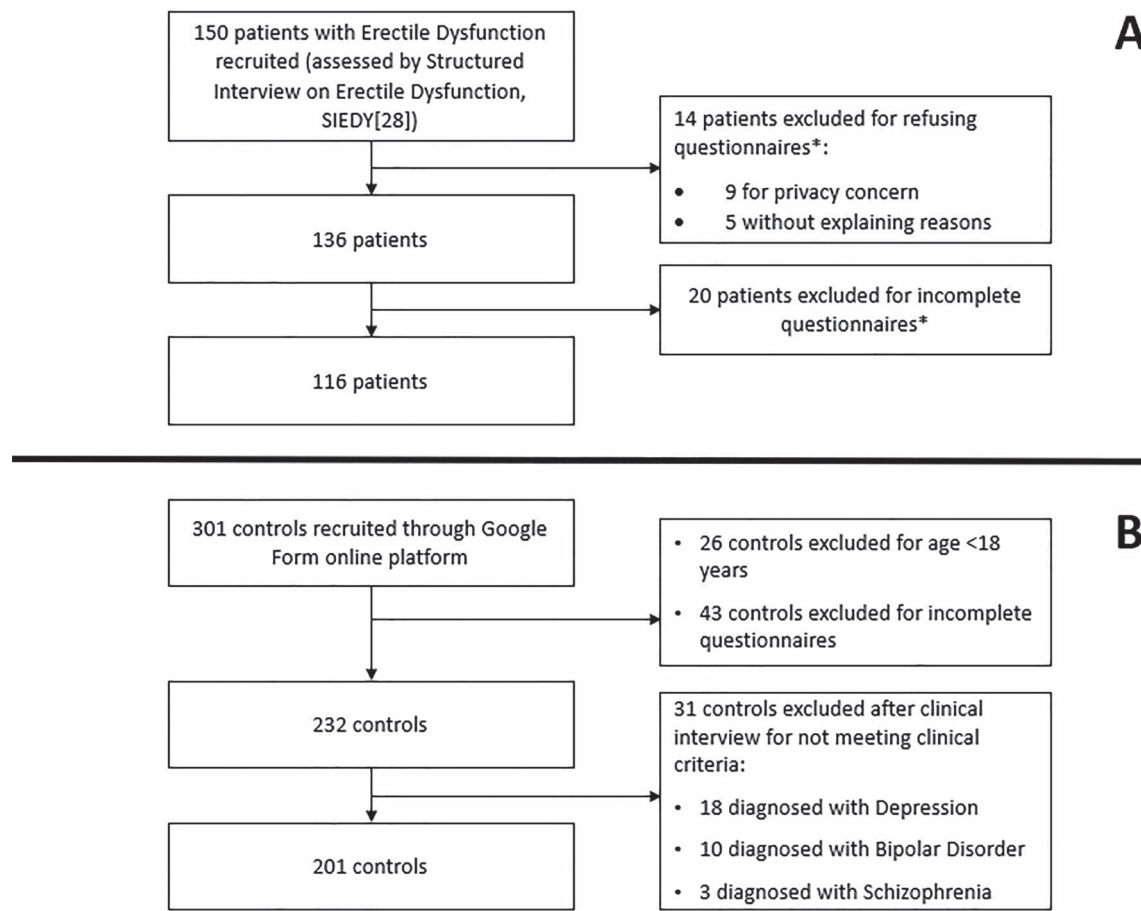


Figure 1. Flow diagram of (A) patient and (B) control recruitment. *Questionnaires: Brief Symptom Inventory,²⁹ Childhood Trauma Questionnaire–Short Form,³⁰ Hypersexual Behavior Inventory,³¹ Body Uneasiness Test–A,³² and 5-item International Index of Erectile Function.³³

with instrumental examination when deemed necessary by the endocrinologist; instead, a psychogenic origin was hypothesized with the subsequent evaluation made by a senior psychiatrist (G.C.) at our clinic. Only the patients who met the inclusion criteria were asked to participate in our study after the assessment phase. Those whose dysfunction was related to organic causes were not referred to psychiatry services, and patients with a psychiatric condition whose organic comorbidities significantly interfered with erectile function were not included in the study. Initially, 150 men were invited to participate in the study. Of these, 14 refused to participate (9 for privacy concerns, 5 for reasons not given), and 20 returned incomplete questionnaires (Figure 1A).

The second group ($n = 201$) was recruited from the general population through the Google Forms online platform via snowball convenience sampling; to this group, questionnaires were administered and associated with a unique alphanumeric code (Figure 1B).

Procedures

Patients were at first clinically evaluated for ED, and by means of the Structured Interview on Erectile Dysfunction.⁴⁹ Standardized self-administered tests were given to both groups. All participants (patients and men from the general population) signed privacy waivers after an interview with clinical personnel at the outpatient clinics for sexual psychopathology at the Careggi University Hospital, Florence, Italy, which collected clinically relevant information and applied inclusion and exclusion criteria before assigning a

unique alphanumeric code to each participant. Participants could complete the questionnaires in hard-copy form or through Google Forms online platform, accessible through the unique pseudo-anonymized identifiers. The questionnaires given were as follows: Brief Symptom Inventory (BSI),⁵⁰ CTQ,⁵¹ Hypersexual Behavior Inventory (HBI),⁵² Body Uneasiness Test–A (BUT–A),²⁵ and 5-item International Index of Erectile Function (IIEF–5).⁵³ All participants gave their written consent to participate. The present work offers an integrated model, as it combines data originating from different clinical fields, psychometric questionnaires, and clinical outcomes.⁵⁴

Instruments

The Structured Interview on Erectile Dysfunction has been used for the characterization of the pathogenesis of ED. It is made up of 13 items, plus 2 accessory items (numbers 1 and 5), which do not contribute to the scoring system but are useful to introduce the key items, all expressed on a 0–3 scale. The interviewer asks the questions allowing the patient to respond freely; then, the interviewer codifies the answer on the previously mentioned scale. This instrument has shown good reliability and versatility and has been validated in Italian.⁴⁹

The BSI⁵⁵ is a self-reported 53-item questionnaire aimed at quantifying general psychopathologic symptoms in adults over the previous 7 days. It provides a general score of psychopathology (global severity index [GSI]). The questionnaire has been validated in its Italian translation.⁵⁰ Internal consistency was excellent in this study (Cronbach's $\alpha = 0.97$).

The CTQ¹³ is a self-reported 28-item questionnaire aimed at measuring exposure to early trauma during childhood retrospectively among adults. The questionnaire is widely used⁵⁶ and represents an accessible instrument to easily assess patients in research and clinical settings. The CTQ measures exposure to early trauma through 1 total score and 5 domains: emotional neglect, emotional abuse, sexual abuse, physical neglect, physical abuse. Higher scores represent a higher exposure to early trauma. Cutoff scores for moderate exposure per domain have been defined as follows: ≥ 13 for emotional abuse, ≥ 10 for physical abuse, ≥ 8 for sexual abuse, ≥ 15 for emotional neglect, and ≥ 10 for physical neglect.^{13,57} The questionnaire has been validated in its Italian translation.⁵¹ Internal consistency was excellent in this study (Cronbach's $\alpha = 0.90$).

The HBI⁵⁸ is a self-reported 19-item questionnaire aimed at measuring hypersexuality among adults. The questionnaire presents a global score and 3 subscales: hypersexuality as a coping factor in response to distress (HBI Coping), lack of restraint in sexuality (HBI Control), and functional impairment due to sexuality (HBI Consequences). Higher scores are associated with higher subjective distress and worse functioning—that is, the interference of sexual activity with educational or occupational duties and its negative consequences. The questionnaire has been validated in its Italian translation.⁵² Internal consistency was excellent in this study (Cronbach's $\alpha = 0.93$).

The BUT-A²⁵ is a self-reported 34-item questionnaire aimed at quantifying current body uneasiness in adults, measuring the following domains: weight phobia, body image concerns, avoidance toward one's body image, compulsive self-monitoring, detachment, and depersonalization feelings toward one's body. It provides a GSI (BUT-A GSI), which represents the mean of individual scores for each item (range, 0-5). Higher scores represent worse functioning. The questionnaire has been validated in Italian.²⁵ Internal consistency was excellent in the current sample (Cronbach's $\alpha = 0.96$).

The IIEF-5 is a self-reported 5-item questionnaire aimed at evaluating erectile function.⁵⁹ The questionnaire evaluates sexual functioning in the last 6 months before the administration of the test. The 5-item version has been validated as a shorter version of the original 15 items.⁶⁰ It represents a shorter and easier-to-use version of the previous test but is equally reliable, showing excellent internal consistency, test-retest reliability, and convergent validity.⁶¹ Each of the 5 items explores a different domain: maintenance ability, erection confidence, maintenance frequency, erection firmness, and sexual intercourse satisfaction. The answers are expressed on a scale from 1 (very low) to 5 (very high), and the sum of all scores gives an overall score (range, 5-25). Lower scores represent worse functioning: a cutoff score of 21 discriminates between ED and no ED, while the overall score classifies the severity of the dysfunction into 5 levels, ranging from none (22-25) through severe (5-7). Internal consistency was excellent in this study (Cronbach's $\alpha = 0.93$). The questionnaire has been validated in Italian.⁵³

Eligibility criteria

Inclusion criteria for patients were as follows: male sex, written consent to participate in the study, age >18 years, a diagnosis of ED as assessed by the Structured Interview on

Erectile Dysfunction, an indication for psychiatry referral by the Andrology Unit of the Careggi University Hospital, Florence, Italy, and evaluation by the liaison psychiatry services of the sexual psychopathology clinic of the same hospital.

Inclusion criteria for controls were male sex, written consent, and age >18 years. Exclusion criteria for cases and controls were as follows: illiteracy and intellectual disability, as well as a diagnosis of schizophrenia, bipolar disorder, or major depression. The rationale for this exclusion was based on previous literature, describing how the nuclear symptoms of these conditions affect sexual function.⁹ Inclusion and exclusion criteria were assessed through a clinical evaluation conducted by medical personnel.

Statistical methods

Between-group comparisons were performed between patients and controls by means of age-adjusted analysis of covariance models; group effect *F* values and level of significance were reported. Age was compared by computing a 2-sample *t*-test. Correlates of sexual functioning were estimated through multiple linear regression models, controlling for the effect of age; standardized beta coefficients and associated level of significance were reported.

The proposed model and pathways between variables were tested within the structural equation modeling (SEM) framework. Early trauma, body uneasiness, and hypersexual behavior were modeled as latent variables, with loadings on the respective questionnaire subscales (a technique known as *parceling*).⁶² All latent variables were scaled by the marker variable technique, a statistical method that identifies a single indicator, or "marker" variable, from a set of observed variables; the variance parameter is subsequently scaled on the basis of this marker variable, which is assumed to have a loading of 1.0 on the latent factor.⁶² The variables related to sexual function (hypersexual behavior and erectile function) were regressed on general psychopathology (BSI) and body uneasiness, which in turn were regressed on early trauma; direct effects of early trauma on sexual function were also included in the equations. Age was included as a covariate in all regression equations, given its potential as a confounding variable in analyses concerning sexuality. The final equations entered in the model were as follows:

$$ET \text{ (early trauma)} = b_0 + b_{\text{age-ET}} \times \text{age}.$$

$$BSI = b_0 + b_{ET-BSI} \times ET + b_{BU-BSI} \times BU + b_{\text{age-BU}} \times \text{age}.$$

$$BU \text{ (body uneasiness)} = b_0 + b_{ET-BU} \times ET + b_{BSI-BU} \times BSI + b_{\text{age-BU}} \times \text{age}.$$

$$HB \text{ (hypersexual behavior)} = b_0 + b_{ET-HB} \times ET + b_{BSI-HB} \times BSI + b_{BU-HB} \times BU + b_{\text{age-HB}} \times \text{age}.$$

$$IIEF-5 = b_0 + b_{ET-IIEF-5} \times ET + b_{BSI-IIEF-5} \times BSI + b_{BU-IIEF-5} \times BU + b_{\text{age-IIEF-5}} \times \text{age}.$$

The following variables were allowed to covary in the model: CTQ physical abuse with sexual abuse; CTQ emotional neglect with physical neglect; BUT-A weight phobia with avoidance, body image concern, and compulsive self-monitoring; BUT-A avoidance with body image concern. The completely standardized solution was also computed. A maximum likelihood estimator with robust Huber-White SE, scaled test statistic, and robust fit measures was used for this model. This technique produces errors,

statistics, and fit indices that are robust to nonnormality and incomplete data. Age and IIEF-5 scores were divided by 10 to facilitate model convergence; results should be interpreted accordingly.

Model fit was assessed by the robust version of the comparative fit index (≥ 0.95 for good fit), the Tucker-Lewis index (≥ 0.95 for good fit), the root mean square error of approximation (≤ 0.06 for good fit), and the standardized root mean square residual (≤ 0.08 for good fit⁶³). The model chi-square statistic was also reported, although it is considered an unreliable index given its many limitations, including a high dependence on sample size.⁶⁴

The indirect effects of early trauma on hypersexuality and erectile function were tested through mediation analysis, with general psychopathology and body uneasiness as parallel and serial mediators. Bias-corrected bootstrapped confidence intervals with 20 000 resamples were computed, and mediation effects were considered statistically significant if their confidence intervals did not include zero. Only mediation pathways composed of significant effects were considered, given that in the absence of associations with the mediating variable (casual steps), the basic criteria for the analysis are not met.

A priori power analysis was conducted with the *semPower* library in R, which indicated that a sample of at least 252 individuals was required to detect misspecifications corresponding to a root mean square error of approximation equal to 0.05 for a model with 85 *df* and a power equal to 0.95 ($\alpha = .05$). This analysis was based on the specified SEM, which served as the main outcome of the study. The decision to base the power analysis on this model was made due to the lack of existing studies in the literature to provide a basis for power calculation.

The statistical analyses based on the SEM framework were conducted on the entire sample without distinguishing between patients and controls. This approach was chosen because the hypothesized model did not posit any distinctions between groups in the regression coefficients, given the assumption that the factors influencing the outcome variable would operate similarly across patients and controls. To further support this assumption, a sensitivity analysis was conducted to examine whether there was a statistically significant improvement in the model by calculating loadings and regression coefficients separately for patients and controls through a measurement invariance test. The comparison was performed by the chi-square comparison test, with the Satorra-Bentler scaled chi-square. Last, to confirm the goodness of fit of the hypothesized model a priori, alternative models were tested, and fit indices were compared to assess their fit to the collected data as compared with the original model.

The following variations were tested: exchanging mediators and dependent variables (with hypersexual behavior and IIEF-5 as mediators and with body uneasiness and BSI as dependent variables), removing body uneasiness (with BSI as the sole mediator), removing BSI (with body uneasiness as the sole mediator), and removing the associations between body uneasiness and BSI.

All analyses were performed with R statistical software (version 4.3.0)⁶⁵ and the following libraries: *dplyr*,⁶⁶ *lavaan*,⁶⁷ and *semPower*.⁶⁸

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional committee, the Declaration of Helsinki of 1964, and its later amendments or comparable ethical standards. Ethical approval of the study was acquired from the local institutional committee (CEAVC 20835_oss). Informed consent was obtained from all participants involved in the study.

Results

Descriptive statistics

The sample of patients had a mean $\pm$ SD age of 42.82 ± 16.89 years, as opposed to 30.82 ± 11.94 years for the control group ($F = 53.75$, $P < .001$). The average years of schooling were 12.96 ± 3.60 for the patients and 14.93 ± 2.68 for the controls. Of 116 patients, 93 (80.17%) had secondary ED—a dysfunction where men succeed in achieving and sustaining an erection for a certain period of the life span before ED manifests⁶⁹—and 23 (19.83%) had primary ED; for this dysfunction, ED arises at the commencement of one's sexual activity and continues throughout the life span.⁷⁰

Patients had lower overall sexual functioning (IIEF-5 total score) than controls and higher levels of hypersexual behavior, particularly as a form of emotional control as measured through the HBI Control domain. Childhood traumatic experience scores were also significantly higher among patients than controls. The descriptive statistics are presented in Table 1, with comparisons between groups.

Correlates of sexual functioning

Results of age-adjusted multiple regression analyses are reported in Table 2. Lower sexual function (IIEF-5 total score) was significantly predicted by older age, higher levels of general psychopathology, and body uneasiness. A direct association between IIEF-5 scores and CTQ total score was found. Moreover, all domains of hypersexual behavior were significantly associated with general psychopathology, body uneasiness, and early trauma but not with age. Hypersexual behavior was significantly predicted by lower IIEF-5 scores but only for the emotional control domain and its total score.

Structural equation modeling

The hypothesized model and tested paths are illustrated in Figure 2. Although the model chi-square was statistically significant ($\chi^2 = 165.13$, $P < .001$), model fit was considered good, as indicated by the robust comparative fit index (0.953), Tucker-Lewis Index (0.950), root mean square error of approximation (0.055), and standardized root mean square residual (0.051). All coefficients between manifest and latent variables were positive and significantly loaded on the respective factors. Considering early trauma, the highest load was on CTQ Emotional Abuse with respect to the other trauma domains. Exposure to early trauma significantly predicted general psychopathology and body uneasiness levels, which in turn predicted hypersexual behavior. Moreover, the BSI-A GSI score showed a negative direct effect on erectile function. Levels of body uneasiness significantly predicted those of general psychopathology,

Table 1. Descriptive statistics and age-adjusted comparisons between groups.^a

	Participants, Mean $\pm$ SD		<i>F</i> (1, 314)	Cohen's <i>d</i>
	Controls (n = 201)	Patients (n = 116)		
IIEF-5 total score	22.67 $\pm$ 4.52	10.84 $\pm$ 8.25	259.82***	1.77
HBI				
Coping	1.85 $\pm$ 0.79	2.01 $\pm$ 0.88	3.07	-0.18
Control	1.45 $\pm$ 0.70	1.77 $\pm$ 0.85	13.83***	-0.42
Consequences	1.55 $\pm$ 0.69	1.65 $\pm$ 0.79	1.68	-0.17
Total score	30.79 $\pm$ 12.44	34.63 $\pm$ 13.55	6.97**	-0.30
BSI global severity index	0.54 $\pm$ 0.41	1.15 $\pm$ 0.65	105.79***	-1.13
BUT-A				
Weight phobia	0.88 $\pm$ 0.87	1.20 $\pm$ 1.06	8.81**	-0.36
Body image concern	0.82 $\pm$ 0.88	1.24 $\pm$ 1.13	13.88***	-0.43
Avoidance	0.22 $\pm$ 0.44	0.53 $\pm$ 0.87	17.97***	-0.44
Compulsive self-monitoring	0.56 $\pm$ 0.61	0.59 $\pm$ 0.69	0.16	-0.05
Depersonalization	0.24 $\pm$ 0.43	0.43 $\pm$ 0.63	10.47**	-0.36
Global severity index	0.59 $\pm$ 0.59	0.87 $\pm$ 0.79	13.43***	-0.42
CTQ				
Emotional neglect	9.29 $\pm$ 4.14	11.08 $\pm$ 5.11	10.08**	-0.44
Emotional abuse	6.15 $\pm$ 2.10	7.47 $\pm$ 3.60	16.33***	-0.45
Sexual abuse	5.39 $\pm$ 1.70	5.88 $\pm$ 2.30	4.93*	-0.24
Physical neglect	5.92 $\pm$ 1.71	6.65 $\pm$ 2.39	9.64**	-0.34
Physical abuse	5.62 $\pm$ 1.64	6.18 $\pm$ 2.79	4.57*	-0.24
Total score	39.03 $\pm$ 10.22	45.08 $\pm$ 14.25	17.63***	-0.49

Abbreviations: BSI, Brief Symptom Inventory; BUT-A, Body Uneasiness Test-A; CTQ, Childhood Trauma Questionnaire-Short Form; HBI, Hypersexual Behavior Inventory; IIEF-5, 5-item International Index of Erectile Function. ^aAll analyses are adjusted for age (analysis of covariance), with the group effect by *F* values reported. The percentage of exposed participants to early trauma was evaluated according to the “moderate” cutoffs of the CTQ. **P* < .05. ***P* < .01. ****P* < .001.

Table 2. Correlates of sexual functioning.^a

	IIEF-5 total score	HBI			
		Coping	Control	Consequences	Total score
Age	-0.30***	-0.08	-0.03	-0.02	-0.06
IIEF-5 total score	—	-0.06	-0.16*	-0.09	-0.14*
BSI global severity index	-0.30***	0.38***	0.41***	0.37***	0.44***
BUT-A					
Weight phobia	-0.11*	0.30***	0.28***	0.29***	0.33***
Body image concern	-0.15**	0.25***	0.29***	0.22***	0.29***
Avoidance	-0.16**	0.22***	0.32***	0.22***	0.30***
Compulsive self-monitoring	-0.02	0.22***	0.23***	0.23***	0.26***
Depersonalization	-0.13*	0.25***	0.42***	0.36***	0.39***
Global severity index	-0.14*	0.30***	0.35***	0.30***	0.36***
CTQ					
Emotional neglect	-0.11	0.24***	0.26***	0.32***	0.31***
Emotional abuse	-0.09	0.27***	0.31***	0.31***	0.34***
Sexual abuse	0.01	0.18**	0.20***	0.24***	0.23***
Physical neglect	-0.09	0.24***	0.13*	0.16**	0.21***
Physical abuse	-0.00	0.29***	0.31***	0.35***	0.36***
Total score	-0.11*	0.34***	0.36***	0.39***	0.41***

Abbreviations: BSI, Brief Symptom Inventory; BUT-A, Body Uneasiness Test-A; CTQ, Childhood Trauma Questionnaire-Short Form; HBI, Hypersexual Behavior Inventory; IIEF-5, 5-item International Index of Erectile Function. ^aAll analyses are adjusted for age. Regression models are presented with independent variables in rows and dependent variables in columns. Standardized coefficients are reported. **P* < .05. ***P* < .01. ****P* < .001.

while the inverse association was not found ($b_{\text{BSI-BU}} = 0.14$, $P = .276$).

Mediation analysis confirmed that early trauma had an indirect effect on hypersexuality through higher levels of general psychopathology (0.01; 95% CI, 0.01-0.03) and body uneasiness (0.03; 95% CI, 0.01, 0.06) in parallel; an additional mediation was observed through BUT-A and BSI in series (0.01; 95% CI, 0.01-0.02). The model did not support a direct association between body uneasiness and IIEF-5 ($b_{\text{BU-IIEF-5}} = 0.04$, $P = .705$). Finally, early trauma significantly

predicted ED through the mediation of higher BSI-A GSI scores alone (-0.03 ; 95% CI, -0.05 to -0.01) and in series with body uneasiness (body uneasiness $\rightarrow$ BUT-A $\rightarrow$ BSI $\rightarrow$ IIEF-5) (-0.02 ; 95% CI, -0.05 to -0.01). The total effects of trauma on hypersexual behavior (0.08, $P < .001$) and erectile function (-0.04 , $P = .002$) were statistically significant, whereas the direct effects were not ($b_{\text{ET-HB}} = 0.03$, $P = .207$; $b_{\text{ET-IIEF-5}} = 0.01$, $P = .506$).

The sensitivity analysis revealed that calculating loadings and regression effects separately for the patient group and

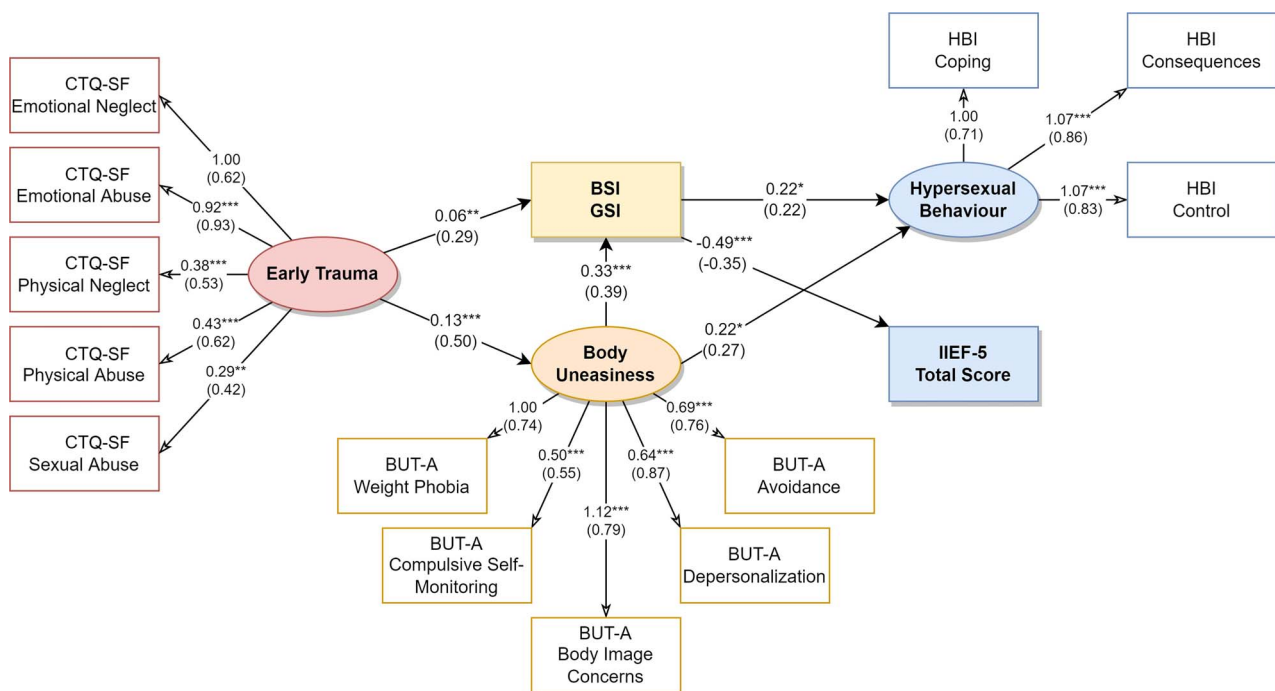


Figure 2. Path diagram of the proposed structural equation model. Latent variables are illustrated as ovals and observed variables as rectangles. Arrows illustrate loadings or regressions, with their corresponding coefficients and P values; completely standardized coefficients are reported in parentheses. * $P < .05$. ** $P < .01$. *** $P < .001$. BSI, Brief Symptom Inventory²⁹; BUT-A, Body Uneasiness Test-A³⁰; CTQ, Childhood Trauma Questionnaire–Short Form³¹; HBI, Hypersexual Behavior Inventory³²; IIEF-5, 5-item International Index of Erectile Function.³³

the control group did not significantly improve the model, as indicated by the nonsignificant chi-square difference test result ($\Delta\chi^2 = 32.33$, $P = .149$).

Finally, alternative models were tested and compared with the proposed one to confirm the goodness of fit of the model hypothesized a priori. The fit indices are provided in Table S1. All alternative models showed poorer fit to the collected data as compared with the original model.

Discussion

The present study attempted to provide an integrated model regarding the consequences in terms of sexual functioning of the already-demonstrated association between sexual behaviors and childhood adversities in men.⁷¹

According to the performed SEM analyses, childhood traumatic experiences showed a direct effect on general psychopathology and body uneasiness, which in turn were predictors of hypersexuality. The model of interaction among childhood abuse, psychological functioning, body uneasiness, and ED seems to be not limited to the clinical sample; rather, it involves people recruited from the general population with similar patterns of interaction.

Role of childhood trauma, body uneasiness, and general psychopathology

From a neurodevelopmental point of view, it has been hypothesized that the exposure to stressful events during childhood can lead to a dysregulation of the hypothalamic-pituitary-adrenal axis and, thus, stress response mechanisms.⁷² Indeed, individuals with a personal history of trauma could hence

be more vulnerable to stressful events, thereby precipitating adult psychopathology.⁷³ From a psychological perspective, an early exposure to traumatic events could affect the individual's schema of interaction with partners, promoting negative self-beliefs, which could affect sexual functioning and psychological well-being.⁷⁴

In the proposed model, general psychopathology predicted lower erectile function, confirming previous observations, especially regarding anxiety and mood disorders.^{75,76} In fact, it has been hypothesized that this relationship may be largely mediated by the effects of affective factors (eg, the negative affect that derives from an expected or perceived inadequate sexual responding) and cognitive factors (eg, the perception of lack of control over arousal or the distractibility during sexual stimulation that often occurs in these patients).^{75,76} Furthermore, mediation analysis indicated that childhood trauma in men was associated with a greater propensity for hypersexual behavior and ED through different mediation pathways of body uneasiness and general psychopathology. Specifically, body uneasiness and general psychopathology levels played a mediating role in the indirect effect of childhood trauma on hypersexuality and ED. It is important to emphasize that, concerning ED, the mediation effects were exclusively through an increase in general psychopathology levels, including that from body uneasiness. This is consistent with expectations, as it was hypothesized that body uneasiness would contribute not primarily but through an increase in distress levels.

In line with previous observations, patients with a primary complaint of ED displayed higher levels of general psychopathology as compared with a general population of men,^{7,77} as well as a higher prevalence of early traumatic experiences.^{7,78} The association of early traumatic experiences with sexual dysfunctions⁷⁹ and hypersexuality⁸⁰ has

been demonstrated in women, suggesting that these 2 diverse patterns might be 2 related faces of the same coin. However, even though less evidence has been provided on this topic in men, it has been already observed that hypersexual behaviors often serve to cope with sexual fantasy poverty, associated boredom, or difficulties in intimate relationships, which in turn predispose to ED.⁸¹ Furthermore, according to the model developed by Jannini et al,⁸² ED often occurs with other types of sexual dysfunctions, such as premature ejaculation.

Thus, it has been hypothesized that ED and premature ejaculation represent the 2 opposite poles of a vicious circle, according to which a man trying to control his ejaculation puts himself at greater risk of not having a satisfactory erection because of a reduction of sexual excitement. On the other side, a man trying to have an erection strives to achieve excitement, thus being more at risk of premature ejaculation.⁸² Accordingly, in men, different types of sexual dysfunction are deeply intertwined, often occurring at the same time in the same individual and often in association with dysfunctional sexual behavior.⁸³

However, when compared with previous studies performed in smaller samples,^{84,85} the current study is the first clinical investigation to demonstrate that ED and hypersexuality represented 2 interconnected outcomes of early trauma in men. According to the SEM, the described effect of early traumatic experiences on sexual functioning occurred through the mediation of body uneasiness and general psychopathology.

The present result is in accordance with previous observations regarding the role of body image-related constructs in men's sexuality (eg, body shame, inaccurate weight perceptions, lower ratings of attractiveness),⁸⁶ through a wider definition of sexual well-being (reduced frequency of sexual behavior,⁸⁷ decreased sexual desire,⁸⁸ sexual dysfunction overall,⁸⁹ reduced sexual satisfaction,²⁸ sexual behaviors at risk^{30,88}). Recent empirical findings^{31,86} suggested that objectification theory could also provide the theoretical background for the relationship between body uneasiness and sexual dysfunction in men. Indeed, body image self-consciousness might determine a retirement from one's sensual experience during sexual intercourse, thus leading individuals to lose sexual arousal.

Furthermore, in the present study, body uneasiness was associated not just with ED but also with hypersexual behaviors, in line with previous observations on sexual behaviors at risk in the general population.^{32,90}

Several explanations can be considered to describe a model in which childhood traumatic experiences exert their negative effect on sexuality through the involvement of disturbances of body experience. According to a developmental perspective, previous authors posited that violations of body boundaries (eg, in sexual or physical abuse) in a sensitive period for the definition of embodiment and personality caused stable effects on the perception of the self and the own body.^{91,92} Previous studies are also coherent with the role of general psychopathology demonstrated by the SEM, as body dissatisfaction has been associated with self-reported anxiety and depression.⁹³ For example, Czeglédi et al⁹⁴ found that anxiety correlated with body dissatisfaction in young men and that having a greater dissatisfaction with one's muscularity led to reduced self-esteem and, subsequently, increased trait anxiety.

Sexual dysfunction in abused men may then be better understood in light of early adverse experiences, but the literature provided insight to ascertain the psychopathologic trajectory

leading from abuse to hypersexuality. Indeed, dysregulated sexuality has been indicated as a behavioral outcome of early traumatic experiences, as an expression of emotional maladaptive coping strategies derived from the experience of abuse.⁸⁰ Negative affective states deriving from embodiment disturbances following childhood abuse have been extensively demonstrated in several other psychopathologic conditions, such as eating disorders,⁹⁵ posttraumatic stress disorder,⁴⁰ borderline personality disorder,⁹⁶ major depressive disorder,⁹⁷ and poor sexual functioning.⁹⁸

Previous literature focused on the role of specific emotional triggers in hypersexuality, describing how shame and guilt can be feelings that precipitate hypersexual behavior.⁹⁸⁻¹⁰⁰ According to the intriguing conceptualization of abuse by van der Kolk,¹⁰² the body can be conceived as a source of constant reminders of a traumatic past in traumatized individuals. The persistent state of alertness in traumatized individuals, known as *hyperarousal*, facilitates the misinterpretation of even the most innocuous stimulus as a potential threat.¹⁰³ Consequently, innocuous events, such as interoceptive or genital stimuli, can induce a feeling of fear in traumatized individuals, which, in parallel with a condition of emotional dysregulation, can result in the adoption of ineffective coping strategies, such as those based on the externalization of symptoms (eg, hypersexuality).¹⁰³⁻¹⁰⁵ Moreover, trauma may modulate testosterone or prolactin levels, further affecting sexual health.¹⁰⁶⁻¹⁰⁸

Implications for clinical practice

The present study highlighted the psychopathologic complexity behind the interconnection of early trauma, body image disturbances, and sexual functioning. The clinical implications included the importance of embodiment-focused interventions in evidence-based trauma therapies. Promising results on the efficacy of body-related interventions in trauma-focused psychotherapy have been reported in women with a history of childhood sexual abuse.¹¹⁰ The putative mediators of such an approach appeared to be associated with enhancement of self-care and more health-conscious behaviors.¹¹¹ Considering that ED may be increasing at the epidemiologic level in young men,¹¹² phosphodiesterase type 5 inhibitors are commonly used as first-line treatment for this condition, and they are increasingly being marketed to young people.¹¹³ The use of such compounds was rarely discussed with medical providers by 25% of young men,^{114,115} without considering the multifactorial etiology at the basis of ED and its potential psychological burden in the long term, in addition to the possible adverse effects in the long term associated with phosphodiesterase type 5 inhibitors.¹¹³⁻¹¹⁶ For these reasons, the increased incidence of ED among young men warrants further discussion, research, and clinical attention. In light of these considerations, the present results underscore the importance of considering factors often overlooked in male sexual dysfunction, such as childhood traumatic experiences, body uneasiness, and hypersexuality. This additional assessment could reveal, especially in young people, causes of sexual dysfunction that otherwise would have been overlooked, allowing referral to appropriate treatments, such as combined pharmacologic and psychotherapeutic interventions.^{6,8,117-120}

Limitations

Differences between patients and controls were evaluated cross-sectionally. The control group consisted of people who

were unsystematically invited through snowball sampling: the results should be interpreted accordingly, since the characteristics of the selected controls may not be representative; future studies on larger samples and different populations are needed to confirm the present findings. Patients with the primary complaint of ED received an indication of referral to psychiatric services; therefore, the patient group was not considered representative of all patients with ED, but a dimensional approach to illness and functioning still allowed for a significant contribution to the field. In addition, the current analysis did not take into account any diversity among men regarding the biographical and personal features (eg, sexual orientation, relationship status), which could be related to the explored psychopathologic dimensions. All mediation analyses should be considered exploratory in absence of a longitudinal evaluation.^{122,123} Moreover, the psychopathologic dimensions were assessed referring to the overall scores of psychometric questionnaires. Hypersexual behavior is a multifaceted symptom⁴; therefore, it could be useful in future research to differentiate among the diverse factors of hypersexuality. While traumatic experiences have been shown to modulate testosterone and prolactin,¹⁰⁶⁻¹⁰⁸ which in turn have a role in sexual health, the current study did not assess these biochemical markers in a systematic manner. Future studies might then integrate psychometric, clinical, and biochemical characteristics in a comprehensive model capable of addressing causal factors associated with hypersexuality. Finally, in the present study, body composition was not evaluated, even though it has been associated with body dissatisfaction in men.

Conclusions

Despite the aforementioned limitations, the goodness of fit of the model in clinical and nonclinical samples demonstrated that the supposed interaction between developmental and psychopathologic variables is not limited to men referring to a clinical setting; rather, it can be applied to the whole population along a dimensional continuum. Current results shed light on the complex interplay among early traumatic experiences, psychological well-being, body uneasiness, and sexual functioning in men. Considering the higher prevalence of childhood traumatic experiences in the group of patients with sexual dysfunction, a wider adoption of psychiatry liaison services in sexual health clinics seems warranted, employing multidisciplinary teams capable of assessing the biological, social, and psychopathologic correlates of sex functioning.

Author contributions

Conceptualization: V.R., G.C. Data curation: E.R., C.D. Formal analysis: E.C. Investigation: M.F., C.D., G.G., S.S., A.B. Methodology: L.T., G.C. Project administration: E.R., G.C. Software: L.T. Supervision: E.C., M.M., L.V., A.G., V.R., G.C. Validation: L.T., C.D., L.V., A.G., G.C. Visualization: M.F. Writing—original draft: E.C., L.T. Writing—review and editing: E.R., M.M., L.V., A.G., G.C.

Supplementary material

Supplementary material is available at *The Journal of Sexual Medicine* online

CRedit taxonomy

E.C.: formal analysis-equal, supervision-equal, writing—original draft-equal. L.T.: methodology-equal, software-equal, validation-equal, writing—original draft-equal. E.R.: data curation-equal, project administration-equal, writing—review and editing-equal. M.F.: investigation-equal, visualization-equal. C.D.: data curation-equal, investigation-equal, validation-equal. G.G.: investigation-equal. S.S.: investigation-equal. A.B.: investigation-equal. M.M.: supervision-equal, writing—review and editing-equal. L.V.: supervision-equal, validation-equal, writing—review and editing-equal. A.G.: supervision-equal, validation-equal, writing—review and editing-equal. V.R.: conceptualization-equal, supervision-equal. G.C.: conceptualization-lead, methodology-equal, project administration-equal, supervision-equal, validation-equal, writing—review and editing-equal.

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Conflicts of interest

The authors report no conflict of interest.

Data availability

Data are available upon reasonable request to the corresponding author.

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