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CONSENSUS STATEMENT

Hypersexuality as a tip of the iceberg of a primary psychopathology: a joined position statement of the Italian Society of Andrology and Sexual Medicine (SIAMS) and of the Italian Society of Psychopathology (SOPSI)

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Abstract

In the last years, hypersexual behavior has been broadly scientifically studied. The interest in this topic, belonging to psycho-sexology and sexual medicine, has been due to its still unclear aetiology, nature, and its manifestation in relationship with several organic and psychopathological conditions. So, the specialist (the psychologist, psychiatrist, endocrinologist, neurologist) may encounter some difficulties in diagnosing and managing this symptom. The first main objective of this position statement, which has been developed in collaboration between the Italian Society of Andrology and Sexual Medicine (SIAMS) and the Italian Society of Psychopathology (SOPSI) is to give to the reader evidence about the necessity to consider hypersexuality as a symptom related to another underlying condition. Following this consideration, the second main objective is to give specific statements, for the biopsychosocial assessment and the diagnosis of hypersexual behavior, developed on the basis of the most recent literature evidence. To develop a psycho-pharmacological treatment tailored on patients' needs, our suggestion is to assess the presence of specific comorbid psychopathological and organic conditions, and the impact of pharmacological treatments on the presence of an excess of sexual behavior. Finally, a suggestion of a standardized psychometric evaluation of hypersexuality will be given.

Keywords Hypersexuality · Compulsive sexual behavior · Psychopathological comorbidities · Pharmacological treatmnets

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Abbreviations

SIAMS Italian Society of Andrology and Medical Sexology
SOPSI Italian Society of Psychopathology

Introduction

Several psychopathological dimensions have been associated with excessive or out-of-control sexual behavior, such as sexual impulsivity [1], sexual addiction [2], compulsive sexual behavior [3], and lately, hypersexuality [4]. Hypersexuality is characterized by a recurrent lack of control of intense and repetitive sexual impulses, which causes distress or clinically significant disorders in important areas of functioning [5]. It has been estimated that hypersexuality may occur in 2–6% of individuals [6], with a higher prevalence in males and selected populations, such as sex offenders [7]. Its multifaceted nature makes complex to classify hypersexuality as a specific diagnostic category. In this regard, due to the lack of consensus on the definition(s) and assessment, and to its multifactorial etiology [8], its recognition and treatment are often inadequate.

Particular attention has been recently paid to specific aspects related to hypersexuality, i.e. (i) addictive behavior [9]; (ii) loss of pleasure associated with the compulsivity of sexual acts [10, 11]; which in some cases can predict the need for help, and, hence, can explain the perceived distress [12, 13]; (iii) sexual frequency [14]; and (iv) high sexual desire [15, 16]. However, none of these aspects has been demonstrated to specifically characterize hypersexuality.

Following this perspective, and based on evidence of some researches [17], it is possible to consider hypersexuality following a dimensional and biopsychosocial perspective, where the concept of "quantity of the sexual behaviour", in interaction with several biological, psychological and socio-cultural variables, becomes the index of severity of hypersexual behavior. So, we can hypothesize a continuum, where on the one extreme we find the Sexual Aversion [18], a diagnosis based on the criteria inserted in precedent versions of the Diagnostic and Statistical Manual of Mental Diseases (DSM), and the hypoactive sexual desire disorder (HSDD) [19], and on the other one the hypersexual disorder (HD). All the central points during the continuum may be considered softened features of a more or less "normotypical sexual behavior" (Fig. 1).

Although the paucity of data does not allow drawing an epidemiological picture in the general population, the complexity of hypersexuality suggests that, in its genuine form, it is a rare, but sexologically interesting symptom. The consideration of hypersexuality as a symptom, rather than as a condition per sé, has a main implication. In fact, following this perspective, the clinician should assess hypersexuality as comorbid condition to many other psychopathological conditions, and should then consider these last pathological aspects as first treatment strategy.

On this ground, this article aims to overview all the known clinical manifestations of hypersexuality and to produce a joined position statement on behalf of the Italian Society of Andrology and Sexual Medicine (SIAMS) and of the Italian Society of Psychopathology (SOPSI), to help the physician, the psychiatrist and clinical psychologist during the assessment of the hypersexual behavior conceived as a symptom related to other psychopathological conditions. All the known psychopathological conditions related to hypersexuality will be discussed here. In addition, a specific section will be dedicated to the most used psychometric tools validated for an accurate evaluation of hypersexuality.

Methods

The Italian Society of Andrology and Sexual Medicine (SIAMS), one of the leading national scientific societies in the related fields, commissioned an expert task force to provide an updated position statement on hypersexuality. The group of psychologists and psychiatrists belonging to SIAMS developed this position statement in collaboration with psychiatrists of the Italian Society of Psychopathology (SOPSI). Following scrutiny and discussion of the best evidence from published literature available in PubMed, the authors generated a series of consensus recommendations according to the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system [20]. The adoption of PubMed as an exclusive database for search was supported by the choice to select only articles with restricted journal range of publication. The GRADE system allows i) rating the quality of evidence and the strength of recommendations and ii) enhancing the value of the clinical advice here provided [20]. This is possible through the use of a consistent language and graphical descriptions for standardizing the grading of both the strength of recommendation and the quality of evidence [20]. Concerning the strength of recommendation, the number 1 indicates a strong recommendation and is associated with the terminology "we recommend", while the number 2 denotes a weak recommendation and is associated with the wording "we suggest". The four levels grading of the quality of evidence employs the following graphical descriptions: ⊕◯◯◯ denotes "very low-quality evidence", ⊕⊕ ◯◯ "low quality", ⊕⊕⊕◯ "moderate quality", and ⊕ ⊕⊕⊕ "high quality".

According to SIAMS rulings, these guidelines have been arranged by a team of experts on the topic coordinated by the senior author and two members of the SIAMS Guideline Committee, then sent to the SIAMS Executive Committee and to the Directors of all SIAMS Excellence Centers

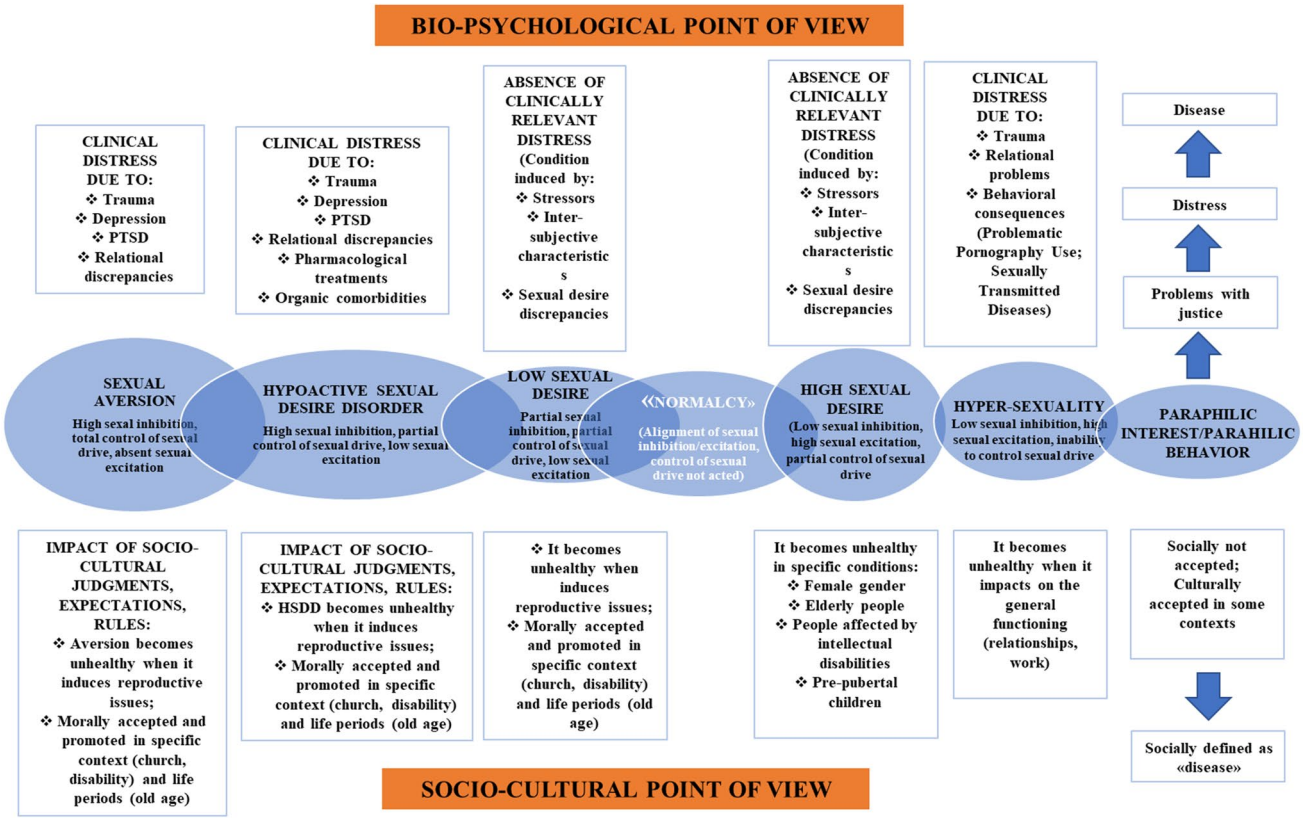

Fig. 1 In this figure, it is explained the continuoum from sexual aversion up to hypersexuality and parahilic disorders. The clinical evaluation of each sexual condition, put on the central part of the figure (the blue circles) is based on the Bancroft's dual model theory for the explanation of inter-subjective differences in sexual interest, explained following the sexual excitation/inhibition role. The superior part of the figure defines each category of sexual condition following the bio-psychological perspective. The inferior part of the figure defines each category of sexual condition following the socio-cultural variables. Following this figure, the specialist in sexual medicine may consider, based on a general bio-psycho-social model, all the variables bearing, or simply explaining the etiology of this sexual symptom. Hypersexuality, or excessive sexuality, or sexual addiction can be interpreted so alongside a continuum, ranging from sexual aversion to paraphilic interests/disorders

for revisions and/or approval. Guidelines have then been announced by mail and published for two weeks on the SIAMS Society's website, siams.info, so that all SIAMS Members could provide further comments and suggest additional minor revisions. Following this last step, the present manuscript has been submitted to the Journal of Endocrinological Investigation for the normal process of international peer reviewing.

Literature search

Epidemiological, behavioral, and clinical data on hypersexuality and its connections to mental health are collected from PubMed, which included Medline and Cochrane Library, SCOPUS, Web of Science, PsychInfo, Embase and Google Scholar. The research in databases was performed by four trained researchers under the supervision of the first author. All the published articles published in English were selected up to June 2021. The combination of the following terms was used to achieve the most complete research and clinical picture on hypersexuality ("hypersexuality": 524 results; "compulsive sexuality": 899 results; "compulsive sexual behavior": 673 results; "hypersexuality AND femlaes": 200 articles; "hypersexuality AND gender differences": 28 results; "hypersexuality AND mood disorders": 39 results; "hypersexuality AND depression": 82 results; "hypersexuality AND bipolar disorders": 30 results; "hypersexuality AND Obsessive Compulsive Disorder": 16 results; "hypersexuality AND Attention Deficit Hyperactivity Disorder": 10 results; "hypersexuality AND impulsivity": 228 results; "hypersexuality AND emotional dysregulation": 12 results; "hypersexuality AND alexithymia": 5 results; "hypersexuality AND emotions": 75 results; "hypersexuality AND sexual dysfunctions": 113 results; "hypersexuality AND couple": 16 results; "hypersexuality AND relationship": 69 results; "hypersexuality AND sexualy risky behaviors": 32 results; "hypersexuality AND cybersex": 8 results; "hypersexuality AND pornography": 49 results; "hypersexuality

and sexually transmitted diseases": 9 results; "hypersexuality questionnaires": 101 results. The search on PubMed was limited to clinical articles, deleting those pertaining to neurosciences. These studies investigated prevalently with fMRI the cerebral damage in dementia patients showing also hypersexual behavior. In addition, there were deleted also articles not pertaining to hypersexuality, such as the studies investigating other psychiatric disorders. Supplementary Fig. 1 represents the flowchart showing further details on the literature search and the selection of the articles included in this literature review.

Psychopathological factors related to hypersexuality

This paragraph is aimed at describing all the known factors which may concur with the development of hypersexuality.

Mood and bipolar disorders

Statement #1: We recommended evaluating hypersexuality with a careful mood assessment, considering the presence of mood cycling, with the tendency of the patient to develop hypersexuality during manic episodes (1 ⊕ ⊕OO).

Evidence

Unipolar depression or major depressive disorder have been reported to be correlated with HSDD [21, 22] but not with hypersexuality, while bipolar disorders are often comorbid with hypersexuality [23]. Indeed, not only hypersexuality, but also high sexual drive, frequent sexual fantasies, and impulsivity are all reported in patients during a manic phase [24–26]. Also risky sexual behaviors are more often reported during manic episodes compared with patients with diagnoses different from the bipolar disorders [26]. In this perspective, the adoption of risky sexual behaviors, including flirtation and the related sexual activities with multiple partners, rather than the specific mood cycling, may in some cases bring to a couple break [26, 27]. Three are the most recent studies evaluating sexual functioning and hypersexuality in people with a diagnosis of bipolar disorder [27]. Interestingly, during the maniacal phase, the incidence rate of sexually risky behaviors of bipolar women is significantly higher than that of women with another psychiatric diagnosis, and of that of bipolar men [28]. In a recent outpatient study on a sample of 71 self-defined subjects referring for hypersexuality, the comorbidity with a bipolar disorders was indeed very high (64.4%), [23]. Even if the literature data suggest to pay particular attention to the evaluation of a manic mood in hypersexual patients, we believe that the presence of a manic mood in a context of a bipolar disorder should automatically direct the clinician towards the primary diagnosis of a bipolar disorder, rather than of hypersexuality. In fact, the increased sexual behavior found during the manic phase is often associated with a general modification/worsening of the patient's life. In some circumstances, not only the increase in sexual behaviour, but also a general increase in different aspects of the patient's life (e.g., gambling, bulimia, compulsive shopping) is observed [29].

Remarks The clinician must be aware that in the presence of a diagnosis of bipolar disorder the diagnosis of "pure" hypersexuality should not be made.

Obsessive–compulsive disorder and post-traumatic stress disorder

Statement #2: In hypersexual patients with a diagnosis of Obsessive–Compulsive Disorder (OCD) we suggest paying particular attention to the comorbidity of other impulse-control disorders (2 ⊕⊕OO).

Statement #3 Particular attention towards the evaluation of comorbid Post-Traumatic-Stress Disorder (PTSD) should be spent in people who lived traumatic experiences. In these comorbid cases, we recommend the assessment of the trauma (1 ⊕⊕OO).

Evidence

The concept of sexual compulsivity represents another way to explain hypersexuality in the spectrum of OCD [30]. However, OCD seems to be present in a relatively small percentage of hypersexual patients. Wery and coll. found, in fact, a prevalence of OCD in about 16% of the recruited subjects [23]. Recently [3], in a large sample of OCD men ($n = 260$) and women ($n = 279$) the prevalence of hypersexuality was about 6%. Another important aspect to take into account during the assessment of OCD patients with sexual compulsivity is the higher risk to have also impulse control difficulties, namely Tourette's syndrome, kleptomania, compulsive shopping, and hypochondriasis [3]. Specifically, for this aspect, the theoretical model explaining the link between OCD and hypersexuality patients and hypochondriasis finds the patients with a high rate of self-masturbation preoccupied for this behavior, considered, in their hypochondriac setting, unhealthy. The main worry of these patients is the comprehension of their sexual desire as a normal, or as an "out-of-control" behavior [3].

For what concerns the PTSD, literature shows the higher prevalence of hypersexuality in traumatized male military veterans [31, 32], as well as in people with a history of sexual/emotional abuse, for which trauma, and the consequent emotional dysregulation may play a role in the development of hypersexual behavior (please, see the specific paragraph

dedicated to emotional dysregulation), [33]. Among these persons, the rate of concurrent hypersexuality with OCD has been reported as being about for times higher (16.7%) than that of the other psychiatric patients (4.4%) and university students (3%) [6, 32]. However, this relatively high prevalence could be related to the presence of PTSD, which occurs in veterans with a prevalence of 54.2% [32]. Hence, hypersexuality has been considered in the case of male veterans as a symptom of PTSD [34], although the official nosography did not include the problematic sexuality among the diagnostic criteria. However, another recent research demonstrated a strong relationship between trauma and hypersexual behavior on the general population of a convenience sample, with the mediation role of depression symptoms and guilt [25]. In the case of a patient suffering from PTSD, the trauma and the related emotional negative consequences may be managed with the adoption of hypersexual behavior. In light of this hypothesis, hypersexuality in response to a traumatic experience could be considered as a dysfunctional or maladaptive coping strategy [35, 36]. Moreover, the link between hypersexuality and PTSD may be considered an obvious but dramatic risk factor for the adoption of sexually risky behaviors [32]. To the present date, literature data on the presence of hypersexual behaviour in patients not veterans with a diagnosis of PTSD are still scarce, and characterized in some cases of case reports [21].

Remarks Future research is needed to highlight the moderation effect of PTSD in generating hypersexuality in traumatized people, as also experimental evidence about specific traumatic experiences and the role of complex PTSD condition.

Attention-deficit hyperactivity disorder and borderline personality disorder

Statement #4: We recommend to evaluate the compresence of Attention-Deficit Hyperactivity Disorder (ADHD) or Borderline Personality Disorder (BPD) in patiens having a history of psychological/sexual/physical abuse (1 ⊕⊕OO).

Evidence

The link between the ADHD and hypersexuality is expressed by the presence in both conditions of impulsivity [37]. Impulsivity is known to be the distinctive tract of several psychiatric disorders, among which different kinds of addictions (e.g., alcohol/drug abuse, compulsive shopping, online behaviors, eating disorders, substance use disorder) [37]. In the case of hypersexuality, the recent literature shows that impulsivity is related to hypersexuality, although not always in a robust manner [38]. Some evidence suggests that, in hypersexual patients, the "loss of control" might be only referred to the sexual thoughts or sexual material [39]. Hence, it is reasonable to suppose that ADHD-related impulsivity may be in some cases a co-factor associated with hypersexuality, as well as a co-factor in generating other kinds of behaviors related to the "loss of control" [38].

An important clinical condition related to hypersexuality and promiscuity/sexually risky behaviors is the BPD. This condition seems to be connected to ADHD. Evidence from the literature shows that, in adulthood, the prevalence of BPD in patients with a diagnosis of ADHD ranges from 19 to 37% [14, 38, 39], whereas the presence of ADHD in patients with a diagnosis of BPD ranges from 16 to 38% [14, 40]. Some authors support the hypothesis that ADHD may be considered a predictor of development of BPD in adulthood [14, 40]. Furthermore, ADHD and BPD have in common some clinical features, impulsiveness, and emotional dysregulation (EDys; see later in the text), [41]. From a genetic point of view, similar serotonergic and dopaminergic systems associated with impulsiveness and EDys have been found in both ADHD and BPD [42]. Moreover, among the environmental factors, the presence of childhood trauma, and specifically of emotional or sexual trauma, seems to be related to the co-diagnosis of adult ADHD and BPD. Some studies have shown the mediating effect of childhood trauma on the transition from child ADHD to adult ADHD and BPD [43]. As childhood trauma is often related to EDys, hence, it could be hypothesized that hypersexuality, expressed as the product of EDys, might be one of the key factors of ADHD or BPD.

Emotional dysregulation and trauma

Statement #5: During the assessment of the compulsive sexual behavior we suggest broadening the emotional dysregulation and trauma, with particular attention to the evaluation of the possible history of child sexual abuse together to the evaluation of personality and of the attachment styles (2 ⊕⊕OO).

Evidence

Emotional dysregulation is a trans-diagnostic and trans-conceptual construct, which connects compulsive sexual behaviors to their comorbidities. The term "emotional dysregulation" defines several conditions for which the patient appears to be unable to be aware of the emotions, to control impulsive behaviors, and to behave in line with the emotional status [44, 45]. EDys seems to have a central role in many psychiatric diseases and internalized problems [12, 46–48]. The link between EDys and hypersexuality is dual. First of all, EDys seems to determine hypersexual behavior due to an uncontrolled and excessive involvement in sexual activities characterized by a persistent desire or unsuccessful

efforts to stop, reduce, or control sexual behaviors, and by cognitive salience, mood regulation, withdrawal, and functional impairment [49]. The second link is, instead, characterized by the tendency of individuals to adopt hypersexuality in the attempt to cope with intense negative emotions, such as stress, dysphoric mood, or high anxiety [50], or to face adverse life events [51]. In this manner, EDys represents a maladaptive coping, but also a failure in the control of sexual impulses, urges, and thoughts [52]. Interestingly, a study makes some considerations regarding the central role of EDys in the development of hypersexuality, related to coping with dysfunctional strategies for depressive or dysphoric mood, to achieve a general relaxation through sexual activity [52].

Traumatic experiences can be often found in relationship with the emotional difficulties, being the trauma a trigger for the EDys. Among these, child sexual abuse ranges from 30 to 80% [53, 54]. Physical, psychological, and sexual abuse in childhood and adolescence was found to be the most prominent predictor of subsequent hypersexual behavior, as well as of other psychopathological conditions [55, 56]. It is also important to consider the relational patterns, in particular the insecure attachment style, considered as an important mediator factor in the development of EDys and hypersexual behavior, above all in the addictive personalities [52, 57].

Psychotic spectrum disorders and antipsychotic drugs

Statement #6: We recommend performing a careful sexological assessment in the presence of a psychotic spectrum disorder (1 ⊕⊕⊕O).

Statement #7 We suggest considering not only the retirement from the sexual sphere but also its increase (hypersexuality, increased self-masturbation) during the follow-up during the follow-up of antipsychotic treatment. (2 ⊕ OOO).

Statement #8 we suggest considering antipsychotic drugs as a therapeutic option for the management of hypersexual behavior (2 ⊕OOO).

Evidence

Limited evidence was found on the relationship between hypersexuality and psychosis, although the dysregulation in the sexual behavior represents a problematic aspect of schizophrenia and a brief psychotic episode [58]. Conventionally, the relationship between sexuality and psychosis is unidirectional and is characterized by a decrease in sexual desire and sexual activities due to both the psychopathology and the side effect of antipsychotic drugs [59–61].

In the case of hypersexuality, although without strong scientific evidence, an iatrogenic association between antipsychotic drugs and hypersexuality has been found [62]. This association has been observed also in young adults diagnosed with first-episode psychosis (FEP), [61].

It is worth mentioning that antipsychotic treatments might have beneficial effects on hypersexuality, if already present in the patient. For this reason, it is reasonable to suppose that in specific cases the use of anti-psychotic drugs may be beneficial for the management of hypersexual behavior. The positive effect could be due to the antidopaminergic effect mirrored by the increased prolactin levels (PRL) following treatment with first- and second-generation antipsychotic drugs, such as amisulpride and risperidone, whereas newer drugs, such as clozapine, quetiapine and, particularly, the dopamine receptor stabilizer aripiprazole which is to be considered "PRL-sparing" drug [63], should not decrease desire. However, a particular attention must be paid towards aripiprazole, which seems today the only one "sex sparing" molecule [63]. Based on this literature evidence we can suppose that other mechanisms might be involved in the regulation of sexual behavior for subjects undergoing treatment with antipsychotic drugs; this hypothesis is of course fitting with the multifactorial pathogenesis of sexual dysfunctions.

Remarks Evidence regarding the specific psychopatological mechanisms underlying the association between the use of antipsychotic and hypersexuality is still lacking, clinical awareness on sexuality in psychoses is far from being optimal, and adequately tailored studies are much needed [64].

Sexual dysfunctions

Statement #9 we recommend assessing all the aspects of sexual functioning, and specifically the sexual desire and arousal, and the presence of paraphilic fantasies and paraphilic behaviors/disorders (1 ⊕⊕OO).

Evidence

The link between compulsive sexual behavior and sexual dysfunctions is not so intuitive. One neglected characteristic of the hypersexual patient is the loss of the pleasure principle. Some data account, in fact, for the absence of sexual pleasure and satisfaction after the adoption of compulsive sexual behavior [65, 66]. Furthermore, in a significant percentage of hypersexual patients, available data show the presence of associated sexual disorders, such as erectile dysfunction (16%), premature ejaculation (12%), or a paraphilic disorder (60%), [67], among which the most prevalent are the voyeuristic disorder (36%), the fetishistic disorder and the sexual coercive behavior (males: 21%; females: 4%), and of the adoption of sexually risky behaviors (32%) [68, 69]. It could be hypothesized that the higher levels of sexual arousal associated with lower sexual inhibition may promote

hypersexual behavior but expose the individual to a worse sexual functioning.

Partly different is, instead, the relationship between viewing visual sexual stimuli (VSS), an aspect which, in some cases, is put in relation to hypersexuality, and the presence of sexual dysfunctions. Recently, a study has evidenced that the VSS induces a stronger sexual response, but is not related to erectile functioning during partnered sexual intercourse [65]. Rather, VSS may induce a stronger sexual desire for sexual intercourse with the partner.

How hypersexuality alters partnered relationships

Statement #10: In oder to properly evaluate the subject's drives and motivations, we suggest analyzing the emotional aspects, as well as how the subject looks at intimacy and the role played by pleasure and satisfaction (2 ⊕OOO).

Evidence

Patients who suffer from hypersexuality and who search for a clinical help are typically married [70]. However, affection and feelings are in many cases neglected, as are the relationship and the sexual pleasure itself. Engrossment in online sexual activity may mirror a decrease or a lack of partnered sexual activity, with a complete withdrawal from intimacy. In this regard, the Problematic Pornography Use (PPU) is often erroneously considered connected to hypersexuality [40]. However, in life periods experienced as potentially critical, such as the loss of job, the diagnosis of illness, the crisis of relational and couple problems, the PPU associated with the idiosyncratic masturbation could reactivate hypersexual behavior.

Due to the presence of hypersexuality, subjects frequently refer to a reduction in the attraction and the frequency of sexual activity with their regular partners [12, 71]. However, this reduction is not the result of a decrease in sexual desire and excitement, but rather of its redirection towards the assumption of sexually risky behaviors (often mediated by drug abuse), which may increase the prevalence of sexually transmitted diseases (STIs). The assumption of sexually risky behaviors is not necessarily due to the presence of higher sexual desire. In some cases, the patient may adopt this strategy to cope with problematic situations, sexual dissatisfaction, and internal psychological suffering [72].

An important aspect must be highlighted: the presence of PPU, and the adoption of sexually risky behaviors must induce the clinician in investigating the presence of other psychopathologies, such as bipolar disorder, psychoses, or OCD. The incidence rate of sexually risky behaviors in bipolar women during the manic phase is the highest when compared to female patients with another psychiatric diagnosis and with male bipolar patients [73].

From a relational point of view, studies have observed that hypersexuality is linked to social anxiety, avoidance of intimate relationships [72] and an insecure way of bonding [72]. However, there are some gender differences regarding the variables bearing on the relationship quality. In particular, female bipolar patients report more stable intimate relationships, higher frequency of sexual intercourse with a stable partner, and higher prevalence of the offspring, in comparison to female patients with a different psychiatric diagnosis [72]. On the contrary, the female partners of male bipolar patients refer to higher sexual unsatisfaction and the avoidance of sexual intercourse during the partner manic phase [72]. Similarly, research on men who have sex mith men (MSM) has shown that higher scores of sexual compulsiveness are more likely associated with unprotected anal intercourse with the highest possible number of male partners outside of the relationship [74].

Organic etiologies of hypersexuality

Statement #11: We suggest investigating hypersexuality, as well as other forms of compulsive behaviors, in patients with different neurological conditions (2 ⊕⊕⊕O).

Statement #12: we suggest investigating neuroendocrine functioning and dysregulations in patients with impulse control disorders (2 ⊕⊕OO).

Statement #13: we suggest evaluating potential risks including hypersexuality in patients treated with dopamine agonist drugs (2 ⊕⊕OO).

Evidence

Changes in sexual behavior have long been reported following brain injuries, starting at least since 1954, when the first case reports on hypersexuality in frontal lobe lesions were reported [75]. Several regions are involved in the pathogenesis of such behavioral changes: the frontal and temporal cortices are prominently involved [76], with both focal lesions [77] and atrophy [77] potentially leading to hypersexuality (Table 1). Rare syndromes affecting several cortical and sub-cortical regions of the brain, such as Kleine–Levin Syndrome and Klüver and Bucy Syndrome, frequently feature hypersexual behaviors [78, 79], suggesting that the hypothalamus, amygdala, and striatum might similarly be involved in the pathogenesis of hypersexuality. This hypothesis was confirmed by functional magnetic resonance imaging studies (fRMN), as first performed by Voon et al. in 2014 [77]: subjects with compulsive sexual behavior showed a significant difference in regard to activation of the dorsal anterior cingulate, ventral striatum, and amygdala compared to controls. Oxytocin signaling has recently been considered as among potential pathways involved in the pathogenesis of some cases of hypersexuality: a study on genome-wide

Table 1 Organic conditions associated with hypersexuality

Organic etiologies of hypersexual behavior
Frontal lobe lesions (focal lesions; atrophy)
Temporal lobe lesions (focal lesions; atrophy)
Kleine Levin Syndrome
Kluver and Bucy Syndrome
High Luteinizing Hormone (LB) plasma levels
lctal events in temporal lobe
Dementia
Parkinson disease
Prl-secreting aclenomas (prolactinomas)

methylation pattern identified different methylation patterns among subjects with hypersexuality for two CpG-sites linked to MIR708 and MIR4456 [80]. This finding might likely pave the way for new tailored treatment, although more robust evidence will be needed to draw definite conclusions.

Although it is well known that testosterone is involved in many human behaviors, and not only in sexual ones, the link between androgen activity and hypersexuality outside from the forensic setting [81] has not been broadly studied (Table 1). A recent study [82] found that patients referring to hypersexuality presented higher luteinizing hormone (LH) plasma levels than healthy volunteers, but there were no significant differences between the hypersexual patients and healthy controls in terms of plasma testosterone, follicle-stimulating hormone (FSH), Prl, and sex hormone-binding globuline (SHBG) levels. Testosterone was significantly positively correlated with SHBG and LH. Moreover, the authors did not found an association between DNA methylation of hypothalamus– pituitary–adrenal (HPA) and hypothalamus–pituitary–gonadal (HPG) axis-coupled genes and plasma testosterone or LH levels after multiple testing corrections. Based on these data, the investigation of neuroendocrine functioning and dysregulation is suggested.

Epilepsy is associated with hyposexuality—although ictal events, as well as temporal lobectomy, may both be triggers for hypersexuality (Table 1), [83]. On the other hand, Parkinson disease, a condition which is per se associated with a higher risk of developing psychiatric symptoms with an estimated > 60% prevalence [84], is often mentioned in the context of the neurological basis for hypersexuality not for the disease itself, but for the treatment with dopamine agonist that may have higher rates of impulse control disorders, including binge eating disorder, compulsive shopping and hypersexuality [85]: a recent systematic review has established the overall prevalence at 7.4% among such patients [85]. Several risk factors have been identified, such as male gender, young age, and presence of psychiatric comorbidities.

Dopamine agonists are also commonly used in the endocrinological setting as a first-line treatment for PRL-secreting adenomas (prolactinomas), although at a much lower dosage (Table 1), [86]. Even at such dosages, however, impulse control disorders may appear: while their prevalence is debated due to different measurement tools, impulse control disorders are significantly more common in prolactinoma/hyperprolactinemia patients treated with dopamine agonists than healthy controls [87].

Psychometry and psychodiagnosis of hypersexuality

Statement #14: We recommend adopting rigorous method for the evaluation of hypersexuality disoders (Good clinical practice).

Statement #15. We suggest using specific psychometric test for hypersexuality together with a personality tool assessing other primary psychopathology (2 ⊕⊕⊕O). In this regard, MMPI is the main tool to assess personality in people with a problematic sexuality (2 ⊕⊕⊕⊕).

Evidence

Psychometric and psycho-diagnostic assessment of hypersexuality (Figs. 2, 3, Table 2) is difficult and should consider the differential diagnosis perspective together with an accurate evaluation of several comorbidity factors such as personality functioning. For these complex reasons, two fundamental steps into the diagnostic process with questionnaires should be considered, i.e. (i) use of validated psychometric tools to screen the hypersexuality and related factors; and (ii) use of the psycho-diagnostic tests to evaluate also the personality (Fig. 3). An additional step is represented by the proposed "Three W Model", presented in Fig. 2. This model, which has been developed following the evidence-based rules for the sexologiocal assessment, tries to give a bidimensional perspective of the assessment of hypersexuality, based on the couple. The Three W Model contains a focus on the problem as reported by the patient and the partner, a focus on previous treatments and on the couple's expectations, and finally a focus on all the most common comorbidities that should be evaluated before making the final diagnosis.

Among the psychometric tools for the assessment of hypersexuality, the hypersexual disorder screening inventory (HDSI), based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) Work Group on Sexual and Gender Identity Disorders, has been used [28]. HDSI is composed of seven items along a five-point Likert scale, according to the proposed criteria for the classification of hypersexuality [28]. This scientifically successful tool can be considered both a self-report and an administered tool.

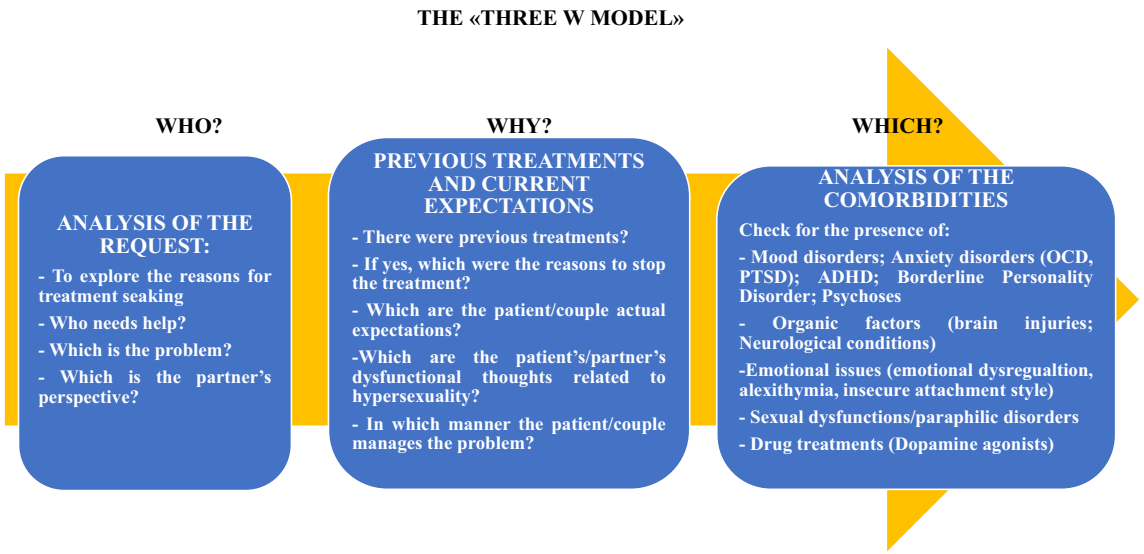

Fig. 2 An easy tool, named the "Three W model", for the assessment of the hypersexual behavior in the patient and the couple is described

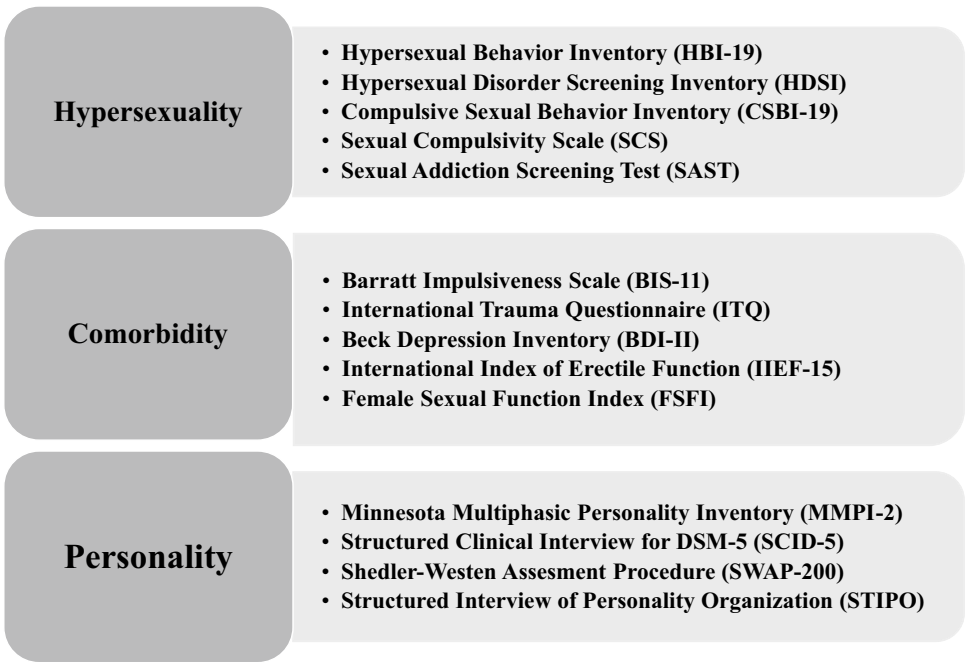

Fig. 3 The psychometric tools for the evaluation of the hypersexual behavior in all its aspects (hypersexuality, comorbidities, evaluation of the personality traits). It is suitable for clinicians to choose one psychometric test related to the hypersexuality box, more questionnaires related to the comorbidity box, and one tool related to the personality box

It's validation in specific socio-cultural contexts is available, among which the English and Italian one.

Another test based on DSM-5 proposal criteria for the hypersexual disorder is the hypersexual behavior inventory (HBI) first validated in an outpatient sample of men [88]. The HBI is a self-report test composed of 19 items with a five-point Likert scale [88]. It is to be noted that the test fails, unfortunately, to explore the domain of pleasure and orgasm, which is to be considered a major clue of hypersexuality, on the contrary explored by the two gender-specific orgasmometers [89, 90], not yet used in the hypersezxuality. Successively, another important study investigated and demonstrated the applicability of HBI among non-clinical subjects and into the general population, revealing excellent psychometric proprieties in large non-pathological samples.

In a similar way, the compulsive sexual behavior inventory (CSBI) has been developed for the evaluation, through 19 items, of the hypersexuality considered as a compulsive behavior [91].

Recently developed, the compulsive sexual behavior disorder scale (CSBD-19) is a psychometric tool based on the eleventh International Classification of Diseases ICD-11

Table 2 Psychometric tests for the evaluation of the hypersexual behaviour

Psychometric tool	Authors	Date of publication	No. of items	Cut-off	Language validations
Hypersexual Behavior Inventory (HBI)	Rehl el al.	2011	19	≥ 53 (range 19–95)	English,German, Spanish, Italian
Hypersexual Disorder Screening Inventory	American Psychiatric Association (APA)	2010	7	20 (range 0–28) HD requires 2:4 items from Section A and 2:1 items from Section B	English, Portuguese
Compulsive Sexual Behavior Inventory (CSBI-19)	Coleman	2001	19	40 (range 22–110)	English, Portuguese
Compulsive Sexual Behavior Disorder Scale (CSBD)	International Classification of Diseases (ICD-11)	2019	19	56.8 (high risk) 32.3 (average risk) 22.3 (low risk)	English, Hungarian, German
Sexual Compulsivity Scale (SCS)	McBride et al.	2008	22	24 (range 10–40)	English, Portuguese, Spanish
Sexual Addiction Screening Test (SAST)	Nelson et al.	2008	25	13 (range 0–25)	Spanish, French, Polish (SAST-R)

criteria [92]. As the previously cited measure, also this is composed of 19 items with a four-point Likert scale. CSBD-19 assesses five domains related to hypersexuality: control, salience, relapse, dissatisfaction, negative consequences. This tool also provides a cut-off point of 50, to establish the problematic condition related to hypersexual behavior [92].

Other psychometric tools to assess hypersexuality are the sexual compulsivity scale (SCS) [93] and the sexual addiction screening test (SAST) [94]. The first one was specifically ideated and validated to detect sexual risk behaviors, related to sexual compulsivity. SCS is composed of 10 items. Conversely, SAST and SAST-R are composed of 25 and 45 items, respectively [94]. The revised version of SAST was ideated to evaluate sexual addiction also among homosexuals and it comprises four factors: preoccupation, loss of control, relationship disturbance, and affect disturbance. These above-mentioned tests are exhaustively described in a review specifically focused on hypersexual conceptualization and evaluation. However, although the assessment of hypersexual behavior is considered beyond the dysregulated sexual behavior or compulsivity, it is always necessary to take into consideration the comorbidity factors and the personality structure. In other words, hypersexual phenomenology could be a symptom of a more severe psychopathological condition or a consequence of a major mental disorder. In these cases, it is suitable to represent hypersexuality as comorbidity or a reactive symptom. For this purpose, it would be advisable to insert into the diagnostic process other tools evaluating the mental health and personality as one of the following well-know tools: Minnesota Multiphasic Personality Inventory (MMPI-2), [95], Structured Clinical Interview for DSM-5 (SCID-5), [96], Shedler-Westen Assessment Procedure (SWAP-200), [97] or Structured Interview of Personality Organization (STIPO), [98] (Fig. 3). However, taking into consideration specific clinical cases, tests assessing intelligence quotient (IQ) and cognitive skills can also be administered.

Value

Based on correlative literature, we believe that emotional dysregulation, trauma, impulsivity, depression, sexual dysfunctions, paraphilic disorders, and overall personality should be carefully and, when possible, psychometrically evaluated by clinicians in patients with hypersexuality. Being a complex symptom, hypersexuality merits, in fact, a complex diagnostic workup.

Conclusion

We have described here the main characteristics associated with hypersexuality, highlighting the clinical implications for each discussed topic. Based on the literature evidence of PubMed, we support the idea of hypersexuality as an expression of another psychopathological condition. The exclusive adoption of PubMed as database of reference could be interpreted as limitation. However, we agree upon the evidence that PubMed may give the possibility to select only articles with restricted journal range of publication.

A hypersexual symptom is a multi-facets psychological, psychiatric, and behavioral (sexological) problem affecting the individual, relational, and social health. In its assessment, several aspects must be considered, as the presence of

comorbidity factors, the organic etiologies, and its impact on relational functioning. The conceptualization of hypersexuality as comorbid condition of other psychopathological diseases may guide the clinician toward a different perspective on treatments options, which should, following this perspective, resolve the psychopathological issues upstream to solve hypersexuality.

Clinicians and researchers should take into consideration all the bio-psycho-social aspects, in the light of the new systems sexology [99] related to hypersexuality.

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Declarations

Conflict of interest GC, GC, AS, FC, TC, VR, GDL, AR, ADF, VR, and GC declare no conflict of interest. EL is or has been paid consultant and/or speaker for Pfzer and Shionogi. EAJ is or has been paid consultant and/or speaker for Bayer, Ibsa, Lundbeck, Otsuka, Meniarini, Pfzer and Shionogi.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent For this type of study formal consent is not required.

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