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Comorbidities Among Sexual Dysfunctions in Men: Results from a Binational Community Sample

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Comorbidities among Sexual Problems in Men:

Results from a Binational Community Sample

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ABSTRACT

Introduction: Men suffering from one sexual problem sometimes report having another sexual problem, but few studies have determined concordance rates among dysfunctions in non-clinical samples.

Aim: This study determined comorbidities among sexual dysfunctions based on a binational sample of 4402 men from Hungary and the USA.

Method: Participants completed an online 55-item questionnaire that included questions assessing erectile dysfunction (ED), premature ejaculation (PE), delayed ejaculation (DE), and lack of sexual interest (LSI).

Main Outcome Measures: Concordance rates and odds ratios among sexual dysfunctions.

Results: Approximately 8% of men suffered from two or more sexual problems; men with a severe sexual problem were significantly more likely to suffer from a second sexual problem; concordance between PE and ED ranged from 23-29%, with subtypes of lifelong vs acquired PE showing patterns similar to one another; and most men reporting DE reported minimal problems with LSI, although LSI was generally key to understanding all other dysfunctions.

Conclusion: Documenting and understanding sexual comorbidities will help clinicians understand the often complex and intertwined nature of sexual problems and assist them in developing management protocols that address the various inadequacies in sexual response.

Key Words: sexual dysfunction, concordance, comorbidity, erectile dysfunction, premature ejaculation, lack of sexual interest, delayed ejaculation

INTRODUCTION

Sexual behavior in men presupposes multiple dimensions or phases, including the presence of sexual desire, sexual arousal, and ejaculation/orgasm [1,2]. Sexual desire is a motivation-related psychological construct intended to explain the likelihood and strength of a sexual response and, broadly speaking, represents the man's interest in and/or psychological readiness to engage in sexual activity. Sexual desire is influenced by internal factors, controlled in part by motivational areas in the diencephalic brain region and primed by androgens, and external factors, including appropriate conditions and characteristics of the intended object/person to whom the response is directed [3].

Sexual arousal is a cerebral and peripheral process induced not only through various modes of sensory stimulation, but also, in the absence of external stimuli, through self-generated fantasy which, under the influence of sexual hormones (in men), provokes an autonomic arousal response [3]. Arousal represents both a physiological state, including erection, and a psychological state, perhaps akin to a "go" state within a "go/no-go" neurocognitive framework.

Ejaculation—the third component of sexual response—is a complex, two-phase neurological process of emission and semen expulsion mediated at the spinal level. Ejaculation represents both a biological and psychological endpoint, necessary for procreation and resulting in pleasure/reward via receptors coursing to the brain to mediate the subjective experience of orgasm [3].

Interdependence of the Phases of the Sexual Response Cycle in Men

The phases of sexual response are considered interdependent and contiguous, with each potentially affecting, and being affected by, the other. These phases are sometimes viewed as hierarchical or sequential in nature, with each necessary (though perhaps not sufficient) for the expression of the next. Thus, in men, sexual desire and interest are likely to influence the man's arousal level, which in turn affects the likelihood of ejaculation. Furthermore, each process is likely to feed back

prospectively to the other, for example, sexual desire and arousal may subsequently be influenced by recent positive or negative experiences related to ejaculation and orgasm [4].

Although these response phases have little meaning to the lay person, they are important to students of sexology for multiple reasons. First, as noted above, the neurological substrates and psychological processes for each of these phases are distinct. Second, these phases give rise to the nosology and classification of sexual dysfunctions (e.g., [5,6]). In men, for example, common dysfunctions correspond to the phases of the sexual response cycle: a lack of sexual interest or desire (LSI); problems with arousal (usually erectile dysfunction [ED] but sometimes subjective/psychological arousal); and problems with ejaculation, this last category including ejaculating before the man desires (premature ejaculation: PE), and having difficulty reaching or absent ejaculation (delayed ejaculation: DE). Third, treatment strategies for different phase-related sexual problems may involve different approaches and/or sets of options [7].

Risk Factors for and Comorbidities of Sexual Problems

An extensive research literature has demonstrated a myriad of biological, psychological, and relationship factors that increase the risk of experiencing a sexual problem [8-10]. Biological risk factors for men include aging, specific chronic diseases, acute problems such as LUTS, specific drugs, and so on. Psychological risk factors typically involve specific Axis 1 disorders (e.g., depression [5]), psychological dispositions such as (trait) anxiety, acute and chronic distress, feelings of low self-efficacy, and social role expectations often related to state anxiety, to name a few [10]. Relationship factors are often associated with sexual problems or attitudes of the partner, but may also include a variety of expectations and assumptions that arise from both the self and the partner based on social scripts [8-11]. As part of any diagnostic procedure, clinicians are routinely advised to probe these various biopsychosocial domains—particularly ones known to impart substantial risk of sexual dysfunction [7].

As noted, phases of the sexual response cycle are interrelated; thus, dysfunction within one phase of the sexual response cycle may also appear as a problem/dysfunction in another phase, as is the case, for example, when LSI results in insufficient sexual-psychological arousal to produce an erection sufficient for intercourse. However, a problem in one phase of the sexual response cycle can also occur independently of responses in other phases: for example, a man may experience a strong level of sexual interest but, for any number of biological and/or psychological reasons, be unable to attain and/or sustain an adequate erection. That is, in one case, LSI and ED co-occur; in the other, LSI and ED do not co-occur. Understanding such concurrences–or comorbidities—among sexual problems is important for multiple reasons. First, it provides guidance to the health care professional regarding the sexual domains that should be investigated when responding to a patient's sexual complaint, and second, it may guide the management of the sexual problem, particularly if one problem can be identified as primary— constituting the root cause of the problem—and the other as secondary, that is, one that occurs as a by-product of the other [12].

Interestingly, only a handful of studies have actually determined the prevalence of sexual comorbidities, that is, the extent to which having one sexual problem serves as a risk factor for having a second (or even third) sexual problem. Of the possible sexual comorbidities, the concurrence of PE and ED appears to be the best documented. For example, the rate of having combined PE and ED has been reported from 1% to over 75%, depending on the severity of the ED, the probability level of having PE, whether the PE is classified as lifelong or acquired, and how the question is phrased [13,14]. Using a slightly different approach, meta-analysis investigating concomitant ED and PE has suggested that PE is associated with over a threefold increased risk of ED [15], and more specific PE-subtype analysis has suggested greater ED comorbidity in men having acquired (vs lifelong) PE [16]. Thus, the current understanding of the concurrence of PE and ED—although not complete—has received at least cursory attention and documentation.

In contrast, comorbidities among most other sexual dysfunctions are less well documented. For example, we identified only one study demonstrating the concurrence of LSI and ED. Specifically, Salonia and colleagues [17] reported that 4% of men with LSI also reported ED, but this rate was determined only for men seeking medical help for a sexual dysfunction and not in a non-patient sample. And perhaps not unexpectedly, delayed or absent ejaculation was found to be quite common among clinical samples of men reporting ED [18]. Generally, however, for comorbidities among dysfunctions other than PE and ED, reliable data based on large-scale community samples are sparse. As a result, the probability of specific concomitant dysfunctions remains at best only partly/poorly documented, affording sexual healthcare specialists little guidance regarding an efficient investigatory path within a time-limited clinical visit.

AIMS

In an attempt to increase the database—and thus our understanding—of the prevalence of sexual comorbidities in men, we assessed concurrence rates and odds ratios among sexual dysfunctions in a large, binational community sample of men. Specifically, we (1) determined the prevalence of each of the sexual dysfunctions: LSI, ED, DE, and PE (including lifelong and acquired); (2) determined concordance rates (CR) and odds ratios (OR) among pairs of sexual dysfunctions; (3) carried out a sub-analysis to determine CRs and ORs for specific types of PE—lifelong and acquired; and (4) determined percentages of men having more than two sexual dysfunctions.

METHODS

Participants

Participants were recruited through voluntary self-selection to complete a survey on sexual health. The community-based sample consisted of 4432 men 18+ years of age (mean = 39.2, SD = 13.3; range = 18-85), with data obtained through two approaches. The first consisted of men in the USA recruited through the research homepage, one of multiple online postings on the forums of reddit.com,

and unpaid public and social media (e.g., Facebook) avenues/announcements (n = 786). The second

consisted of men visiting comparable online posting sites in Hungary, visiting the Hungarian research

homepage, and through unpaid public and social media (e.g., Facebook) avenues/announcements (n =

3639). A third group of men attending a major university in Hungary volunteered to take a pencil-and-

paper version of the survey (n = 134) for the exclusive purpose of enabling test-retest reliability analysis

on selected response items (see Procedure); their data were not included in the analyses.

Questionnaire

As part of the survey development, a pilot was conducted with seven focus groups, two

from the USA (n = 10, mean age = 32.4), and five from Hungary, these latter groups comprised mainly of

university students across a variety of professional and non-professional disciplines (n = 79, mean age =

20.7). Groups reviewed survey items, commented on their relevance, suggested wording clarifications

and response categories, appraised overall item face-validity, and assessed the time required for survey

completion. For Hungarian participants, the survey was translated to Hungarian by a professional

translator and then back-translated to English to ensure preservation of meaning.

The 55-item survey took about 20-25 minutes to complete. Participants were guaranteed

anonymity, and safeguards were implemented to prevent multiple submissions. In addition, several

items were used as "attention checks," such that cases having inconsistent or contradictory responses

on these items were dropped from the analysis.

Two sections of the survey were used in this analysis. The first gathered information about

demographics, lifestyle behaviors, medications, and medical and sexual history, including questions

regarding pornography use, sexual orientation, gender identity, partner status, overall relationship and

sexual satisfaction and, using the past 12 months as a timeframe and/or their current or most recent

(primary) sexual relationship, items related to frequency of masturbation and partnered sex, importance

of sex, and sexual interest. The second section, the part most relevant to this analysis, assessed the

phases of sexual response during partnered sex—sexual desire/interest, erectile response, and

ejaculatory function (premature and delayed)—using the past 12 months and/or the current/most

recent sexual relationship for reference.

Procedure

Ethics approval was obtained from the Institutional Review Boards (IRB) of the authors'

universities in the USA and Hungary. Informed consent was obtained from participants, with their

needing to check boxes attesting (1) to being at least 18 years of age and (2) to their informed consent

before accessing the survey, with the stated option of ending participation at any point by closing the

webpage. As a reliability check, participants taking the pencil and paper version of the survey were

assigned an anonymous code so they could be retested 4-6 weeks later for a reliability analysis.

Defining Dysfunctional Categories and the Overall Analytical Strategy

Dysfunctional categorizations. Erectile dysfunction (ED) during partnered sex was evaluated with

four IIEF-5 items related specifically to erection [19]. Premature ejaculation (PE) was evaluated with

three items related to ejaculatory control from the PEDT [20]. Delayed ejaculation (DE) was evaluated

with one item about difficulty reaching orgasm/ejaculation in conjunction with participants' estimated

ejaculatory latency (EL) during partnered sex. Lack of sexual desire/interest (LSI) was evaluated by

combining ratings on two items: the "importance of sex" and "interest in sex."

Specifically, for each dysfunction, we created three categories based on partnered sex: no/low,

moderate/probable, and severe/definite dysfunction. For PE and ED, these categorizations relied on

questions drawn from standardized instruments (IIEF and PEDT), selecting only those questions most

relevant to the construct/definition of the dysfunction under question.[1] Thus, for the four selected IIEF

items (scaled 1-5, with lower scores representing greater ED), scores of 4-9 represented "moderately-

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[1] We did not include all items from the IIEF-5 or the PEDT, as one item on the IIEF-5 focused on satisfaction during intercourse and would have compromised the measure of erectile function, and two items on the PEDT focused on distress/bother rather than ejaculatory control, the central component related premature ejaculation [22].

severe to severe ED," 10-13 represented "moderate ED," and 14-20 represented "mild to no ED." In

presenting the results, this scale was reverse-scored so greater levels of all dysfunctions were

represented by higher scores, enabling easier interpretations of comorbidities. For determining PE

based on the three PEDT items (scaled 1-5, with higher scores representing greater probability of PE),

scores 13-15 represented "definite PE," 9-12 represented "probable PE," and < 8 represented "no PE."

We used similar strategies to represent the two other male sexual dysfunctions, DE and LSI. DE

was based on an experimenter-derived question about difficulty reaching orgasm (scaled 1-5, with

higher scores representing greater severity). Specifically, 1-3 represented "no/mild DE," 4 represented

"moderate DE," and 5 represented "severe DE." For those falling into the "severe" category (i.e., 5), we

stipulated a second condition of an estimated EL > 20 min (including not ejaculating at all) during

partnered sex. Men indicating "5" but not meeting the EL > 20 min criterion and men indicating "4"

comprised the "moderate" category as long as the men in either group met a second condition of an

estimated EL >15 minutes. The selection of these EL criteria was based on recent data suggesting 15 and

20 min as plausible secondary criteria for probable and definite DE [21]. For LSI, we used question #12

from the IIEF (rate your sexual desire/interest), and supplemented this item with a second question

regarding the "importance of sex." As these questions were correlated (r_s = .71)—and thus tapping into

the same general construct—we combined them to generate a composite variable (LSI). Specifically,

scores for this composite variable ranged from 2-10; those with scores of 2-4 represented "no lack of

interest;" 5-7 represented "moderate lack of interest;" and 8-10 represented "strong lack of interest." In

summary, each new variable had three categories of dysfunction (no/mild, moderate, severe

dysfunction), with higher scores representing greater dysfunction. For three dysfunction variables

assessed—cumulative IIEF, cumulative PEDT, and composite LSI, test-retest correlations were 0.850,

0.850, and 0.750 respectively, indicating a reasonably high degree of reliability for these survey items.

Concordance Rates and Odds Ratios. We established concordance rates (CR) and odds ratios (OR) for men having severe/definite levels of each dysfunction, by calculating the percentage (and related OR) of men who reported having moderate/probable and severe/definite levels of another dysfunction. Determining CRs among dysfunctions using this strategy requires that one of the sexual dysfunctions under investigation serve as the reference group. For example, the CR between ED and LSI may be investigated in two ways: Specifically, for those men with severe/definite ED, we can ask what percentage also showed moderate and/or severe LSI, or we can ask, for those men showing severe/definite LSI, what percentage also showed moderate and/or severe/definite ED. In our analysis, we investigated both options, based on the rationale that men with severe levels of dysfunction (vs mild or moderate) would more likely seek treatment, and thus be encountered in a clinical situation [23].

In an ancillary analysis of PE, we further divided men into those reporting lifelong vs. acquired PE. In a final analysis, we determined the percentage of men reporting three concomitant dysfunctions. All analyses were carried out with SPSS v.25 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0 Armonk, NY).

RESULTS

Description of the Sample (Aim 1)

Table 1 provides basic demographic and sexual characteristics of the sample, including age, education, sexual orientation, current sexual partner status, and the percent having ongoing anxiety/depression or an ongoing (chronic) medical condition. Table 2 shows the percentages of men having each dysfunction, for both severe/definite and moderate/probable categories. The combined (moderate plus severe) percentage for ED was 13.6%; for DE, 13.5%; and for LSI, 26.7%.

For PE, the combined percentage was 27.0%. Of those specifying a PE-subtype, 71.3% (about 17% of the total sample) indicated a lifelong problem while 29.7% (about 9% of the total sample) indicated the problem was acquired later in life; a number of men (24%) categorized with PE did not

specify either subtype. When these men were included, the percent of men indicating lifelong PE was approximately 53% of the total PE group; those indicating acquired PE was 21%.

Two-Way CRs and ORs Across Sexual Dysfunctions (Aim 2)

Two-way CRs and ORs are reported for each of the following pairs of sexual dysfunctions in Table 3: PE and LSI; PE and ED; LSI and ED; ED and DE; and DE and LSI. CRs and ORs were not generated for DE and PE, as these conditions presumably represent mutually exclusive dysfunctions. ORs ranged from 1.08 to 4.83, with all but two pairs reaching $p < 0.05$, and 5 of the 10 reaching $p < 0.01$.

We also determined percentages of concurrence relative to the overall sample, using the same procedure as that used for determining CRs and ORs. Of the overall sample, 0.75-1.79% of men reported comorbid PE and LSI; 1.04-1.29% reported comorbid PE and ED; 0.41-1.32% reported comorbid LSI and ED; 1.66-1.94% reported comorbid ED and DE; and 0.43-1.50% reported comorbid DE and LSI. The cumulative estimated probability of a man having any two concomitant sexual problems was thus estimated at 7.84%.

CRs and ORs for PE Subtypes: Lifelong and Acquired (Aim 3)

Men with PE were subdivided into lifelong and acquired. For these analyses, only the definite PE subgroups were used as reference groups (i.e., used as the denominator in calculations) (Table 3).

Lifelong PE. Of the men having definite lifelong PE, 9.1% also had severe ED and 16.5% had moderate ED. Of the men having definite lifelong PE, 3.0% also had a severe/definite LSI and 28.0% had moderate/probable LSI.

Acquired PE. Of the men having definite acquired PE, 7.1% also had severe ED and 16.1% had moderate ED. Of the men having definite acquired PE, 1.7% also had severe/definite LSI and 34.5% had a moderate/probable LSI.

ORs indicated that men with definite PE, whether lifelong or acquired, were more likely to show moderate/severe ED than those with no/probable PE, but only the lifelong group reached significance (p

= .02). Men with lifelong vs acquired PE showed divergent concurrence patterns with LSI: those with

lifelong PE showed decreased odds of LSI, whereas those with acquired PE showed increased odds of

LSI. However, neither reached significance.

Three-way Concordances (Aim 4)

Percentages of men reporting three concomitant sexual dysfunctions were also determined. We

first assessed three-way concordances only for men in the severe/definite categories for each of the

three dysfunctions. We then assessed them for men in both severe/definite and moderate/probable

categories for each of the three dysfunctions.

Having three severe dysfunctions was extremely rare: 1 participant reported concomitant

severe DE, ED, and LSI, and 2 reported concomitant severe PE, ED, and LSI. When restrictions were

eased to include those having severe *and* moderate dysfunctions, 54 men reported concomitant

moderate-to-severe DE, ED, and LSI, a number representing 1.3% of the total sample, and 14.6% of

those of the DE-ED-LSI subgroups. In addition, 54 participants reported concomitant moderate-to-severe

PE, ED, and LSI, a number representing 1.3% of the total sample, and 26.8% of the PE-ED-LSI subgroups.

DISCUSSION

This study provides new data and insights into comorbidities across various sexual dysfunctions.

Highlighted by this analysis—and mentioned repeatedly in other reports—is that substantial variation in

prevalences and comorbidities results from the specific criteria used to define the dysfunctional groups,

with stricter criteria yielding lower prevalences and concordance rates. In our analysis, we explored two

criterion levels—severe/definite and moderate/probable—such that the effects of criterion stringency

could be compared. We also viewed comorbidities using each "severe" dysfunction as the reference

group, as the way the question is phrased impacts the CRs and ORs among dysfunctions.

General Baseline Rates of Sexual Dysfunctions and Sexual Comorbidities

Prevalence rates for each of the dysfunctions were generally consistent with those reported in the literature. For example, the prevalence for "definite" PE was 7.5%, a rate that aligns well with several other community-based samples [8,24-26]. When men with "probable" PE were included, the combined prevalence of 27% was consistent with early research suggesting about a 30% prevalence based on less stringent criteria, for example, a single item querying about "climaxing too early" [8,27]. Regarding PE subtypes, not all men classified themselves as either lifelong or acquired, but of those that did, about a 2:1 ratio was found for lifelong to acquired. This distribution differs from other studies which have indicated approximate equal percentages for lifelong and acquired PE. However, many of those studies included only patient groups and thus may be compromised by treatment-seeking bias [28-30]. Ours is one of the few studies to assess such percentages in a community sample that includes men with and without dysfunctions.

The prevalence rate for men with severe ED was 4.1%, and when moderate ED was included, the combined prevalence rose to 13.6%, close to the rate of 11% reported by Rosen et al [31] and consistent with rates summarized by others [e.g., 8,27] for men in their 30s and 40s.

Severe DE prevalence in our sample was 5%, under the 9% reported by Laumann et al. [27] using a dichotomous categorization for "unable to achieve orgasm," but falling within the 1-10% summarized by Lewis et al. [8]. When men with moderate DE were added, the combined percentage rose to 13%.

The prevalence for severe LSI in our sample was 3.6%, and when combined with moderate LSI, the rate rose to 26%, substantially higher than reported in one study [26], yet similar to other studies indicating about 25% LSI in men ranging in age from 16-80 [8].

Thus, prevalences for all dysfunctions in our sample—not only those for which standardized procedures exist (e.g., PE and ED) but also those lacking consensus criteria (e.g., LSI and DE)—were generally well within the ranges of other studies, establishing a foundation of both credibility and confidence for the CRs and ORs reported for comorbidities.

Finally, the comorbidity rate of sexual problems within the overall sample was quite low, ranging from a low of 0.41% to a high of nearly 2% for various pairs of sexual problems. A cumulative percent derived across comorbidity pairs suggests that about 8% of our sample experienced two or more concurrent sexual problems.

CRs and ORs across Sexual Dysfunctions

The most consistent finding regarding sexual comorbidities can be summarized by the following: all but two ORs were significant at the 0.05 level, indicating that for nearly all (8 of 10) sexual dysfunctions defined as severe, the probability of having a second moderate-to-severe dysfunction was significant (that is, higher than for those men having no or moderate levels of the dysfunction). Even with a more stringent alpha, 5 of the 10 ORs were significant.

Several specific comorbidity patterns deserve further comment and interpretation. The first pattern is the relationship between PE and ED, one that has garnered considerable attention in the past [13-16,32-34]. The concordance between these two dysfunctions in our sample ranged from 23-29% (depending on which group was selected as the reference), with a significant OR of 2.04. In other words, men having definite PE were twice as likely to show moderate to severe ED than men having no or probable PE. To provide context within the research literature, our CR was slightly higher than the approximately 20% reported in two Asian observational studies [14,16], yet our OR was slightly lower than the 3.35-3.70 reported in Corona et al.'s meta-analysis [15]. The correlation (not presented in the Results) between the included PEDT and IIEF items in our sample was 0.34, substantially lower than the 0.64 reported by Brody and Weiss [33]. As noted previously, however, many of the studies in the meta-analysis [15] included only treatment-seeking patients, either for a sexual problem or another medical disorder, with self-selection for treatment representing a significant source of bias. Such men, for example, would typically fit a profile of being older and less healthy, or of having a lower threshold for treatment-seeking. We believe our results add a comorbidity estimate to the growing evidence

indicating that men with PE have a higher-than-average probability of also suffering from ED, while circumventing the self-selection and compromised-health bias inherent in various patient samples (see also the discussion about PE subtypes). While our data do not enable us to address questions regarding the specific etiologies of PE and ED when they occur concomitantly, as suggested by Jannini [34] and indicated by others [12,14], they do support the idea that in men with severe PE—who report greater concordance of ED than vice versa—sexual arousal may be moderated intentionally (e.g., through distraction) or inadvertently (e.g., through anxiety), thus resulting in a less-than-adequate erection. Alternatively, the concurrent PE and ED could result from an underlying third variable, as yet unidentified, that compromises the integrity of both erectile and ejaculatory responses.

Second, men who report severe DE generally have a low concordance with LSI, suggesting that for most men with DE, the problem is *not* an issue with lack of sexual interest. Not surprisingly, ED and DE occurred together quite frequently—nearly 40% of the time—although the primary vs. secondary status of these dysfunctions was not discernible from our analysis. Clearly, men with severe ED are not likely to reach orgasm easily, and thus may suffer from difficulty or delayed ejaculation as well [18]. At the same time, our data indicate that over 60% of these men reported DE in the absence of erectile problems. For this subset of men, a lack of sexual psychological arousal rather than a lack of erectile capacity appears to be the more salient factor in explaining the DE [35,36].

Third, men who report strong LSI are likely to report significant comorbidities with all other sexual dysfunctions. Whereas comorbidity between LSI on the one hand, and ED and DE on the other, are readily explained, the fact that similar comorbidity was found with PE suggests the critical role that LSI has on all aspects of sexual responding and, as recommended by others [37], further highlights the importance of assessing sexual interest/desire in any man or couple seeking help for a sexual problem.

Finally, three-way comorbidities have rarely been reported for sexual dysfunctions [e.g., 38]. In our sample, three-way comorbidities were very uncommon, though less so when restrictions were

eased to include both moderate and severe dysfunctions. Even then, the prevalence of three-way comorbidities in the overall sample was only slightly above 1%. We surmise that men who suffer from two dysfunctions such as PE and ED, or ED and DE, may—partly out of frustration—also lose their general appetite for sex, thus exhibiting LSI. Such an assumption remains to be empirically tested.

PE Subtypes and Concordance Patterns

Men with either lifelong or acquired PE showed higher probabilities of having ED than those with no or probable PE. In contrast with an observational study in Asia [16] which reported a much higher concordance for men with acquired PE, our lifelong and acquired subgroups showed similar CRs and ORs (acquired, 23.2% vs lifelong, 25.6%); indeed, even the percentages across severity levels of ED (moderate to severe) were similar for these subtypes (16.1/16.5 and 7.1%/9.1 respectively). Future research needs to reconcile these contrasting results and identify potential explanatory variables. For example, men with acquired PE in the Asian study [16] were older, weighed more, and were characterized by higher levels of psychological and chronic somatic health problems than men with lifelong PE; and these known risk factors, rather than PE status per se, may have been responsible for the higher rate of ED in their men with acquired PE. In contrast, in our study, ad hoc analysis comparing the lifelong and acquired PE groups on age, chronic medical disorders related to ED, and ongoing/persistent anxiety revealed a high degree of homogeneity on these variables. Thus, the differences between concordance patterns across studies in men with acquired PE may well be due to health and aging-related issues in Gao's acquired PE group, rather than to PE status per se [see also 39]. These same general health issues may explain the higher LSI seen in men with acquired (vs lifelong) PE [37,40].

Conclusion and Limitations

The patterns of sexual comorbidities based on our large bi-national community sample elucidate the importance of understanding the relatively common concordance among sexual dysfunctions, findings that should inform the clinical diagnostic and treatment process for any man seeking assistance

for a sexual complaint [7,41]. As with any studies determining comorbidities, the quality of the data, the strategy for categorizing dysfunctional status, and the selection of "severe/definite" dysfunction as the reference group all play critical roles in generating credible CRs and ORs. Regarding the quality of our data, although we implemented precautions such as guaranteeing anonymity, attention checks which eliminated participants responding inconsistently across the survey, and prevention of multiple submissions, online surveys that rely largely on recruiting via public and social media are subject to biases in education, class, social media access, and other factors. Consequently, given that ours was not a probability sample, prevalence rates need to be qualified accordingly. Regarding the categorization of dysfunctional status, our groupings differed from those used in other studies, so direct comparisons need to be taken cautiously. We used categorizations based on IIEF and PEDT questions—as well as on experimenter-derived questions for DE and LSI—that captured three broad levels for each of the dysfunctions under investigation (none/mild, moderate, and severe) and thus enabled us to investigate various combinations of these in order to generate concordance rates. Furthermore, we chose to use the severe category of a dysfunction as the reference group, based on the premise that such individuals would more likely be encountered at a medical clinic. However, other studies have used different instruments and/or methods for defining sexual dysfunctions. Our intention in providing such methodological detail is to encourage others—whether or not they agree with our categorization strategy—to contribute not only to the effort of building a sexual comorbidity database, but also to the larger conversation surrounding their relevance to diagnosis and treatment. Finally, we recognize that not all possible male sexual dysfunctions were analyzed (e.g., sexual aversion disorder) and, further, that simply knowing comorbidity rates provides only limited insight into possible etiological pathways. In fact, careful probing by the healthcare provider is critical to establishing primary, secondary, sequential, and concomitant problems for establishing an appropriate management or treatment protocol.

DECLARATIONS

Table 1. Demographics of study participants

Age	Percentage
18-21	7.4
22-30	23.8
31-40	24.9
41-50	24.3
51-60	12.2
61-70	6.1
71+	1.4
Education	
Less than high school	4.2
High school	26.5
Post-high school	14.2
Some college	18.0
Bachelor's degree	16.2
Graduate degree	20.9
Sexual Orientation	
Asexual/Non-sexual	0.2
Strongly heterosexual	87.0
Bisexual	1.5
Strongly homosexual	10.9
Current Sexual Partner	
No sexual partner	20.7
One sexual partner	69.2
Multiple sexual partners	10.1
Anxiety/Depression	
No	81.0
Yes	19.0
Ongoing Medical Issues	
No	78.2
Yes	21.8

Table 2. Percentages of men reporting no/mild, moderate/probable, and severe/definite sexual problems

	PE	ED	DE	LSI
None to Mild	73%	86.4%	86.7%	73.3%
Moderate/Probable	19.5%	9.5%	8.9%	23.1%
Severe/Definite	7.5%	4.1%	4.6%	3.6%
Combined Moderate/Severe	27.0%	13.6%	13.5%	26.7%

Note: PE = premature ejaculation; ED = erectile dysfunction; DE = delayed ejaculation; LSI = lack of sexual interest.

Table 3. CRs and ORs (with p-values) of men with severe sexual dysfunctions who also have another moderate or severe sexual dysfunction

For men reporting…		% of men also having…			
		Moderate/Severe PE	Moderate/Severe DE	Moderate/Severe ED	Moderate/Severe LSI
Severe PE	*Combined %*		-	22.7%	30.7%
	Partitioned %		-	15.1%/7.6%	28.4%/2.3%
	Odds-ratio		-	2.036	1.327
	p-value		-	**.001**	**.043**
Severe DE	*Combined %*	-		31.2%	28.0%
	Partitioned %	-		19.8%/11.4%	25.0%/3.0%
	Odds-ratio	-		3.932	1.075
	p-value	-		**.001**	.659
Severe ED	*Combined %*	29.2%	38.3%		37.0%
	Partitioned %	17.2%/12.1%	22.8%/16.0%		33.8%/3.2%
	Odds-ratio	1.211	4.83		1.784
	p-value	.288	**.001**		**.001**
Severe LSI	*Combined %*	39.2%	39.8%	22.8%	
	Partitioned %	32.1%/7.1%	20.5%/19.3%	16.5%/6.3%	
	Odds-ratio	1.897	1.726	1.968	
	p-value	**.005**	**.047**	**.013**	

Notes: "-" because severe PE and severe DE represent mutually exclusive categories, CRs and ORs are not presented. p-Values in bold are < .05

Table 4. CRs and ORs (with p-values) of men with severe lifelong or acquired PE who also have an another moderate/severe sexual dysfunction

		% of men also having...	
		Moderate/Severe ED	Moderate/Severe LSI
Severe Lifelong PE	*Combined %*	25.6%	31.0%
	Partitioned %	16.5%/9.1%	28.0%/3.0%
	Odds-ratio	1.586	.979
	p-value	**p=.023**	p=.915
Severe Acquired PE	*Combined %*	23.2%	36.2%
	Partitioned %	16.1%/7.1%	34.5%/1.7%
	Odds-ratio	1.149	1.421
	p-value	p=.693	p=.231

Note: p-Values in bold < .05

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