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Associations between common mental disorders and sexual dissatisfaction in the general population

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Background
Little is known about the associations between common mental disorders and sexual dissatisfaction in the general population.

Aims
To assess the associations between the presence of 12-month and remitted (lifetime minus 12-month) mood, anxiety and substance use disorders and sexual dissatisfaction in the general population of The Netherlands.

Method
A total of 6646 participants, aged 18–64, took part in a face-to-face survey using the Composite International Diagnostic Interview 3.0. Childhood trauma, somatic disorders and sexual dissatisfaction were also assessed in an additional questionnaire. Associations were assessed with multivariate regression analyses.

Results
In total, 29% reported some sexual dissatisfaction. Controlling for demography, somatic disorders and childhood trauma, significant associations with 12-month mood disorder (B = 0.31), substance use disorder (B = 0.23) and anxiety disorder (B = 0.16) were found. Specifically, relatively strong associations were found for alcohol dependence (B = 0.54), bipolar disorder (B = 0.45) and drug dependence (B = 0.44). The association between remitted disorders and sexual dissatisfaction showed significance for the category substance use disorder.

Conclusions
People with mood, anxiety and substance use disorders show elevated scores on sexual dissatisfaction, even when relevant confounders are controlled for. Sexual satisfaction appears to be reduced most by alcohol and drug dependence and bipolar disorder. Once remitted, substance use disorder shows a persisting association with present sexual dissatisfaction.

Declaration of interest
None.

Sexuality and mental health are related in many different ways. A vast literature addresses the psychiatric outcomes of sexual experiential variables, notably of child sexual abuse in women[1] and, to a lesser extent, in men.[2] Mental ill health has also been associated with non-heterosexuality[3] and homophobic social reactions.[4] Another body of literature looks at the sexual outcomes of various psychiatric conditions, the larger part of which addresses sexual dysfunction.[5,6] Sexual dysfunction is only one aspect of human sexual experience and the focus on it in sexology has been criticised as being notably limited in light of human sexual discontent more generally.[7] Problematic aspects of sexuality other than dysfunctions, such as dissatisfaction with emotional or relational aspects of sexual experience, are studied to a lesser extent in the context of mental health. Taking the broader view of sexual (dis)satisfaction in relation to mental health is desirable. Although the body of evidence on the determinants of sexual (dis)satisfaction is sometimes contradictory, sexual dissatisfaction has rather consistently been associated with being female, particularly when older,[8] having been sexually victimised[9] and having low (somatic) health status.[10] When studying the relationship between sexual dissatisfaction and mental health, such variables need to be taken into account.

The psychiatric conditions mostly studied as sexual correlates are the common mental disorders such as depression,[11,12] anxiety disorders[5] and substance use disorders.[13] Most research has studied patient samples. Overall, a negative relationship between psychiatric conditions and sexual function or satisfaction is found,[14] although a minority of patients report an increase in sexual interest and function.[11] Bipolar disorder is associated with a reduction in sexual desire in depressive phases, but with hypersexual and promiscuous behaviour in individuals in manic phases.[6,15] There is some evidence that, in comparison with other psychiatric conditions, associations of sexual problems with heroin addiction are notably strong.[16] However, most studies involved only one specific disorder. Thus, comparison of specific psychiatric conditions and their relationship with sexual (dys)function or general sexual (dis)satisfaction, is relatively rare. So are studies among the general population in this area. Questions remain about the extent to which divergent mental health problems are associated with sexual dissatisfaction in the general population. In addition, population studies on psychiatric epidemiology have provided evidence that after remittance, notably of depression, residual debilitating effects in social, emotional and physical domains of life can still exist;[17,18] however, to our knowledge no study has addressed residual effects of a variety of mental disorders on sexual dissatisfaction. In this paper, data from the first wave of The Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2) were used to study, among the general population, the associations between three categories of common mental disorders (mood, anxiety and substance use disorders) and general sexual dissatisfaction. To what extent is mental health associated with present general sexual dissatisfaction? How does this differ between categories of disorders and specific disorders? In addition, we investigated whether sexual dissatisfaction continues after the various mental disorders have remitted by studying the associations between lifetime minus 12-month disorders and present sexual dissatisfaction.

Method

Design and sample

In NEMESIS-2, a multistage, stratified random sampling procedure was applied. A random sample of 184 of the 443 existing municipalities was drawn. In these municipalities, a random sample of addresses of private households from postal registers was drawn. Based on the most recent birthday at first contact within the household, an individual aged 18–64 with sufficient fluency in the Dutch language was randomly selected for interview. The study was approved by a medical ethics committee and respondents provided written informed consent. Selected households received a letter from the Dutch Minister of Health, Welfare and Sport, in which the study was explained and recommended. Households were contacted by telephone, or visited in person if no telephone number was available, at least ten times during November 2007 to July 2009. The response rate was 65.1%. The sample was nationally representative, although younger participants were somewhat underrepresented. In total 6646 people participated. For a more detailed description of the design and fieldwork see de Graaf *et al*.[19]

Measurement

Mental disorders. We assessed DSM-IV disorders[20] using the Composite International Diagnostic Interview (CIDI) 3.0,[21] which was developed in the World Mental Health Surveys.[22–24] Both 12-month and lifetime prevalence were measured for the following disorders: mood (major depression, dysthymia, bipolar disorder), anxiety (panic disorder, agoraphobia (without panic disorder), social phobia, specific phobia, generalised anxiety disorder) and substance use disorders (alcohol/drug absuse and dependence; the drugs investigated ranged from sedatives and tranquillisers to hypnotics and opiates). Clinical calibration studies conducted in various countries have found that CIDI 3.0[21] and earlier versions[25,26] assess anxiety, mood and substance use disorders with generally good validity compared with masked clinical reappraisal interviews.

Sexual dissatisfaction. Sexual dissatisfaction was assessed with the question 'How satisfied with your sexual life are you at present?' Scores on this item showed high item-rest correlations in data from a multiple-item scale on sexual satisfaction in a large Dutch survey.[27] Answers were on a four-point scale ranging from very much satisfied (score 1) to not satisfied (score 4).

Somatic disorders. Presence of one or more conditions from a standard checklist of 17 chronic physical disorders treated or monitored by a medical doctor in the past 12 months was assessed. These conditions were: respiratory disorders (asthma, chronic obstructive pulmonary disease, chronic bronchitis, emphysema), cardiovascular disorders (severe heart disease, heart attack, hypertension, stroke), digestive disorders (stomach or intestinal ulcers, severe intestinal disorders such as irritable bowel syndrome), diabetes, thyroid disorder, chronic back pain, arthritis, migraine, impaired vision or hearing and other chronic physical disorders. Comparisons between self-reports of chronic physical disorders and medical records show moderate to good concordance.[28]

Sociodemographics. These included gender, age, educational level, living with a partner or not, being sexually active or not, having children, degree of urbanisation and being employed or not.

Childhood trauma. Participants were asked whether, before the age of 16, they had experienced emotional neglect, psychological abuse or physical abuse on two or more occasions, or sexual abuse on one or more occasion.

Statistical analyses

Of the 6646 respondents, 140 received a shortened version of the questionnaire and were not asked about sexual dissatisfaction, somatic disorder and childhood trauma. Furthermore, 116 respondents answered 'don't know' and 172 persons refused to answer the question on sexual dissatisfaction. These respondents were omitted from the analyses, which means that the final number of respondents in the analyses was 6218.

The data were weighted to correct for differences in the response rates among several population groups and for differences in the probability of selection of respondents within households,[19] so that it was possible to generalise the results to the national population. Robust standard errors were calculated by using the first-order Taylor-series linearisation method, as implemented in Stata 11 on Windows, in order to obtain corrected 95% confidence intervals and *P*-values.[29] Summary statistics were used to describe correlates of sexual dissatisfaction. Multivariate regression analyses were performed to examine the association between mental disorders and sexual dissatisfaction, adjusted for gender, age, partner status and being sexually active (Model 1) and additionally for having children, paid job, education, urbanicity of residence, somatic disorder and childhood trauma (Model 2). As the outcome variable sexual dissatisfaction was measured on a narrow four-point scale and the distribution of these data was somewhat skewed, we also performed the analyses with multinomial logistic regression analyses. These analyses yielded similar results and are available from the authors on request.

Results

Correlates of sexual dissatisfaction

A minority of the study sample reported dissatisfaction with their sexual lives at present. Overall, 8.1% of the sample reported being 'not satisfied'; another 20.6% reported being 'a little satisfied'. Table 1 shows the relative sexual dissatisfaction among the Dutch population as distinguished by a number of demographic variables and Table 2 by variables related to somatic health, childhood trauma and whether sexually active. Many of these variables show significant associations with sexual dissatisfaction: participants of older age, not living with a partner, without children (at home), without a paid job, with a lower education, living in urban areas, who reported somatic disorders, who experienced childhood abuse and neglect and who were not sexually active all showed more sexual dissatisfaction. No differences were found between men and women.

Associations between 12-month mental disorders and sexual dissatisfaction

Table 3 details categories of 12-month common mental disorders as correlates of sexual dissatisfaction (see online Table DS1 for the results by specific disorder). At the bivariate level, all categories of disorders investigated, with the exception of agoraphobia and alcohol abuse (Table DS1), are significantly correlated with sexual dissatisfaction.

The results of the multivariate analyses, controlling for gender, age, partner status and being sexually active (Table 4, Model 1) and, additionally, for all relevant demographic variables, somatic

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Table 1 Sociodemographic characteristics as correlates of sexual dissatisfaction ($n = 6218$), in unweighted numbers and weighted means and percentages

		Sexual satisfaction					
	n	Dissatisfaction Mean	Very much satisfied, % ($n = 1237$)	Very satisfied, % ($n = 3056$)	A little satisfied, % ($n = 1341$)	Not satisfied, % ($n = 584$)	*P*
Gender							
Male	2817	2.17	20.8	49.9	21.3	8.1	
Female	3401	2.15	20.9	51.0	20.0	8.1	0.7433
Age, years							
18–24	430	2.00	28.6	50.7	13.2	7.5	
25–34	1068	2.11	26.7	43.2	22.6	7.5	
35–44	1622	2.13	21.2	52.2	19.3	7.4	
45–54	1498	2.20	17.1	54.3	20.0	8.7	
55–64	1600	2.30	14.4	50.9	25.6	9.2	**<0.0001**
Partner status							
Living with partner	4326	2.03	22.1	56.6	17.6	3.7	
Not living with partner	1892	2.46	17.9	36.5	27.4	18.1	**<0.0001**
Having children							
With children living at home	2732	2.08	21.2	55.4	17.9	5.5	
With children not at home	1596	2.27	16.2	50.5	22.9	10.4	
Without children	1890	2.20	22.9	44.1	22.9	10.2	**<0.0001**
Employment situation							
With paid job	4700	2.12	21.5	51.8	19.8	7.0	
Without paid job	1518	2.29	18.6	45.9	23.5	12.0	**<0.0001**
Education							
Primary, basic vocational	278	2.28	12.9	55.9	21.6	9.6	
Lower secondary	1680	2.14	22.7	50.2	17.9	9.2	
Higher secondary	2010	2.14	21.3	50.8	20.1	7.8	
Higher professional, university	2250	2.17	20.5	48.9	23.3	7.4	**0.0115**
Urbanicity of residence							
Very low	838	2.08	23.0	52.2	18.1	6.6	
Low	1348	2.11	20.6	54.2	18.5	6.7	
Medium	1407	2.21	18.5	51.2	21.3	8.9	
High	1639	2.14	23.7	46.8	21.3	8.2	
Very high	986	2.25	17.4	50.1	23.0	9.6	**0.0032**

Results in bold are significant.

Table 2 Somatic disorder, childhood trauma and whether sexually active as correlates of sexual dissatisfaction ($n = 6218$), in unweighted numbers and weighted means and percentages

		Sexual satisfaction					
	n	Dissatisfaction Mean	Very much satisfied, % ($n = 1237$)	Very satisfied, % ($n = 3056$)	A little satisfied, % ($n = 1341$)	Not satisfied, % ($n = 584$)	*P*
Somatic disorder							
No	3978	2.11	22.0	51.9	19.2	6.9	
Yes	2240	2.26	18.4	47.6	23.5	10.5	**<0.0001**
Emotional neglect							
No	5239	2.13	21.3	51.9	19.6	7.2	
Yes	979	2.35	17.8	42.2	26.9	13.1	**<0.0001**
Psychological abuse							
No	5128	2.13	21.4	51.7	19.6	7.2	
Yes	1090	2.33	17.7	44.3	25.7	12.3	**<0.0001**
Physical abuse							
No	5697	2.14	21.1	51.4	19.9	7.6	
Yes	521	2.39	17.3	39.7	29.3	13.6	**<0.0001**
Sexual abuse							
No	5712	2.14	21.1	51.2	19.9	7.8	
Yes	506	2.36	16.9	42.1	29.0	11.9	**<0.0001**
Sexually active							
No	896	2.84	9.0	27.1	34.8	29.1	
Yes	5298	2.06	22.5	53.8	18.6	5.1	**<0.0001**

Results in bold are significant.

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Table 3 Twelve-month mental disorders as correlates of sexual dissatisfaction ($n = 6218$), in unweighted numbers and weighted percentages and means[a]

		Sexual satisfaction					
	n	Dissatisfaction Mean	Very much satisfied, % ($n = 1237$)	Very satisfied, % ($n = 3056$)	A little satisfied, % ($n = 1341$)	Not satisfied, % ($n = 584$)	*P*
Any mood disorder							
No	5832	2.13	21.1	51.7	20.3	6.9	
Yes	386	2.60	17.0	31.6	26.1	25.3	**<0.0001**
Any anxiety disorder							
No	5586	2.13	21.0	51.8	19.9	7.2	
Yes	632	2.39	18.8	38.6	27.0	15.6	**<0.0001**
Any substance use disorder							
No	5936	2.14	21.3	50.8	20.1	7.8	
Yes	282	2.42	13.2	44.4	29.5	12.9	**0.0002**
Any Axis I disorder							
No	5169	2.11	21.6	52.4	19.5	6.5	
Yes	1049	2.40	17.0	41.5	26.0	15.5	**<0.0001**

Results in bold are significant.
a. Please see online Table DS1 for a more detailed version of Table 3.

disorders and childhood trauma (Model 2) show that 'any Axis I disorder' and all three categories of mental disorders are significantly associated with sexual dissatisfaction in both models. In Model 2, sexual dissatisfaction scores of people with 'any mood disorder' are, on average, 0.31 higher than those without any mood disorder. For 'any substance use disorder' and 'any anxiety disorder' these figures are 0.23 and 0.16 respectively. When looking at the separate disorders, associations with sexual dissatisfaction in Model 1 are significant for (in order of coefficient size) alcohol dependence, bipolar disorder, drug dependence, drug abuse, social phobia, major depression, panic disorder, generalised anxiety disorder and specific phobia. When also controlling for relevant demographic confounders, somatic disorders and childhood trauma (Model 2), only the associations with panic disorder and generalised anxiety disorder were no longer significant. In both models, the results of the multivariate analyses were not significant for dysthymia, agoraphobia and alcohol abuse.

Associations between remitted mental disorders and sexual dissatisfaction

Associations between lifetime minus 12-month mental disorders and sexual satisfaction in the multivariate analyses (Table 5, Model 1) are significant for 'any Axis I disorder' and for the categories any substance use disorder and any anxiety disorder. Specifically, agoraphobia and social phobia show significant associations with present sexual dissatisfaction. Mood disorder was not significantly associated with sexual dissatisfaction, categorically nor specifically. When other relevant demographic variables, somatic disorders and childhood trauma are additionally entered into the model (Table 5, Model 2), the association with any anxiety disorder

Table 4 The association between 12-month mental disorders and sexual dissatisfaction ($n = 6194$), in weighted adjusted regression coefficients with 95% confidence intervals

		Sexual dissatisfaction			
		Model 1[a]		Model 2[b]	
12-month disorders	*n*	Adjusted coefficient (95% CI)	*P*	Adjusted coefficient (95% CI)	*P*
Any mood disorder	386	**0.35 (0.23 to 0.47)**	<0.001	**0.31 (0.18 to 0.43)**	<0.001
Major depression	341	**0.30 (0.15 to 0.45)**	<0.001	**0.25 (0.10 to 0.40)**	0.001
Dysthymia	59	0.40 (−0.07 to 0.86)	0.094	0.31 (−0.14 to 0.76)	0.173
Bipolar disorder	41	**0.52 (0.16 to 0.87)**	0.004	**0.45 (0.12 to 0.78)**	0.008
Any anxiety disorder	632	**0.21 (0.12 to 0.30)**	<0.001	**0.16 (0.07 to 0.25)**	0.001
Panic disorder	75	**0.30 (0.06 to 0.54)**	0.013	0.22 (−0.02 to 0.45)	0.072
Agoraphobia	23	−0.02 (−0.44 to 0.41)	0.942	−0.14 (−0.55 to 0.26)	0.481
Social phobia	221	**0.33 (0.18 to 0.48)**	<0.001	**0.27 (0.12 to 0.42)**	<0.001
Specific phobia	326	**0.21 (0.07 to 0.34)**	0.003	**0.15 (0.02 to 0.29)**	0.026
Generalised anxiety disorder	107	**0.22 (0.01 to 0.43)**	0.044	0.17 (−0.03 to 0.38)	0.101
Any substance use disorder	282	**0.26 (0.15 to 0.36)**	<0.001	**0.23 (0.12 to 0.34)**	<0.001
Alcohol abuse	183	0.14 (−0.01 to 0.30)	0.074	0.13 (−0.03 to 0.29)	0.114
Alcohol dependence	33	**0.56 (0.31 to 0.81)**	<0.001	**0.54 (0.30 to 0.78)**	<0.001
Drug abuse	44	**0.36 (0.14 to 0.58)**	0.002	**0.29 (0.06 to 0.51)**	0.012
Drug dependence	37	**0.48 (0.09 to 0.87)**	0.016	**0.44 (0.06 to 0.82)**	0.023
Any Axis I disorder	1049	**0.24 (0.18 to 0.30)**	<0.001	**0.20 (0.14 to 0.27)**	<0.001

Results in bold are significant.
a. Model 1: adjusted regression coefficient for gender, age, partner status, being sexually active.
b. Model 2: adjusted regression coefficient for gender, age, partner status, being sexually active, having children, paid job, education, urbanicity of residence, somatic disease, four types of childhood trauma (emotional neglect, psychological abuse, physical abuse, sexual abuse).

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Table 5 The association between lifetime minus 12-month mental disorders and sexual dissatisfaction ($n = 6194$), in weighted adjusted regression coefficients with 95% confidence intervals

		Sexual dissatisfaction			
		Model 1[a]		Model 2[b]	
Lifetime minus 12-month disorders	*n*	Adjusted coefficient (95% CI)	*P*	Adjusted coefficient (95% CI)	*P*
Any mood disorder	932	0.05 (−0.02 to 0.13)	0.176	0.01 (−0.07 to 0.09)	0.752
Major depression	891	0.06 (−0.02 to 0.14)	0.132	0.02 (−0.06 to 0.11)	0.581
Dysthymia	28	0.19 (−0.12 to 0.51)	0.230	0.09 (−0.24 to 0.41)	0.603
Bipolar disorder	36	−0.16 (−0.44 to 0.13)	0.276	−0.22 (−0.52 to 0.07)	0.137
Any anxiety disorder	625	**0.10 (0.01 to 0.19)**	0.023	0.06 (−0.03 to 0.15)	0.159
Panic disorder	171	−0.03 (−0.19 to 0.14)	0.761	−0.07 (−0.23 to 0.10)	0.431
Agoraphobia	41	**0.41 (0.11 to 0.72)**	0.008	**0.35 (0.06 to 0.65)**	0.019
Social phobia	359	**0.15 (0.01 to 0.29)**	0.038	0.11 (−0.03 to 0.24)	0.115
Specific phobia	193	0.10 (−0.02 to 0.22)	0.110	0.06 (−0.07 to 0.18)	0.350
Generalised anxiety disorder	180	0.10 (−0.05 to 0.24)	0.197	0.02 (−0.12 to 0.17)	0.747
Any substance use disorder	794	**0.12 (0.03 to 0.20)**	0.006	**0.09 (0.01 to 0.17)**	0.032
Alcohol abuse	607	0.07 (−0.02 to 0.16)	0.143	0.06 (−0.04 to 0.15)	0.256
Alcohol dependence	74	0.10 (−0.09 to 0.29)	0.298	0.02 (−0.16 to 0.21)	0.795
Drug abuse	169	0.12 (−0.03 to 0.27)	0.118	0.06 (−0.08 to 0.21)	0.395
Drug dependence	63	0.17 (−0.13 to 0.47)	0.273	0.12 (−0.16 to 0.41)	0.393
Any Axis I disorder	1518	**0.09 (0.03 to 0.16)**	0.005	**0.07 (0.01 to 0.14)**	0.023

Results in bold are significant.
a. Model 1: adjusted regression coefficient for gender, age, partner status, being sexually active.
b. Model 2: adjusted regression coefficient for gender, age, partner status, being sexually active, having children, paid job, education, urbanicity of residence, somatic disease, four types of childhood trauma (emotional neglect, psychological abuse, physical abuse, sexual abuse).

was no longer significant. Associations between present sexual dissatisfaction and 'any Axis I disorder', 'any substance use disorder' and agoraphobia, even when remitted for 12 months or longer, still remained significant.

Discussion

Strengths and limitations

To our knowledge, this is one of the first studies in a representative sample of the adult population in which the relationship between a broad range of mental disorders and sexual dissatisfaction has been investigated. Several strengths of the study are noteworthy. First, because of the size and representativeness of the sample, its external validity is high. The same is true for its internal validity, because of the use of a structured diagnostic interview to measure mental disorders. Moreover, the extensiveness of the additional questionnaire allowed controlling for relevant confounders. Considering the relevance of childhood trauma as a confounder, it should be mentioned as a minor shortcoming of our diagnostic interview that it did not measure post-traumatic stress disorder.

Another minor limitation relates to the prevalence estimates in NEMESIS-2. The study excluded people who were unable to understand the Dutch language well and people that were homeless or who remained institutionalised for long periods. However, as such people make up only a very small proportion of the Dutch population, overall prevalence rates are not affected to a large extent. Another limitation is the cross-sectional design of the study. Although NEMESIS-2 has a longitudinal design, we made use of data from the first wave only, because sexual dissatisfaction was only measured in the first wave. It remains undetermined whether mental problems cause sexual dissatisfaction, or vice versa, or both. Considering the possible negative and debilitating effects of mental disorders, it seems plausible to at least suppose an effect from them on sexual satisfaction. Our findings here do, moreover, support such a causality by providing evidence that the negative effects of mood and anxiety disorders on sexual satisfaction seem not to last after the psychiatric problems remitted. Nevertheless, it is possible that sexual dissatisfaction (also) facilitates the aetiology of psychiatric disorders, or impedes recovery from them. As is often the case, a two-way process with both forms of ill health sustaining each other might be possible.

Another drawback is the non-specificity of the sexual dissatisfaction measure used in this study. Basically, we do not know what sexual (dis)satisfaction actually pertains to here. Does it relate to sexual meanings or emotions, sexual experiences, relational satisfaction, sexual communication, the frequency of sexual behaviour, sexual function, or a combination of those? On the other hand, using 'sexual dissatisfaction' as a broader and thus more complete indicator of sexual health than 'sexual dysfunctions', is an advantage of the study and a welcome addition to the majority of dysfunction-focused studies in this field. But to what extent and how exactly the two concepts differ is unclear, although some recent evidence indicates that, in lay people's definitions, sexual satisfaction derives from positive sexual experiences (such as mutual pleasure) rather than from the absence of sexual dysfunction.[30]

In addition, medication taken for a psychiatric condition may further hamper sexual experience. Medication may directly affect sexual function (notably by affecting neurotransmission) or work indirectly through negative effects on physiology (such as perspiration, smell or energy level) or appearance (such as weight or skin).[31] Our study does not overcome one of the general problems found in research in this area, which is that it is often unclear whether effects are to be attributed to the condition itself or to medication. However, since we know that only a small minority of respondents in this study had medication prescribed during their 12-month disorder (varying between 1% and 3.5% for the different types of disorders), a large effect thereof is not to be expected.

Correlates of sexual dissatisfaction

First, this study has shown, as anticipated, that many demographic variables, somatic disorders and childhood trauma are indeed related to sexual dissatisfaction in expected ways. However, it

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was contrary to expectations[8] that we found that sexual dissatisfaction was not greater in women than men. A recent sexual-health-focused survey among the Dutch population (aged 15–71 years of age)[32] did find a small but significant gender difference in sexual satisfaction, with 61.0% of women and 63.4% of men reporting they were satisfied with their sexual lives (scores 4 and 5 on a five-point scale). Responding to a five- instead of a four-point scale may be one reason for these slightly different findings. Another reason that no gender differences were found may have been that participants thought of different aspects of sexual satisfaction in answering the question.

Second, the study has shown that general sexual dissatisfaction is moderately but consistently associated with a range of mood, substance use and anxiety disorders. This is even the case when all demographic and experiential variables (somatic disorders, childhood trauma) are controlled for.

Third, sexual dissatisfaction was found to be associated with the category any substance use disorder even when the latter had already remitted for 12 months or more. This was the case for any anxiety disorder (and specifically for social phobia) only before controlling for the experiential variables, but in neither case for any mood disorder. That agoraphobia specifically was associated with present sexual dissatisfaction after remission, whereas no associations were found before remission, is a remarkable finding in this study. It is difficult to explain this finding. However, because of the low prevalence and thus small number of individuals with agoraphobia, the positive association might well be the result of chance and thus a false positive.

Overall, the associations of sexual dissatisfaction with mood and anxiety disorders may have been attenuated by the oppositely directed effects they may have on sexual dissatisfaction. Although the evidence for negative effects of mood and anxiety disorders on sexuality is strong, some patients, on the other hand, seem to experience positive effects.[11,14] In a study by Bancroft *et al*, 44% of men with depression reported reduced sexual interest, but 12% reported an increase.[11] In our study, negative and positive effects may have, to a certain extent, cancelled each other out in the analyses.

Various associations compared

When looking at the various associations found, alcohol and drug dependence (but not so alcohol abuse, and drug abuse to a lesser extent) show a somewhat more solid relationship with sexual dissatisfaction in comparison with mood and, particularly, anxiety disorders. The fact that alcohol abuse (as opposed to dependence) was not associated with sexual dissatisfaction may be seen as an illustration of the normative character of alcohol use in The Netherlands, a habit not necessarily reflecting mental problems and, apparently, not bearing a relationship to sexual problems, either causally or covariantly. The suggestion that alcohol abuse might not necessarily indicate psychopathology has been discussed previously.[33] Alcohol dependence however, may be reflective of pathology and as such related to, among others, sexual dissatisfaction. The differential effects of occasional *v.* prolonged alcohol use on sexual experience have been well documented.[34] Occasional and moderate use may have notable positive effects, whereas heavy and long-lasting use, notably when out of control, such as in dependence, may strongly obstruct sexual performance and experience.

The suggestion that drug dependence is strongly associated with sexual dissatisfaction is also supported by other studies. For instance a Turkish study showed that psychiatric patients who were addicted to heroin significantly more often had sexual problems than out-patients in remission with schizophrenia, patients with bipolar affective disorders and a healthy control group.[16] The sexual disturbance and possibly connected dissatisfaction caused by opiate-induced hypogonadism is well documented in the literature, with hormone substitution in individuals addicted to heroin strongly advised by some authors.[35] Others, however, have attributed sexual problems not to the opiate but more to the underlying psychiatric problems.[36]

We also found the association between sexual dissatisfaction and bipolar disorder to be relatively strong, at least when individuals were still experiencing the disorder. This is consistent with the fact that bipolar disorder is one of the most severe common mental disorders, together with alcohol and drug dependence.[37] The more severe mental disorders most probably have a relatively strong negative effect on daily life and functioning, with likewise negative effects on sexual satisfaction.

Implications

Our findings strongly endorse the existence of a significant relationships between mental health and overall sexual satisfaction. Therefore, the results of this study highlight the need for appropriate attention to be given to sexuality in mental health clinical practice, residential or otherwise. Not least the issue of sexual dissatisfaction in patients with drug addiction (as opposed to 'mere' drug abuse) could be addressed in treatment plans. Explicitly exploring sexuality with patients with dependence may even provide an extra motivation to recover from their dependency. Finally, this study draws attention to the need for more research into the associations between mental health and a variety of indicators of sexual health and satisfaction, indicators that are broader than the dysfunctions mostly studied but more specific than the broad measure of overall satisfaction used here.

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