

# Somatoform and Substance Use Disorders

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**Objective:** To review the potential for diagnostic difficulties and overlap in a number of symptoms of somatoform disorders and symptoms of withdrawal from alcohol and drugs, and to review epidemiologic, family, and clinical studies addressing comorbidity between somatoform and substance use disorders. The comorbidity between somatoform disorders and substance use disorders has rarely been studied. **Methods:** Symptoms of somatoform disorders and substance withdrawal were compared. A PubMed-based literature review was conducted. **Results:** Somatoform and withdrawal symptoms overlap considerably. Few studies, however, have addressed comorbidity between somatoform and substance use disorders. Although results are inconsistent, a number of studies suggest that an association exists. **Conclusion:** More research on this type of comorbidity is warranted because the associations may be stronger than generally assumed. Such research should address methodological problems to produce studies with clearer findings. **Key words:** somatoform, substance, abuse, dependence, somatization.

ECA = Epidemiologic Catchment Area; USD = undifferentiated somatoform disorder; SSI = Somatic Symptom Index; SSI<sub>4,6</sub> = Somatic Symptom Index, 4 symptoms (men) and 6 symptoms (women).

## INTRODUCTION

Somatoform disorders are generally characterized by somatic symptoms that are unaccounted for by a medical condition, a direct substance-related effect, or another psychiatric disorder. These disorders include somatization disorder, body dysmorphic disorder, pain disorder, hypochondriasis, conversion disorder, as well as undifferentiated somatoform disorder and somatoform disorder not otherwise specified. Because somatoform symptoms overlap with the symptomatology of numerous other conditions, clinicians and researchers often encounter difficulty assigning a somatic symptom to an appropriate diagnostic category and they have trouble consequently in diagnosing a somatoform disorder. After the publication of Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition (DSM-III), relatively little attention has focused on the overlap of symptoms and comorbidity between somatoform and substance use disorders. This review addresses two main issues. The first issue is the potential for diagnostic difficulties posed by the overlap in somatoform symptoms and symptoms of substance use disorders, including acute intoxication or withdrawal. The second issue is what is known about the comorbidity between somatoform disorders and substance use, abuse, and dependence.

In the DSM-IV, two main substance use disorders are included—abuse and dependence (1). The DSM-IV dependence diagnosis includes seven criteria. Meeting three or more

of these criteria results in a diagnosis of dependence. One of these dependence criteria is withdrawal. The DSM-IV also lists withdrawal symptoms separately for each major substance category (stimulants, alcohol, etc.). Table 1 presents all DSM-IV withdrawal symptoms that are included for any substance category. Table 1 also indicates which of these are included as symptoms of at least one somatoform disorder. Several of the 18 withdrawal symptoms overlap with symptoms of a somatoform disorder. Given the high levels of depressive or anxiety symptoms noted among individuals with somatoform disorders or subclinical manifestations (2,3), the withdrawal symptoms of anxiety, depression, insomnia, hypersomnia, restlessness, or psychomotor retardation can also be perceived as overlapping with symptoms commonly seen in patients manifesting what seems to be a somatoform condition.

Even substance use that does not meet the criteria for dependence can produce various side effects, such as abdominal pains, impaired coordination, hallucinations, and sexual dysfunction; somatoform symptoms overlap with multiple DSM-IV symptoms for intoxication in any substance category (Table 2). All these symptoms thus have the potential to create diagnostic difficulties, especially if a patient has a pattern of unrecognized alcohol or illicit substance use, or is using medication prescribed to alleviate pain.

Both somatoform disorders and substance use disorders incur a great burden of health care costs (3–5) and may greatly impair physical health, quality of life, and psychological well-being. We therefore reviewed the research conducted to date on the comorbidity of the two classes of disorders, how they might possibly interact, and what difficulties and limitations hinder the research. To our knowledge, such a review has not previously been undertaken.

## METHODS

We conducted online literature searches, primarily via PubMed, using combinations of key words related to both somatoform disorders and substance use disorders. Keyword combinations were comprised of general terms such as “substance use disorders” and “somatoform disorders,” specific terms such as “conversion disorder” and “alcohol,” and pairings of general and specific terms such as “somatization” and “opiates.” The keywords included the following: somatoform disorder, somatization, somatization disorder, body dysmorphic disorder, pain disorder, conversion disorder, hypochondriasis, undifferentiated somatoform disorder, somatoform disorder not otherwise specified, substance use, substance abuse, dependence, withdrawal, substance use disorder, drugs, alcohol, drinking, nicotine, smoking, cocaine, cannabis, heroin, opiates, and medication.

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TABLE 1. DSM-IV Symptoms of Withdrawal From Any Substance

Anxiety <sup>b</sup>	Feeling weak or tired <sup>a</sup>
Insomnia <sup>b</sup>	Bad headaches <sup>a</sup>
Vivid or unpleasant dreams	Muscle cramps
Hallucinations <sup>a</sup>	Runny eyes or nose
Restlessness <sup>b</sup>	Yawning
Shaking <sup>b</sup>	Nausea <sup>a</sup>
Depressed mood <sup>b</sup>	Sweating
Hypersomnia <sup>b</sup>	Fever
Psychomotor retardation <sup>b</sup>	Seizure <sup>a</sup>

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition.

<sup>a</sup> Symptoms overlapping directly with somatoform symptoms.

<sup>b</sup> Symptoms that may additionally overlap with somatoform symptoms due to the extensive comorbidity between somatoform, depressive, and anxiety disorders.

TABLE 2. DSM-IV Symptoms of Intoxication From Any Substance

Slurred speech	Chest pain <sup>a</sup>
Incoordination <sup>a</sup>	Cardiac arrhythmia <sup>a</sup>
Insteady gait	Respiratory depression
Nystagmus	Muscular weakness
Impairment in attention/ memory	Restlessness <sup>b</sup>
Stupor or coma	Nervousness <sup>b</sup>
Tachycardia <sup>b</sup> or bradycardia	Excitement
Pupillary dilation	Insomnia <sup>b</sup>
Elevated or lowered blood pressure	Dystonia
Perspiration or chills <sup>b</sup>	Dyskinesia <sup>a</sup>
Nausea/vomiting <sup>a</sup>	Confusion
Psychomotor agitation/ retardation <sup>b</sup>	Seizure <sup>a</sup>
Flushed face <sup>b</sup>	Diuresis (increased urine discharge)
Gastrointestinal disturbance <sup>b</sup>	Rambling thought and speech
Twitching muscles <sup>a</sup>	Dry mouth
Palpitations <sup>b</sup>	Tremors <sup>a</sup>
Dizziness <sup>b</sup>	Tiredness <sup>a</sup>
Blurred vision <sup>a</sup>	Numbness <sup>b</sup>
Ataxia <sup>a</sup>	Dysarthria
Muscle rigidity	Hyperacusis (abnormally acute hearing) <sup>a</sup>
Increased appetite <sup>b</sup>	Conjunctival injection (red/bloodshot eyes)

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition.

<sup>a</sup> Symptoms overlapping directly with somatoform symptoms.

<sup>b</sup> Symptoms that may additionally overlap with somatoform symptoms due to the extensive comorbidity between somatoform, depressive, and anxiety disorders.

The search encompassed family history studies, epidemiological studies, and patient-based studies whose purpose was to investigate comorbidity between substance use disorders and somatoform disorders or that provided information on this topic through an assessment procedure that was explicitly described in the article. Through articles found in this manner, we also identified additional papers through the citations of the articles found via PubMed.

**RESULTS**

Our search uncovered few papers on the comorbidity of substance use disorders or even substance use and somatoform disorders. We review these papers by type of study design.

**Epidemiologic Studies**

Three German general population studies suggested a significant association between substance use disorders and somatoform disorders. Among 4074 German adults, drinkers meeting the criteria for DSM-IV alcohol abuse and at-risk drinkers (men and women consuming >30 and >20 g ethanol/day, respectively) had significantly higher rates of somatoform, affective, and anxiety disorders than abstainers and moderate drinkers (6). Among females, 16.1% of moderate drinkers and abstainers were diagnosed with a lifetime somatoform disorder, as opposed to 26.3% and 33.3% of the at-risk drinkers and alcohol abusers, respectively. Among men, the rate of lifetime somatoform disorder was 7.1% for moderate drinkers, 13.8% for at-risk drinkers, and 11.6% for alcohol abusers. In another study comparing smokers and nonsmokers, German female daily smokers had higher odds of somatoform disorders (odds ratio (OR) = 1.8), as well as higher odds for anxiety disorders (OR = 1.9), affective disorders (OR = 2.1), and other substance use disorders (OR = 3.0) (7). Additionally, nicotine dependence and withdrawal symptoms were associated with all psychiatric disorders, including somatoform disorders. Finally, among Germans aged 14 to 24 years, substance dependence was significantly associated with conversion disorder (OR = 8.19) (8). Substance dependence was also associated with the subthreshold somatoform condition known as SSI4,6, a Somatic Symptom Index category requiring at least 4 somatization symptoms among men and at least 6 among women (9). An OR of 3.53 was found for the association between substance dependence and SSI4,6 (8).

In contrast to the German findings, data from the US Epidemiologic Catchment Area (ECA) study (10), a large-scale study carried out in five sites in the US, found that somatization symptoms were correlated most weakly with substance abuse symptoms, and most strongly with symptoms of major depression and anxiety disorders (11). Among a subset of ECA participants with ≥5 current somatization symptoms, the prevalence of drug abuse/dependence and alcohol abuse/dependence was 2.2% and 7.4%, respectively, compared with 45.2% for phobia, 17.8% for panic disorder, and 14.8% for major depression. However, a more recent study drawing on data from four ECA sites broadened its analyses to include somatization symptoms of lesser severity (coded as nondisruptive of daily life) and found that a greater number of somatization symptoms was associated with an increasingly elevated risk of comorbid “extreme alcohol use,” which was defined as drinking ≥7 drinks per day for at least 2 weeks or binge-drinking 20 beers a day (or its alcoholic equivalent) more than once (12).

A Canadian general population study conducted among 1015 13- to 16-year-olds did not find a significant relationship between high levels of somatization symptoms and the development of alcohol or drug abuse/dependence 4 years later (13). However, high levels of somatization symptoms pre-

dicted greater risk of depression and panic attacks at the 4-year follow-up.

The studies conducted in Germany produced different results than the studies conducted in North America. Whereas studies in the US and Canada produced mixed findings, the studies in Germany, conducted among both adults and adolescents, consistently suggested that somatization and substance disorders are comorbid. The reason for the discrepancies is unclear and merits further study.

### Patient/Treatment Samples

Several studies conducted among patient samples indicated an association between substance use disorders and somatoform disorders. Among patients diagnosed with body dysmorphic disorder, lifetime rates of substance use disorders ranged from 25% to 49% (14,15). Higher levels of somatization symptoms were also associated with craving for benzodiazepines in Dutch general practice patients, 113 of whom were current long-term benzodiazepine users and 80 of whom were former users (16). British ecstasy users ( $n = 53$ ) who reported that their ecstasy use caused problems in their lives had significantly higher scores on somatization, depression and anxiety scales than several comparison groups, including non-problem ecstasy users, past illicit drug users who did not use ecstasy, and past users of alcohol and nicotine only (17). In a US study that compared 119 primary care patients with somatization disorder and a comparison community sample, the patients had a higher rate of alcohol abuse and dependence but not of drug abuse (18).

In contrast, other patient-based studies had negative results. Among psychiatric outpatients in Greece diagnosed with somatoform disorders, very few were diagnosed with substance abuse, although the patients had high rates of major depression, dysthymia, and panic disorder (19). In a small sample ( $n = 50$ ) of patients with body dysmorphic disorder, only 2% were diagnosed with substance dependence, whereas the rates of dysthymia and social phobia were 18% and 16%, respectively (20).

Few reports on the comorbidity between somatoform and substance disorders are available, in contrast to many hundreds of articles on other aspects of comorbidity in clinical samples. The few studies available are contradictory, although the larger studies tended to report that somatoform and substance use disorders were associated. The reasons for the inconsistencies are unclear, and may involve measurement issues as well as true variation in the comorbidity depending on unspecified aspects of the patients studied or the countries in which the studies were conducted.

### Family History Studies

In the 1980s, the Stockholm Adoption Study (21–23) examined the intergenerational relationship between somatization and parental criminality and alcohol abuse; the latter was defined by registrations at the Swedish temperance board for alcohol-related offenses, hospitalizations, and duration of treatment for alcoholism. Compared with female adoptees of

nonalcohol abusing and noncriminal biological parents, female adoptees whose biological parents abused alcohol or exhibited criminal behavior showed increased risk of somatization (23,24), defined by the frequency, diversity, and duration of symptoms reported on medical records, as well as an increased number of absences from work (21). Also, the biological parents of somatizing adoptees manifested significantly higher rates of alcohol abuse and criminal behavior than the biological parents of nonsomatizers (23). Female somatizers were divided into two types—“high frequency” and “diversiform” somatizers, based primarily on the number and kinds of symptoms they exhibited. Both groups of somatizing adoptees had higher rates of alcohol abuse and criminality than nonsomatizers (22).

Similar findings arose in two smaller family studies. One study found that the relatives of primary care patients with full or subthreshold somatization ( $n = 99$ ) presented with higher rates of alcohol use disorders and depression than relatives of community residents without psychiatric disorders (25). In another study, antisocial symptoms, substance use, and somatization in parents were all linked to higher rates of somatization in children (26). A third family study compared relatives of 35 substance-abusing adolescent males with delinquent behavior and relatives of 35 controls (27). Relatives of the two groups did not differ in somatization symptoms but the sample was small. Thus, the family studies have tended to suggest associations between somatoform disorders and symptoms and substance abuse problems.

## DISCUSSION

Although the research to date suggests the possibility of an association between substance use disorders and somatoform disorders, the scarcity of research and inconsistent findings preclude strong conclusions about their relationship. However, the literature reviewed suggests that somatoform and substance use disorders may be more highly associated than is commonly believed. A number of methodological issues in the studies that are available contribute to the lack of clarity about the comorbidity of somatoform and substance use disorders and symptoms.

### Failure to Control for Depressive or Anxiety Comorbidity

The available studies typically included analyses of depressive and anxiety disorders, which were common. Somatoform disorders and subthreshold somatization symptoms usually show a stronger association with depression and anxiety than with substance use disorders. Because of a failure to control for the comorbidity of depression and anxiety, the studies are not clear about whether substance disorders are associated with the actual somatization of the subjects, or rather with the high levels of concomitant depression and anxiety commonly comorbid with somatization.

### High Diagnostic Thresholds

Another methodological issue is the high symptom threshold for some somatoform disorders and their consequent low prevalence, regardless of the population studied. For example, a comparison of psychiatric disorders in 8296 relatives of alcoholic probands and 1654 controls did not identify enough cases of DSM-III-R somatization disorder for analysis (28). In another example, in the population-based study of Germans aged 14 to 24 years, too few cases of hypochondriasis and somatization disorder emerged for meaningful analysis (8). However, when this study broadened its inclusion criteria for somatoform conditions by using the SSI4,6, an association with substance dependence was found. The impact on prevalence of a lower diagnostic threshold was shown in a general population sample that yielded a rate of 0.03% for somatization disorder and a rate of 4.4% for SSI4,6 (29). Comorbidity research on somatoform and substance use disorders typically have not used less restrictive disorders, such as the SSI4,6. Using categories with lower thresholds seems to be a useful approach in studying the comorbidity of substance and somatoform disorders, as may be the elimination of categories entirely and the use instead of a dimensional approach. However, a consensus on the validity of lower threshold categories of somatoform disorders or on an entirely dimensional approach has not yet been reached.

Another low-threshold somatoform condition is undifferentiated somatoform disorder (USD). USD is included in DSM-IV but, unlike somatization disorder, does not require a specific number or type of symptoms, and requires only that the unexplained symptoms be present for at least 6 months; prevalence rates for USD in the general population have been found to be as high as 19.7% (30). A caution for studies based on USD is that this category may encounter reliability and validity problems due to the lack of specificity in its definition.

### Poor Recall of Symptoms

The problem of symptom recall, particularly as applied to lifetime symptoms, is exemplified by an assessment of longitudinal data from a World Health Organization study, which found that 61% of medically unexplained lifetime symptoms reported at baseline were not reported in a 12-month follow-up that also assessed lifetime symptoms (31). In research investigating the lifetime comorbidity of substance use disorders and somatization disorders or symptoms, this could lead to an underestimation of the relationship of somatoform symptoms or disorders to alcohol or drug disorders.

### Problems Arising From Misattribution of the Cause of the Symptoms

In studies of somatoform symptoms and disorders, the need for symptoms to have the lack of an explanation has the potential to cause bias due to misattribution of the cause (or lack thereof) of the symptoms. For example, a subject may feel that a symptom has no explanation but therefore fails to correctly attribute it to a substance-related effect arising from

alcohol, drug, and/or medication use, masking a symptom of substance use. The reverse is possible as well, with subjects incorrectly reporting substance use as the cause of what is actually an unexplained somatic symptom. Whereas some somatoform symptoms such as urogenital complaints are not typically associated with a substance use effect or disorder, other somatoform symptoms are more closely associated with substance intoxication or withdrawal; for example, cardiologic symptoms such as chest pain and a racing heartbeat may result from cocaine or amphetamine intoxication.

Over the course of many years, patients with multiple medically unexplained somatic symptoms may receive variable diagnoses influenced by the specialties of the many different doctors or departments that the patients consult (32). In addition, among patients with somatic complaints, physicians may not probe to determine patterns of substance use, abuse, and/or dependence, or verify subject self-reports with tests or with collateral information from a significant other; the reverse is also possible, with a current substance use disorder masking an earlier manifestation of multiple unexplained somatic symptoms. Diagnoses may vary not only based on the clinician's own area of specialty or interest, but may also be influenced by the patient's gender, class, and/or race, as has been found for other disorders such as posttraumatic stress disorder (33). Methodological studies are needed to clarify the extent to which these types of misattribution occur.

A specific example of the potential for symptom misattribution may have occurred in the ECA study, where the lay-administered diagnostic assessment procedure used a probe flow chart to determine the source (i.e., the attribution of cause) of all psychiatric symptoms (34). In a validity study of this procedure via comparison of its results to assessments by psychiatrists, the greatest discrepancies involved somatization disorder, which was underdiagnosed (34). The failure to detect somatoform disorders in the ECA may have led to inaccurate findings on the weakness of their relationships to substance use disorders (11). Although a more recent ECA-based study suggested an association between somatization symptoms and heavy alcohol use, the study did not examine the prevalence of alcohol abuse and dependence among the heavy drinkers and the possible relationship of those disorders with somatization symptoms, nor did it take into account other factors potentially associated with both extreme alcohol use and somatization, such as drug use disorders, depression, and anxiety (12). The weak relationships initially found between somatoform and substance use disorders from the ECA may have led (at least in part) to the lack of research on this aspect of comorbidity since then. If so, it is possible that an important association between two diagnostic categories of major interest has been missed. Additional studies addressing some of the methodological shortcomings reviewed above would yield crucial information on this topic, both in the ECA data and in data from new studies.

### Overly Large Assessment Burden due to Large Number of Diagnostic Symptoms

Diagnostic accuracy might be improved by condensing symptom checklists used for somatoform disorder diagnoses (35,36). A reason somatoform disorders may have been omitted so often from large studies is that the battery of symptoms required to make a full diagnosis of the somatoform disorders is so large. Trimming the battery via statistical analyses to a smaller subset of highly relevant symptoms would considerably aid future comorbidity research by enabling more studies to include the most common, relevant, and widely exhibited somatoform symptoms and determine if substance use disorders are comorbid with these.

### Future Research

In addition to the numerous methodological and assessment issues identified above, an important area barely addressed in the research to date is the issue of prescription and nonprescription medications. Some evidence suggests that, in addition to making more frequent use of primary care doctors, hospitals, and outpatient services (3), patients diagnosed with somatization disorder also use higher levels of medication than patients without somatization disorder (37). Although patients with unexplained somatic symptoms may not always explicitly ask for medication, they might indirectly pressure physicians to prescribe drugs by describing their symptoms in graphic and highly emotional terms (38). Even if patients do not succeed in obtaining a prescription from their doctors, they might turn to the Internet, where drugs such as benzodiazepines and opiates are increasingly available online (39,40), leading to concerns about the misuse and abuse of these drugs due to lax regulation at online pharmacies and the improper dispensation of drugs by unlicensed and uncertified distributors. Future research could explore a possible link between somatoform disorders or subthreshold somatization and the abuse/dependence of painkillers and other medications; a challenge for both researchers and clinicians would also be to tease apart the side effects of such medications and the symptoms attributed to the somatoform disorder.

More information is also needed on whether specific somatoform disorders are associated more strongly with certain substances, or if certain somatoform disorders are generally more significantly comorbid with substance use disorders regardless of the substance. The somatoform category encompasses disorders that differ markedly from each other in clinical presentation, progression, and appropriate treatments. Therefore, future comorbidity studies should address specific disorders or subthreshold manifestations of the disorders rather than aggregating all disorders within the category as a whole. For example, one study comparing patients with somatization disorder ( $n = 65$ ) and patients with conversion disorder ( $n = 51$ ) at a large American medical center found a significantly higher level of substance abuse among the somatization disorder patients (41). In another example, a study of substance abusers treated in a drug-free residential community, residents reporting marijuana and hallucinogens as their

greatest drug use problem experienced higher levels of somatization than residents with cocaine or heroin as their greatest drug use problem (42). However, very few such studies have been conducted. More information of this type would aid greatly in understanding the specificity or generality of any associations between somatoform and substance use disorders. This could help explain, in turn, some of the inconsistencies in the associations found to date.

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