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Predictors of social anxiety in an opioid dependent sample and a control sample

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Abstract

Compared to other mental health problems, social anxiety is under-acknowledged amongst opioid dependent populations. This study aimed to assess levels of social anxiety and identify its predictors in an opioid dependent sample and a matched control group. Opioid dependent participants (n = 1385) and controls (n = 417) completed the Social Interaction Anxiety Scale (SIAS), the Social Phobia Scale (SPS) and a diagnostic interview. Regression analyses were used to test a range of predictors of social anxiety. Opioid dependent cases had higher mean scores on both scales compared to controls. Predictors of social anxiety centred on emotional rejection in childhood, either by parents or peers. For opioid dependent cases, but not controls, lifetime non-opioid substance dependence (cannabis, sedatives, and tobacco) was associated with higher levels of social anxiety. However, much of the variance in social anxiety remains unexplained for this population.

Keywords

Social anxiety; social phobia; opioid dependence; substance use disorder; comorbidity

1. Introduction

An estimated 2.7 per cent of the general population in Australia meet criteria for social phobia (12 month prevalence), with higher proportions among women than men (Andrews, Hall, Teesson, & Henderson, 1999). It is a persistent and disabling disorder that impairs functioning across several domains (Schneier et al., 1994). Social anxiety, although not synonymous with social phobia, constitutes an important aspect of social phobia, although individuals with social anxiety may not exhibit the behavioral avoidance or distress necessary for a diagnosis of social phobia (Rapee & Spence, 2004).

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Opioid dependence occurs rarely at approximately 6.9 per 1000 in the Australian population (Hall, Ross, Lynskey, Law, & Degenhardt, 2000), but it is associated with high levels of mental health problems, unemployment, crime, and poor physical health (Hall, Lynskey & Degenhardt, 1999; Henderson, Ross, Darke, Teesson, & Lynskey, 2002; Hser, Hoffman, Grella, & Anglin, 2001). Dependent opioid users tend to cycle through periods of use, treatment and abstinence (Darke, Degenhardt, & Mattick, 2006). The long term outcomes are typically poor (Hser et al., 2001). The combination of two such disabling problems is therefore likely to have a negative impact across a range of domains.

Research examining social anxiety amongst heroin users is sparse, but there is a known high rate of comorbidity between anxiety and substance use disorders. In Australia, 46 per cent of women and 25 per cent of men with a substance use disorder also met criteria for an anxiety or affective disorder (Andrews et al., 1999; 12 month prevalence). Of those people with a diagnosis of social phobia, 8.7 per cent met criteria for a drug use disorder (Andrews et al., 1999). This compares with rates of drug use disorders in the general population of 2.2 per cent (Teesson, Hall, Lynskey, & Degenhardt, 2000). Two earlier studies indicate that social anxiety is common amongst opioid users. Rates amongst clinical samples have ranged from one-quarter for significant social anxiety (Grenyer, Williams, Swift, & Neill, 1992) to 20 per cent for generalised social phobia and 42.6 per cent for non-generalised social phobia amongst 150 substance dependent patients (Zimmerman, Pinn et al., 2004).

These rates of comorbidity raise the question of shared risk factors. One longitudinal study found that although young people with anxiety disorders are at increased risk of substance dependence, this association is largely non-causal and reflects common risk factors such as child abuse, exposure to family adversity, and parental psychopathology, and also to prior substance dependence, comorbid depression, and peer affiliations (Goodwin, Fergusson, & Horwood, 2004). Risk factors for drug dependence include social and cultural factors such as drug availability, laws, cultural norms and economic factors (Hawkins, Catalano & Miller, 1994); childhood sexual and physical abuse (Afifi, Brownridge, Cox, & Sareen, 2006; Bulik, Prescott & Kendler, 2001; Fergusson, Horwood, & Lynskey, 1996; Kilpatrick, Acierno et al., 2000); early conduct disorder (Fergusson, Horwood, & Ridder, 2005); parental drug and alcohol use (Gorsuch & Butler, 1976; Lynskey, Fergusson, & Horwood, 1994; Kilpatrick, Acierno, et al., 2000); parental attitudes to drug use (Hawkins et al., 1994); affiliation with drug using peers (Goodwin et al., 2004; Hawkins et al., 1994); peer rejection in early grades, poor and inconsistent parenting practices during childhood, exposure to family conflict, and low bonding to family (Hawkins et al., 1994); inter-parental violence in childhood (Fergusson & Horwood, 1998); academic failure (Hawkins et al., 1994; Newcomb, Maddahian, & Bentler, 1986); and sensation seeking and risk taking (Hawkins et al., 1994; Miles, van den Bree et al., 2001).

There may be a shared genetic component between social phobia and substance dependence: Nelson, Grant et al. (2001) found that a common additive genetic component influenced social phobia, depression, and alcohol dependence. Additionally, substance dependence and social phobia both have a heritable component (Tsuang, Lyons et al., 1996; Kendler & Prescott, 1998; Miles, van den Bree et al., 2001; True & Xian, 1999; VandenBree, Johnson, Neale, & Pickens, 1998). One model of the etiology of social phobia suggests that social phobia has its origins in broad genetic factors which predispose an individual to a given level of social anxiety (Rapee & Spence, 2004). This level acts as the individual's 'set point' which is moderately stable and consistent, but which can be moved by powerful environmental influences.

The environmental risk factors for social phobia include lack of a close relationship with an adult (Chartier, Walker, & Stein, 2001). However, DeWit, Chandler-Coutts et al. (2005)

found that this was a risk factor for males but not females. Other risk factors include childhood sexual abuse and marital conflict in the family of origin (Chartier et al., 2001; DeWit, Chandler-Coutts et al., 2005); parental history of mental disorder, moving more than three times as a child, juvenile justice and child welfare involvement, running away from home, and poor school performance (Chartier et al., 2001); parental alcohol problems (De Wit et al., 2005); lower educational attainment (de Graaf, Bilj, Smit, Vollebergh, & Spijker, 2002); traumatic conditioning (Stemberger, Turner, Beidel, & Calhoun, 1995); childhood shyness and early behavioral inhibition (Rapee & Spence, 2004; Stemberger et al., 1995); parental over-control, parental coldness, parental hostility, and restricted social exposure (Rapee & Spence, 2004; Taylor & Alden, 2005), and peer rejection/early aversive social experiences (Gazelle & Ladd, 2003). Those with specific social phobia but not generalized social phobia are more likely to have had a traumatic social conditioning event than normal controls (Stemberger et al., 1995). Socially phobic patients describe their parents as less affectionate and more rejecting compared to controls (Taylor & Alden, 2005). Although physical abuse has been indentified as a risk factor for social phobia (Chartier et al., 2001), physical punishment is not a risk factor for anxiety disorders generally (Afifi et al., 2006).

This paper aims to identify prevalence and correlates of social anxiety amongst opioid dependence cases and non-dependent controls. We predicted we would find high levels of social anxiety amongst the opioid dependent case sample because of shared risk factors between the two disorders. And, given that we have attempted to match the non-dependent controls to cases on socioeconomic status, and social disadvantage is a risk factor for anxiety disorders, we also expected to find elevated scores amongst the control group compared to general community samples. Based on current literature, we expected the following factors to predict social anxiety for both cases and controls: lack of a close relationship with an adult, violence between parents; parental separation; parental history of substance use disorder, juvenile justice involvement, running away from home, childhood abuse and neglect, and being victim of bullying during childhood.

2. Method

2.1 Procedure

This study utilized data collected for the Comorbidity and Trauma Study (CATS), a large retrospective case-control study examining the influence of genetics and childhood trauma on opioid dependence. The study was funded by the National Institute of Drug Abuse, and was run in collaboration with Washington University, the Queensland Institute of Medical Research, and the National Drug and Alcohol Research Centre (NDARC), University of New South Wales. The aim of the main project was to identify the interaction of genetic vulnerability and childhood trauma in the development of opioid dependence and its associated comorbid mental disorders. It is a case-control design with 1500 opioid dependent participants and 500 non-dependent, age, sex, and socio-economic status (SES) matched controls. At the time of writing, the project had completed research with 1802 participants. Data collection was carried out in the greater Sydney area by NDARC.

2.2 Participant recruitment

Opioid dependent participants (n = 1385) in this study were recruited through public and private methadone clinics. Non-dependent control participants (n = 417) were recruited through street press, employment services, and letter-box drops and/or flyer hand outs in areas close to participating methadone clinics.

Cases were eligible if they were aged 18 years or over; had an adequate understanding of English (in order to provide informed consent and participate in a long interview); and had

participated in pharmacotherapy maintenance treatment for opioid dependence. Controls were eligible if they were aged 18 years or over; had an adequate understanding of English (in order to provide informed consent and participate in a long interview); and had used opioids illicitly less than 5 times over their lifetime. Recruitment was targeted at matching cases and controls on age, sex, and employment status. The matching criteria and the recruitment of the groups from the same geographical areas were techniques employed as proxy measures for ethnicity and social disadvantage.

All participants were guaranteed any information given to the researchers would be kept strictly confidential. Ethics approvals were obtained from the institutional review boards of University of New South Wales, Washington University, Queensland Institute of Medical Research and, for cases, the relevant area health service. Written informed consent was obtained from all participants. All participants were reimbursed \$50 for out-of-pocket expenses.

2.3 Structured Interview

Each participant completed a 1.5 to 2.5 hour structured interview containing sections on demographics, family history, alcohol and substance use and dependence, psychiatric diagnoses, and childhood and adult trauma. The diagnostic sections of the interview were based on the Semi-Structured Assessment of the Genetics of Alcoholism - Australia (SSAGA-OZ) and allow for DSM-IV and/or DSM-III-R diagnoses to be made for opioid abuse and dependence, alcohol, cannabis, sedative, stimulants, and cocaine abuse and dependence, nicotine dependence, post-traumatic stress disorder, depression (major depressive episode), panic disorder and antisocial personality (Bucholz et al., 1994; Hesselbrock et al., 1999). Sections of the Christchurch Health and Development Study interview were modified to assess for childhood trauma and adult victimization history (Fergusson, Horwood, Shannon, & Lawton, 1989). Childhood trauma included ten items about non-contact, contact and penetrative sexual abuse. Physical abuse included thirteen items asking about physical assault by a caregiver or injury arising from a caregiver's actions towards the participant. Emotional abuse was measured with a single item assessing verbal insult from a caregiver. Neglect included five items regarding inadequate provision of physical care, inadequate supervision, and lack of support or emotional regard from a caregiver. Several other risk factors were also examined: experiencing bullying during childhood or adolescence, early parental separation (before the age of five), problematic substance use by a parent, physical conflict between parents, close maternal and close paternal relationships, having a support person while growing up, running away from home, and juvenile justice involvement. Interviewers had graduate and postgraduate qualifications in psychology or social sciences and had received comprehensive training in the administration of the structured diagnostic interview used in the study.

Participants completed two measures of social anxiety: the Social Anxiety Interaction Scale (SIAS), which corresponds to Generalised Social Phobia in DSM-III-R (Mattick & Clarke, 1998), and the Social Phobia Scale (SPS), which corresponds to the criteria for Circumscribed Social Phobia in DSM-III-R (Mattick & Clarke, 1998). The SIAS measures fear of social interaction. It consists of 20 items rated from 0 (*not at all characteristic or true of me*) to 4 (*extremely true or characteristic of me*). It is scored by summing the ratings (after reversing the three positively worded items) and has a total score ranging from 0 to 80, with higher scores representing greater anxiety. The SPS assesses fear of being scrutinized during routine activities such as eating, drinking, and writing. It consists of 20 items and is rated on the same 5 point scale as the SIAS. It is also scored in the same way as the SIAS. Scores range from 0 to 80, with higher scores representing greater anxiety. The mean community scores on the SIAS and SPS were 18.8 and 14.4 respectively (Mattick & Clarke,

1998). The SIAS and the SPS were also validated amongst a US sample of socially phobic patients (Brown et al., 1997).

2.4 Statistical analysis

T-tests were used to test for differences in age and SIAS and SPS scores, with the mean and standard deviation reported (SD). Where indicated by cross-tabulations, chi square tests (χ^2) were conducted to determine whether an association existed between categorical variables. Because of the large sample size and the number of analyses conducted, a conservative significance level (0.01) was adopted to minimise Type I errors. In the case of odds ratios, 95% confidence intervals have been reported in keeping with standard practice, but only those with a significance level of less than or equal to 0.01 have been reported here.

Linear regression analysis was used to determine the risk factors associated with social anxiety. Separate regressions were used for cases and controls. The total score for each participant was used as the dependent variable. Independent variables were initially selected if they had been identified by previous studies as a risk factor for social phobia. Variables for the linear regression models were then selected by running univariate analysis for each variable under consideration for the model. Variables with a *p*-value less than 0.25 were included in the multivariate model, along with variables identified in the literature as clinically important (Hosmer & Lemeshow, 2000). Gender, age, education, employment status, and substance dependencies (alcohol, nicotine, sedatives, cannabis, stimulants, and cocaine) were entered into the model to control for differences between cases and controls. All independent variables were entered at the same time. Some factors (juvenile justice involvement, early separation from parents, running away from home) were excluded from the linear regression analysis as univariate analysis indicated that they were not associated with increased social anxiety scores. All analyses were carried out using SPSS for Windows, version 15.0.

3. Results

3.1 Sample characteristics

Cases were more likely to be male (60.7% vs. 46.5%, OR 1.78, 95% CI 1.43–2.22), to have less years of education (53.1% vs. 18.8%, OR 4.89, 95% CI 3.74–6.39), and to be unemployed (83.9% vs. 56.9%, OR 3.94, 95% CI 3.10–5.02) than controls (Table 1). There was no difference in age, with cases having a mean age of 36.4 years compared to a mean age of 35.3 years for controls. Both groups had high levels of substance use, with cases having higher levels of lifetime dependence across all substance categories (Table 2).

3.2 Social anxiety scores

Cases had higher mean scores than controls on both the SIAS (25.7 (SD = 14.5) vs. 23.1 (SD 12.7), $t = -3.31_{1785}$, $p < 0.001$) and the SPS (20.1 (SD = 17.0) vs. 16.7 (SD = 15.1), $t = -3.69_{1785}$, $p < 0.001$). On the SIAS, 64% of cases and 59.5% of controls scored above the mean community score, while only 51.6% of cases and 40.8% of controls scored above the mean community score on the SPS.

3.3 Potential risk factors for social anxiety

For cases, bullying, emotional abuse, sedative dependence, and tobacco dependence were the variables most consistently associated with social anxiety scores (Table 3). Alcohol, stimulant, and cocaine dependence were not associated with either measure of social anxiety. Social interaction anxiety was associated with having been bullied, having experienced childhood emotional abuse, and sedative, cannabis, and tobacco dependence. Witnessing parental violence was negatively correlated with SIAS scores. Social

performance anxiety was associated with having less than 10 years of education, bullying, childhood emotional abuse, and sedative and tobacco dependence (Table 3).

For controls, social interaction anxiety and social performance anxiety were both associated with bullying, childhood emotional abuse and sexual abuse (Table 3). Overall, the model explained little of the total variance in social anxiety scores for cases (10.3% for the SIAS and 8.5% for the SPS) compared to controls (24.1% for the SIAS and 17.9% for the SPS).

4. Discussion

Both cases and controls appear to have higher mean social anxiety scores than those found in an Australian community sample (Mattick & Clarke, 1998). On the SIAS, more than half of the cases and controls scored above the community mean.

Significant proportions of both cases and controls had experienced lifetime non-opioid substance dependence. This finding is not unexpected for the case group since polydrug use is common amongst opioid users (Ross et al., 2005). However, rates of substance dependence for the control group are higher than those found in the general community. For instance, 26 per cent had experienced alcohol dependence at some point in their life. No lifetime prevalence figures are available for the Australian population. However, the United States lifetime population prevalence for alcohol dependence is 5.4 per cent, with a 12 month prevalence of 1.3 per cent (Kessler et al., 2005). Australia's 12 month population prevalence for alcohol dependence is 3.5 per cent (Teesson et al., 2000). Higher levels of substance dependence amongst controls may be because we attempted to match controls to cases on SES, using unemployment as a marker. There is evidence that a disadvantaged background is a risk factor for substance dependence (Goodwin et al., 2004).

Emotional abuse by parents and peers were risk factors for social anxiety amongst opioid dependent participants and matched controls. Some of the expected correlates of social anxiety were not significant (emotional neglect, physical abuse and neglect, and parental history of substance use disorder). In contrast, bullying and emotional abuse were consistently associated with both social interaction anxiety and social performance anxiety for both groups. Less education was associated with social performance anxiety for both groups. Predictors for social anxiety on both scales for controls were remarkably consistent: bullying, sexual abuse and emotional abuse. For cases, bullying, emotional abuse, and tobacco dependence were the most consistent predictors on both scales.

Some interesting case-control differences emerged. Substance dependence (cannabis, sedatives, and nicotine) was a risk factor only for cases, whereas sexual abuse was a risk factor only for controls. Unemployment was associated with social interaction anxiety only for cases. Witnessing parental violence was protective against social interaction anxiety for the case group. The reasons for this unusual outcome are unclear. We can only hypothesise that this sub-group who witnessed parental violence may have inherited antisocial tendencies from parents who have similarly high levels of antisocial tendencies and are thus more likely to engage in inter-partner violence. Externalizing disorders have a heritability estimate of 0.80 (Hicks et al., 2004). While internalizing and externalizing disorders are by no means mutually exclusive, these inherited antisocial characteristics may be somewhat protective against social anxiety, since antisocial personality disorder is characterized by a lack of concern for others, whereas social anxiety is characterized by over concern for what others think. In the National Comorbidity Study Replication, conduct disorder showed lower correlations with anxiety disorders than did the other impulse control disorders (Kessler, Chiu, Demler, & Walters, 2005).

While it was surprising that physical abuse was not associated with either measure of social anxiety, it may be that the impact of physical abuse is mediated by emotional abuse. It is also possible that there are gender differences in the impact of physical abuse on social anxiety. De Wit et al. (2005) found that physical abuse was a risk factor for females but not males. Predictors identified in each of the regression models presented a consistent theme. Factors linked to emotional rejection in childhood, either by parents or peers, were associated with social anxiety. This is consistent with previous findings regarding the development of social anxiety. Rejection and neglect by peers is strongly associated with increased social anxiety (Gazelle & Ladd, 2003; Neal & Edelman, 2003). Further, increased social anxiety has been found to be more a consequence of frequent rejection experiences than overt aggression (Vernberg, Abwender, Ewell, & Beery, 1992). Anxious, solitary children who are excluded by their peers early in life also display greater stability of anxious solitude in later life (Gazelle & Ladd, 2003). Those who responded positively to questions of emotional abuse may have experienced parental rejection, criticism and coldness, which are all risk factors for social anxiety (Rapee & Spence, 2004; Taylor & Alden, 2005). Further, peer rejection may be more potent for those whose parents are perceived as more controlling, as the need for peer affiliation is more acute amongst this group as they enter adolescence (Fuligni & Eccles, 1993).

Some limitations of this study should be acknowledged. The possibility of early cognitive biases and errors on the part of the study's participants cannot be ruled out. Social phobia often begins in childhood or early adolescence (Chavira & Stein, 2005) and this study relied on participants' memories and perceptions of how they were treated by parents and peers. These perceptions, and participants' interactions with their peers and families, may have been influenced by cognitive, attentional and memory biases experienced by social anxiety sufferers (Amir, Foa, & Coles, 1998; Amir, Foa, & Coles, 2000; Amir, Freshman, & Foa, 2002). However the perception of parent and peer interactions that participants recalled may be equally important as what might be noted externally by an independent observer (Neal & Edelman, 2003). No research to date conclusively demonstrates that our participants' recall of these experiences is likely to be factually incorrect. A further limitation of the study is that a high score on the SIAS or SPS does not constitute a diagnosis of social phobia as it doesn't measure behavioral avoidance and functional impairment.

It seems reasonable to conclude that the major risk factors for social anxiety in this population are yet to be identified as the regression models explained only a small proportion of the variance in social anxiety scores for heroin dependent cases. It is feasible that the high levels of social anxiety amongst this sample are partially explained by a shared genetic risk. Previous research has identified that a common additive genetic component influences social phobia, depression, and alcohol dependence (Nelson et al., 2001). Similarly, many of the environmental risk factors identified for social anxiety and opioid dependence are also risk factors for other mental disorders, so the likelihood is that these two disorders are part of a much more complex pattern of disorders (Rapee & Spence, 2004).

5. Conclusion

This is the first large-scale Australian study to examine social anxiety among an opioid dependent sample. It indicates that childhood adversity in the form of peer and parental rejection is a risk factor for social anxiety for both opioid dependent individuals and controls matched for age, sex, and SES. Given the levels of substance use problems amongst both groups and the disabling effects of substance use disorders and social phobia, it is important to acknowledge the added impact that these levels of social anxiety may have on their lives and treatment outcomes.

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Table 1

Demographic characteristics of cases and controls

	Cases % (n = 1370)	Controls % (n = 417)	OR (95% CI)	χ^2 (p<0.001)
Male	60.7	46.5	1.78 (1.43–2.22)	26.39, df = 1
Unemployed	83.9	56.9	3.94 (3.10–5.02)	133.56, df = 1
10 years or less of education	53.1	18.8	4.89 (3.74–6.39)	151.09, df = 1

Table 2

Lifetime rates of substance dependence for cases and controls

Dependence	Cases % (n = 1370)	Controls % (n = 417)	OR (95% CI)	χ^2 (p<0.001)
Cannabis	56.8	31.4	2.87 (2.27–3.62)	82.35, df = 1
Sedatives	37.4	1.9	30.51 (15.03–61.94)	194.77, df = 1
Stimulants	51.1	17.5	4.92 (3.74–6.47)	146.63, df = 1
Cocaine	32.4	3.4	13.80 (8.01–23.80)	141.56, df = 1
Alcohol	40.7	30.0	1.61 (1.27–2.03)	15.66, df = 1
Nicotine	65.5	44.4	2.38 (1.91–2.98)	59.92, df = 1

Table 3
Risk factors for cases and controls on Social Interaction Anxiety Scale and Social Phobia Scale

Variables	Social Interaction Anxiety Scale				Social Phobia Scale			
	Cases (n = 1385)		Controls (n = 417)		Cases (n = 1385)		Controls (n = 417)	
	β standardised	t	β standardised	t	β standardised	t	β standardised	t
Unemployment	0.06*	2.05	0.05	1.04	0.04	1.53	0.03	0.63
Education < 10 yrs	0.05	1.83	0.07	1.42	0.09**	3.23	0.11*	2.11
Age in years	-0.01	-0.39	-0.05	-1.07	-0.02	-0.88	-0.10	-1.86
Sex (male)	0.03	1.04	-0.05	-0.97	0.02	0.83	-0.08	-1.48
Bullied	0.13***	4.73	0.28***	5.84	0.12***	4.06	0.17***	3.43
Sexual abuse	0.03	0.99	0.15***	3.06	0.05	1.57	0.16***	3.08
Emotional abuse	0.09***	2.81	0.12***	2.27	0.08***	2.44	0.16***	2.84
Parental violence	-0.08**	-2.83	-0.06	-1.29	-0.03	-0.94	-0.04	-0.71
Parental substance use	0.04	1.41	-0.05	-0.99	-0.01	-0.06	-0.02	-0.44
Cannabis dependence	0.09***	3.11	0.03	0.47	0.05	1.81	0.04	0.69
Sedative dependence	0.06*	2.12	-0.03	-0.56	0.07***	2.46	0.07	0.30
Tobacco dependence	0.09***	3.23	0.06	1.19	0.07***	2.67	0.03	0.52
Alcohol dependence	0.01	0.27	0.06	1.23	0.02	0.63	0.02	0.30

* significant at 0.05

** significant at 0.01