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ARTICLE *in* CANADIAN JOURNAL OF PSYCHIATRY. REVUE CANADIENNE DE PSYCHIATRIE · SEPTEMBER 2005

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Original Research

Comorbid Depression Among Untreated Illicit Opiate Users: Results From a Multisite Canadian Study

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Objectives: This study aimed to describe patterns of major depression (MDD) in a cohort of untreated illicit opiate users recruited from 5 Canadian urban centres, identify sociodemographic characteristics of opiate users that predict MDD, and determine whether opiate users suffering from depression exhibit different drug use patterns than do participants without depression.

Method: Baseline data were collected from 679 untreated opiate users in Vancouver, Edmonton, Toronto, Montreal, and Quebec City. Using the Composite International Diagnostic Interview Short Form for Major Depression, we assessed sociodemographics, drug use, health status, health service use, and depression. We examined depression rates across study sites; logistic regression analyses predicted MDD from demographic information and city. Chi-square analyses were used to compare injection drug use and cocaine or crack use among participants with and without depression.

Results: Almost one-half (49.3%) of the sample met the cut-off score for MDD. Being female, white, and living outside Vancouver independently predicted MDD. Opiate users suffering from depression were more likely than users without depression to share injection equipment and paraphernalia and were also more likely to use cocaine (Ps < 0.05).

Conclusions: Comorbid depression is common among untreated opiate users across Canada; targeted interventions are needed for this population.

(Can J Psychiatry 2005;50:512–518)

Information on funding and support and author affiliations appears at the end of the article.

Clinical Implications

- The regional variation in rates of depression across study sites suggests that targeted interventions may be required to ameliorate local comorbidities within the opiate-using population.
- Needle-sharing behaviour among opiate users with depression requires systematic investigation as a topic in its own right.
- High levels of cocaine use among the opiate users recruited for this study imply that polydrug use is common among this population.

Limitations

- The study presented only cross-sectional relations; this precludes understanding the temporal relations between opiate use and comorbid depression.
- Given the high representation of nonwhite participants in the study sample, use of the CIDI-SFMD might have introduced cultural biases into our estimates of comorbidity in the target population.
- Generalizability of the findings is unknown, owing to possible sampling and selection biases.

Key Words: *depression, opiate use, risk behaviour, injection drug use*

Over the past 20 years, community studies have consistently established high rates of concurrent psychiatric and substance use disorders in the general population. These large-scale epidemiologic projects include the seminal ECA study conducted in the US in the early 1980s (1), the NCS conducted in the US during the 1990s (2), and several others coordinated by the WHO ICPE (3) and the WHO World Mental Health 2000 initiative (4). One of the primary ECA results—that people with substance use disorders exhibit significantly higher rates of one or more psychiatric disorders, compared with individuals without substance use disorders—has been replicated in virtually all subsequent community studies, both outside Canada (5–9) and within Canada (10,11).

With regard to diagnosis, affective disorders are prevalent among drug users in the general population. The ECA study found that 8% of the general US population had an affective disorder at some time in their lifetime. However, affective disorders were 4.7 times more likely among those who had abused drugs (excluding alcohol), compared with the general population. Among people who had abused opiates in their lifetime, 31% had an affective disorder at some time during their life (1). Kessler and others reported a similar cooccurrence of lifetime prevalence of drug abuse and affective disorders (28%) but also demonstrated that 39% of people who have been drug-dependent at some time have also had an affective disorder (2).

Abbreviations used in this article

CI	confidence interval
CIDI-SFMD	Composite International Diagnostic Interview Short Form for Major Depression
CIHR	Canadian Institutes of Health Research
ECA	Epidemiologic Catchment Area
HBV	hepatitis B virus
HCV	hepatitis C virus
ICPE	WHO International Consortium in Psychiatric Epidemiology
IHRT	Interdisciplinary Health Research Team
IV	intravenous
MDD	major depressive disorder
NCS	National Comorbidity Survey
OPICAN	multisite cohort of illicit opioid users in 5 Canadian cities
OR	odds ratio
REB	research ethics board
SD	standard deviation
SE	standard error

Treated drug-dependent individuals in general, and treated opiate users in particular, are more likely to experience affective disorders or depression, compared with untreated drug users in the community. For example, 42% of people seeking treatment for polysubstance dependence report lifetime experience with an affective disorder, and almost 19% report a lifetime history of depression (12). Other research has shown that 24% of people in drug treatment had lifetime MDD (13) and that lifetime experience with MDD among individuals seeking treatment for opiate addiction or involved with the law ranges from 16% to 54% (14–18). Women in drug treatment are more likely to have a diagnosis of MDD, compared with men (13,14). Opiate users not in treatment have been shown to have depression rates ranging between 14% and 37% (16,19).

Research to date does not allow a definitive conclusion about whether depression precedes or follows substance dependence (20,21). This is because depression can be attributed to drug effects, drug withdrawal, or preexisting pathology or life events (21). However, it is clear that cooccurring depression among illicit drug users does have important behavioural and treatment implications; for example, depression is positively correlated with continued drug use during and after treatment for opiate abuse (22–24). Conversely, longitudinal studies among injection drug users and individuals with opiate addiction have shown that stopping drug use leads to reduced depressive symptoms (19,20). Moreover, depressive symptoms have been significantly associated with needle-sharing behaviour among community injection drug users (25,26): Mandell and others reported that individuals with depression had 1.66 higher odds of needle-sharing behaviour than did injection drug users suffering from less severe depression (26). As well, emerging evidence suggests that sequential or concurrent use of cocaine among opiate users is associated with increased health and economic risks and also with poorer treatment prognosis (27).

The Present Study

Only 3 studies to date have examined comorbid depression among untreated opiate users recruited from the community, and all have been conducted in the US (16,19,26). Consequently, relatively little is known about relations between untreated opiate abuse and depression in the Canadian context. Moreover, it is unknown whether, in Canada, opiate users with and without depression exhibit different patterns of injection drug use and (or) cocaine and crack cocaine use. To address these issues, our study aimed to describe drug use and comorbid depression in a large community sample of untreated Canadian opiate users. The study objectives were to describe the prevalence and distribution of MDD among out-of-treatment opiate abusers recruited from 5 Canadian urban centres, to identify sociodemographic characteristics of opiate users that were associated with MDD, and to determine

whether opiate users with depression exhibit different drug use and risk-behaviour patterns than do opiate users without depression.

Method

Study Sites and Sample

The multisite cohort of illicit opioid users in 5 Canadian cities (OPICAN), from which data are reported here, is a research component of a CIHR-funded IHRT investigating illicit opiate addiction, research, treatment, and policy. The study protocol received ethical review board approval at all 5 study sites via local institutional REBs. Between March and December 2002, baseline participants were recruited by snowball sampling and outreach methods. Snowball sampling is a methodological approach to convenience sampling wherein eligible participants nominate social network members who are likely to meet study inclusion criteria (28); it is often used to sample hard-to-reach populations such as illicit opiate users. The OPICAN cohort was drawn from 5 cities: Vancouver, Edmonton, Toronto, Montreal, and Quebec. Potential participants were aged 18 years or older, were fluent English speakers, had used opiates for a minimum of 5 of 7 days in the week preceding recruitment, had not received treatment in the 6 months preceding recruitment (the study protocol defined "treatment" as residential treatment, outpatient treatment, all forms of opiate pharmacotherapy, and [or] long-term residential detoxification followed by treatment), and were currently residing in 1 of the 5 study sites. Participants who met these inclusion criteria were given a saliva test for opioid use (AVITAR ORALscreen 4©, Avitar Technologies, Canton, MA) to biologically verify self-reported opiate use. Compared with a urine screen, this test provides acceptable sensitivity and specificity (29). Participants were excluded if they were currently experiencing psychological distress at the time of recruitment (for example, an acute psychotic episode) or if they were intoxicated at the time of recruitment. Although the study protocol did not systematically record the number of potential participants excluded by these criteria, all participants who contacted the researchers (whether excluded or included) received referral information to help them access local psychiatric and addiction services. The study cohort comprised 679 biologically verified regular opiate users (that is, individuals, both injectors and noninjectors, who reported using opiates on most days in the week preceding recruitment) who were not receiving treatment at the time of recruitment.

Procedure and Measures

A standardized baseline protocol was administered in a one-on-one interview conducted with all participants. It included written and oral informed consent; social, health, and drug use items; a psychiatric assessment; and a saliva immunoassay screen for infectious disease (specifically, HIV, HCV, and HBV). Assessments were conducted anonymously (via anonymous study code), and all participant data were and are treated confidentially. Participants received $20 for baseline assessment and are being followed over a 3-year period. Because the study is collecting final follow-up data, follow-up rates are not currently available. This paper only reports baseline results for the OPICAN cohort. The psychiatric assessment included the CIDI-SFMD, a brief version of the full CIDI interview that has been used to indicate MDD in survey research (30–33).

Results

Characteristics of the Sample and Patterns of Depression

Table 1 presents the sample's sociodemographic characteristics. Values for the CIDI-SFMD were missing for 6 participants, and values for the other demographic variables were missing for 13 participants, yielding 657 participants with complete data for analyses. Among these 657 participants, 66.5% were men, 68.2% were white, 16.3% were Aboriginal, and 49.3% met the CIDI-SFMD cut-off score for inferring MDD. The average age of the sample was 34.7 years. Analyses indicated that, compared with the overall sample, fewer participants recruited from the Vancouver site met the cut-off for MDD (34.2%, compared with 49.3%; $P < 0.05$) and that more participants recruited from the Montreal site met the cut-off score for MDD (58.7%, compared with 49.3%; $P < 0.05$).

Socioeconomic Predictors of MDD

Table 2 presents results of logistic regression analyses predicting the presence or absence of MDD from sex, ethnicity, recruitment site, and housing status. In each analysis, predictor variables were forced into the regression equation as a single set. We conducted 2 analyses: one used unweighted data, and the other took into account variations in sample size at each study site by weighting these data by the number of subjects for each city. The weighted analysis indicated that depression was more common among women, relative to men (OR 1.70; 95%CI, 1.19 to 2.42; $P < 0.05$); among white participants, relative to nonwhite participants (OR 1.51; 95%CI, 1.02 to 2.23; $P < 0.05$); and among OPICAN participants living in Edmonton, Toronto, Montreal, and Quebec City, relative to those in Vancouver (ORs 2.10, 2.18, 2.23, and 2.27, respectively; 95%CIs, 1.24 to 4.03, respectively; Ps < 0.05). Living in stable housing, compared with transitional housing or with living on the street, was not associated with depression. Exploratory logistic regression analyses indicated no significant interactions between city of recruitment and sex, ethnicity, or housing status in the prediction of MDD.

Table 1 Sociodemographic characteristics of the sample[a]

Variable	Vancouver (*n* = 190)	Edmonton (*n* = 87)	Montreal (*n* = 155)	Quebec City (*n* = 87)	Toronto (*n* = 138)	Total (*n* = 657)
Men, %	56.3* (3.6)	67.8 (5.0)	74.2* (3.5)	69.0 (5.0)	69.6 (3.9)	66.5 (1.8)
Mean age, years	34.6 (9.0)	39.1 (6.9)	29.0** (9.3)	35.1 (8.9)	38.5 (8.7)	34.7 (9.4)
Ethnicity, %						
White	40.0* (3.6)	54.0* (5.4)	88.4* (2.6)	95.4 (2.3)	76.1* (3.6)	68.2 (1.8)
Aboriginal	34.2* (3.5)	32.2* (5.1)	1.3* (0.9)	3.4* (2.0)	6.5* (2.1)	16.3 (1.4)
Other	25.8* (3.2)	13.8 (3.7)	10.3* (2.5)	1.1* (1.1)	17.4 (3.2)	15.5 (1.4)
With depression, %	34.2* (3.5)	50.6 (5.4)	58.7* (4.0)	58.6 (5.3)	52.9 (4.3)	49.3 (2.0)
CIDI-SFMD, mean score	1.95** (2.7)	2.76 (2.9)	3.19 (2.8)	2.9 (2.9)	3.0 (3.0)	2.7 (2.9)

[a]Data in parentheses are SEs for proportions and SDs continuous variables.

*Significant at $P < 0.05$ with adjusted standardized residual > 2.0

**When variances were unequal, statistical significance is based on nonparametric Kruskal–Wallis tests ($P < 0.05$). Vancouver had significantly lower CIDI-SFMD scores than other sites (mean rank = 278.2, $\chi^2 = 18.03$, $P = 0.001$); Montreal participants were significantly younger than those from other sites.
(mean rank = 211.7, $\chi^2 = 100.04$, $P < 0.001$)

Table 2 Variables associated with depression among untreated illicit opiate users: unweighted and weighted logistic regression analysis

Variable	Total (*n* = 657)	Adjusted OR (95%CI) Unweighted analysis	Adjusted OR (95% CI) Analysis weighted by recruitment site
Sex			
Men	437	Reference	Reference
Women	220	1.68 (1.18 to 2.39)*	1.70 (1.19 to 2.42)*
Age		0.98 (0.96 to 1.00)	0.98 (0.97 to 1.00)
Ethnicity			
Nonwhite	209	Reference	Reference
White	448	1.42 (0.97 to 2.08)	1.51 (1.02 to 2.23)*
Site			
Vancouver	190	Reference	Reference
Edmonton	87	2.10 (1.22 to 3.61)*	2.10 (1.24 to 3.55)*
Montreal	155	2.23 (1.35 to 3.70)*	2.24 (1.28 to 3.91)*
Quebec City	87	2.27 (1.25 to 4.11)*	2.27 (1.28 to 4.03)*
Toronto	138	2.18 (1.34 to 3.55)*	2.14 (1.26 to 3.65)*
Stable housing	302	1.23 (0.88 to 1.72)	1.15 (0.83 to 1.61)

*$P < 0.05$

Injection Drug Use and Cocaine Use

Table 3 presents results of chi-square analyses comparing injection drug use patterns among participants with and without depression. Although more than 93% of study participants in each subsample reported using needles to inject opiates at some time in their lives, participants with depression reported sharing needles and injection paraphernalia more often in the 30 days preceding the interview (29.6%), compared with participants without depression (20.4%, $P < 0.05$). In addition, participants with depression were more likely to have reported experiencing a drug overdose in the 6 months preceding study recruitment (21.0%), compared with participants without depression (13.6%, $P < 0.05$).

Table 3 Depression and injection drug use: overall sample[a]

	Opiate users	
Variable	% with depression	% without depression
Used needles		
Lifetime (n = 657)	93.8 (1.3)	93.4 (1.4)
Past 30 days (n = 615)	78.7 (2.3)	82.6 (2.1)
Average number of injections daily in past 30 days		
Did not inject	21.3	17.4
Once daily or less	8.6	11.7
2 to 4 times daily	39.5	37.5
5+ times daily	30.6	33.3
Shared needles or injection paraphernalia in past 30 days	29.6 (2.5)	20.4 (2.2)*
Overdosed in past 6 months	21.0	13.6 (1.9)*

[a]Data in parentheses are SEs for proportions.
*Significant chi-square statistic at $P < 0.05$; adjusted standardized residuals > 2.0

Table 4 Depression and the use of cocaine and crack cocaine[a]

	Opiate users	
Variable	% with depression	% without depression
Combined opiate use with nonopiates	71.8 (2.5)	69.2 (2.5)
Cocaine and (or) crack use		
Did not use cocaine or crack	22.2	15.9*
Cocaine and crack use	29.0	26.4
Cocaine use only	30.6	23.7*
Crack use only	18.2	33.9*

[a]Data in parentheses are SEs for proportions.
*Significant chi-square statistic at $P < 0.05$; adjusted standardized residuals > 2.0

Table 4 presents the results of chi-square analyses comparing different patterns of cocaine and (or) crack cocaine use among participants with and without depression. A high proportion of study participants in each subsample reported combining and (or) switching between opiates and other drug types; however, this was not related to depression. Instead, participants suffering from depression generally reported using cocaine more frequently (30.6%) than did participants without depression (23.7%, $P < 0.05$). Conversely, participants with depression reported smoking crack cocaine less frequently (18.2%) than did participants without depression (33.9%, $P < 0.05$).

Discussion

To our knowledge, this is the first study to document comorbid depression among untreated illicit opiate users in Canada. Across 5 urban centres, almost one-half of the recruited opiate users met CIDI-SFMD criteria for MDD. This high level of comorbidity has also been reported among untreated US samples of opiate users (16,19), although we obtained slightly higher prevalence rates for depression in the present study. Inconsistencies in measuring MDD across studies may account for divergent results relative to other research. Logistic regression analysis identified 3 independent predictors of depression: being a woman, being white, and living outside Vancouver. A higher rate of depression among female opiate users has also been reported in US samples (13,14), although these other results were obtained for treated opiate users. It is unclear why greater depression was observed among white drug users and among those living outside Vancouver. One explanation for the ethnicity differences may relate to the cross-cultural applicability of the CIDI-SFMD items in regard to Aboriginal and other nonwhite

populations. Further research is required to examine this issue, given the diverse ethnic background in our sample of untreated opiate users.

The present results also replicate US findings indicating that opiate users suffering from depression may be particularly likely to engage in unsafe drug use patterns (24,25) Specifically, we observed that opiate users with depression shared needles and injection paraphernalia more frequently, compared with those not suffering from depression. Although the mechanism underlying this effect is unclear, several plausible lines of investigation may prove fruitful. For example, Mandell and others reported that IV drug users with severe depression who also had large drug-using social networks exhibited 2.59 times higher odds to engage in needle-sharing behaviour, compared with IV drug users exhibiting low depression levels (26). Further research is required to determine whether social network dynamics also exhibit synergistic effects on risky injection practices among opiate users with depression in Canadian cities. It may also be helpful to undertake more in-depth investigation of opiate users' attitudes toward infectious disease transmission risks, as well as tactics they use to cope with stressful life events, in the context of understanding the relation between depression and opiate use.

Compared with users not suffering from depression, opiate users with depression were more likely to use cocaine but less likely to smoke crack cocaine. Other research on patterns of opioid and cocaine use in the OPICAN cohort suggests that switching between opioid and cocaine use does not reflect independent drug habits but, rather, reflects attempts to achieve contrasting drug effects by using substances with different psychopharmacological profiles (34).

Generalizability of the present findings is limited for several reasons. First, this study used snowball and opportunistic sampling procedures. Consequently, it is not known whether the sample accurately represents the entire population of untreated opiate users in Canada. In addition, selection bias was probably present in the sample, given that participants had, first, to be known and (or) available to outreach staff in each study site and, second, to be interested in participating in a 3-year cohort study. Additional research is therefore required to replicate the present findings in community surveys and other studies of Canadian opiate users who have not sought treatment. Finally, given that some Canadian research using the CIDI-SFMD suggests that the brief instrument may overestimate rates of depression in community samples (33), replication of the study is required, ideally with a standardized protocol that administers several indicators of MDD.

Despite these limitations, this is the first large Canadian study across 5 major urban centres to suggest that MDD is a significant psychiatric concern among untreated opiate users. Because opiate users experiencing MDD do respond to combined pharmacotherapy and psychotherapy (21,24), it is essential to develop innovative outreach and comorbidity treatment programs to reduce the population burden of comorbid depression in the context of opiate abuse.

Acknowledgements

We are grateful to the OPICAN study participants and staff who made the project possible.

Funding and Support

The study received funding from the Canadian Institutes of Health Research.

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Manuscript received June 2004, revised, and accepted October 2004.
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Résumé : La dépression comorbide chez les utilisateurs d'opiacés illicites non traités : résultats d'une étude multisite canadienne

Objectifs : Cette étude visait 1) à décrire les modèles de dépression majeure (TDM) dans une cohorte d'utilisateurs d'opiacés illicites non traités, recrutés dans 5 centres urbains du Canada, 2) à identifier les caractéristiques sociodémographiques des utilisateurs d'opiacés qui prédisent le TDM, et 3) à déterminer si les utilisateurs d'opiacés souffrant de dépression révèlent des modèles d'utilisation de drogues différents de ceux des participants sans dépression.

Méthode : Les données de départ ont été recueillies auprès de 679 utilisateurs d'opiacés non traités à Vancouver, Edmonton, Toronto, Montréal et Québec. Nous avons évalué les données sociodémographiques, l'utilisation de drogues, l'état de santé, l'utilisation des services de santé et la dépression, à l'aide de la version abrégée de l'entrevue diagnostique composite internationale pour la dépression majeure. Nous avons examiné les taux de dépression entre les sites de l'étude; des analyses de régression logistique ont prédit le TDM d'après les données démographiques et la ville. Des analyses du chi-carré ont servi à comparer les participants avec et sans dépression, en ce qui concerne l'utilisation de drogues injectables, de cocaïne et de crack.

Résultats : Presque la moitié (49,3 %) de l'échantillon atteignait le score du seuil d'inclusion du TDM. Être femme, blanc et vivre à l'extérieur de Vancouver prédisait indépendamment le TDM. Les utilisateurs d'opiacés souffrant de dépression étaient plus susceptibles que les utilisateurs sans dépression de partager du matériel de drogues injectables et des accessoires, et étaient aussi plus susceptibles d'utiliser de la cocaïne ($P < 0,05$).

Conclusions : La dépression comorbide est répandue chez les utilisateurs d'opiacés non traités au Canada; des interventions ciblées sont nécessaires pour cette population.