

# Patient Characteristics Associated With Nonprescription Drug Use in Intentional Overdose

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**Objective:** Over-the-counter (OTC) medications remain freely available to suicidal patients, despite their potential lethality and common use in suicide. The study's main objective was to identify patient characteristics, particularly psychiatric diagnosis associated with the use of OTC medications in intentional overdose.

**Methods:** We retrospectively reviewed 95 charts from patients who presented to St Paul's Hospital from August 1, 1997, to July 31, 1998, with a discharge diagnosis of intentional drug overdose. Univariate analysis was carried out to identify potential risk markers for OTC medication use, and logistic regression was performed using these variables.

**Results:** When the variables age, sex, and concurrent psychiatric diagnoses were controlled, use of OTC medications in overdose was significantly lower in patients with a DSM-IV diagnosis of substance abuse (OR 0.11,  $P = 0.005$ ) and in those who possessed prescription medications at the time of overdose (OR 0.18,  $P = 0.007$ ). Most patients in this cohort (82%) had at least 1 of these 2 traits. Although not statistically significant, younger patients appeared more likely to choose OTC medications for overdose.

**Conclusion:** Suicide-prone patients with a diagnosis of substance abuse and who possess prescription medications are unlikely to use OTC medications in overdose. For this cohort, this represents a relatively small proportion of patients whom clinicians should consider to be at greater risk for attempting suicide when using OTC medication, especially acetaminophen.

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

## Clinical Implications

- Patients without a DSM-IV diagnosis of substance abuse and who do not possess prescription medications may be more likely to choose over-the-counter (OTC) medications in intentional overdose.
- A relatively small proportion of patients in this cohort would be considered "at risk" of intentional OTC medication overdose.
- Clinicians may consider alerting family and health care professionals about the potential use of OTC medications in suicide-prone patients who meet these criteria. For these patients, limiting access to OTC medications may be appropriate.

## Limitations

- We did not assess completed suicide cases or those who did not present to hospital.
- Retrospective chart review may have compromised the accuracy of data collection.
- The study sample was small and limited to a single institution.

**Key Words:** medication overdose, over-the-counter medications, psychiatric diagnoses

Intentional drug overdose is one of the most common methods of attempted suicide (1,2). In 1997, intentional drug or chemical overdose was the third most commonly used method

of suicide in British Columbia (74 cases, 15%), next to hanging or suffocation (154 cases, 32%) and using firearms or explosives (125 cases, 26%) (3). Many studies have identified

**Table 1 Medications used in overdose**

Medication	Number (%) (n = 95)
Antidepressant medications	
Tricyclics	5 (5.3)
SSRI	20 (21.1)
MAOI	1 (1.1)
Other antidepressants	3 (3.2)
Antipsychotic medications	
Typical antipsychotics	10 (10.5)
Atypical antipsychotics	6 (6.3)
Other prescription medications	
Benzodiazepines	50 (52.6)
Hypnotics	12 (12.6)
Mood stabilizers	9 (9.5)
Opiates	5 (5.3)
Others	18 (18.9)
Illicit drugs	5 (5.3)
OTC medications	
Acetaminophen	18 (18.9)
ASA	4 (4.2)
OTC with codeine	5 (5.3)
Other OTC medications	16 (16.8)

ASA = acetylsalicylic acid; SSRI= selective serotonin reuptake inhibitor, MAOI = monoamine oxidase inhibitor, OTC = over-the-counter

the types of medications consumed in intentional drug overdoses, varying from barbiturates in the 1960s to tricyclic antidepressants (TCAs), other psychotropic medications, and over-the-counter (OTC) medications in the 1990s (1,2,4).

Although most psychotropic medications can provide positive clinical outcomes if used appropriately, clinicians are often concerned about potential toxicity and lethality of these agents. This concern can result in underdosing or in inadequate treatment that may subsequently increase the risk of suicide (5). Recent reports, however, suggest that freely accessible OTC medications, especially acetaminophen, are among the most common and lethal agents used in overdose (4,6).

There are well-established relations between suicide attempts and psychiatric conditions, especially with depression and borderline personality disorders (7–9). Even so, no data are available with respect to the association between the characteristics of those attempting suicide—particularly, a history of psychiatric diagnosis or personality disorder—and the type of medications used in overdose. Identifying these associations may help in developing strategies to decrease the incidence of intentional drug overdose and to assess the role of medication accessibility in the risk of overdose. For this reason, the focus of this study was to identify associations between the

characteristics of those attempting suicide and the type of medication used; specifically, prescription vs OTC medications.

## Methods

St Paul's Hospital is a 450-bed acute care teaching hospital located in downtown Vancouver, British Columbia. To identify patient characteristics associated with the use of OTC medications in intentional overdose, we performed a retrospective chart review that included all patients who presented at St Paul's Hospital from August 1, 1997, to July 31, 1998, with a discharge diagnosis of medication overdose. Patients were excluded if they had accidental poisoning or overdose or if they exclusively used alcohol, illicit drugs, and nondrug chemicals.

Information that was recorded from the charts comprised patient demographics, types of medications used in the overdose, and presence of prescription medications at the time of overdose. In addition, the latest DSM-IV diagnosis written by a psychiatrist was noted. However, if this was unavailable, we used the latest diagnosis written on the chart by other medical-service individuals. Charts with no diagnosis were excluded. To ensure the consistency and quality of the diagnosis data collected, a psychiatrist reviewed the diagnosis of one-third of the 95 usable charts.

## Data Analysis

All data analysis was performed using SPSS 9.0 for Windows® (10). Owing to the relatively small size of the study population, patients' diagnoses were grouped into several categories: depression (including bipolar-depressed phase), adjustment disorder, posttraumatic stress disorder, schizophrenia or psychosis (including bipolar-manic phase), anxiety, substance abuse (including substance or alcohol intoxication and alcohol abuse), personality disorder (including borderline, antisocial, histrionic, dependent, and narcissistic), and Axis III diagnoses.

We chose the use of any OTC medications for overdose as the dependent variable. Univariate analysis was carried out, comparing characteristics of patients who used any OTC medications in their suicide attempt with those who did not use OTC medications. We used Student's *t*-test for independent samples for interval data and the chi-square test for nominal data. Variables exhibiting a *P* value of < 0.25 were selected for multivariate logistic regression analysis, using the approach described by Hosmer and Lemeshow (11). A liberal threshold was employed to avoid excluding variables from the multivariate analysis that might appear important once other variables were considered. The final multivariate model included only those variables with *P* < 0.05.

**Table 2 Univariate analysis of patient characteristics according to over-the-counter (OTC) medication use in overdose**

	OTC use in overdose <sup>a</sup>		P value
	Yes (n = 28)	No (n = 67)	
Sex			
Men	20/28 (71.4%)	34/67 (50.7%)	0.073
Women	8/28 (28.6%)	3/67 (49.3%)	0.073
Age years, mean (SD)	35 (9)	42 (14)	0.01
Living alone	7/20 (35)	25/58 (43.1)	0.60
Previous suicide attempt	19/26 (73.1)	40/54 (74.1)	1.00
Previous overdose	19/26 (73.1)	36/51 (70.6)	1.00
Previous psychiatry consult	14/23 (60.9)	41/54 (75.9)	0.27
Ongoing psychiatry consult	10/22 (45.5)	24/48 (50)	0.80
Presence of prescription medications	15/27 (55.6)	56/65 (86.2)	< 0.01
Psychiatric diagnosis			
Depression	13/28 (46.4)	36/67 (53.7)	0.65
Psychosis or schizophrenia	1/28 (3.6)	10/67 (14.9)	0.17
Personality disorder	10/28 (35.7)	19/67 (28.4)	0.48
Substance abuse	3/28 (10.7)	28/67 (41.8)	< 0.01
Adjustment disorder	12/28 (42.9)	14/67 (20.9)	0.04
Posttraumatic disorder	3/28 (10.7)	7/67 (10.4)	1.00
Anxiety	1/28 (3.6)	0/67 (0.0)	0.30
Axis III	10/28 (35.7)	22/67 (32.8)	0.82

<sup>a</sup>Number of cases or records with available data (%) is reported for categorical variables; mean (SD) is reported for continuous variables

## Results

Of 333 patient charts with medication overdose over the study period, 180 were randomly selected. The sample size resulted from a 1-year limit on the study duration and the coinvestigators' availability for chart review. Of the 180 charts, 85 were excluded, owing to incomplete data or lack of evidence indicating the patient met the diagnostic inclusion criteria, leaving 95 cases for analysis. In the study cohort, the patient mean (SD) age was 40 (13) years, and 57% were men. Most patients had a previous suicide (74%) or overdose (71%) attempt and required treatment in the emergency room only (53%).

Most overdose attempts included multiple medications (71%) and were limited to prescription drugs only (71%). The most common type of prescription medication used for overdose was a benzodiazepine, and the most common type of OTC medication used for overdose was acetaminophen (Table 1). Patients typically overdosed with their own medications (85%), and most possessed prescription medications at the time of the overdose (76%). Concurrent use of alcohol was evident in 34% of the patients. Further, most patients had a

psychiatric diagnosis, with the most common being depression (52%), and most had previously overdosed on medications (71%).

Between patients using OTC medications in overdose and those using exclusively prescription medications, univariate analysis identified potentially important differences in sex, age, and possession of prescription medications (Table 2). For this reason, these variables were controlled in the multivariate model that assessed the association between psychiatric diagnosis and the use of OTC medications in overdose. Because only 1 patient in the cohort met the DSM-IV criteria for anxiety disorders, this variable was not entered into the regression model.

When differences in age, sex, and possession of prescription medications were controlled, a DSM-IV diagnosis of substance abuse was the only psychiatric diagnosis that was a significant independent predictor of OTC

medication use in overdose (Table 3). Patients with a diagnosis of substance abuse were 11% as likely (89% less likely) to use OTC medications in overdose, compared with those without this diagnosis. Not surprisingly, possession of prescription medications also significantly decreased the likelihood of using OTC medications. Most patients in this cohort (82%) had a diagnosis of substance abuse (6%), possessed prescription medications (49%), or both (72%). No 2 variables in the regression model were highly correlated, with Pearson correlation coefficients ranging from 0.04 to 0.38. The high *P* value for the regression model's Hosmer and Lemeshow goodness-of-fit (*P* = 0.92) indicates a reasonable fit of the data. Although not statistically significant in the multivariate model, younger patients appeared more likely to choose OTC medications for overdose. The mean age was significantly lower for those using OTC medications: 35 (SD 9) years vs 42 (SD 14) years (*P* = 0.01). Age did not correlate highly with possession of prescription medications (*r* = 0.11, *P* = 0.29) or with a diagnosis of substance abuse (*r* = 0.07, *P* = 0.52), suggesting that age itself may be important to consider when assessing the risk of OTC overdose.

**Table 3 Adjusted odds ratio (OR) for over-the-counter medication use in overdose**

Independent variable	OR	95%CI	P value
Substance abuse	0.11	0.02–0.51	0.005
Presence of prescription medication	0.18	0.05–0.63	0.007
Psychosis or schizophrenia	0.29	0.02–3.64	0.34
Sex	0.34	0.09–1.19	0.09
Posttraumatic stress disorder	0.52	0.06–4.66	0.56
Age (per decade)	0.58	0.32–1.05	0.07
Depression	0.89	0.23–3.44	0.87
Personality disorders	1.42	0.41–4.98	0.58
Adjustment disorder	2.19	0.59–8.09	0.24

## Discussion

Recent studies have identified OTC medications as a common component in self-poisonings (1,4,12). Further, the incidence of acetaminophen overdose has increased dramatically since the early 1980s (1,12) and accounts for the largest number of deaths from drug overdose in some studies (6). Despite these statistics, OTC medications remain freely accessible to patients who have demonstrated suicidal behaviour. Indeed, most patients in this study had previous overdose attempts, including more than 73% of those who used OTC medications. Knowledge about which patients are more likely to choose OTC medications in overdose may alert clinicians to the risk of OTC overdose and could be used to develop strategies aimed at lowering the frequency of OTC medication overdose.

The results of this study indicate that patients with a diagnosis of substance abuse or those who possessed prescription medications at the time of overdose may be less likely to choose OTC medications in their suicide-overdose attempts. The risk markers identified in this study appear logical and provide insight into patient situations that prompt the use of OTC medications in overdose.

Patients with a history of substance abuse may pursue and stockpile, thus increasing availability of prescription medication. It should be noted, however, that the availability of prescription medications was controlled in the regression model and therefore would not completely explain why substance abuse was independently associated with a decreased risk of OTC use. There appear to be other reasons why individuals who suffer from substance abuse were less likely to choose OTC medications. Perhaps this reflects a misconception among this population that prescription medications are more lethal in overdose.

Patients who do not possess prescription medications at the time of overdose would logically be more likely to use agents available without a prescription. Because most of the study population had a psychiatric diagnosis and had previously attempted suicide, it is conceivable that medications were not prescribed, owing to the perceived risk of prescription drug overdose. Although this cannot be proven from the data presented here, it reminds us that the availability of OTC medications is an important consideration in suicidal patients. Given the potential lethality of OTC medication overdose, assertive prescribing of indicated psychiatric medications in suicidal patients may be an appropriate way to limit suicide attempts in some patients.

Still, there are several limitations to this study. First, the study population was limited to hospitalized patients and to those who were brought to the hospital emergency room. Consequently, completed suicide and suicide attempts that did not result in presentation to a hospital were not included in the analysis. Possibly, the risk markers for OTC medication use in overdose for these patients differ significantly from those in the study population. The study population, however, likely represents most hospitals located in the city core, with a significant proportion of patients having a diagnosis of substance abuse. In addition, data were collected by retrospective chart review and therefore may be less accurate than if collected prospectively. The subjectivity of psychiatric diagnosis is especially prone to intraindividual variability and is thus difficult to accurately assess retrospectively. To help limit this problem, a psychiatrist confirmed the diagnosis in one-third of the charts reviewed. Psychiatric diagnoses were grouped, owing to the small number of patients within each diagnostic subgroup. This may limit extrapolation of results to populations wherein the diagnostic mix differs substantially or to those wherein individual components of our diagnostic groupings (for example, mania) are particularly common. Finally, the study population was relatively small and was restricted to a single institution. Consequently, these results may not reflect the patterns of intentional drug overdose in the community at large. Results from 2 previous studies, however, suggest that similarities exist between our study population and other overdose cohorts. Stein and others (1) describe a sample of 103 hospitalized drug overdose patients in the US: 48% were men (57% in our sample), and 59% had a diagnosis of depression (52% in our sample). In an English study carried out by Crome, 48% of drug suicide cases reviewed were men (6).

## Conclusion

Suicide-prone patients with a diagnosis of substance abuse who possess prescription medications are unlikely to use OTC medications in overdose. For this cohort, this represents a

relatively small proportion of patients whom clinicians should consider to be at greater risk for OTC medication overdose. In particular, younger patients meeting these criteria may use OTC medications. These results could be used to develop strategies that aim to lower the frequency of suicides involving OTC medications. Clinicians may consider alerting family and health care professionals to the potential use of OTC medications in suicide-prone patients who meet these criteria. For these patients, limiting access to OTC medications may be appropriate.

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### Résumé : Caractéristiques des patients associées avec l'utilisation de médicaments en vente libre dans les surdoses intentionnelles

**Objectif :** Les médicaments en vente libre (EVL) demeurent aisément accessibles aux patients suicidaires, malgré leur létalité potentielle et leur usage répandu dans les cas de suicide. Le principal objectif de l'étude était de déterminer les caractéristiques des patients, en particulier le diagnostic psychiatrique associé avec l'utilisation des médicaments EVL dans les surdoses intentionnelles.

**Méthodes :** Nous avons fait une étude rétrospective de 95 dossiers de patients qui se sont présentés à l'hôpital de St. Paul entre le 1<sup>er</sup> août 1997 et le 31 juillet 1998 et qui ont reçu au congé un diagnostic de surdose de médicaments intentionnelle. Une analyse unidimensionnelle a été effectuée pour identifier les marqueurs potentiels du risque d'utilisation de médicaments EVL, puis une régression logistique a été exécutée à l'aide de ces variables.

**Résultats :** Après contrôle selon l'âge, le sexe et les diagnostics psychiatriques concurrents, l'utilisation de médicaments EVL dans les surdoses était significativement plus faible chez les patients ayant un diagnostic d'abus de substance du *DSM-IV* (OR 0,11,  $P = 0,005$ ) et chez ceux qui possédaient des médicaments sur ordonnance au moment de la surdose (OR 0,18,  $P = 0,007$ ). La plupart des patients de cette cohorte (82 %) avaient au moins 1 de ces 2 traits. Bien que ce ne soit pas statistiquement significatif, les jeunes patients semblaient plus susceptibles de choisir les médicaments EVL pour une surdose.

**Conclusion :** Les patients sujets au suicide qui ont un diagnostic d'abus de substance et qui possèdent des médicaments sur ordonnance ne sont pas susceptibles d'utiliser des médicaments EVL pour une surdose. Pour cette cohorte, cela représente une proportion relativement faible de patients que les cliniciens devraient considérer comme étant à risque accru de tenter de se suicider avec des médicaments EVL, surtout l'acétaminophène.