Prescription Medication Misuse Among Adolescents With Severe Mental Health Problems in Ontario, Canada

Shannon L. Stewart, Philip Baiden & Wendy den Dunnen

informa
healthcare

ORIGINAL ARTICLE

Prescription Medication Misuse Among Adolescents With Severe Mental Health Problems in Ontario, Canada

Shannon L. Stewart[1,2], Philip Baiden[1] and Wendy den Dunnen[3]

[1]*Applied Research and Education, Child and Parent Resource Institute, London, Ontario, Canada;* [2]*Department of Psychiatry, University of Western Ontario, London, Ontario, Canada;* [3]*School of Psychology, University of Ottawa, Ottawa, Ontario, Canada*

The purpose of this study was to examine the prevalence of prescription medication misuse among adolescents with severe mental health problems in Ontario, Canada, and to explore some of the factors that influence the misuse of prescription medication. Data were obtained from the Resident Assessment Instrument for Mental Health. A total of 2,677 adolescents between the ages of 12 and 18 years who were admitted into adult mental health beds were analyzed. Logistic regression was used in estimating the likelihood of misusing prescription medication. Overall, 17% of adolescent inpatients misused prescription medication. In the multivariate model, the following were found to be associated with misuse: being female, having multiple psychiatric admissions, education, threat or danger to *self*, problem with addiction, history of emotional abuse, use of alcohol, past year use of opiates and cannabis, as well as symptoms of depression. Misuse of prescription medication was less likely to occur among adolescents with a diagnosis of schizophrenia and adolescents who were admitted as a result of posing a threat or danger to *others*. Implications of the findings are discussed with suggestions for future research.

Keywords prescription medication misuse, adolescents, severe mental health, RAI-MH

INTRODUCTION

Various studies and reports produced in the last two decades have shown that the misuse of prescription medication in Canada is on the rise (Dhalla et al., 2009; Paglia-Boak, Adlaf, & Mann, 2011; Sajan, Corneil, &

Grzybowski, 1998). According to the Ontario Student Drug Use and Health Survey (OSDUHS) conducted by Paglia-Boak et al. (2011), one in seven students in Grades 7 through 12 reported using prescription medication for pain relief and nonmedical purposes in the past year. This rising rate of prescription medication misuse is in contrast to the rate of alcohol, tobacco, and illicit drug use by adolescents (Johnston, O'Malley, Bachman, & Schulenberg, 2012; PATS, 2006). Among adolescents, use of cannabis, alcohol, and tobacco are currently the only drugs with rates of use higher than prescription medication drugs (Johnston et al., 2012).

A major problem in the literature on prescription medication misuse has to do with how to define and measure the concept of prescription medication misuse. There is no universally acceptable definition of what constitutes misuse (Compton & Volkow, 2006; Twombly & Holtz, 2008). Terms such as "abuse," "addiction," "dependence," and "misuse" are often used in the literature. The National Institute on Drug Abuse (2011, p. 1) defines prescription drug abuse to mean "the intentional use of a medication without a prescription; in a way other than as prescribed; or for the experience or feelings it causes." Substance Abuse and Mental Health Services Administration (SAMHSA) (2010) also defined prescription medication misuse to mean the use of medication without a prescription or simply for the experience or feeling the drugs caused. For the purposes of this study, prescription medication misuse was defined as the over-use of recommended/prescribed dosage (e.g., taking a greater dose of an analgesic or taking an anxiolytic more often than recommended or prescribed), or using prescribed medication for a purpose other than its intended use within the last three months (see Hirdes et al., 2005).

Prevalence and Factors Associated With Prescription Medication Misuse

As stated previously, it was found that 14% of Ontario students in Grades 7 through 12 misuse prescription drugs, with use increasing progressively with grade level and reaching 18% among students in Grade 11 (Paglia-Boak et al., 2011). A similar study conducted in the USA by the National Survey on Drug Use and Health (NS-DUH) shows that whereas use of illicit drugs have remained fairly stable over the past 15 years, the use of psychotherapeutic drugs continue to increase, largely due to the increase in use of prescription drugs and salvia (Johnston et al., 2012). Cicero, Inciardi, and Munoz (2005) went further to note that major reasons for increased use of prescription drugs has to do with the fact that prescription drugs are relatively easier to obtain, as opposed to the difficulties involved in obtaining cocaine, heroine, and other illicit drugs on the street, and thus reduce the likelihood of arrest by law enforcement officials. The perception among adolescents that prescription medications are not as dangerous as other drugs also accounts for the rising incidents of prescription medication use among this population (Friedman, 2006; PATS, 2006).

Even though various studies have shown gender differences in the use of alcohol, tobacco, and other illicit substances, less is known about gender differences in prescription medication misuse among adolescents with severe mental health problems. Epidemiological data have consistently shown rates of alcohol, tobacco, and illicit drug use to be higher among males than females across all ages (SAMHSA, 2010). Recent studies and reports, which mostly come from the USA, have also provided evidence that females are more likely to misuse prescription medications and less likely to use illicit substances whereas males are more likely to use illicit substances but less likely to misuse prescription medication (Roe, McNamara, & Motheral, 2002; SAMHSA, 2010). Simoni-Wastila, Ritter, and Strickler (2004) noted that the continued exposure to psychoactive prescription medications could account for why females are more likely to misuse prescription medication than males. Schepis and Krishnan-Sarin (2008) recently analyzed data from a nationally representative sample of 18,678 adolescents and found that adolescent females were 1.25 times more likely to misuse prescription medication. Mention should be made, however, that this significant effect disappears once the effect of other variables was controlled for.

Other important explanatory factors identified as contributing to prescription medication misuse include age, race and ethnicity, level of education, housing situation, abuse and trauma related symptomatology, and psychopathology (Boyd, McCabe, Cranford, & Young, 2006; Cicero et al., 2005; Cole & Logan, 2010; Fischer, Rehm, Patra, & Cruz, 2006; Roe et al., 2002; Schepis & Krishnan-Sarin, 2008; Twombly & Holtz, 2008). Other studies have also suggested that the concurrent use of psychoactive substances with alcohol, tobacco, and other illicit substances can result in additional reinforcement, and consequently increase the potential for addiction (Compton & Volkow, 2006).

The Current Study

Misuse of prescription medication can worsen psychiatric symptoms, lead to illness relapse, or increase the likelihood of rehospitalization (Cicero et al., 2005; Select Committee on Mental Health and Addictions Final Report, 2010; Twombly & Holtz, 2008). Recognizing the factors that put adolescents with mental health problems at risk of misusing prescription medication is vital for prevention and the development of appropriate intervention strategies. Also, thorough examination of prescription medication misuse among adolescents with mental health problems has great public and mental health benefits, as it could aid mental healthcare providers in designing appropriate prevention programs for adolescents who are likely to misuse prescription medication and also help in discharge planning for those who have already started misusing prescription drugs (Schepis & Krishnan-Sarin, 2009; Stewart & Baiden, in press). Even though some studies have been conducted on prescription medication misuse, few studies have examined prescription medication misuse among adolescents with severe mental health problems. Within the Canadian context, less is known about the factors associated with prescription medication misuse among adolescents with severe mental health problems and more research using large datasets is needed. Thus, the primary purpose of this study was to examine the prevalence of prescription medication misuse among adolescents with severe mental health problems in Ontario, Canada, and to explore some of the factors that influence prescription medication misuse.

METHOD

Participants

The analyses presented in this study are based on the admission and discharge records of 2,677 adolescents between the ages of 12 and 18 years who were admitted into adult mental health beds in Ontario, Canada. Adolescents who only had a short-stay assessment were excluded from the analysis due to missing data. The adolescents in this study represent a heterogeneous population in terms of their mental health problems, daily adaptation, and functioning that one might consider relevant to their perceptions, judgments, and decisions in medication management and misuse. For instance, self-care performance in activities of daily living indicated that the majority of the adolescent patients were able to perform basic activities (e.g., walking, toilet use, eating, combing hair, and brushing teeth) with little or no assistance. The majority of the adolescent patients (60%) required no help or supervision in managing their medication (i.e., remembering when to take medication, opening bottles, taking correct dosage, giving injections, or applying ointments), 24% required only set-up or minimal supervision, and about 17% required limited assistance to total dependence in managing their medication. Insight into mental health was also assessed to determine the adolescent's level of awareness of his or her mental health problems and the contributing factors. This measure was not intended to provide an in-depth understanding of the signs and symptoms that the

adolescent patient may be experiencing, but rather that the adolescent patient is aware that a problem exists and is in need of some help. Approximately, 22% of the adolescents had no awareness of the difficulties or the presence of their mental health problem. These adolescents also did not believe they needed assistance and did not feel the need to be hospitalized. However, the majority (58%) acknowledged that a mental health problem exists but was not able to identify contributing factors. Close to one in five (19.6%) recognized that a mental health problem exists and appeared to understand that the problem requires treatment.

Data

Data for this study were obtained from the Resident Assessment Instrument for Mental Health (RAI-MH) submitted to the Canadian Institute for Health Information (CIHI), Ontario Mental Health Reporting System (OMHRS), between October 2005 and March 2010. The Ministry of Health and Long-Term Care (MOHLTC) made the use of the RAI-MH mandatory in all adult mental health beds in hospitals in Ontario, Canada, starting October 1, 2005. Seventy-three facilities in Ontario have over 4,500 adult inpatient mental health beds – facilities include general hospitals, provincial psychiatric hospitals, as well as specialty psychiatric hospitals (Hirdes et al., 2005). Bed types include acute, addictions, child and adolescent, forensic, crisis, and long-term care. Patients admitted are assessed within 72 hours of intake and reassessed every three months thereafter. Information is gathered via direct questioning of the patient and the primary support person (if applicable), observation of the patient in the mental health setting, and a review of available records. Mental health professionals are also encouraged to use their professional judgment in coding where necessary (Hirdes et al., 2005). The RAI-MH is completed by trained clinical hospital staff and takes about an hour to complete. Items in the instrument describe the patient's performance and capacity in different areas, with the majority of items serving as specific triggers for care planning and discharge purposes (see Hirdes et al., 2005, for a detailed description of the RAI-MH).

The inter-rater reliability and validity of the RAI-MH have been reported with an overall kappa value of 0.75 and over 60% of items in the instrument having kappa values (using Fleiss-Cohen weights for ordinal data) ranging between 0.63 and 0.73 (Hirdes et al., 2008). The RAI-MH data is managed by CIHI and has built-in validation rules and uses rigorous coding procedures to ensure consistency and data quality. Data submitted to CIHI is encrypted in a secure format (CIHI, 2011). Assessors are trained to adhere to the documentation of coding guidelines contained in the RAI-MH manual. In addition, CIHI uses standard processing edits in assessing data quality. A submission can be accepted, flagged, or rejected with warning messages produced for inconsistent data. For example, a discharge record is rejected if the date of discharge precedes the date of admission for the same episode of care. Facilities are then expected to correct rejected records and resubmit (CIHI, 2011). Ethics approval was granted by

the University of Waterloo Office of Research Ethics. Aspects of this data have been used in other publications (see Stewart & Baiden, in press; Stewart, Kam, & Baiden, in press).

Outcome Variable

The outcome variable examined in this study was prescription medication misuse defined as the over-use of recommended/prescribed dosage (e.g., taking a greater dose of an analgesic or taking an anxiolytic more often than recommended or prescribed), or using prescribed medication for a purpose other than its intended use within the last three months. Adolescents who misused prescription medication were coded as 1 and those who did not misuse prescription medication were coded as 0.

Explanatory Variables

Explanatory variables examined in this study include age; gender; education; residing in temporary shelter; number of recent psychiatric admissions; reasons for admissions; history of childhood sexual, physical, or emotional abuse; past year use of inhalants, hallucinogens, stimulants, cocaine and crack, opiates, and cannabis; daily use of tobacco; use of alcohol; symptoms of depression; and DSM-IV provisional psychiatric diagnoses (i.e., disorders of childhood/adolescence, substance-related disorders, schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, adjustment disorders, and personality disorders).

Reasons for admissions were categorized into: (1) threat or danger to self, (2) threat or danger to others, (3) problem with addiction, (4) psychiatric symptoms (e.g., depression, medication side effects, or hallucination), and (5) involvement with the criminal justice system or forensic admission. More than one reason could contribute to admission. For example, an adolescent inpatient may abuse alcohol and have stated intentions of hurting him or herself (see Hirdes et al., 2005).

Sexual abuse relates to any form of non-consensual sexual contact (including but not limited to being subjected to non-consenting fondling, exposure of genitals, sexual intercourse/rape) experienced by the adolescent. *Physical abuse* relates to any form of physical abuse experienced by the adolescent (e.g., any incident resulting in non-accidental injury, physical confinement, excessive physical discipline, or withdrawal of necessities of life such as food and shelter). *Emotional abuse* relates to the ongoing emotional environment created by an abuser for the purposes of control such that the abused person's self-esteem, identity, energy, ability to feel and question, wants, and needs are invalidated by the abuser (Hirdes et al., 2005). Even though reliability and validity of the items measuring abuse has not been tested in this study, these items have been used in past studies and were found to be a good measure of abuse (see e.g., Baiden, Stewart, & den Dunnen, in press) and traumatic life events (see e.g., Mathias, Pittman, & Hirdes, 2011). Depression symptoms were assessed based on the Depressive Severity Index (DSI). The DSI is made up of the following five items: negative statements, self-deprecation, expressions

of guilt/shame, statements of hopelessness, and sad, pained, or worried facial expression. Scores on the DSI range from 0 to 15, with higher scores indicating more symptoms of depression.

Data Analyses

Descriptive statistics of the outcome variable (prescription medication misuse) and the explanatory variables were conducted to examine the means and standard deviations for continuous variables and the percentage distribution for categorical variables. A bivariate analysis using logistic regression was conducted to examine the association between prescription medication misuse and the explanatory variables. Here, we present the unadjusted odds ratio (OR) and 95% confidence interval (CI) for prescription medication misuse. Any variable whose bivariate test yielded a p-value of 0.25 or less was considered as a candidate for inclusion in the multivariate model (Hosmer & Lemeshow, 1989). According to Hosmer and Lemeshow (1989), the use of a more conservative level (such as 0.05) in the model-building stage often fails to identify variables known to be important.

Following this, OR and the 95% CI for each explanatory variable was obtained using SAS PROC LOGISTIC (SAS Institute Inc, Cary, NC) to determine the factors associated with prescription medication misuse. Logistic regression was chosen because the outcome variable of interest was a binary variable and the explanatory variables were measured as nominal and interval/ratio variables. The multivariate results present the adjusted OR for the likelihood of misusing prescription medication. The Hosmer-Lemeshow chi-square goodness-of-fit test was used in assessing the overall goodness of fit of the model. All statistical analyses were conducted using SAS version 9.2 (SAS Institute Inc, Cary, NC).

RESULTS

Descriptive Statistics

As can be seen from Table 1, the average age of the adolescents in this study was 17.63 years with a standard deviation (SD) of 1.17 years. About one-half of the sample are females and the other half are males. Of the 2,677 adolescent inpatients, 456 representing 17% misused prescription medication. Threat or danger to self and psychiatric symptoms, i.e., depression and hallucinations, were the main reasons for adolescents' admissions. A little over 6% had three or more psychiatric admissions, 19.5% had one to two admissions within the last two years, and 74.1% were admitted for the first time. The distribution of abuse is as follows: 18.2% experienced sexual abuse, 22% experienced physical abuse, and one in three (33.1%) experienced emotional abuse. Half of the adolescents reported using cannabis within the past year and 36.1% used tobacco daily. The majority of adolescents (55.8%) had a diagnosis of mood disorders, 24% had a diagnosis of substance-related disorders, and 23.2% had a diagnosis of schizophrenia and other psychotic disorders (see Table 1

for a detailed depiction of the distribution of the variables used in the analysis).

Bivariate Analyses of Prescription Medication Misuse

A number of explanatory variables examined at the bivariate level were found to be significantly associated with prescription medication misuse (see Table 2). Age, psychiatric symptoms, history of involvement with the criminal justice system, provisional DSM-IV psychiatric diagnoses of disorders of childhood/adolescence, and anxiety disorders failed to reach statistical significance. Residing in temporary shelter and adjustment disorders were found to be significant at $p < .25$.

The bivariate results indicate that adolescent females were 2.19 times more likely to misuse prescription medications compared to their male counterparts. Adolescents in Grades 9–11 were 2.1 times more likely to misuse prescription medications compared to adolescents in Grade 8 or less. The number of recent psychiatric admissions was positively associated with prescription medication misuse and adolescents admitted as a result of posing a threat or danger to *themselves* and those admitted as a result of problem with addiction were more likely to misuse prescription medication. However, adolescents who were admitted as a result of posing a threat or danger to *others* were significantly less likely to misuse prescription medication. The experience of emotional abuse, physical abuse, and sexual abuse was associated with greater likelihood of prescription medication misuse. Similarly, significant bivariate association was found between all the substance use variables examined in this study and prescription medication misuse (see Table 2). Of the various DSM-IV provisional psychiatric diagnoses examined, this study found a significant positive association between diagnoses of substance-related disorders (OR = 1.77), mood disorders (OR = 1.65), and personality disorders (OR = 1.90). However, adolescents with a diagnosis of schizophrenia were 67% less likely to misuse prescription medications (OR = 0.33).

Multivariate Analyses of Prescription Medication Misuse

Variables found to be associated with prescription medication misuse at the bivariate level were entered in a multivariate logistic regression model to identify the most parsimonious variables in explaining prescription medication misuse. Ten variables were positively associated with prescription medication misuse and two variables were negatively associated with prescription medication misuse. Holding other variables in the model constant, females were 1.64 times more likely to misuse prescription medications compared to their male counterparts (OR = 1.64). Adolescents with three or more psychiatric admissions within the last two years were 2.26 times more likely (OR = 2.26) to misuse prescription medication when compared to their colleagues admitted for the first time. Past year use of opiates and adolescents who were admitted as a result of posing a threat or danger to *themselves* emerged as the two most robust contributors in explaining medication misuse, both with ORs above 2.

TABLE 1. Sample distribution

Variables	Frequency (%)	Mean (SD)
Outcome variable: Prescription medication misuse		
No	2,221 (83.0)	
Yes	456 (17.0)	
Explanatory variables		
Demographic variables		
Age (years)		17.63 (1.17)
Gender		
Male	1,344 (50.2)	
Female	1,333 (49.8)	
Education		
Less than Grade 9	333 (12.4)	
Grades 9–11	1,736 (64.9)	
High school and above	608 (22.7)	
Number of recent psychiatric admissions		
None	1,984 (74.1)	
1–2	521 (19.5)	
3 or more	172 (6.4)	
Residing in temporary shelter	600 (22.4)	
Reasons for admissions		
Threat or danger to self	1,828 (68.3)	
Threat or danger to others	633 (23.7)	
Problem with addiction	635 (23.7)	
Psychiatric symptoms	1,760 (65.8)	
Involvement with the criminal justice system	224 (8.4)	
History of abuse		
Emotional abuse	887 (33.1)	
Physical abuse	589 (22.0)	
Sexual abuse	487 (18.2)	
Substance use		
Inhalants	75 (2.8)	
Hallucinogens	381 (14.2)	
Stimulants	202 (7.6)	
Cocaine and crack	378 (14.1)	
Opiates	169 (6.3)	
Cannabis	1,343 (50.2)	
Tobacco	967 (36.1)	
Alcohol	809 (30.2)	
DSM-IV provisional psychiatric diagnosis		
Disorders of childhood/adolescence	366 (13.7)	
Substance-related disorders	642 (24.0)	
Schizophrenia and other psychotic disorders	621 (23.2)	
Mood disorders	1,494 (55.8)	
Anxiety disorders	332 (12.4)	
Adjustment disorders	264 (9.9)	
Personality disorders	340 (12.7)	
Depression score		4.04 (3.66)

Adolescents were also more likely to misuse prescription medication if they:

- were in Grades 9–11 (OR = 1.66),
- were admitted as a result of an addiction problem (OR = 1.48),
- experienced emotional abuse (OR = 1.28),
- use alcohol (OR = 1.35),
- used cannabis within the past year (OR = 1.35), and
- had symptoms of depression (OR = 1.04).

Adolescents who were admitted as a result of being a threat or danger to *others* were 40% less likely to misuse prescription medication (OR = 0.60) and adolescents with a diagnosis of schizophrenia were 52% less likely to misuse prescription medication (OR = 0.48; see Table 3).

DISCUSSION

The primary objective of this study was to examine the prevalence of prescription medication misuse among adolescents with severe mental health problems and to explore some of the factors that influence prescription medication misuse. Given that this study is exploratory and coupled with the marginal significance observed for some variables in the multivariate model, the findings presented in this study should not be

TABLE 2. Demographic and clinical characteristics of prescription medication misuse

Variables	Odds ratio (95% CI)
Patients demographic characteristics	
Age in years	1.00 (0.92–1.09) ns
Gender: Female	2.19 (1.77–2.70)***
Education	
Less than Grade 9 (RC)	1
Grades 9–11	2.10 (1.44–3.05)***
High school and above	1.49 (0.98–2.27) ns
Residing in temporary shelter	1.17 (0.93–1.48)+
Number of recent psychiatric admissions	
None (RC)	1
1–2	1.14 (0.89–1.47)+
3 or more	1.92 (1.34–2.75)**
Reasons for admission	
Threat or danger to self	2.87 (2.20–3.75)***
Threat or danger to others	0.46 (0.35–0.62)***
Problem with addiction	1.82 (1.46–2.27)***
Psychiatric symptoms	0.89 (0.72–1.10) ns
Involvement with the criminal justice system	1.10 (0.77–1.57) ns
History of childhood abuse	
Emotional abuse	1.76 (1.44–2.17)***
Physical abuse	1.43 (1.14–1.80)**
Sexual abuse	1.56 (1.22–1.98)***
Substance use	
Inhalants	2.52 (1.54–4.12)***
Hallucinogens	1.97 (1.53–2.54)***
Stimulants	2.53 (1.85–3.46)***
Cocaine and crack	2.00 (1.55–2.58)***
Opiates	4.22 (3.05–5.83)***
Cannabis	1.83 (1.49–2.25)***
Tobacco	1.60 (1.30–1.96)***
Alcohol	2.02 (1.64–2.49)***
DSM-IV provisional psychiatric diagnoses	
Disorders of childhood/adolescence	0.93 (0.69–1.25) ns
Substance-related disorders	1.77 (1.42–2.20)***
Schizophrenia and other psychotic disorders	0.33 (0.24–0.45)***
Mood disorders	1.65 (1.34–2.04)***
Anxiety disorders	1.01 (0.75–1.37) ns
Adjustment disorders	1.22 (0.88–1.68)+
Personality disorders	1.90 (1.46–2.48)***
Depression score: mean (S.D.)	1.08 (1.05–1.11)***

$+p < .25$; $*p < .05$; $**p < .01$; $***p < .001$.
Note. RC = reference category; Ns = not significant.

TABLE 3. Multivariate logistic regression model examining prescription medication misuse

Variables	Odds ratio (95% CI)
Gender: Female	1.64 (1.29–2.08)***
Number of recent psychiatric admissions	
None (RC)	1.00
1–2	1.29 (0.98–1.70) ns
3 or more	2.26 (1.53–3.35)***
Education	
Less than Grade 9 (RC)	1.00
Grades 9–11	1.66 (1.11–2.49)*
High school and above	1.48 (0.94–2.33) ns
Threat or danger to self	2.28 (1.71–3.04)***
Threat or danger to others	0.60 (0.44–0.82)**
Problem with addiction/dependency	1.48 (1.13–1.92)**
Emotional abuse	1.28 (1.03–1.61)*
Schizophrenia	0.48 (0.34–0.68)***
Use of alcohol	1.35 (1.06–1.72)*
Use of opiates	3.50 (2.44–5.02)***
Use of cannabis	1.35 (1.05–1.73)*
Depression	1.04 (1.01–1.07)**

$*p < .05$; $**p < .01$; $***p < .001$.
Note. RC = reference category; C statistic = 0.76; Hosmer-Lemeshow G.O.F (p-value) = 7.23 (0.5126).

2008) and are often prescribed psychotropic medications (Olfson et al., 2000; Wong, Murray, Camilleri-Novak, & Stephens, 2004). It is possible that inpatients may not have a higher prevalence of prescription medication misuse as clinicians and psychiatrists usually monitor their medication intake and also often receive additional resources in form of family counseling. However, a lower prevalence of illicit prescription medication use in a community sample has been reported. McCabe, Teter, and Boyd (2004) found that just under 5% of a middle- and high-school sample misused prescribed stimulant medication. These varying rates of prescription drug misuse in community samples suggest that misuse may vary depending on the location of study, the availability of prescription medication, and how it was defined and measured. It is apparent that prescription medication misuse is prevalent during adolescence and, given that the rate continues to increase, deserve further attention (Johnston et al., 2012; PATS, 2006).

The finding that adolescent females were more likely to misuse prescription medication both corroborates and contradicts past findings on prescription medication misuse. Roe et al. (2002) analyzed the 15 most frequently used prescription drugs and found significant gender differences across all ages with females more likely to use antidepressant, antianxiety, and pain medications than their male counterparts. Controlling for demographics, health status, and diagnosis, Simoni-Wastila (2000) also found females to be 48% more likely to abuse prescription drugs when compared to their male counterparts. Similar results have also been found in other studies (McCabe et al., 2006; Simoni-Wastila et al., 2004). However, Schepis and Krishnan-Sarin (2008) found no significant

overstretched. Overall, the study found 17% of adolescent inpatients misused prescription medication. This result is fairly consistent with previous research examining prescription medication misuse in community samples (Boyd et al., 2006; Paglia-Boak et al., 2011). McCabe, Boyd, and Teter (2006) also found lifetime use of illicit prescription medication to be 21% with an annual prevalence rate of 14% among undergraduate students. One would expect the proportion of adolescents misusing prescription medication to be higher in an inpatient sample given that adolescents with mental health problems tend to have higher drug usage (Atakan,

association between gender and prescription medication misuse once other factors were taken into account. That said, the proportion of adolescent females that misused prescription medication in their study was greater than adolescent males that misused prescription medication. Back, Payne, Simpson, and Brady (2010) also found no gender differences when examining prescription opioid use although their study revealed that females were more likely to obtain prescription opioids for free from family or friends, while males were more likely to purchase them from a dealer. In support of this, Simoni-Wastila (1998, 2000) found that women have greater medical exposure to prescription drugs than men. It is possible that the ease for females to gain exposure to and obtain psychotropic medications and the notion that prescription drugs are less harmful than illicit drugs may lead to misuse of prescription medication particularly for women (Simoni-Wastila et al., 2004).

Consistent with previous research, adolescents who used alcohol, opiates, or cannabis, or were admitted as a result of problem with addiction were more likely to misuse prescription medication. For example, Simoni-Wastila et al. (2004) found that the likelihood of nonmedical prescription drug use was 8.3 times higher among respondents who reported using illicit substances within the past year. Similar findings have also been found by Schepis and Krishnan-Sarin (2008). This further lends credence to the proposition that misuse of prescription drugs often times co-occurs with other illicit substances and does not occur in isolation (Simoni-Wastila et al., 2004). The desire to overcome side effects associated with some psychotropic medications or the quest to decrease the undesirable drug effects of street drugs may account for the association between illicit substance use and prescription medication misuse (Pogge, Singer, & Harvey, 2005). A similar explanation has also been offered by Compton and Volkow (2006). Given the high co-occurrence of prescription medication use with other drugs, it may be important to remind adolescents about the negative effects of combining illicit substances with psychotropic medication.

Abuse-related events are traumatic and can be very difficult for children, adolescents, and adults to cope with, especially when they have experienced repeated incidents of abuse (Herman, 1997). Individuals with these histories may experience shame, guilt, low self-esteem, depression, and other types of emotional pain and resort to substance use in order to numb the pain (Baiden et al., in press). Because the effects of these substances are temporary and the emotional pain ensues, this can lead to continued substance use and possible addiction (Bujarski et al., 2012; Hyman et al., 2008). Thus, it is not uncommon for individuals who have histories of abuse to misuse illicit substances (Baiden et al., in press). Mental illness, such as depression, can also be very debilitating. The emotional pain associated with depression can lead some individuals to abuse substances to escape it. Antidepressants are often prescribed for depression, making prescription medication readily available to these individuals. Thus, it makes sense that prescription medication misuse was found to be more common among adolescents with depression. This finding is also consistent with previous research examining predictors of prescription medication misuse in adolescents (Schepis & Krishnan-Sarin, 2008).

The results regarding those having a diagnosis of schizophrenia and those who were admitted as a result of threat or danger to *others* being less likely to misuse prescription medication are quite interesting and intuitive. First, the pronounced gender differences in schizophrenia, whereby males are more likely to be diagnosed with schizophrenia (e.g., Kirkbride et al., 2006), may help explain the negative association between a diagnosis of schizophrenia and prescription medication misuse, since males are also less likely than females to misuse prescription medication. Second, the majority of those who were admitted as a result of threat or danger to others were males who have stated intentions to hurt someone, have actually hurt someone, or made an attempt to hurt someone.

Clinical Implications

In Ontario, prescription medication misuse was just as common among the inpatient mental health populations as a community sample, although those in the inpatient mental health population are more likely to have increased exposure to prescription medication (Wong et al., 2004). Mental health clinicians and nurses may be preventing increased prescription medication misuse among inpatient adolescents through monitoring and supervision of medication use. Adolescents who obtain prescription medications illegally are less likely to have the support and advice of medical personnel on the dangers and risks associated with misusing prescription medications and the monitoring of medication intake by professionals.

That said, 17% of adolescent inpatients misusing prescription medication is still quite high. Clinicians and nurses should be cognizant of the factors associated with prescription medication misuse to help identify adolescents who may have this specific problems and provide them with appropriate services to prevent long-term substance use. Research examining prevention and intervention efforts for prescription drug misuse are limited. One study, by Spoth, Trudeau, Shin, and Redmond (2008), examined a family-based, seven-session intervention with sixth and seventh graders that did not focus specifically on the prevention of substance abuse but instead on family risk and protective factors, such as parental nurturing, child management skills, communication skills, and adolescent prosocial skill development. They found that the adolescents in the intervention group had significantly less prescription drug misuse than youth in the control group at follow-up when they were in Grade 11 and at 21 years of age. This indicates that including the family and focusing on reducing the impact of risk factors, such as abuse of other substances, and improving protective factors, such as family support and peer relationships, without a specific emphasis on prescription medication misuse, may be an effective long-term approach to preventing prescription

drug misuse in inpatient settings as well. These findings also demonstrate the importance of being aware of predictors of prescription drug misuse not only to identify youth who have a substance use problem but also to develop an effective treatment plan for the prevention of prescription medication misuse through strength promotion.

Limitations and Future Research

This study has some limitations that must be taken into account. First, due to the cross-sectional nature of the data, causal inferences regarding the direction between prescription medication misuse and the explanatory variables could not be made. Prescription medication misuse, however, is a non-linear, complex, dynamic, and multidimensional human phenomenon making it unlikely that future studies will be designed in such a way that causal inferences will be captured. Longitudinal studies are required in order to establish the stability of factors associated with prescription medication misuse among adolescents with mental health problems. Furthermore, we were unable to examine the availability of prescription drugs and its misuse. This should be addressed in future studies as there is reason to believe that with the increase in marketing of medications via social media, there is the increased likelihood that adolescents may develop a more favorable attitude towards prescription medications. Another limitation of this study has to do with the fact that the sample used for this study was comprised of adolescents placed in adult facilities rather than adolescent-oriented treatment facilities. This has the potential to limit the generalizability of the findings to other populations as these adolescents tend to be older than those in mainly adolescent-focused facilities. Lastly, another consideration limiting this study's generalizability is that the sample's resources and possible protective factors were not examined. More research examining prescription medication use in inpatient samples of adolescents is needed to determine whether the current findings are generalizable and how protective factors impact adolescent prescription drug use.

CONCLUSIONS

Prescription medication misuse is a growing problem in the adolescent population and prevention efforts are needed. Mental healthcare professionals should explain the risks of prescription medication misuse to children and adolescents who are prescribed medication and monitor its use to prevent misuse. Families should also be involved in prevention efforts aimed at reducing prescription medication misuse as this has been found to be effective. It is also important to do a thorough assessment with adolescents to determine if prescription drug use is a problem, especially when adolescents have had histories of abuse and abuse other substances. Any identified risk factors and possible protective factors for misuse of prescription medication should be identified and incorporated into the treatment plan to help reduce substance use problems.

Declaration of Interest

RÉSUMÉ

Mauvaise utilisation des médicaments d'ordonnance chez les adolescents souffrant de graves problèmes de santé mentale en Ontario, Canada

Le but de cette étude était d'examiner la prévalence de l'abus de médicaments d'ordonnance chez les adolescents souffrant de graves problèmes de santé mentale en Ontario, au Canada et à explorer quelques-uns des facteurs qui influencent l'utilisation abusive de médicaments d'ordonnance. Les données ont été obtenues à partir du Resident Assessment Instrument pour la santé mentale. Un total de 2,677 adolescents âgés de 12 à 18 ans qui ont été admis dans des lits de santé mentale pour adultes ont été analysés. La régression logistique a été utilisée pour estimer la probabilité d'un mauvais usage des médicaments sur ordonnance. Dans l'ensemble, 17% des adolescents hospitalisés fessaient preuve d'abus de médicaments sur ordonnance. Dans le modèle multivarié, la suite se sont avérés être associés à l'abus: d'être de sexe féminin, ayant de multiples admissions psychiatrique, l'éducation, une menace ou un danger pour soi-même, un problème de toxicomanie, des antécédents de violence psychologique, la consommation d'alcool, l'usage d'opiacés ou de cannabis durant la dernière année, ainsi que les symptômes de la dépression. L'abus de médicaments sur ordonnance est moins possible de se produire chez les adolescents ayant un diagnostic de schizophrénie et les adolescents qui, en raison admis, constituaient générer une menace ou un danger aux autres. Les conséquences de ces résultats sont discutées avec des suggestions de futures recherches.

Mots-clés: abus des médicaments sur ordonnance, les adolescents, les graves problèmes de santé mentale, la RAI-MH

RESUMEN

Medicamentos recetados y usados indebidamente entre adolescentes con graves problemas de salud mental en Ontario, Canadá

El propósito de este estudio fue examinar la prevalencia del uso indebido de medicamentos que requieren de prescripción medica entre jóvenes con graves problemas de salud mental en Ontario, Canadá, y explorar algunos de los factores que influyen en el uso indebido de medicamentos de prescripción. Los datos fueron obtenidos del Resident Assesment Instrument para la Salud Mental. Un total de 2,677 adolecentes que se encuentran entre las edades de 12 a 18 años que fueron ingresados en camas para adultos que tienen problemas de salud mental fueron analizados. El método de Regresión logística se utilizó

para estimar la probabilidad de abusar de los medicamentos recetados. En general, el 17% de los adolescentes hospitalizados abusaron de dichos medicamentos. En el modelo multivariado, se encontró cierta asociación con el uso indebido de los medicamentos y las siguientes características: ser mujer, tener múltiples ingresos al psiquiatrico, la educación, la amenaza o el riesgo para sí mismo, problemas de adicción, haber pasado por abuso emocional, el uso de alcohol, el consumo en el último año de opiáceos y cannabis, así como también síntomas de depresión. El uso indebido de medicamentos de prescripción médica es menos probable que ocurra entre los adolescentes con un diagnóstico de esquizofrenia y adolescentes que fueron ingresados por ser una amenaza o riesgo para los demás. Lo que implican los hallazgos es discutido con sugerencias s para investigaciones futuras.

Palabras clave: uso indebido de medicamentos de prescripción medica, adolescentes, severa salud mental, RAI-MH

THE AUTHORS

Shannon L. Stewart, PhD, C Psych, is Psychologist and Manager of Applied Research and Education at the Child and Parent Resource Institute, Ministry of Children and Youth Services, Ontario, Canada. She is also Assistant Professor in the Division of Child and Adolescent Psychiatry, Department of Psychiatry, University of Western Ontario, Canada, as well as Adjunct Professor in the Department of Psychology and Faculty of Education. Shannon is also an Associate interRAI Fellow and is leading efforts to develop several interRAI child and youth mental health instruments. She is also a member of the interRAI Network of Excellence in Mental Health (iNEMH). Dr. Stewart is also co-principal investigator on two grants examining chronic users of children's mental health services. Primary areas of interest include treatment sustainability for children and youth with complex mental health needs, service delivery, residential treatment and inpatient outcomes, patterns of service use, restraint use, and child psychopathology.

Philip Baiden, MA, is currently Research Coordinator/Data Analyst at Child and Parent Resource Institute in London, Ontario, Canada. His areas of research interest include adolescent mental health service utilization, substance abuse/prescription medication misuse, reliability and validity analysis, quantitative research methodology, and statistical analysis. Philip has published in the areas of substance abuse, prescription medication misuse, and readmission among children/youth with mental health needs.

Wendy den Dunnen, MEd, is currently a doctoral student in the Clinical Psychology program at the University of Ottawa in Ottawa, Ontario, Canada. She is interested in research examining child psychopathology, mental health treatment outcomes, and the child welfare system. Her doctoral research focuses on three areas within the child welfare system: (1) placement stability, (2) foster parent satisfaction, and (3) foster parent training. Wendy has published in the areas of substance abuse, residential treatment outcomes, and mental health treatment for children in the child welfare system.

GLOSSARY

C statistic: Is a measure of a model's ability to discriminate those who experienced an event versus those who did not. It is similar to the area under a receiver operating characteristic (ROC) curve. Generally, the C-statistic ranges from 0.5 (no predictive ability) to 1 (perfect discrimination).

Depressive Severity Index (DSI): A measure of depressive symptoms based on the following five items: negative statements, self-deprecation, expressions of guilt/shame, statements of hopelessness, and sad, pained, or worried facial expression.

Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV): The American Psychiatric Association.s diagnostic manual that provides standardized criteria for the classification of mental disorders.

Goodness-Of-Fit (G.O.F.): A statistical test used to determine how well a model fits a particular set of data.

Hosmer-Lemeshow goodness-of-fit test: The Hosmer-Lemeshow goodness-of-fit is used in assessing model fitness whereby a good model produces a nonsignificant chi-square test statistic.

Logistic regression: A type of regression analysis often used when the outcome variable is measured as a binary variable. Logistic regression estimates parameters using the maximum likelihood estimation procedure.

Resident Assessment Instrument . Mental Health (RAI-MH): The RAI-MH is a comprehensive standardized instrument for evaluating the needs, strengths and preferences of adults with mental illness in in-patient psychiatric settings.

REFERENCES

Atakan, Z. (2008). Cannabis use by people with severe mental illness: is it important? *Advances in Psychiatric Treatment, 14*(6), 423–431.

Back, S. E., Payne, R. L., Simpson, A. N., & Brady, K. T. (2010). Gender and prescription opioids: findings from the National Survey on Drug Use and Health. *Addictive Behaviors, 35*(11), 1001–1007.

Baiden, P., Stewart, S. L., & den Dunnen, W. (in press). Childhood abuse and cannabis use among adolescents with mental health needs in Ontario, Canada. *Journal of Substance Use.* doi:10.3109/14659891.2012.727522.

Boyd, C. J., McCabe, S. E., Cranford, J. A., & Young, A. (2006). Adolescents' motivations to abuse prescription medications. *Pediatrics, 118*(6), 2472–2480.

Bujarski, S. J., Feldner, M. T., Lewis, S. F., Babson, K. A., Trainor, C. D., Leen-Feldner, E., et al. (2012). Marijuana use among traumatic event-exposed adolescents: posttraumatic stress symptom frequency predicts coping motivations for use. *Addictive Behaviors, 37*(1), 53–59.

Cicero, T. J., Inciardi, J. A., & Munoz, A. (2005). Trends in abuse of Oxycontin and other opiod analgesics in the United States: 2002–2004. *The Journal of Pain Society, 6*(10), 662–672.

CIHI (Canadian Institute for Health Information). (2011). *Ontario Mental Health Reporting System data quality documentation, 2010–2011.* Ottawa: Canadian Institute for Health Information (CIHI). Retrieved August 22, 2012, from http://www.cihi.ca/CIHI-ext-portal/pdf/internet/OMHRS_DQ_2010–2011_EN

Cole, J., & Logan, T. K. (2010). Nonmedical use of sedative-hypnotics and opiates among rural and urban women with protective orders. *Journal of Addictive Diseases, 29*(3), 395–409.

Compton, W. M., & Volkow, N. D. (2006). Abuse of prescription drugs and the risk of addiction. *Drug and Alcohol Dependence, 83*(Supplement 1), S4–S7.

Dhalla, I. A., Mamdani, M. M., Sivilotti, M. L. A., Kopp, A., Qureshi, O., & Juurlink, D. N. (2009). Prescribing of opioid analgesics and related mortality before and after the introduction of long-acting oxycodone. *Canadian Medical Association Journal, 181*(12), 891–896.

Fischer, B., Rehm, J., Patra, J., & Cruz, M. F. (2006). Changes in illicit opioid use across Canada. *Canadian Medical Association Journal, 175*(11), 1385–1387.

Friedman, R. A. (2006). The changing face of teenage drugs abuse: the trend toward prescription drugs. *New England Journal of Medicine, 354*(14), 1448–1450.

Herman, J. (1997). *Trauma and recovery: The aftermath of violence – from domestic abuse to political terror.* New York: Basic Books.

Hirdes, J. P., Ljunggren, G., Morris, J. N., Frijters, D. H. M., Soveri, H. F., Gray, L., et al. (2008). Reliability of the interRAI suite of assessment instruments: A 12-country study of an integrated health information system. *BMC Health Services Research, 8*, 277.

Hirdes, J. P., Perez, E., Curtin-Telegdi, N., Prendergast, P., Morris, J. N., Ikegami, N., et al. (2005). *Ontario Mental Health Reporting System (OMHRS): Minimum data set user's manual.* Ottawa: Canadian Institute for Health Information.

Hosmer, D. W., & Lemeshow, S. (1989). *Applied logistic regression.* New York: Wiley.

Hyman, S. M., Paliwal, P., Chaplin, T. M., Mazure, C. M., Rounsaville, B. J., & Sinha, R. (2008). Severity of childhood trauma is predictive of cocaine relapse outcomes in women but not men. *Drug and Alcohol Dependence, 92*(1–3), 208–216.

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2012). *Monitoring the future national results on adolescent drug use: Overview of key findings, 2011.* Ann Arbor, MI: Institute for Social Research, the University of Michigan.

Kirkbride, J. B., Fearon, P., Morgan, C., Dazzan, P., Morgan, K., Tarrant, J., et al. (2006). Heterogeneity in incidence rates of schizophrenia and other psychotic syndromes: Findings from the 3-Center AESOP Study. *Archives of General Psychiatry, 63*(3), 250–258.

Mathias, K., Pittman, D., & Hirdes, J. P. (2011). Traumatic life events CAP. In J. P. Hirdes, N. Curtin-Telegdi, K. Mathias, C. M. Perlman, T. Saarela, H. Kolbeinsson, et al. (Eds.), *interRAI Mental Health Clinical Assessment Protocols (CAPs) for use with community and hospital-based mental health assessment instruments* (pp. 63–70). Washington, DC: interRAI.

McCabe, S. E., Boyd, C. J. & Teter, C. J., (2006). Medical use, illicit use, and diversion of abusable prescription drugs. *Journal of American College Health, 54*(5), 269–278.

McCabe, S. E., Teter, C. J., & Boyd, C. J. (2004). The use, misuse and diversion of prescription stimulants among middle and high school students. *Substance Use and Misuse, 39*(7), 1095–1116.

National Institute on Drug Abuse. (2011). *Topics in brief: Prescription drug abuse.* Retrieved September 18, 2012, from http://www.drugabuse.gov/sites/default/files/prescription_1.pdf

Olfson, M., Mechanic, D., Hansell, S., Boyer, C. A., Walkup, J., & Weiden, P. J., (2000). Predicting medication noncompliance after hospital discharge among patients with schizophrenia. *Psychiatric Services, 51*(2), 216–222.

Paglia-Boak, A., Adlaf, E. M., & Mann, R. E. (2011). *Drug use among Ontario students, 1977–2011: OSDUHS highlights (CAMH Research Document Series No. 33).* Toronto: Centre for Addiction and Mental Health.

PATS (Partnership Attitude Tracking Study). (2006). *The Partnership Attitude Tracking Study (PATS) Parents with children in grades 7 – 12.* Retrieved October 10, 2012, from http://www.drugfree.org/wp-content/uploads/2011/04/FULL-REPORT-FINAL-PATS-Teens-and-Parent-April-6–2011-1.pdf

Pogge, D. L., Singer, M. B., & Harvey, P. D. (2005). Rates and predictors of adherence with atypical antipsychotic medication: A follow-up study of adolescent inpatients. *Journal of Child and Adolescent Psychopharmacology, 15*(6), 901–912.

Roe, C. M., McNamara, A. M., & Motheral, B. R. (2002). Gender- and age-related prescription drug use patterns. *Annals of Pharmacotherapy, 36*(1), 30–39.

Sajan, A., Corneil, T., & Grzybowski, S. (1998). The street value of prescription drugs. *Canadian Medical Association Journal, 159*(2), 139–142.

SAMHSA (Substance Abuse and Mental Health Services Administration). (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of national findings* (NSDUH Series H-38A, HHS Publication No. SMA 10–4586 Findings). Rockville, MD: Office of Applied Studies, SAMHSA.

Schepis, T. S., & Krishnan-Sarin, S. (2008). Characterizing adolescent prescription misusers: a population-based study. *Journal of American Academy of Child and Adolescent Psychiatry, 47*(7), 745–754.

Schepis, T. S., & Krishnan-Sarin, S. (2009). Sources of prescriptions for misuse by adolescents: differences in sex, ethnicity, and severity of misuse in a population-based study. *Journal of American Academy of Child and Adolescent Psychiatry, 48*(8), 828–836.

Select Committee on Mental Health Addictions Final Report. (2010). Navigating the journey to wellness: A comprehensive mental health and addictions action plan for Ontarians.

Simoni-Wastila, L. (1998). Gender and psychotropic drug use. *Medical Care, 36*(1), 88–94.

Simoni-Wastila, L. (2000). The use of abusable prescription drugs: the role of gender. *Journal of Women's Health Gender-Based Medicine, 9*(3), 289–297.

Simoni-Wastila, L., Ritter, G., & Strickler, G. (2004). Gender and other factors associated with nonmedical use of abusable prescription drugs. *Substance Use and Misuse, 39*(1), 1–23.

Spoth, R., Trudeau, L., Shin, C., & Redmond, C. (2008). Long-term effects of universal preventive interventions on prescription drug misuse. *Addiction, 103*(7), 1160–1168.

Stewart, S. L., & Baiden, P. (In Press). An exploratory study of the factors associated with medication nonadherence among youth in adult mental health facilities in Ontario, Canada. Psychiatry Research. doi: 10.1016/j.psychres.2013.01.017.

Stewart, S. L., Kam, C., & Baiden, P. (In Press). Predicting length of stay and readmission for psychiatric inpatient youth admitted to adult mental health beds in Ontario, Canada. Child and Adolescent Mental Health.

Twombly, E. C., & Holtz, K. D. (2008). Teens and the misuse of prescription drugs: evidence-based recommendations to curb a growing societal problem. *Journal of Primary Prevention, 29*(6), 503–516.

Wong, I. C., Murray, M. L., Camilleri-Novak, D., & Stephens, P. (2004). Increased prescribing trends of paediatric psychotropic medications. *Archives of Disease in Childhood, 89*(13), 1131–1132.