Factors associated with recent suicide attempts in clients presenting for addiction treatment

Alexander Penney, Dwight Mazmanian, John Jamieson, Nancy Black

---

Factors Associated with Recent Suicide Attempts in

Clients Presenting for Addiction Treatment

Alexander Penney[1], Dwight Mazmanian[1],

John Jamieson[1], and Nancy Black[2]

[1] Department of Psychology, Lakehead University, Thunder Bay, Ontario, Canada

[2] Mental Health, Addictions and Problem Gambling Programs, St. Joseph's Care Group, Thunder Bay, Ontario, Canada

Corresponding Author: Dwight Mazmanian.

Psychology Department, Lakehead University,

955 Oliver Road, Thunder Bay, ON Canada P7B 5E1

Telephone: 1-807-343-8257 Fax: 1-807-346-7734

Email: dwight.mazmanian@lakeheadu.ca

Abstract

Factors associated with recent suicide attempts were examined in clients who sought treatment at an addictions facility between 2001 and 2008. Clients who reported being hospitalized for attempting suicide in the past year ($n = 76$) were compared to all other clients ($n = 5914$) on demographic, mental health, substance use, and problem gambling variables. Compared to all other clients, clients who attempted suicide were significantly less educated, and more likely to have major depressive disorder, a bipolar disorder, ADHD, personality disorder, or a gambling problem. While mental health issues have long been linked with suicide, new research, such as the present study, continues to find associations between gambling and suicide. With the strong relationship between mood disorders and gambling, these findings support continued research into the possible connection between gambling and suicide.

Key Words: gambling, suicide, mood disorder, substances, education

Factors Associated with Recent Suicide Attempts in Clients Presenting for Addiction Treatment

The suicide rate in Canada remained stable between 2001 and 2005, fluctuating between 11.3 and 11.9 suicides per 100,000 (Statistics Canada, 2010). It has been found that having a history of suicide attempts and being diagnosed with a mood disorder, particularly major depressive disorder or a bipolar spectrum disorder, are the best predictors of making a future suicide attempt (Goodwin & Jamison, 2007). Compared to other mental disorders and medical conditions, mood disorders are associated with higher likelihoods of suicide attempts (Harris & Barraclough, 1997).

People who abuse substances are also more likely to attempt suicide than the general population. For example, the lifetime risk for suicide has been estimated at 7% for alcohol dependence (Inskip, Harris, & Barraclough, 1998). Using standardized mortality ratios based on suicides, a meta-analysis conducted by Harris and Barraclough (1997) found that the suicide risk associated with sedative and polysubstance abuse was as high as mood disorders. Opioid and intravenous drug use has also been shown to increase the likelihood of suicide (Wilcox, Conner, & Caine, 2004). In populations that received substance abuse treatment, being younger, being separated or divorced, being polysubstance dependent, and having made previous suicide attempts have been shown to predict suicide attempts after treatment (Preuss et al., 2003). Lifetime eating disorders, agoraphobia, major depression, and dysthymia also predict suicide attempts after substance abuse treatment (Bakken & Vaglum, 2007).

In addition to substance abuse and mental health problems, the possible link between problem gambling and suicide risk has received increased attention (Battersby, Tolchard, Scurrah, & Thomas, 2006; Ladd & Petry, 2003). Not surprisingly, mental health disorders and pathological gambling have been shown to be highly comorbid in both community and clinical

samples (Hodgins, Peden, & Cassidy, 2005). Similarly, lifetime prevalence rates for substance abuse among pathological gamblers range from 25% to 60% (Crockford & el-Guebaly, 1998), while between 13% and 30% of treatment seeking substance users report a history of problem gambling (Langenbucher, Bavly, Labouvie, Sanjuan, & Martin, 2001; Shepherd, 1996).

The literature has shown that gamblers dealing with mental health issues and substance abuse are more likely to report suicidal ideation and to attempt suicide (Hodgins, Mansley, & Thygesen, 2006; Wong, Chan, Conwell, Conner, & Yip, 2010). Among clients who attended a gambling treatment service, suicidal ideation and behaviours were associated with gambling severity, alcohol dependence, and depression (Battersby et al., 2006). Gamblers with a history of substance abuse are more likely to have suicidal thoughts and to have made suicide attempts than gamblers without a history of substance abuse (Ladd & Petry, 2003). The results of a recent Canadian national survey found gambling severity to be strongly related to suicidal thoughts and behaviours, mania, depression, alcohol use, and social phobia (Brooker, Clara, & Cox, 2009).

The present study examined data for clients receiving substance or gambling treatment at the Addiction Treatment Centre in Thunder Bay from 2001 to early 2008. Clients who reported being hospitalized for attempting suicide in the past year ($n = 76$) were compared to all other clients ($n = 5914$) on demographic variables, mental health variables, substance abuse variables, and problem gambling. The aim of these analyses was to find variables associated with previous suicide attempts in an addictions treatment seeking population.

<div align="center">Method</div>

Participants

Data for the 5,990 clients who presented for treatment at the provincially funded Addiction Treatment Centre in Thunder Bay between 2001 and 2008 were extracted from the

Catalyst database. No identifying information about individual clients was included in the

extracted data, and participants remained completely anonymous. Of the 5990 clients, 63.1%

were male and the mean age was 32.60 years (*SD* = 14.55 years, range from 11 to 86 years). The

clients were predominantly single (56.0%) and only 22.1% had attended university or college.

The majority were unemployed (36.1%), employed full time or part time (26.3%), or students

(21.9%).

Catalyst database

All clients entering addiction treatment services in Ontario are required to complete an

assessment with an addiction counsellor, and the client reported information from this

assessment provides much of the data entered into the database. The addiction counsellors were

trained to complete the assessment, but because this information is gathered primarily for

administrative purposes, no inter-rater reliability information is available. The *Catalyst* database

is maintained by the Centre for Addiction and Mental Health (CAMH) and tracks a range of data

upon admission.

As part of the assessment, all clients were asked if they had been hospitalized in the past

year, and the reason for their most recent hospitalization. Reasons for hospitalization included

suicide attempt ($n = 76$), accidental overdose ($n = 64$), respiratory ($n = 64$), mental health ($n =$

44), gastrointestinal ($n = 17$), head injury ($n = 15$), cardiac ($n = 14$), seizures ($n = 8$), diabetes (n

$= 6$), liver disease ($n = 6$), kidney disease ($n = 5$), complications of injection drug use ($n = 4$),

cancer ($n = 3$), HIV/AIDS ($n = 3$), and hepatitis ($n = 2$).

The additional measures from *Catalyst* examined in the present study were:

Demographic information: Clients self-reported their sex, age, marital status, education, legal

problems, and employment status. Based on previous research with this database (Jamieson et

al., in press), marital status, education, legal status, and employment status were converted to dichotomous variables. Marital status was coded to distinguish between clients who were single (never married), and those who were currently married/partnered, divorced/separated, or widowed. Education was coded to distinguish between clients who received a college or university education and clients who received a high school or elementary education. Legal status was coded to distinguish between clients who were or were not currently involved in the legal system. Employment status was coded to distinguish between clients who were employed or retired versus clients who were students, disabled or not in the labour force (in general, better vs. poorer employment).

Mental health measures: Clients reported whether or not they had been diagnosed by a mental health professional in the last 12 months and in their lifetime. Up to two most recent diagnoses were entered. For this study, the disorders reported by clients were grouped into seven major categories based on interpretability and *DSM-IV* categories. These categories were: 1) anxiety disorder (including obsessive-compulsive disorder, panic disorder with or without agoraphobia, posttraumatic stress disorder, and unspecified anxiety disorder), 2) major depressive disorder (MDD), 3) attention-deficit/hyperactivity disorder (ADHD; including disruptive behaviour disorder), 4) bipolar disorder, 5) personality disorder (including antisocial personality disorder, borderline personality disorder, narcissistic personality disorder, and paranoid personality disorder), 6) psychotic disorder (including schizophrenia, schizoaffective disorder, and unspecified psychotic disorder) and 7) "other disorders" (including adjustment disorder, situational crisis, eating disorder, and pain disorder).

Type of problematic substances: Clients reported which substances they had addiction problems with. Up to five problematic substances could be provided. The substances were collapsed into

categories based on interpretability. The eleven categories included: 1) alcohol, 2)

amphetamines and stimulants (including methamphetamines), 3) barbiturates and

benzodiazepines, 4) cannabis, 5) cocaine and crack, 6) ecstasy, 7) glue and inhalants, 8)

hallucinogens, 9) heroin and opium, 10) medications (consisting of over-the-counter codeine,

prescription opiates, and steroids), and 11) other psychoactive drugs.

Problem gambling measure: Clients answered a 7-item gambling screen developed by CAMH.

The first five items on the gambling screen are similar to questions on the South Oaks Gambling

Screen (Lesieur & Blume, 1987). The questions assess whether, in the past 12 months, 1) the

client has gambled more than intended, 2) has falsely claimed to be winning, 3) has felt guilty

about his or her gambling, 4) has been criticized for his or her gambling, 5) has had arguments

about his gambling, and 6) felt he or she had to continue gambling until he or she won. The last

question asks for the frequency of these occurrences. Those answering "yes" to three or more

questions are categorized as having a gambling problem, unless the last question indicated that

this occurred only one time.

Procedure

Permission to access the data was granted by Lakehead University Research Ethics Board

and the Addiction Treatment Centre's Research Ethics Committee. Upon inspection of the data,

it was found that some clients had more than one row of data, because they were admitted for

treatment on multiple occasions. The choice for data analysis was whether to reduce each client

to a single entry (unit of study is the client) or to keep all the data (unit of study is the

admission). The first admission was used for all clients since statistical analyses on the

admission data would violate the important assumption of independence of observations. Any

blank, unknown, or uncertain responses were excluded and treated as missing.

Clients who reported being hospitalized for a suicide attempt in the past year ($n = 76$) were compared to all other clients ($n = 5914$) using bivariate logistic regression. In the combined analysis, the demographic variables, mental health diagnoses, the specific drugs categories, and problem gambling categorization were entered simultaneously. Because of the number of mental health and substance categories in the combined analysis, it was possible that the shared variance would mask multiple variables associated with being hospitalized for a suicide attempt. To address this, individual logistic regressions were also conducted between each of the demographic, mental health, substance, and problem gambling variables and the dependent measure.

Results

Table 1 contains a summary of the factors associated with being hospitalized for a suicide attempt when comparing clients who reported being hospitalized for a suicide attempt in the past year to all other clients. Looking at the significant variables from the individual logistic regressions, demographic factors included younger age, being female, being single, and being less educated. The mean age of the clients who had been hospitalized for a suicide attempt in the past year was 27.09 years ($SD = 14.51$), while the mean age of the other clients was 32.67 years ($SD = 14.54$). Of the clients who had been hospitalized for a suicide attempt, 52.6% were female and 68.4% were single. In comparison, 36.7% of all other clients were female and 56.7% were single. Of the clients who had been hospitalized for a suicide attempt in the past year, only 10.5% had received a college or university education, while 23.5% of all other clients had received a college or university education.

For the mental health variables, having an anxiety disorder, MDD, ADHD, bipolar disorder, and personality disorder were each individually associated with having been

hospitalized for a suicide attempt in the past year. Of the clients who reported being hospitalized

for a suicide attempt, 10.5% had been diagnosed with an anxiety disorder, 42.1% had been

diagnosed with MDD, 9.2% had been diagnosed with ADHD, 6.6% had been diagnosed with a

bipolar disorder, and 5.3% had been diagnosed with a personality disorder. In contrast, only

3.3% of all other clients had been diagnosed with an anxiety disorder, 6.8% had been diagnosed

with MDD, 2.5% had been diagnosed with ADHD, 1.4% had been diagnosed with a bipolar

disorder, and 0.4% had been diagnosed with a personality disorder.

 For the substance categories, having problems with amphetamines and stimulants,

cannabis, cocaine and crack, ecstasy, or medications were associated with having been

hospitalized for a suicide attempt in the past year. Of the clients who reported being hospitalized

for a suicide attempt, 5.3% had problems with amphetamines and stimulants, 56.6% had

problems with cannabis, 27.6% had problems with cocaine and crack, 9.2% had problems with

ecstasy, and 26.3% had problems with medications. Of all other clients, 2.0% had problems with

amphetamines and stimulants, 38.3% had problems with cannabis, 16.5% had problems with

cocaine and crack, 2.7% had problems with ecstasy, and 13.6% had problems with medications.

Problem gambling was also significantly related to being hospitalized for a suicide

attempt. Twenty-two (28.9%) of the 76 clients who had been hospitalized for a suicide attempt

in the past year had a gambling problem, while 15.6% of all other clients had a gambling

problem.

When all the mental health and substance categories were entered, the regression

equation predicted being hospitalized for a suicide attempt in the past year, χ^2 (25, $n = 5440$) =

128.75, $p < .001$, Nagelkerke $R^2 = 0.171$. Unique significant factors were being less educated,

being diagnosed with MDD, a bipolar disorder, ADHD, or a personality disorder, and having a

gambling problem.   Being less educated uniquely increased the chances of been hospitalized for a suicide attempt by over 3 times, odds ratio (OR) = 3.16. Similarly, having MDD more than doubled the likelihood of been hospitalized for a suicide attempt (OR = 2.83). Having a personality disorder (OR = 1.85) or a gambling problem (OR = 1.80) contributed large unique predictions, while having ADHD (OR = 1.43) and a bipolar disorder (OR = 1.33) made smaller unique contributions.

Discussion

The present study examined how well demographic, mental health, substance use, and gambling information for clients who received substance or gambling treatment at a provincially funded Addiction Treatment Centre were associated with hospitalization for a suicide attempt in the past year. Being less educated was the only demographic variable to be uniquely associated with having been hospitalized for a suicide attempt in the past year. Of the mental health categories, having a mood disorder, ADHD, a bipolar disorder, or a personality disorder were found to be uniquely associated with hospitalization for a suicide attempt. Problems with specific substance categories were not significant unique factors of having been hospitalized for a suicide attempt. Finally, having a gambling problem was also found to be associated with hospitalized for a suicide attempt in the past year.

While previous research has indicated that female gamblers are more likely to report a suicide attempt due to problem gambling than male gamblers (Feigelman, Gorman, & Lesieur, 2006; Potenza et al., 2001), sex was not a unique significant factor of being hospitalized for a suicide attempt in the past year in this study. Similarly, being younger and being single were significantly associated with being hospitalized for a suicide attempt in the individual logistic regressions, but they were not significant unique factors in the combined analysis. The variance

shared over the five demographic variables, seven mental health categories, eleven substance categories, and the gambling variable may account for sex, age, and relationship status not emerging as significant unique factors. Education was the only unique significant demographic factor in the current study. Clients who did not receive a college or university education were far more likely to have been hospitalized for a suicide attempt in the past years. Fewer years of education have also been shown to predict suicide attempters when compared to suicide gesturers (Nock & Kessler, 2006).

As anticipated, mental health variables were strongly associated with having attempted suicide. MDD, ADHD, bipolar disorders, and personality disorders were all had unique associations with being hospitalized for attempting suicide in the past year. These findings are in line with the results of Bakken and Vaglum (2007), who found that major depression and dysthymia were predictive of attempting suicide in a substance abuse treatment-seeking population. Clients who are depressed and suicidal at the start of substance treatment appear to be more likely to have both attempted suicide before treatment and in the 12 months following treatment (Britton & Conner, 2010). Results also converge with previous research that has shown that both ADHD and personality disorders, especially when comorbid with depression and substance use, heighten suicide risk (James, Lai, & Dahl, 2004; Séguin et al., 2006). Anxiety disorder was the only mental health diagnosis that was a significant factor in the individual logistic regression, but not in the combined analysis. Given the high comorbidity of anxiety disorders and depression (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998), it is not surprising that the shared variance between anxiety disorders and the mood disorders would eliminate anxiety disorders as a significant unique factor in this study.

Although numerous substances have been linked to an increased likelihood of attempting suicide (Harris & Barraclough, 1997), none of the specific drug categories were associated with being hospitalized for attempting suicide in the past year in this sample of clients who sought addiction treatment when shared variance was taken into account. On their own, amphetamines and stimulants, cannabis, cocaine and crack, ecstasy, and medications were each associated with being hospitalized for a suicide attempt in the past year. However, none of these categories emerged as significant unique factors. Since many clients who seek treatment at an Addiction Treatment Centre are polysubstance users, it is not surprising that no specific substance problem had a unique association with clients who had been hospitalized for a suicide attempt.

Having a gambling problem was found to be uniquely associated with being hospitalized for attempting suicide in the past year. In contrast to a study that used randomly selected individuals from Edmonton, Canada, which found that gambling was not predictive of suicide attempts when multiple mental health diagnoses were included in the equation (Newman & Thompson, 2003), gambling was a significant factor in this study despite including seven mental health categories and eleven drug categories. Research has shown that gamblers with suicidal ideation and attempts have more mental health and social problems than gamblers with no history of suicidal ideation (Petry & Kiluk, 2002). As well, problem gamblers are more likely to have a comorbid mood disorder than other clients with addiction problems (Jamieson et al., in press). However, the present finding that gambling was a significant unique factor, even when mental health issues were included in the regression equation, suggests that mental health problems are not the sole explanation for suicide attempts in gamblers. More research is needed to explore this issue.

Limitations

While the findings are from one geographical centre and for a seven-year time period, there was an adequate sample size in spite of the low prevalence of suicide attempts. However, the data were collected from clients presenting for addiction treatment, and the results may not generalize to gamblers who do not seek treatment. Similarly, there was no information on the temporal order of the various disorders, substance use, gambling, and suicide attempt. For example, for some clients, problem gambling may have begun after the suicide attempt. Without temporal order, the data does not allow for an examination of casual pathways. As well, the gambling measure employed by CAMH is categorical in nature and not a measure of gambling severity. Whether the risk of suicide increases with increases in gambling severity is a question for future researchers to examine. Finally, the *Catalyst* database relies on self-report information and inter-rater reliability information is lacking.

Conclusions

In this study, the variables most associated with a client who sought substance or gambling treatment having been hospitalized for a suicide attempt in the past year were being less educated, having mental health issues, and having a gambling problem. While mental health issues have long been linked with suicide, new research, such as the present study, continues to find associations between gambling and suicide. With the strong relationship between mood disorders and gambling (Hodgins et al., 2005; Jamieson et al., in press), these findings support continued research into the connection between gambling and suicide.

Table 1. Demographic, mental health and substance variables associated

with being hospitalized for a suicide attempt

Variable Type	Predictors	Individual LR		Combined LR		
		p	OR	p	OR	95% CI
Demographic	Younger Age	.001		.225		
	Being Female	.005	1.91	.160	1.43	
	Being Single	.042	1.66	.875	1.05	
	Less Educated	.010	2.62	.006	3.16	1.40 - 7.14
	No Legal Problems	.531	1.17	.278	1.36	
	Employed or Retired	.078	1.65	.775	1.09	
Mental Health	Anxiety Disorder	.001	3.41	.296	1.55	
Categories	MDD	< .001	3.15	< .001	2.83	2.19 - 3.66
	ADHD	.001	1.59	.018	1.43	1.06 - 1.91
	Bipolar Disorder	.001	1.31	.001	1.33	1.13 - 1.57
	Personality Disorder	< .001	1.94	< .001	1.85	1.35 - 2.52
	Psychotic Disorder	.541	1.13	.603	1.12	
	Other Disorder	.185	1.22	.313	1.17	
Substance	Alcohol	.366	1.26	.674	1.12	
Categories	Amphetamines and Stimulants	.050	1.67	.984	1.01	
	Barbiturates and Benzodiazepines	.149	1.28	.650	1.01	
	Cannabis	.001	1.20	.410	1.06	
	Cocaine and Crack	.011	1.14	.797	1.01	
	Ecstasy	.001	1.24	.823	1.02	
	Glue and Inhalants	.904	1.02	.710	1.06	
	Hallucinogens	.348	1.06	.986	1.00	
	Heroin and Opium	.183	1.11	.315	1.09	
	Medications	.002	1.08	.128	1.04	
	Other Psychoactive Drugs	.815	1.01	.935	1.01	
Gambling	Problem Gambling	.002	2.20	.033	1.80	1.05 - 3.09

Note. MDD = Major Depressive Disorder; ADHD = Attention-Deficit/Hyperactivity Disorder; Medications = Over-the-counter codeine, prescription opiates, and steroids; LR = Logistic regression; OR = Odds ratio; CI = Confidence interval.

References

Bakken, K., & Vaglum, P. (2007). Predictors of suicide attempters in substance-dependent patients: A six-year prospective follow-up. *Clinical Practice and Epidemiology in Mental Health, 3*: 20, 11p.

Battersby, M., Tolchard, B., Scurrah, M., & Thomas, L. (2006). Suicide ideation and behaviour in people with pathological gambling attending a treatment service. *International Journal of Mental Health & Addiction, 4*, 233-246.

Britton, P. C., & Conner, K. R. (2010). Suicide attempts within 12 months of treatment for substance use disorders. *Suicide and Life-Threatening Behavior, 40*, 14-21.

Brooker, I. S., Clara, I. P., & Cox, B. J. (2009). The Canadian problem gambling index: Factor structure and associations with psychopathology in a nationally representative sample. *Canadian Journal of Behavioural Science, 41*, 109-114.

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology, 100,* 316–336.

Crockford, D., & el-Guebaly, N. (1998). Psychiatric comorbidity in pathological gambling: A critical review. *Canadian Journal of Psychiatry, 43*, 43-50.

Feigelman, W., Gorman, B. S., & Lesieur, H. (2006). Examining the relationship between at-risk gambling and suicidality in a national representative sample of young adults. *Suicide and Life-Threatening Behavior, 36*, 396-408.

Goodwin, F. K., & Jamison, K. R. (2007). Suicide. In F. K. Goodwin & K. R. Jamison (Eds.), *Manic-depressive illness: Bipolar disorders and recurrent depression* (pp. 247-272). New York, NY: Oxford University Press.

Harris, E. C., & Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *British Journal of Psychiatry, 170*, 205-228.

Hodgins, D. C., Mansley, C., & Thygesen, K. (2006). Risk factors for suicide ideation and attempts among pathological gamblers. *The American Journal of Addictions, 15, 303-310.*

Hodgins, D. C., Peden, N., & Cassidy, E. (2005). The association between comorbidity and outcome in pathological gambling: A prospective follow-up of recent quitters. *Journal of Gambling Studies, 21*, 255-271.

Inskip, H. M., Harris, E. C., & Barraclough, B. (1998). Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. *British Journal of Psychiatry, 172*, 35-37.

James, A., Lai, F. H., & Dahl, C. (2004). Attention deficit hyperactivity disorder and suicide: A review of possible associations. *Acta psychiatrica Scandinavica, 110*, 408-415.

Jamieson, J., Mazmanian, D., Penney, A., Black, N., & Nguyen, A. (in press). When problem gambling is the primary reason for seeking addiction treatment. *International Journal of Mental Health & Addiction, 13p*.

Ladd, G. T., & Petry, N. M. (2003). A comparison of pathological gamblers with and without substance abuse treatment histories. *Experimental and Clinical Psychopharmacology, 11*, 202-209.

Langenbucher, J., Bavly, L., Labouvie, E., Sanjuan, P. M., & Martin, C. S. (2001). Clinical features of pathological gambling in an addictions treatment cohort. *Psychology of Addictive Behaviours, 15*, 77-79.

Lesieur, H. R., & Blume, S. N. (1987). The south oaks gambling screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry, 144*, 1184-1188.

Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology, 49*, 377-412.

Newman, S. C., & Thompson, A. H. (2003). A population-based study of the association between pathological gambling and attempted suicide. *Suicide and Life-Threatening Behavior, 33*, 80-87.

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: Analysis of the national comorbidity survey. *Journal of Abnormal Psychology, 115*, 616-623.

Petry, N. M., & Kiluk, B. D. (2002). Suicidal ideation and suicide attempts in treatment-seeking pathological gamblers. *Journal of Nervous and Mental Disease, 190*, 462-469.

Potenza, M. N., Steinberg, M. A., McLaughlin, S. D., Wu, R., Rounsaville, B. J., & O'Malley, S. S. (2001). Gender-related differences in the characteristics of problem gamblers using a gambling helpline. *American Journal of Psychiatry, 158*, 1500-1505.

Preuss, U. W., Schukit, M. A., Smith, T. L., Danko, G. P., Bucholz, K. K., Hesselbrock, M. N., . . . Kramer, J. R. (2003). Predictors and correlates of suicide attempts over 5 years in 1,237 alcohol-dependent men and women. *American Journal of Psychiatry, 160*, 56-63.

Séguin, M., Lesage, A., Chawky, N., Guy, A., Daigle, F., Girard, G., & Turecki, G. (2006). Suicide cases in New Brunswick from April 2002 to May 2003: The importance of better recognizing substance and mood disorder comorbidity. *The Canadian Journal of Psychiatry, 51*, 581-586.

Shepherd, R. (1996). Clinical obstacles in administering the South Oaks Gambling Screen in a

    methadone and alcohol clinic. *Journal of Gambling Studies, 12*, 21-32.

Statistics Canada. (2010, January 5). Suicides and suicide rate, by sex and by age group.

    Retrieved May 3rd, 2010 from http://www40.statcan.ca/l01/cst01/hlth66d-eng.htm.

Wilcox, H. C., Conner, K. R., & Caine, E. D. (2004). Association of alcohol and drug use

    disorders and completed suicide: An empirical review of cohort studies. *Drug and*

    Alcohol Dependence, 76S, S11-S19.

Wong, P. W., Chan, W. S., Conwell, Y., Conner, K. R., & Yip, P. S. (2010). A psychological

    autopsy study of pathological gamblers who died by suicide. *Journal of Affective*

    Disorders, 120, 213-216.