



Research paper

Recent and lifetime utilization of health care services by children and adolescent suicide victims: A case-control study

Johanne Renaud^{a,b,*}, Marcelo T. Berlim^a, Monique Séguin^c, Alexander McGirr^a, Michel Tousignant^d, Gustavo Turecki^a

^a Depressive Disorders Program, and the McGill Group for Suicide Studies, Douglas Mental Health University Institute, McGill University, Montreal, Quebec, Canada H4H 1R3

^b CHU Sainte-Justine, University of Montreal, Montreal, Quebec, Canada

^c Université du Québec en Outaouais, Hull, Quebec, Canada

^d Centre de Recherche et d'Intervention sur le Suicide et l'Euthanasie (CRISE), Université du Québec à Montréal (UQAM), Montreal, Quebec, Canada

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ABSTRACT

Objective: In the present paper we describe a case-control study on the utilization of health care services prior to suicide (across different time periods) among children and adolescents aged 11 to 18 years in the Province of Quebec, Canada and matched healthy controls.

Method: Utilization of services (i.e., contact with general practitioners, mental health professionals, psychiatrists and/or youth protection groups) was examined at different time periods in 55 child and adolescent suicide victims and 54 matched community controls using proxy-based interviews and questionnaires. In addition, we examined the rates of detection of psychopathology by health care professionals, the use of psychotropic medications and the subjects' compliance with treatment.

Results: Although more than 90% of child and adolescent suicide completers in our sample suffered from mental disorders, a significant proportion of them were left without appropriate healthcare support (including psychiatric consultation) in the period preceding their suicide. Also, 20% of suicide completers and no control subject made prior suicide attempts. More specifically, over two-thirds of suicide completers had no treatment contact within the month prior to the completion, while only 12.7% ($n = 7$) of them were in contact with psychiatric services during that same period. Moreover, 56.4% ($n = 31$) of the suicide completers had not been diagnosed as having a mental disorder at the time of their death, and 54.5% of the subjects' that received treatment (12 out of 22) were considered poorly compliant or not compliant at all according to their medical/psychosocial records. Finally, we also found that females seemed to have more psychiatric and mental health service contacts in the past month, that subjects with depressive and anxious disorders received more psychiatric and general mental health services in the past year, and that past month hospitalization was more often associated with alcohol abuse and psychosis.

Limitations: Relatively small sample size, and cross-sectional design.

Conclusions: Our findings indicate the need for an overall increase in the rates of healthcare services delivered to young subjects at risk for suicide, as well as better training of health professionals in detecting and treating youth psychopathology.

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Suicide is one of the leading causes of death in children and adolescents and, accordingly, is being increasingly recognized

* Corresponding author. 6875 LaSalle Blvd., Douglas Mental Health University Institute, FBC-3 Pavilion, Rm. F-3118, Montreal, Quebec, Canada H4H 1R3.

E-mail address: johanne.renaud@douglas.mcgill.ca (J. Renaud).

as a major global public health problem (Bridge et al., 2006; Pelkonen and Marttunen, 2003). The latest mean worldwide annual rates of suicide per 100,000 inhabitants were 0.5 for females and 0.9 for males among 5–14-year-olds, and 12.0 for females and 14.2 for males among 15–24-year-olds (Pelkonen and Marttunen, 2003). In the Province of Quebec, Canada, the

suicide rate in young people is one of the highest in all the industrialized nations, having increased markedly from the 1980s through the 1990s (i.e., from 11.1 per 100,000 in 1980 to 20.5 per 100,000 in 1996) (1999). Therefore, policy-makers, families, and healthcare professionals are currently struggling to better understand this complex phenomenon in order to ultimately prevent it (Pompili et al., 2005).

Several studies have shown that the majority (up to 90%) of young people who committed suicide had at least one diagnosable mental disorder at the time of their death (particularly mood, disruptive¹ and substance disorders) (Brent et al., 1993a, 1994; Marttunen et al., 1991; Renaud et al., 2008; Runeson, 1989; Shaffer et al., 1996). Furthermore, the presence of personality traits of impulsivity and aggression seem to be additional risk factors for suicide in this age group (Brent et al., 1994; Renaud et al., 2008).

Importantly, a number of studies have documented that psychopathology remains undetected and untreated in a large proportion of children and adolescents who completed suicide (Brent et al., 1993a; Marttunen et al., 1994). Therefore, a fundamental step in addressing youth suicidal behaviour is to better characterize their patterns of healthcare service use. However, there are only a handful of investigations furthering our understanding of this important issue.

The few studies (mainly from the U.S. and Europe) that have comprehensively investigated the treatment contacts of youth suicide completers have reported heterogeneous estimates. For example, approximately 64% of Swedish adolescent and young adults had received mental health treatment during the year preceding their suicide (Runeson, 1989), and 24% of Norwegian adolescents had received any treatment for emotional or behavioural problems in their lifetime (Groholt et al., 1997). Furthermore, a recent systematic review reported that, on average, for persons age 35 and younger approximately 15% had seen a mental health professional within 1 month of suicide, whereas 24% and 38% have had a contact within 1 year of suicide or during lifetime, respectively (Luoma et al., 2002). In addition, the authors showed that in this same age group contact with primary care providers within 1 month and up to a year before suicide averaged 23% and 62%, respectively (Luoma et al., 2002). Moreover, in a recent Canadian youth sample of suicide completers in youth centres services, 15% (8/53) had psychiatric medical visits in the 90 days prior to suicide, while 28.3% (15/53) in the year before suicide (Renaud et al., 2006). However, a recent American study reported that 77% (38/49) of their youth sample had received some mental health services in the six-month period prior to suicide (Moskos et al., 2007), while only 26.5% had received services from a psychiatrist during that same time interval. Furthermore, a Canadian study on a provincial database (including 435 individuals younger than 19 years who committed suicide between 1992 and 1996) has shown that 12% of youth have received medical attention for psychiatric reasons in the year preceding their suicide, while only 9.9% had seen a psychiatrist (Farand et al., 2004).

In the present paper we describe a case-control study on the utilization of health care services prior to suicide (across different time periods) among children and adolescents aged 11 to 18 years in the Province of Quebec, Canada. We expect that given the characteristics of the Canadian health system of socialized medicine, high rates of primary care utilization will be found in both suicide cases and living controls, while contact with mental health services (including or not a psychiatrist) will be higher in completers. We also expect low rates of psychopathology detection by health professionals (Brent et al., 1993a; Marttunen et al., 1994) and poor treatment compliance among subsequent suicide victims (Spirito, 1996).

1. Methods

1.1. Subjects

In the present study, 55 consecutive youth suicide victims (adjudicated by coroners of the Province of Quebec) aged 11–18 years were matched to living youths for age (within 2 years), gender (43 males; 12 females), and geographic area. However, we were not able to retrieve information on health services use from one male subject in the control group; thus, our study had in total 55 cases and 54 controls. Our primarily Caucasian samples originated from the all around the Province, and were recruited from January 2000 to May 2003. For both groups, a key respondent best acquainted with the subject in question was interviewed by clinicians using standardized diagnostic interviews (see below).

Families of suicides were invited to participate in this study by mail. Half of the families responded to our letter. Those cases that did not respond were not different from those that responded with regard to age, race, or method of suicide. Controls were identified by school directors, and by members of health and social community services. To ensure comparability of the two groups, all comparison subjects were diagnosed by proxy-based interviews carried with a best informant. Delay between recruitment and interview was similar for both groups, and averaged 15 months.

The present project was approved by our local institutional review board and the families of the suicide victims, comparison subjects and informants signed written informed consents.

1.2. Measures

For each suicide and control subject, the following information regarding services utilization was collected with the acquainted informant: (a) presence of contacts with a general practitioner (GP), a mental health professional, a psychiatrist or with a professional from the youth protection services/rehabilitation and juvenile system services, (b) use of antidepressant medication, and (c) history of hospitalization. For each healthcare contact determined to be present, the respective medical and/or social records were reviewed in order to survey, among other things, subjects' compliance with treatment. The presence of a service contact before the suicide (cases) or the interview (living controls) was classified as lifetime, during the past year and/or during the past month.

Psychiatric diagnoses in suicide victims were made by means of the psychological autopsy method. This technique, which has been extensively validated for Axis I diagnoses in

¹ Disruptive disorders include attention deficit hyperactivity disorder, oppositional defiant disorder and conduct disorder (DSM-IV classification).

children and adolescents (Brent et al., 1988a,b, 1993a,b), consists of selecting a family member who was best acquainted with the deceased to serve as an informant for the interview process. Psychiatric diagnoses were obtained following interviews using the Schedule for Affective Disorders and Schizophrenia for School-Age Children–Present and Lifetime Version (K-SADS-PL version) (Kaufman et al., 1997). Information collected through the K-SADS-PL interviews, and from the coroner's notes and medical records was combined and a best-estimate procedure (Leckman et al., 1982) was used to reach a consensus regarding DSM-IV diagnoses for each individual. Results regarding diagnosis frequencies in this sample have previously been reported (Renaud et al., 2008).

1.3. Statistical analysis

Statistical analyses in this study were performed with SPSS version 11.5 (SPSS, Chicago). Chi-square analyses, Fisher's exact test (FET) (two-tailed), and odds ratios (OR, with the exact limit test to evaluate the 95% confidence interval [CI]) were used to compare categorical variables, and Student's *t* test was used to analyze continuous variables. Principal component analyses, with varimax rotation and loading determined at $>.60$, were also employed, scores saved and subsequently used in logistic regression analyses.

2. Results

2.1. Socio-demographic characteristics

Fifty-five youth suicide completers and 54 living subjects were included in this study. By design, completers and controls were matched with respect to age (suicide victims: mean = 16.8, SD = 1.5; comparison subjects: mean = 16.9, SD = 1.4; $p = 0.56$), gender (43 males and 12 females), and geographic location within the Province of Quebec. Additionally, the groups were similar for other important demographic variables, including familial composition (biparental - suicide victims: 63.6%; comparison subjects: 81%; $p = 0.165$), Canadian origin (cases: 89%; controls: 98%; $p = 0.457$), and revenue ($>C\$ 60,000$ /year – suicide victims: 47%; comparison subjects: 53%; $p = 0.867$).

2.2. Clinical characteristics

Detailed clinical information concerning the study groups has been reported in a previous communication (Renaud et al., 2008). Briefly, the prevalence rates for current axis I diagnoses for the suicide and the living control groups were 94.5% and 32.7% ($p < 0.001$), respectively, and the rates of psychiatric comorbidity were, respectively, 60% and 9.1% ($p < 0.001$). Among the 94.5% current axis I diagnoses observed in suicide cases, 47.3% ($n = 26$) were presenting with major depression and depression not otherwise specified. In addition, as compared to controls, a much greater proportion of suicide victims had previously engaged in a suicide attempt (20% vs. 0%, $p = 0.001$). Finally, after multivariate analyses, the main predictors of suicide in this sample were the presence of depressive, disruptive, and substance/alcohol abuse disorders.

Table 1

Utilization of health care services: suicide completers versus controls.

	Cases (<i>n</i> = 55)		Controls (<i>n</i> = 54)		χ^2	<i>p</i> -value
	<i>N</i>	%	<i>N</i>	%		
Contact with a general practitioner						
Lifetime	55	100	54	100	FET*	NS [#]
Past year	36	65.5	32	59.2	0.62	NS
Past month	10	18.5	4	7.4	2.05	NS
Contact with a mental health professional						
Lifetime	35	63.6	18	33.3	8.84	0.003
Past year	23	41.8	5	9.3	13.5	0.0002
Past month	11	20.0	0	0	FET	0.0006
Contact with a psychiatrist						
Lifetime	19	34.5	4	7.4	FET	0.0008
Past year	13	23.6	0	0	FET	0.0001
Past month	7	12.7	0	0	FET	0.01
Contact with youth protection services						
Lifetime	13	23.7	0	0	FET	0.0001
Past year	7	12.7	0	0	FET	0.001
Past month	3	5.5	0	0	FET	NS

*Fisher's Exact test.

[#]Statistically non-significant ($p > 0.05$).

2.3. Contacts and types of services received across time-periods

2.3.1. Contact with a general practitioner

Similar proportions of lifetime, past year and past month period contacts with a GP were found in the two groups (see Table 1). However, among the 36 suicide completers that had contacts with GPs in the past year, only 20 had been seen for psychiatric reasons ($n = 20$, 36.4% vs. $n = 1$, 1.9%; FET, $df = 1$, $p < 0.001$).

2.3.2. Contact with a mental health professional

Previous contacts with mental health services were significantly higher in the suicide group for the three time periods compared with the controls: lifetime ($n = 35$, 63.6% vs. $n = 18$, 33.3%; $\chi^2 = 8.84$, $df = 1$, $p < 0.01$), past year ($n = 23$, 41.8% vs. $n = 5$, 9.3%; $\chi^2 = 13.5$, $df = 1$, $p < 0.001$), and past month ($n = 11$, 20.0% vs. $n = 0$, 0.0%; FET, $df = 1$, $p < 0.001$).

2.3.3. Contact with a psychiatrist

In addition, prior contact with a psychiatrist across the different time periods were also significantly higher for the suicide group compared with the controls: lifetime period ($n = 19$, 34.5% vs. $n = 4$, 7.4%; FET, $df = 1$, $p < 0.001$), past year ($n = 13$, 23.6% vs. $n = 0$, 0.0%; $df = 1$, $p < 0.001$), and past month ($n = 7$, 12.7% vs. $n = 0$, 0.0%; FET, $df = 1$, $p < 0.02$).

2.3.4. Contact with youth protection services

We found higher rates of contact with youth protection services (in the entire life) in the suicide group as compared to controls ($n = 13$, 23.6% vs. $n = 0$, 0.0%; FET, $df = 1$, $p < 0.001$). Furthermore, 12.7% ($n = 7$) of the suicide victims have had contacts in the past year, and 5.5% ($n = 3$) had still contacts in the past month.

2.3.5. Hospitalization at one-year and one-month period

We found higher rates of hospitalization at one-year and one-month period in the suicide group as compared to

controls. In controls, no hospitalization was found at one-month period, while there were 2 subjects hospitalized for surgery at one-year period.

For the suicide completers we found a rate of 18.2% ($n = 10$) of hospitalization in the year preceding death, with 9 of them being for psychiatric reasons and 1 for physical problems. Moreover, only 2 subjects in the suicide completers group had been hospitalized in the past month, both for psychiatric reasons.

2.4. Detection of psychopathology and treatment received by suicide completers

We found that among suicide completers, 56.4% ($n = 31$) had not been diagnosed as having a mental disorder by their treating professionals but were assessed as having a disorder at the time of their death by the psychological autopsy procedure. From the remaining 43.6% ($n = 24$), two subjects received no specific diagnosis after the psychological autopsy assessment (and were also not diagnosed by their treating professionals at the time of their death), and 22 were diagnosed as psychiatrically ill (for specific information on diagnosis see Renaud et al. (Renaud et al., 2008)). We then assessed treatment compliance in regards to hospitalization, psychotherapy and/or medication among these 22 subjects, as determined by the clinical notes of their healthcare providers. Our results indicate that 54.5% ($n = 12$) of these subjects were presenting poor or no adherence to the treatment plan (e.g., refusal of hospitalization, missed appointments, medication non-compliance), 18.2% ($n = 4$) had just completed their treatment plan (e.g., family therapy, medication trial), 5.5% ($n = 3$) were initiating their treatments (e.g., medication, individual psychotherapy). However, it was beyond the scope of this study to assess the adequacy of these treatment conditions in terms of their duration, dosage and/or compliance.

Finally, from the 22 suicide completers diagnosed with a psychiatric illness, 45.5% ($n = 10$) had used antidepressants/mood stabilizers in the year preceding their suicide, and only 18.2% ($n = 4$) had been hospitalized and received antidepressants.

2.5. Psychopathology and service use

We were interested to assess whether, specifically among suicides, different diagnoses were associated with services received. Principal component analyses, using varimax rotation, were conducted on proxy diagnosed psychopathology, including major depression, dysthymia, bipolar disorder, brief reactive psychosis, anxiety disorders, disruptive disorders as well as alcohol and drug abuse disorders. Component scores were saved and entered into a logistic regression where services served as the dependent variable and sex was included as a covariate. Component loading was determined at $>.60$.

Four components with eigenvalues exceeding 1.00 emerged, accounting for a total of 64.2% of the variance. The first component was characterized by positive loading of alcohol abuse and psychosis. The second component was characterized by positive loading of drug abuse and disruptive disorders. The third component was characterized by positive loading of major depression and bipolar disorder. Last, the

fourth component was characterized by positive loading of anxiety disorders.

In the prediction of psychiatric consultation in the past month, in addition to the model constant ($\beta = -2.89$, S.E. = .69, Wald = 17.20, $p < .001$), females were more likely to have received services (OR = 9.96, 95%CI: 1.54 to 64.19, $p < .05$) while a trend ($\beta = .41$, S.E. = .24, Wald = 3.03, $p = .082$) emerged with respect to higher scores on component 1 (alcohol abuse and brief reactive psychosis). With respect to psychiatric consultations within the past year, the model indicated that higher scores on component 3 ($\beta = .72$, S.E. = .30, Wald = 5.44, $p < .05$) and marginally higher scores on component 4 ($\beta = .55$, S.E. = .29, Wald = 3.85, $p = .058$) were associated with consultations in the past year in addition to the model constant ($\beta = -1.88$, S.E. = .49, Wald = 14.52, $p < .001$).

Relating to mental health services in the past month, only female sex was associated with greater service use (OR = 4.40, 95%CI: 1.04 to 18.51, $p < .05$), in addition to the model constant ($\beta = -1.81$, S.E. = .44, Wald = 17.98, $p < .001$), predicted service use. With respect to mental health services in the past year, none of the components or sex variables predicted service use.

With respect to hospitalizations, component 1 was associated with a greater likelihood of hospitalization in the past month ($\beta = .63$, S.E. = .28, Wald = 4.89, $p < .05$) in addition to the model constant ($\beta = -3.93$, S.E. = 1.02, Wald = 14.89, $p < .001$). With respect to hospitalizations in the past year, no psychopathological component or sex variable was found to be a predictor.

3. Discussion

In the present study we compared health care service contacts between young suicide victims and healthy living controls. Our main finding is that a remarkable proportion of children and adolescents who committed suicide had no proper treatment contacts in the period preceding their death. In addition, and perhaps more importantly, the majority of these subjects did not have a general medical or psychiatric consultation despite the presence of proxy endorsed mental disorders. More specifically, within the year prior to suicide, 36.4% of the completers had a contact with a GP for psychiatric reasons, while only 23.6% had met with a psychiatrist. For the past month, these figures dropped to 18.5% and 12.7%, respectively. In other words, this means that the opportunities for healthcare professionals to intervene and act in order to prevent suicide in this population seem slight. Moreover, this points to the need of improving mental health literacy among young people and their key helpers through, for example, specific community campaigns (Kelly et al., 2007). This also reinforces the importance of establishing screening programs as suicide prevention strategies, such as the identification of subjects at risk among high schools students, juvenile offenders, and youth in general (Cauffman, 2004; Joiner et al., 2002; Shaffer et al., 2004).

Furthermore, our finding that only 43.6% of the suicide completers in contact with health services were properly diagnosed indicates that there is ample room for improvement of health care professionals' detection rates of psychopathology. Moreover, we found that among future suicides who were under treatment ($n = 22$), 54.5% ($n = 12$) showed, according to their clinical notes, weak or poor adherence to

the treatment plan. These findings, in turn, confirm previous studies that suggested that non-compliance with recommended aftercare is particularly common among adolescents with suicidal behaviour (Spirito, 1996).

Overall, when compared to controls, young suicide completers had significantly more current and lifetime contacts with mental health professionals (including psychiatrists) and youth protection services (with *p*-values ranging from 0.01 to 0.0001), and this probably reflects their likely severe psychopathology. As expected, rates of contact were much higher for primary care providers, relative to specialized mental health services. This is consistent with the fact that in many countries, including the United States (Regier et al., 1978) and Canada (Vasiliadis et al., 2007), individuals with psychiatric problems are more likely to seek services in the primary care sector, rather than from mental health professionals.

Moreover we also found that females seemed to have more psychiatric and mental health service contacts in the past month (although that was not true for each service period and type of service period), that subjects with depressive and anxious disorders received more psychiatric as well as general mental health services in the past year, and that past month hospitalization was more often associated with the presence of alcohol abuse and psychosis.

In sum, despite the fact that a significant proportion of Quebec adolescent suicide victims had met with a physician within the year prior to their suicide, the level of recognition and treatment of their mental health problems was alarmingly low. This is especially relevant in the light of a growing consensus in the literature that education in depression recognition and treatment, the careful assessment of comorbid risk factors for suicide, as well as the aftercare of those with high suicide risk are important preventative strategies (in addition to restricting access to lethal methods) (Mann et al., 2005; Rihmer, 1996). Therefore, we suggest that information and training programs concerning youth psychopathology and suicide prevention should be implemented for both general practitioners and non-psychiatric medical specialists. In addition, better knowledge about the protective mechanisms that prevent individuals from acting on their suicidal thoughts could improve suicide prevention efforts. Also, stigma of mental illness is a considerable barrier to mental health treatment (e.g., the belief that nothing could help or the reluctance to admit that one has a mental health problem) (Moskos et al., 2007). Furthermore, the assessment of the specific rates of contact between young suicidal subjects and specific subgroups of professionals (e.g., emergency staff or social workers) might also be helpful in enhancing training for these specialties (Luoma et al., 2002). An American study on suicide attempters has shown that those teenagers were 2.5 times more likely to depend on the emergency room for routine care and less likely to identify a primary care site than were non suicidal teenagers, even after controlling for SES (Slap et al., 1989). Another issue that deserves closer scrutiny is whether services provided by one type of provider may be more effective for suicide prevention compared with another (e.g., primary versus specialized care). Moreover, it is our impression that only an organizational restructuring of health services (with multi-level targets and careful coordination of care) would lead to an

improvement in the recognition and treatment of mental illnesses, and this along with other prevention strategies, would hopefully decrease the suicide rate among youngsters. Finally, we think that studies like ours should spur future research with a specific focus on the factors that may affect directly and/or indirectly service use for mental health problems among suicidal youth. This is a very relevant endeavour, as understanding these factors may eventually aid in the development of more effective and better tailored health policies toward suicide prevention.

3.1. Limitations

Some of the limitations associated with the methods employed in this study are inherent to post-mortem investigations involving proxy-based interviews. A direct assessment of the whole provincial population of youth suicide completers as well as the use of more specific tools for quality of services and needs assessment would have enhanced the impact and generalization of our findings. Comparability, however, was assured by the fact that we used proxy-based interviews in both groups. Moreover, our choice of community rather than psychiatric controls limits our ability in this study to draw fine-grained conclusions regarding which patterns of health services utilization are inherent to suicidal behaviour (as opposed to mental disorders in general). Undoubtedly, additional studies are necessary to address this question. Additionally, our sample is relatively small, yet our main findings are in agreement with the current literature on suicide in youngsters. Furthermore, we determined treatment compliance and adequacy by reviewing medical/psychosocial records and interviewing acquainted informants; accordingly, the reliability of this information has limitations. Finally, the generalizability of our findings remains to be investigated as health care services differ somewhat between countries.

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The funding source for our study did not interfere in the collection, analysis, interpretation and/or presentation of our results.

Conflict of interest

The authors have no financial relationships or conflicts of interest to disclose.

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