RESEARCH PAPER

Canadian Community Health Survey: Major Depressive Disorder and Suicidality in Adolescents

L'Enquête sur la santé dans les collectivités canadiennes : trouble dépressif majeur et tendance au suicide chez les adolescents

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Abstract

Background: Contrary to other developed countries where adolescent suicide rates have declined in the last decade, the rate in Canada has remained unchanged. Suicide is the second leading cause of death in Canadian adolescents and poses a serious public

health concern. However, there is little epidemiological data examining the rates of suicidality or depression – two factors most closely associated with completed suicides. This study therefore examines the rates of depression and suicidality in adolescents aged 15–18.
Methods: Data from the Canadian Community Health Survey Cycle 1.2 on Mental Health and Well-being, a population-based survey conducted by Statistics Canada, were used to examine the rates of depression and suicidality in adolescents aged 15–18. Lifetime prevalence rates were calculated for depression and suicidality by region for males and females. Multivariate analyses were conducted to test the robustness of these results.
Results: The lifetime prevalence rates were 7.6% for depression and 13.5% for suicidality. There were significant gender differences for both: 4.3% of males and 11.1% of females had depression, and 8.8% of males and 18.4% of females had suicidality. After adjustment for age, sex and household income, the Maritimes had a lower rate of depression and British Columbia had a higher rate of suicidality relative to Ontario. Youth from low-income households had a higher risk of suicidality.
Interpretation: The findings suggest that depression and suicidality are common in adolescents and that females are more likely to be affected. The results also point to regional and socio-economic differences. Future research should examine differences that exist in mental health services provision and access. This will aid in the development of national, regional and local strategies to address the issue of depression and suicidality in Canadian adolescents.

Résumé

Contexte : Au cours de la dernière décennie, le taux de suicide chez les adolescents est demeuré inchangé, contrairement aux autres pays développés, où ce taux a diminué. Le suicide est la deuxième principale cause de décès chez les adolescents canadiens et constitue un grave problème de santé publique. Il existe cependant peu de données épidémiologiques examinant les taux de dépression et de tendance au suicide – les deux facteurs les plus étroitement liés aux suicides réussis. Cette étude examine donc les taux de dépression et de tendance au suicide chez les adolescents de 15 à 18 ans.
Méthodes : On a utilisé les données de l'Enquête sur la santé dans les collectivités canadiennes - Cycle 1.2 sur la santé mentale et le bien-être – une enquête menée par Statistique Canada auprès de la population – pour examiner les taux de dépression et de tendance au suicide chez les adolescents de 15 à 18 ans. On a calculé les taux de prévalence sur toute une vie pour la dépression et la tendance au suicide par région chez les garçons et les filles. On a aussi effectué des analyses multivariées afin d'évaluer la fiabilité de ces résultats.
Résultats : Les taux de prévalence sur toute une vie étaient de 7,6 % pour la dépression

et de 13,5 % pour la tendance au suicide. On a observé d'importantes différences entre les sexes pour les deux facteurs évalués – 4,3 % des garçons et 11,1 % des filles souffraient de dépression, et 8,8 % des garçons et 18,4 % des filles avaient une tendance au suicide. Seulement une différence régionale était significative après qu'on ait eu effectué des ajustements en fonction des variables démographiques. Les Maritimes affichaient un taux de dépression plus faible.
Interprétation : Les résultats suggèrent que la dépression et la tendance au suicide sont courantes chez les adolescents et que les filles sont davantage susceptibles d'être affectées. Ils suggèrent également qu'il y a peut-être des différences régionales. Les travaux de recherche futurs devraient examiner les différences qui existent dans la prestation des services de santé mentale et l'accès à ces derniers. Cela aidera à élaborer des stratégies nationales, régionales et locales visant à aborder le problème de la dépression et de la tendance au suicide chez les adolescents canadiens.

Although studies of depression and suicidality have been undertaken in the past few decades, gaps remain in our understanding of the epidemiology of adolescent depression and suicidality, both currently and on a national level. Depression is typically a recurring disorder with serious morbidity and mortality that commonly begins in adolescence (Leaf et al. 1996; Kramer and Garralda 1998). Rates of depression in Canadian adolescents were first evaluated more than 20 years ago in the Ontario Child Health Study (ages 6–16), which showed depression rates ranging from 2.7% to 7.8% (Fleming et al. 1989). A similar survey conducted in the early 1990s with the Ontario Mental Health Supplement (ages 15–24) reported rates of depression ranging from 6.5% to 7.1% (Offord et al. 1996). However, both of these studies examined rates in Ontario only, and they are over a decade old. Cairney (1998) examined gender differences in depression among Canadian adolescents using the National Population Health Survey (NPHS 1994–1996) and reported gender-specific rates for depression, with females having nearly double the rates of males. Again using the NPHS, Wade et al. (2002) compared these data to UK and US population data, and also observed higher rates among females compared to males.

One of the most significant consequences of depression is suicide. More than 50% of adolescents who complete suicide have had a form of depression (Brent et al. 1993). Suicidality (ideation or attempts) without depression is also a common occurrence in adolescents. According to US population surveys, more than 12% of high school students have had thoughts about suicide, and 9% have attempted suicide in the previous 12 months, with 2%–3% requiring medical attention as a result of a suicide attempt (Morbidity and Mortality Weekly Report 2002). In 1988, Joffe et al. reported rates of

suicidal behaviours at 12.2% (range, 5%–20%) in Canadian adolescents aged 12–16. However, these data are decades old and are limited to Ontario residents. Recent reports from the United States indicate that rates of completed suicides have decreased by 25% in the last decade, but rates in Canada have remained unchanged (Olfson et al. 2003; Cheung and Dewa 2005). This finding raises the question of whether changes have occurred in rates of Canadian suicidal behaviours during this time.

Without information about current rates of suicide and depression in adolescents, it is difficult to develop effective policies and prevention strategies. In addition, regional differences have not been examined. To provide information that can be used to develop and monitor targeted management strategies for adolescents, this paper examines the rates of depression and suicidality in adolescents aged 15–18 using the Canadian Community Health Survey Cycle 1.2 on Mental Health and Well-being (CCHS 1.2), a population-based epidemiological survey conducted by Statistics Canada (2004), with a focus on gender and regional differences.

Background

To date, no study has specifically examined the national rates of depression and suicidality in adolescents aged 15–18. Yet, this is an important age group for several reasons. Although previous surveys have analyzed this age group aggregated with young adults (aged 15–24 years), transitional issues – including education, employment status and developmental needs – would suggest that those 18 and under are distinct from those older than 18 years (Patten et al. 2005; National Advisory on Child Mental Health 2001). For example, those under 18 years are more likely to live with family members. As a result, they may have a different support network compared to those who are older than 18 and who are likely to be more independent of familial support. In fact, service agencies such as child protection services still consider 18 to be the age where an adolescent becomes an adult (Ministry of Children and Youth Services Ontario, personal communication). Because of these differences, mental health service systems also generally distinguish between adolescents and young adults (National Advisory on Child Mental Health 2001; Leavey et al. 2000).

Role of gender

To understand the occurrence of depression and suicidality in adolescents, we must consider possible differences due to gender. Previous research has demonstrated significant gender differences in rates of depression and suicidality, with adolescent females at almost three times the risk of developing depression or suicidality compared to their male counterparts (Shaffer and Waslick 2002). The gender difference in depression is consistent throughout adulthood, although the magnitude declines with age

(Kornstein 2001). Understanding these differences may help policy makers and clinicians to target and develop mental health services for adolescents experiencing these difficulties in order to intervene and prevent future difficulties.

Regional variations

Previous research has suggested there may be differential rates of depression, suicide or both by region. One key example is the higher rates of completed suicides in adolescents in Quebec (Government of Quebec 1998). A number of reasons have been given for these differences, including hereditary traits and the social acceptance of suicide. The Quebec government and other agencies have worked actively for many years to change this trend, and the social endorsement of suicide has decreased substantially (Government of Quebec 1998). Nonetheless, it is not known whether these efforts have made a difference in the rates of adolescent suicide or other indicators such as suicidality and depression.

There are also regional differences in the healthcare system. In Canada, individual provinces are responsible for healthcare, and each may have different priorities and mandates. Therefore, examining regional differences is the first step in understanding how we can learn from within the Canadian system to better address depression and suicidality in adolescents and to inform the development of a national strategy. For example, British Columbia has a very active program addressing the issue of adolescent depression, including training of mental health workers in evidenced-based therapies such as cognitive behavioural therapy and regular surveys of adolescent health (Barker 2004; McCreary Centre Society 2005).

Methods

Subjects

We used the data from the CCHS 1.2 (conducted in 2002) to examine the rates of depression and suicidality in adolescents aged 15–18. One person aged 15 or older was randomly selected from the sampled households. Structured interviews were conducted with individuals in 10 provinces and two territories. Individuals residing in institutions, such as nursing homes and hospitals, as well as those living on military bases, were excluded.

The study population was composed of CCHS 1.2 respondents aged 15–18. The total sample size for the CCHS 1.2 was 38,500, with a sample size of 2,866 for adolescents aged 15–18. We calculated the prevalence rates for major depressive episode (MDE) and suicidality (ideation and attempts).

MDE diagnosis was evaluated using structured interviews. Subjects who replied positively to one of three screening questions completed the interview module for depression. Respondents were asked about any previous or current history of depression (lifetime). The interview module was drawn from the Composite International Diagnostic Interview (CIDI) (Kessler et al. 2004). The diagnosis of major depression was based on the WMH-CIDI (World Mental Health – Composite International Diagnostic Interview Instrument), which in turn is based on the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV).

Although the CCHS 1.2 is a cross-sectional survey, lifetime prevalence was examined. Survey respondents who met the criteria endorsed two or more weeks of depressed mood or loss of interest or pleasure and at least five other symptoms associated with depression. The symptoms also had to lead to significant distress or impairment in functioning. (For further details, please visit the Statistics Canada website, (http://www.statcan.ca/english/freepub/82-617-XIE/def.htm.)

Suicidality was measured using questions inquiring about previous suicidal ideation or attempts. Subjects, *whether or not they met criteria for MDE*, were interviewed for any current or previous history of suicidal ideation and suicide attempts (lifetime). Although the CCHS is the largest and most current population-based mental health survey completed in Canada, the sample of adolescents is small. Therefore, suicidal ideation and attempts were combined into one measure called "suicidality." These two groups (ideation and attempt) have been combined in previous research examining suicidality in adolescents in Canada (Joffe et al. 1988). Although these two groups should ideally be studied separately, because of the small samples we were unable to conduct the analyses (Statistics Canada reporting restrictions).

Regional differences were measured by dividing the country into five distinct regions. The regions were selected based on population size and cultural differences, and groupings used in previous studies of national-level data. Although it would have been ideal to examine rate differences across provinces rather than regions, because of sample size this was, again, not possible owing to Statistics Canada reporting restrictions. Therefore, the country was divided into the regions that have traditionally been used in other papers examining national-level data (Cairney 1998). The following five regions were created: Maritimes (Nova Scotia, New Brunswick, Newfoundland/Labrador, Prince Edward Island), Prairies (Manitoba, Alberta, Saskatchewan), Quebec, Ontario and British Columbia.

Income was calculated based on household income and household size. Individuals were classified either as "low income" or "not low income." A low-income household was identified where household income was <$15,000 for 1–2 residents, <$20,000 for 3–4 residents, or <$30,000 for 5+ residents (Statistics Canada 2004).

Statistical analyses

The CCHS 1.2 uses a stratified design with differences in sampling fractions across the strata such that some geographical areas are over- or underrepresented in the sample relative to their representation in the population. Therefore, we used the weights recommended by Statistics Canada when conducting analyses. The weighting calculates each subject's associated sampling weight (Statistics Canada 2004).

Frequencies were calculated for lifetime MDE and lifetime suicidality. Confidence intervals were calculated using bootstrap weights as developed by Statistics Canada (2004).

Multivariate analyses were conducted to examine the associations between gender, income, age and region of residence with diagnosis of depression or suicidality.

Results

The lifetime prevalence rate for MDE in adolescents aged 15–18 was 7.6% (95% CI: 6.2–9.1). The rate was 4.3% (95% CI: 2.7–6.0) for males and 11.1% (95% CI: 8.7–13.5) for females. Regional rates are shown in Table 1 for lifetime MDE. The

TABLE 1. Lifetime depression in adolescents aged 15–18

GENDER	REGION	PROPORTION	95% CI	UNWEIGHTED COUNTS
Males	Atlantic	1.6%	0.3%, 3.0%	-
	Quebec	6.1%	1.1%, 11.1%	-
	Ontario	3.5%	1.3%, 5.7%	-
	Prairies	5.3%	2.0%, 8.5%	-
	BC	4.4%	0.2%, 8.6%	-
	National	4.3%	2.7%, 6.0%	-
Females	Atlantic	7.0%	3.6%, 10.3%	-
	Quebec	14.1%	7.2%, 20.9%	-
	Ontario	11.3%	7.1%, 15.4%	-
	Prairies	8.4%	4.5%, 12.3%	-
	BC	11.8%	5.1%, 18.4%	-
	National	11.1%	8.7%, 13.5%	-
Overall	Atlantic	4.2%	2.4%, 6.0%	25
	Quebec	9.6%	5.4%, 13.7%	33
	Ontario	7.3%	5.0%, 9.6%	67
	Prairies	6.8%	4.3%, 9.4%	34
	BC	8.4%	4.3%, 12.4%	24
	National	7.6%	6.2%, 9.1%	183

- Not available due to Statistics Canada reporting restrictions

rate of MDE in the Maritimes was 4.2% (95% CI: 2.4–6.0%), which was lower than the national average of 7.6% (95% CI: 6.2–9.1).

The lifetime prevalence rates for suicidality in adolescents aged 15–18 was 13.5% (95% CI: 11.8–15.2). The rate was 8.8% (95% CI: 6.7–11.0) for males and 18.4% (95% CI: 15.6–21.2) for females. Regional rates for females and males are shown in Table 2 for lifetime suicidality. The rate of suicidality in the Maritimes (11.1%, 95% CI: 7.6–14.6) was lower than the national average (13.5%, 95% CI: 11.8–15.2).

TABLE 2. Lifetime suicidality rates in adolescents aged 15–18

GENDER	REGION	PROPORTION	95% CI	UNWEIGHTED COUNTS
Males	Atlantic	8.0%	4.2%, 11.7%	-
	Quebec	10.9%	5.1%, 16.7%	-
	Ontario	7.2%	4.2%, 10.3%	-
	Prairies	9.6%	4.6%, 14.7%	-
	BC	9.7%	4.0%, 15.5%	-
	National	8.8%	6.7%, 11%	-
Females	Atlantic	14.5%	8.2%, 20.9%	-
	Quebec	15.8%	9.0%, 22.7%	-
	Ontario	16.3%	11.7%, 20.8%	-
	Prairies	22.6%	16.3%, 29%	-
	BC	25.2%	16.5%, 33.8%	-
	National	18.4%	15.6%, 21.2%	-
Overall	Atlantic	11.1%	7.6%, 14.6%	51
	Quebec	13.1%	8.5%, 17.6%	48
	Ontario	11.7%	9.0%, 14.3%	117
	Prairies	16.1%	12%, 20.2%	77
	BC	18.0%	12.9%, 23.1%	46
	National	13.5%	11.8%, 15.2%	339

- Not available due to Statistics Canada reporting restrictions

To test the robustness of the findings regarding gender and regional differences, multivariate analyses were conducted (Tables 3 and 4). The regression results indicate that females had significantly higher odds of having major depression and suicidality (MDE OR 2.77, 95% CI: 1.71–4.48; suicidality OR 2.30, 95% CI: 1.63–3.23). The odds of MDE were significantly lower for adolescents in the Maritimes (OR 0.55, 95% CI: 0.30–0.99). However, this did not hold true for suicidality (OR 0.92, 95% CI: 0.57–1.49). In addition, the odds of suicidality increased with age (OR 1.16, 95% CI: 1.01, 1.34), low income (OR 1.87, 95% CI: 1.16, 3.02) and living in British Columbia (OR 1.64, 95% CI: 1.07, 2.52).

TABLE 3. Adjusted odds ratio for major depression

VARIABLES	OR	95% CI
Female	2.77	1.71, 4.48
*Atlantic	0.55	0.30, 0.99
*Quebec	1.42	0.75, 2.66
*Prairies	0.91	0.53, 1.59
*BC	1.12	0.57, 2.21
Age	1.05	0.88, 1.26
Low income	1.14	0.50, 2.60

*Reference Group = Ontario
OR = Odds Ratio

TABLE 4. Adjusted odds ratio for suicidality

VARIABLES	OR	95% CI
Female	2.30	1.63, 3.23
*Atlantic	0.92	0.57, 1.49
*Quebec	1.18	0.72, 1.94
*Prairies	1.46	0.96, 2.24
*BC	1.64	1.07, 2.52
Age	1.16	1.01, 1.34
Low income	1.87	1.16, 3.02

*Reference Group = Ontario
OR = Odds Ratio

Discussion

Our findings suggest that depression and suicidality are common in adolescents. The results of this study mirror findings from the United States showing high rates for these mental health problems in adolescents aged 15–18 (Morbidity and Mortality Review 2002). Since suicidality is frequently a consequence of untreated depression, it is noteworthy that rates of suicidality in Canada are comparable to those in the United States in spite of the universal health insurance coverage that gives Canadians access to needed healthcare. This finding raises questions about the barriers to access to mental health services and the effectiveness of the Canadian healthcare system in addressing the mental health needs of our adolescents.

Several policy implications arise from these findings. These include giving priority to regular surveillance of the mental health of young Canadians to help regional and

local governments develop strategies to identify and assist these youth. In addition, ensuring the effectiveness of these strategies will require understanding the role of such factors as gender and income in order to target programs and decrease the barriers to accessing needed mental health services by the most at-risk Canadian youth.

Regular surveillance

The rates emphasize the need for more regular surveillance of adolescent mental health in Canada. These data are essential to plan for improved access to and provision of services. For instance, surveillance has been conducted on a biannual basis in the United States for many years. Results from the studies have spurred national strategies to intervene with adolescents (Morbidity and Mortality Weekly Review 2002). One such example is the Teen Screen Program, which uses computerized screening for mental health problems in adolescents in such settings as schools and primary care clinics (Shaffer et al. 2004). The goal of the Teen Screen Program is to give all teenagers a mental health check-up before they finish high school. It is federally funded and is now running in all 50 of the United States. Strategies like these may have contributed to decreasing rates of suicide in American adolescents in the last 10 years (Olfson et al. 2003). However, a decline has not been seen in Canada. Regular monitoring could help to guide national strategies on addressing the mental health needs of Canadian adolescents. Regular surveillance will also take advantage of observing natural experiments that arise when there are changes in provincial programs.

Role of socio-economic factors

National strategies should consider the role of socio-economic disparities as they contribute to regional differences. Our results suggest that financially disadvantaged youth are particularly at risk for suicidality. Further research into the determinants of mental health may shed light on these differences.

Female adolescents

A compelling finding from this study is the high lifetime prevalence of suicidality in female adolescents, underscoring the urgent need to improve the provision of mental health services to this group. Overall, females were shown to have higher rates of depression and suicidality compared to males. This finding is consistent with the results of previous surveys as well as clinical reports that indicate these difficulties tend to occur more frequently in females than males. The female-to-male ratios for depression (2:1) and for suicidality (3:1) are consistent with previous research findings (Mortality and Morbidity Weekly Review 2002; Wade et al. 2002). Several hypoth-

eses have been advanced regarding this gender difference, including hormonal differences and societal pressures regarding women's roles (Kornstein 2001). Evidence to support the latter theory includes the fact that these higher rates in females continue throughout adulthood into the post-menopause, when hormones are assumed to have little differential impact in the female versus the male (Kornstein 2001).

Male adolescents

The consistent finding from previous research of higher rates of completed suicides in male adolescents compared to female adolescents also highlights the need for further development of services and prevention programs targeting males with depression and suicidality (Health Canada 1994). These findings have often been explained by the higher likelihood of males to use more lethal means to commit suicide (Schaffer and Waslick 2002). Therefore, services that target males may consider limiting access to lethal means for suicide such as firearms. There may also be differences in service utilization in males versus females with depression, suicidality or both; further research examining rates of service utilization will provide crucial information for the development of targeted programs and services (Wu et al. 2001).

Depression and suicidality in adolescents is a major public health concern because this period is a time of important biological and psycho-social development for adolescents.

Depression and suicidality in adolescents is a major public health concern because this period is a time of important biological and psycho-social development for adolescents. During adolescence, youth are preparing for independence from their families of origin and the start of their occupational endeavours. It is also a time of learning regarding adult relationships. Therefore, mental illness experienced during this period has significant impact on the quality of life and relationships that the adolescent may have throughout adulthood (Weissman et al. 1999).

Limitations

Several limitations associated with using population-based surveys should be noted. First, as with other surveys, the CCHS provides cross-sectional data, and the diagnoses are based on recall by respondents. Recall bias is especially problematic for lifetime

rates, given that memory of symptomatology can deteriorate over time. However, this is the most feasible method for assessing lifetime prevalence rates and has been validated in previous studies and accepted by experts in the field (Kessler and Walters 1998).

A second limitation is that the diagnoses used in the CCHS 1.2 are based on algorithms developed by Statistics Canada, and Statistics Canada has generally developed algorithms that produce conservative population estimates (Data Access Unit, Statistics Canada, personal communication). Therefore, the true prevalence rates may in fact be higher than those reported in this study. However, one confirmation of the validity of the algorithms used by Statistics Canada is the fact that national depression rates mirror rates in previous Canadian studies (Wade et al. 2002).

Finally, the small sample size in the targeted age group limited the ability to conduct further subanalyses and did not provide enough power to test for differences between individual provinces and territories. Similarly, we could not examine specific subsamples such as the Aboriginal population, where the rate of suicidality/suicide is known to be higher than in the general population (Chenier 1995). The small sample size also required the combined analyses of those with suicidal ideation and those with attempts, even though these two populations are very different clinically and may require differing levels of intervention. However, these results are important because this is the first study to examine suicide-related events in this age group and is thus a first step in addressing this important public health issue in adolescents.

Conclusions

Given the lack of previous Canadian studies of the rates of suicidality among adolescents aged 15–18, no comparison can be made regarding national changes in rates over the last decades. Since Canada, contrary to other developed countries, has not seen a decline in adolescent suicide rates over the last decade, the need for regular surveillance of national and regional rates is crucial in the development of national prevention strategies (Shaffer and Waslick 2002). Unfortunately, depression rates have remained unchanged in this age group over the last decade.

With respect to rate differences at the national and regional levels, future research needs to examine differences that exist in mental health services provision and access. Such investigation will aid in the development of national, regional and local strategies to address the issue of depression and suicidality in Canadian adolescents.

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