Research paper

Is the prevalence of major depression increasing in the Canadian adolescent population? Assessing trends from 2000 to 2014

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ABSTRACT

Background: Major depressive disorder is a relatively common diagnosis with onset across the lifespan. There is a recent belief that major depressive episodes (MDE) are increasing in adolescence; however, it is not clear if this is truly an increase in prevalence or reflective of other causes such as change in diagnostic patterns. This study aimed to determine whether evidence supports an epidemic of MDE in Canadian adolescents.
Methods: Past year MDE prevalence estimates were derived from a series of nationally representative surveys. Random effects meta-regression and graphical analyses were used to evaluate trends. A post hoc analysis compared trends in MDE prevalence to trends in self-reported mood disorder diagnosis (made by a health professional). The sample was split into 9 birth cohorts to examine whether MDE prevalence increased in more recent cohorts.
Results: Prevalence of MDE did not significantly change between 2000 and 2014 (β=0.001; p=0.532), and there was no modification of trends by sex or age. However, prevalence of self-reported mood disorder diagnosis by a health professional increased from 2003 to 2014 (β=0.001; p=0.024). There was no indication that MDE prevalence differed by birth cohort.
Limitations: Limitations include reduced precision in subgroup analyses, lack of clinical judgement in the structured diagnostic interview, and inability to differentiate mild, moderate and severe episodes of depression.
Conclusion: These findings do not support an epidemic of MDE in adolescents, however as more individuals report diagnoses by a health professional, future policy may need to incorporate an increase in need of mental health services.

1. Introduction

Major depressive episodes (MDE) are a characteristic feature of major depressive disorder, believed to be the second leading cause of disability worldwide (Ferrari et al., 2013). Development of a MDE during adolescence is critical, as early onset of depression can predict adverse mental health outcomes in adulthood, such as MDE recurrence, anxiety, substance use, and suicidal behaviours (Fergusson et al., 2007). The vulnerability of adolescents to MDE may result from a combination of genetic predisposition, age related changes, and psychosocial risk factors (i.e. peer conflict, bullying) that often occur during this period of development (Maughan et al., 2013). Further,

symptoms of MDE are strongly associated with substance abuse and academic problems, and are risk factors for suicidal ideation and behaviour, which contribute to both morbidity and premature mortality in adolescents (Deykin et al., 1987; Goldston et al., 2009; Mayes et al., 2015; Owens et al., 2012).

In order to properly allocate resources in Canada, the prevalence of MDE in the adolescent population must be better understood. Canadian literature on trends in depression is limited (McMartin et al., 2014), and international reports are inconclusive. Some reports from Iceland, Finland and the United Kingdom demonstrate prevalence to be increasing in both males and females (Sigfusdottir et al., 2008; Sweeting et al., 2009; Torikka et al., 2014; Wijlaars et al., 2012),

while additional reports specifically from England and the Netherlands support a decrease in males (Collishaw et al., 2010; Tick et al., 2008), and reports from Canada and Norway exhibit no change at all (McMartin et al., 2014; von Soest and Wichstrom, 2014). While the evident inconsistency may result from cross national difference or methodological variation between studies, there were some common limitations that emerged. In many studies, minimal time points were included for comparison, which provided insufficient information to document a trend over time. It was also common for different sampling or measurement strategies to be used over time, making it difficult to compare information. Finally, non-specific measures of depression (i.e. composite measures, distress scales) were often used, which did not address standardized diagnostic criteria. In order to properly evaluate trends, data must be collected at multiple time points, using comparable methods at each time point, and all samples must be representative of the same population. Assessment of trends in adolescent depression would also benefit from the use of a validated measure that is specific to MDE.

Another way to assess change over time is to evaluate past year MDE prevalence over subsequent birth cohorts. A birth cohort effect can be conceptualized as variation in the risk of disorder according to the year an individual is born, often coinciding with a shift in population exposure to risk factors over time (Keyes et al., 2010). This approach was popularized in the 20th century (Kessler et al., 1994), and has changed substantially since then, incorporating various statistical techniques (Keyes et al., 2010). Rather than attempting to disentangle the effect of birth cohort from age and period effects, this can be explored visually to examine prevalence of MDE in different birth cohorts as they age.

The Canadian Community Health Survey (CCHS) is a series of nationally representative health questionnaires that collect data on the general health of the Canadian household population. The sampling frames and interview strategies remained largely consistent each cycle, which provides a valuable opportunity to compare data over time (Statistics Canada, 2015a). The aim of this study was to assess the existence of trends in past year prevalence of MDE using nationally representative samples of Canadian adolescents between 2000 and 2014.

2. Methods

2.1. Participants and procedures

The CCHS is a series of cross sectional surveys conducted by Statistics Canada biannually from 2000 to 2006, and annually from 2007 to 2014. In each cycle, the target population was household residents 12 years of age or older, living in private dwellings. Individuals were excluded if they were full time members of the Canadian forces, were institutionalized, lived in remote regions of Canada or on reserves (< 3% of the national population) (Statistics Canada, 2015a). Participants were selected using a multistage sampling strategy. Households were identified by one of three sampling frames: the area frame, the list frame of telephone numbers, and Random Digit Dialing (RDD). The area frame was designed for the Labour Force Survey, and selected clusters of households using a probability proportional to size sampling method. The list frame of telephone numbers was an external list complementing the area frame, and RDD was used to randomly generate a set of numbers until the required sample size is reached. Once a household was selected, the next step was to identify a single respondent. The probability of selection was based on the number of eligible respondents living in the household at the time of sampling. Interviews were conducted either in person or by the telephone, by trained Statistics Canada representatives (Statistics Canada, 2015a). The sample was further restricted to adolescents 12–19 years of age. Sample size and response rates for each cycle are reported in Table 1.

Table 1
Sample sizes for core content and optional content (CIDI-SF module), and response rates for each cycle.

Survey cycle	Response rate (%)	Total sample size (12–19 years)	Sample size CIDI (12–19 years)
CCHS 1.1	84.7	17619	17261
CCHS 2.1	80.7	18810	7491
CCHS 3.1	78.9	16397	8397
CCHS 0708	77.6	14580	5073
CCHS 0910	72.3	14585	6725
CCHS 1112	68.4	13832	2369
CCHS 1314	66.2	13283	4398

2.2. Measures

Past year MDE was assessed using an abbreviated version of the fully structured Composite International Diagnostic Interview (CIDI). The short form version (CIDI-SF) is a quick screening method for common mental health disorders, including past year MDE (Kessler et al., 1998). Respondents were asked about symptoms in the past year, and an algorithm-based predictive score was generated based on their response profile. Validity of the CIDI-SF has been previously reported (Kessler et al., 1998). In the CCHS, the CIDI-SF was optional content, which means not all provinces included this module in the survey each cycle.

Self-reported mood disorder diagnosis by a health professional was included as core content in the CCHS starting in 2003. It is used in the current analysis as a proxy for trends in diagnosis of depression over time. Respondents were asked the following question: "Remember we are interested in conditions diagnosed by a health professional and that are expected to last or have already lasted 6 months or more. Do you have a mood disorder, such as depression, bipolar disorder, mania or dysthymia?" Individuals were classified as having the disorder if they responded 'yes' to this question (Statistics Canada, 2003). Self-report diagnosis has been previously reported as an adequate proxy measure for clinician diagnosis of depression, when compared to the Structured Clinical Interview for DSM-IV (Sanchez-Villegas et al., 2008).

Sex and age were assessed using standard interview questions, field tested by Statistics Canada. Age of respondent was further classified into two groups for the analysis: 12–14 year olds and 15–19 year olds. Province of residence was classified based on divisions established in previous studies (Cheung and Dewa, 2006). These groupings were divided into Maritimes (Prince Edward Island, Nova Scotia, New Brunswick, Newfoundland), Prairies (Manitoba, Saskatchewan, Alberta), Ontario, Quebec, British Columbia, and the Territories (Yukon, Northwest Territories, Nunavut).

2.3. Statistical analysis

The proportion of individuals experiencing a past year MDE at each time point was estimated using a two-stage meta-regression analysis. In the first stage, the survey-specific estimates are derived and are combined using meta-analysis and meta-regression techniques in the second stage (Rao et al., 2008; Thomas et al., 2014).

Trends in prevalence of MDE were examined using the two-stage meta-analysis approach. Survey specific estimates for prevalence of MDE were derived from each survey. These estimates incorporated replicate bootstrap weights to account for unequal selection probabilities, non-response, and the clustering techniques used by Statistics Canada. Random effects meta-regression analyses were used to assess any effect of time (survey year) on MDE prevalence estimates. For the overall sample of 12–19 year olds, the heterogeneity between survey estimates was statistically significant with a tau^2 of 0.0001 and an I^2 of 81.26% (Q=53.35, p < 0.01). This supported the use of a random effects model. Sex- and age-specific trends were also assessed using random