
One-Year Prevalence Rates of Major Depressive Disorder in First-Year University Students

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ABSTRACT

First-year university students may be more at risk for experiencing Major Depressive Disorder (MDD) than the general population given associated risk factors of this age range. A two-phase procedure was used to estimate the one-year prevalence rate of MDD and comorbid Major Anxiety Disorders among first-year university students at a small Canadian university. The results of the study indicate that approximately 7% of men and 14% of women in their first year met the criteria for MDD. Further, about 13% of men and 19% of women met the criteria for a Major Anxiety Disorder. Implications of these findings are discussed.

RÉSUMÉ

Les étudiants de première année d'université peuvent être plus exposés au risque d'éprouver un trouble dépressif majeur (TDM) que l'ensemble de la population, étant donné les facteurs de risque liés à ce groupe d'âge. Une procédure en deux étapes a été utilisée pour estimer le taux de prévalence du TDM et des troubles majeurs de l'anxiété dans une petite université canadienne. Les résultats de l'étude indiquent que 7 % environ des hommes et 14 % environ des femmes en première année satisfont aux critères de TDM. En outre, environ 13 % des hommes et 19 % des femmes satisfaisaient aux critères d'un trouble majeur de l'anxiété. Les répercussions de ces résultats sont discutés.

University students are at risk for developing Major Depressive Disorder (MDD) as onset most commonly occurs during adolescence (Hammen, 2001). Research indicates that high numbers of adolescents experience MDD. For example, the National Comorbidity Study (NCS) and the Oregon Adolescent Depression Project (OADP) show that lifetime prevalence rates of MDD among 17- to 18-year-old American adolescents range from 13.5% (NCS, Kessler & Walters, 1998) to 24.0% (OADP, Lewinsohn, Rohde, & Seeley, 1998). The 2003 American College Health Association Survey of over 19,000 students indicated that 13.4% of college students reported being diagnosed with depression at some point in their lives (American College Health Association, 2005). Researchers at Kansas State University found that over a 13-year period, the number of students presenting with depression at the university's counselling centre had doubled (Benton, Robertson, Tseng, Newton, & Benton, 2003). Similar increases have also been reported in the United Kingdom (Andrews & Wilding, 2004).

A Major Depressive Episode (MDE) can be as brief as two weeks (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, DSM-IV; American Psychiatric Association, 1994). While it may be argued that such brief periods of depressed mood should not be given a psychiatric diagnosis, longitudinal epide-

miological studies of depression in older adolescents have reported that the actual mean duration of MDD was 26 weeks and median duration was 8 weeks (Lewinsohn et al., 1998). Personal distress, anxiety, or sadness may, of course, accompany any transitional period. A diagnosable disorder, such as MDD, however, requires elevated levels of severity, duration, and number of symptoms and a degree of functional impairment. In order for an episode of low mood or depression to meet criteria for diagnosis of MDD, "even in mild cases there must be either clinically significant distress or some interference in social, occupational, or other important areas of functioning" (American Psychiatric Association, p. 322). Studies of adolescent depression have shown that it closely resembles depression in adults, that adolescents seen in treatment have similar pattern of symptoms to individuals in the community, and that "there is consensus that with minor modifications the DSM criteria are applicable to adolescents" (Lewinsohn & Essau, 2002, p. 541). The use of DSM diagnostic categories to describe depression in adolescents and young adults has extensive empirical support and precedent, especially in the fields of epidemiology, prevention science, and clinical psychology.

The onset and recurrence of depression can be triggered by stressful life events (Essau, 2004). Thus, it is not surprising that the transition from late adolescence to early adulthood is a critical period of vulnerability for the onset of MDD. It follows, then, that vulnerable first-year students may be particularly at risk for developing depression given the many challenges that they face. The disruption of social support networks and the stress of separation associated with first-year students moving away from home, as well as the increased exposure to and use of alcohol and other recreational drugs, frequent sleep pattern disruptions, romantic relationship break-up, financial worries, and changing social roles (e.g., decrease in athletic involvement, no longer being the "big kids" in their school peer group) are all potential risk factors for depression (Andrews & Wilding, 2004; Jamison, 1999; Kadison & Digeronimo, 2004; Monroe, Rohde, Seeley, & Lewinsohn, 1999).

Individuals who have their first episode of MDD typically have already experienced a series of subthreshold depressive episodes (Coyne, Pepper, & Flynn, 1999). Subthreshold depression is characterized by elevated depressive symptoms that do not meet the DSM-IV criteria for MDD or Dysthymia (Lewinsohn, Klein, Durbin, Seeley & Rohde, 2003). There is evidence of high rates of subthreshold depression among adolescents and young adults, ranging between 31% and 40% (Canadian Mental Health Association, 1995). Fergusson, Horwood, Ridder, and Beautrais (2005) found that adolescents who had subthreshold depression were significantly at risk for experiencing a later depressive episode and/or suicidal behaviours. Other investigations have shown that those with subthreshold depression already show impairment in psychosocial functioning (Gotlib, Lewinsohn, & Seeley, 1995). Among the university student population, then, students may be at risk for negative outcomes not only if they are experiencing MDD but also if they show high levels of subthreshold depressive symptoms.

To our knowledge, there has been no study investigating the prevalence of MDD among university students using a diagnostic interview assessment, the

most reliable research method for determining MDD caseness. There is indirect evidence, however, to suggest that university students are experiencing major mental health problems. For example, Adlaf, Gliksman, Demers, and Newton-Taylor (2001) conducted a study of mental health among 7,800 Canadian undergraduate students from 16 universities. Using a mental health screening tool, they found that just under a third of the students sampled reported "elevated psychological distress," which included such problems as the inability to concentrate, being unhappy or depressed, and losing sleep because of worrying. These data are only suggestive, as Adlaf et al. did not assess MDD specifically. In a study at Cambridge University, MDD was assessed using an abbreviated DSM-IV-based, self-report questionnaire over three years. In this sample, MDD one-year prevalence estimates for males and females ranged from 8.8% to 9.3% and 15.9% to 18.1%, respectively (Surtees, Wainwright, & Pharoah, 2002).

Structured diagnostic interviews have been used to assess the prevalence of MDD in general population surveys in the US and Canada. The NCS reported a 12-month MDD prevalence of 9.0% for males and 16.1% for females between the ages of 15 and 24 in the United States (Kessler & Walters, 1998). Slightly lower rates of MDD were found for the same age group in a Canadian national survey. The Canadian Community Health Survey reported that 4.5% of males and 8.3% of females had an MDE over a one-year period (Statistics Canada, 2002, Table 1).

The main purpose of our study was to determine the one-year prevalence of MDD among first-year students at a small rural Canadian university. Based on past research showing high prevalence rates of depression among university students relative to the general population (Surtees et al., 2002), we hypothesized that the one-year prevalence of MDD in our university student sample would be higher than the rates of MDD for youth in the Canadian general population.

MDD often co-occurs with Major Anxiety Disorders¹ (MAD; Brown & Barlow, 1992). Individuals suffering from comorbid MDD and MAD are more psychologically distressed and show more severe symptoms (Dozois & Westra, 2004). There is also evidence to suggest that anxiety can be a precursor to depression (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Woodward & Fergusson, 2001). Therefore, a secondary purpose was to assess the rates of MAD among this population. This was done to assess the severity of these comorbid mental health problems among university students and to better gauge the proportion of students who may not yet have MDD but who by virtue of meeting diagnostic criteria for a MAD are at elevated risk of later developing MDD. We hypothesized that there would be high comorbidity between MDD and a MAD.

METHOD

This study was conducted over a two-year period at a small primarily undergraduate rural Canadian university where the majority of students (approximately 70%) live in university residences. Data collection in each year consisted of two

phases. In Phase 1, participants were screened for depressive symptoms using an online survey. In Phase 2, MDD and other mental disorders based on DSM-IV criteria (American Psychiatric Association, 1994) were identified using a fully structured interview instrument.

Phase 1: Assessment of Depressive Symptoms

PARTICIPANTS

Two cohorts of first-year university students participated in Phase 1 of the study for a total of 686 participants (227 men and 459 women). The participants ranged in age from 17 to 23 ($M = 18.32$). The majority of the participants came from two-parent families (77%), and the median self-reported family income was between \$75,000 and \$100,000 per year. Most of the participants indicated that they were from Canada (78%), while 5% were from the United States, and the rest were from a wide range of countries including China, Bhutan, and Bermuda.

MEASURES

Demographic information. Basic demographic characteristics of students were collected. These characteristics included gender, age, family structure, family income, and country of origin.

The Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977). The CES-D was used as a first-stage screening instrument. It is appropriate for use in epidemiological surveys of depression in the general population. This scale contains 20 questions assessing depressive symptoms that have occurred in the past week. A score of 0 to 60 is possible, with higher scores indicating greater degrees of depression. Conventionally, a score of 16 or higher has been considered an indication of possible depression. However, the threshold score of 16 may be too low for determining depression among first-year students because the feelings of depression may be temporary. Therefore, higher symptom scores were used to indicate whether a student was at high risk for having depression. We also adopted a slightly lower cut-point for men than for women (as men typically report fewer depressive symptoms than women) to determine which participants to target for a full diagnostic interview (Roberts, Lewinsohn, & Seeley, 1991). CES-D scores of 24 or higher for women and 22 or higher for men were used as cut-points to classify a person as being at risk for depression. The CES-D is a reliable and valid measure for this population with a coefficient alpha of .87, test-retest correlations above .40, and strong correlations with other scales that measure symptoms of depression (Radloff, 1977, 1991).

PROCEDURE

During the first week of the fall term, the freshman class orientation committee informed all first-year students of the study and encouraged them to participate in it. After orientation week, all first-year students were sent an electronic survey by the Provost's office via e-mail, asking about their experiences at the university so far. As part of that e-mail survey, all first-year students were encouraged to also complete the first-phase screening web-based survey. As there was a possibility

of selection bias associated with this data collection method, several follow-up reminders were sent during the first month of the term. The messages encouraged those who had not yet completed the screening questionnaires to do so. In the first year of the study, posters were also placed in all residences on campus to encourage participation. Further, many faculty members across disciplines told introductory classes about the survey, and encouraged their students' participation in the study. In year two, a pizza and pool party for the residence with the highest percentage of first-years participating in our study was used as an inducement to further reduce recruitment bias both by encouraging more widespread participation and to counter any stigma that might be associated with participating with a survey on "first-year students' attitudes and their adjustment to university life."

Students who agreed to participate in the study followed a hot link from the invitational e-mail. The link led them to a web address where a more detailed consent form and the screening questionnaires were hosted on a secure server. Students completing the online survey had the option to withdraw from the survey at any point by exiting the survey. After the students completed the questionnaires, their data were electronically transferred to the research team.

Phase 2: DSM-IV Diagnostic Interviews

PARTICIPANTS

A total of 309 of the individuals who completed Phase 1 and gave contact information (93 men and 216 women) were invited to participate in Phase 2 of the study using stratified proportional sampling based on gender and three categories of CES-D scores (see below). Of the 309 invited, 147 participants (36 men and 111 women) completed Phase 2. The demographics of the returning participant sample in Phase 2 were very similar to those in Phase 1. The participants ranged in age from 17 to 22 ($M = 17.98$). The majority of the participants came from two-parent families (71%), and the median self-reported family income was between \$75,000 and \$100,000 per year.

MEASURES

The Composite International Diagnostic Interview (CIDI-Auto 2.1; CIDI Advisory Committee, 1997). The CIDI is the product of a joint project undertaken by the World Health Organization (WHO, 1997) and the former United States Alcohol, Drug Abuse and Mental Health Administration. It is a comprehensive, fully structured diagnostic interview for the assessment of mental health disorders, which provides lifetime and/or annual diagnosis according to the accepted definitions of the International Classification of Diseases, 10th revision (ICD-10) and DSM-IV (CIDI Advisory Committee). The one-year version was used in this study. The CIDI has excellent inter-rater reliability (above .90), and adequate agreement with parallel measures such as the syndromes diagnosed with the Present State Examination (Andrews & Peters, 1998).

The CIDI-Auto can be self-administered by the respondent, or administered by a trained interviewer who reads the questions as they appear on the screen.

The CIDI-Auto is a faithful representation of all modules of the CIDI interview, with the wording of questions that appear on the screen being identical to that of the paper-and-pencil interview. The probe flow chart and skip decisions are implemented by the program. The coded responses to all questions are written to a file in a form that allows them to be scored using the same computerized scoring algorithms as are used for the paper-and-pencil interview. Overall, the CIDI-Auto is considered to have acceptable reliability and validity (Roberts, Andrews, Lewinsohn, & Hops, 1990), and this instrument has been used in both the Australian National Mental Health Survey (Whiteford, 2000) and the Calgary Mental Health Study (Patten, 2000).

In year one, participants also completed a number of pencil-and-paper measures that are not relevant to the present study. These were administered after the CIDI-Auto to avoid influencing the results of the diagnostic interview. Interviewers either had graduate degrees in education or psychology or were graduate students in Clinical Psychology. They completed a one-day training session in the administration of the CIDI-Auto. Ongoing supervision and monitoring of the interviews was provided by a member of the research team with a Ph.D. in Clinical Psychology.

PROCEDURE

Based on their CES-D scores, all Phase 1 participants were categorized as having high (CES-D score ≥ 24 for females and ≥ 22 males), medium (16–23 for females and 16–21 for males), or low (< 16 for both females and males) levels of depressive symptoms. The CES-D cutoff of 24 has been used as a first-stage screening cut-point to identify “demoralized” adolescents at risk of developing MDD in previous prevention studies (Clarke et al., 1995). The two-point lower cut-off score for males was used to increase the number of males in our Phase 1 sample. CES-D cut-off scores as high as 27 have been used to identify “probable cases of depression” (Gotlib et al., 1995). The lower score is more appropriate for identifying those “at risk” of having MDD.

In year one, the following participants from Phase 1 who voluntarily provided contact information on the online screening form² were invited for in-depth interviews in Phase 2: (a) *all* those classified as being at a high risk for depression, and (b) an equal number of those classified as being at medium or low risk for depression in proportion to their representation by gender in the Phase 1 sample. For example, 68% of the Phase 1 males who were not at high risk for depression (i.e., had CES-D scores ≤ 22) were at low risk (CES-D < 16), so 68% of the males not at high risk that we invited for Phase 2 were also at low risk. This was done to reliably estimate “false-negative” rates of using the CES-D to screen for MDD. In year two,³ all participants with CES-D scores in either the medium or high ranges and an equal number of those who had CES-D scores in the low range and for whom we had contact information were invited to participate in Phase 2.

After completing consent forms, the participants were interviewed using the CIDI-Auto by trained research assistants. After each interview was completed,

the research assistants determined if the participant met the criteria for a mental health disorder using the data from the CIDI-Auto. Those individuals were informed within one to seven days by a registered clinical psychologist or by one of the trained research assistants after consulting with a registered psychologist about the possibility that they met the criteria for a mental health disorder and given a complete list of local mental health support services.

RESULTS

Phase 1 male and female participants' mean scores on the CES-D screening tool were 15.8 (± 11.4 *SD*) and 17.0 (± 11.4 *SD*), respectively. If we were to assume that the 23% of males and 46% of females who chose to participate in Phase 1 of our study were representative of the first-year population and that those who participated in the Phase 2 diagnostic interviews were representative of all their gender and CES-D risk category, then a rough first approximation of one-year prevalence rates for the population of first-year university students is easily obtained from the data in Table 1. From our data, this would suggest that approximately 17% of males and 15% of females have MDD. However, the large percent estimate for males is primarily due to the result of finding two with MDD from among those 11 interviewed in Phase 2 with low-risk CES-D scores. Given the majority (57.7%) of males were in the low CES-D group, this 18.2% false negative estimate among them extrapolates to an unrealistic estimate of 10.5% of our male population with low CES-D scores having MDD. If we assume no false negatives among those scoring below our CES-D high cut-offs, our prevalence estimates would be 6.7% for males and 8.7% for females. Finally, if we look at all those in the medium- and high-risk ranges (using the traditional cut-off of 16 on the CES-D for identifying those at risk) and assume no false negatives among those who scored below this, our estimates for MDD would be 6.7% for males and 13.8% for females.

Although not designed as a screening tool for MAD, these were the most common disorders among our Phase 2 female participants and occurred as often as MDD among our males (see Table 1). All of the MAD diagnoses were represented in this sample. Using the same logic to estimate MAD as used to estimate MDD (which assumes the CES-D accurately categorized participants in terms of their risk for MAD), our prevalence estimates for MAD among first-year university students would be 12.5% for males and 28.9% for females. Here, the high rate for female MAD is again due to estimated false negatives, as 7 of 36 Phase 2 participants with low-risk CES-D scores (52.9% of Phase 1 females) were diagnosed with one or more MAD. If we use the traditional medium-risk CES-D cut-off of 16, and assume no false negatives below this, the estimates are 12.5% for males and 18.6% for females. Assuming no false negatives below our high-risk CES-D cut would result in estimated MAD one-year prevalence rates of 7.8% and 10.9% for males and females respectively.

Similar estimates for comorbid MAD and MDD can be made from the data in Table 1. Using the same logic for prevalence of comorbid MDD and one or more

Table 1

DSM-IV Frequency (and Percent) of Diagnoses of Two Cohorts of First-Year University Students Screened with the CIDI Showing Diagnoses of Major Depressive Disorder (MDD) and Major Anxiety Disorders (MAD), and Levels of Comorbidity for the Total Sample and Males and Females Separately

CES-D–based risk category	Sample by phase		Phase 2: DSM-IV diagnostic category (% of Phase 2 sample)				% pop. with diagnoses ^a		
	Phase 1	Phase 2	MDD	MAD	Both ^b	None ^c	MDD	MAD	Both
	<i>N</i> (%Phase)	<i>N</i> (%Phase)							
Males									
Low	131 (57)	11 (31)	2 (18)	0 (0)	0 (0)	9 (82)	10.5	0	0
Medium	43 (19)	4 (8)	0 (0)	1 (25)	0 (0)	3 (75)	0	4.7	0
High	53 (23)	21 (58)	6 (29)	7 (33)	5 (24)	11 (52)	6.7	7.8	5.6
<i>Male total</i>	<i>227</i>	<i>36</i>	<i>8</i>	<i>8</i>	<i>5</i>	<i>23</i>			
Females									
Low	243 (53)	36 (32)	1 (3)	7 (19)	0 (0)	26 (72)	1.5	10.3	0
Medium	100 (22)	17 (15)	4 (24)	6 (35)	3 (18)	10 (59)	5.1	7.7	3.8
High	116 (25)	58 (52)	20 (34)	25 (43)	16 (28)	23 (40)	8.7	10.9	7.0
<i>Female total</i>	<i>459</i>	<i>111</i>	<i>25</i>	<i>38</i>	<i>19</i>	<i>59</i>			

Note. See text for sampling information.

^aThese calculations simplistically assume that our samples are representative at both stages of the study. ^bNumber (and percent) of individuals with MDD and MAD (counted in columns to the left) who have both. ^cNumber (and percent) of Phase 2 participants with no DSM-IV diagnoses.

MAD, our estimated one-year prevalence rates are 5.6% for males and 10.8% for females (assuming no false negative cases in the low-risk category).

Finally, 15 men and 38 women scored high on the CES-D but did not meet the criteria for MDD. Some of these individuals (4 men and 13 women) met the criteria for a MAD and/or other DSM-IV disorders.⁴ These individuals also may have had subthreshold depression.

DISCUSSION

We used a two-phase procedure to estimate the one-year prevalence of MDD among first-year university students at a small Canadian university. When we omitted likely false negatives from our results, we found that approximately 7% of male and 14% of female first-year university students at a small Canadian university met the criteria for MDD during the index twelve-month period. These one-year estimates are somewhat higher than the findings of the Canadian Community Health Survey (Statistics Canada, 2002, Table 1) but are similar to the NCS in the United States (Kessler & Walters, 1998). Our data are also comparable to, albeit slightly lower than, those found by questionnaire assessment for UK university students at Cambridge (Surtees et al., 2002).

Using the same method, we estimate that 12.5% of men and 18.6% of women met the criteria for one or more MAD. In comparison, among the graduate and undergraduate Cambridge students in the Surtees et al. (2002) study, Generalized Anxiety Disorder (GAD; the only anxiety disorder they screened for) was estimated to have a prevalence of 3.1%–3.8% for males and 9.5%–12.2% for females. Among those diagnosed with a MAD in our sample, approximately 30% had GAD (with or without another diagnosis), again making our estimates comparable to Surtees et al. One study which calculated the total number of *any* anxiety disorders in a method comparable to ours is a study of 3,024 randomly sampled youth (aged 14 to 24) in Munich, Germany. This study reported a one-year prevalence for any anxiety disorder of 13.8% for females and 4.7% for males (Wittchen, Nelson, & Lachner, 1998), estimates which are similar to the rates of MAD in our sample.

We also found that a large percentage of men (5.6%) and women (10.8%) met the criteria for both MDD and at least one MAD. This high comorbidity between the one-year prevalences of MDD and MAD is consistent with OADP, which reported a lifetime comorbidity rate of 21% between MDD and anxiety disorders (Rohde, Lewinsohn, & Seeley, 1991).

It is important to acknowledge that our Phase 2 participants may not be representative of all of those in their CES-D–based risk category and that the CES-D may not accurately measure risk for MAD. However, assuming that our sample is representative and that the CES-D does accurately measure risk for MAD, we are able to provide empirical evidence for high levels of mood and anxiety disorders among first-year university students.

It is likely that the students identified with MDD and those identified with both

MDD and a MAD in this study are having a difficult time coping in their first year at university. Past research has indicated that university students who experience MDD are less likely to be successful in maintaining their heavy workloads and achieving high academic standing. Heiligenstein, Guenther, Hsu, and Herman (1996) found that “academic impairment was seen in 92% of (depressed) students in the study and was manifested as missed time from academic class, decreased academic productivity, and significant interpersonal problems at school” (p. 61). In the Andrews and Wilding study (2004), depression predicted a significant decrease in exam performance. In their review of the literature on comorbidity, Dozois and Westra (2004) note that “comorbidity of anxiety and depression is associated with increased severity of symptoms, psychological distress, and overall impairment” (p. 26). The experience of depression also places students at risk for suicide (Kessler & Walters, 1998; Kisch, Leino, & Silverman, 2005).

The present study also identified a proportion of students who may have subthreshold depression. Many of the individuals who may have subthreshold depression in our study also were identified as meeting the criteria for an anxiety disorder. Studies show that there appears to be a temporal relationship between anxiety and depression in that individuals tend to experience anxiety, particularly social phobia and GAD, before they develop depression (Cole et al., 1998; Whittal & Dobson, 1991; Woodward & Fergusson, 2001). Based on this research, the results from our study suggest that notable numbers of students may be at risk for eventually developing depression. In addition, these students may be currently experiencing impairment in psychosocial functioning, even though they do not meet the full criteria for MDD (Gotlib et al., 1995).

Depression in university students may go unrecognized if the symptoms are attributed to a developmental or adjustment phase. However, our results highlight the need for mental health professionals to ensure that students presenting with symptoms of depression are thoroughly assessed and treated. The potential personal costs to the undiagnosed individual are high. Once an individual has experienced his or her first depressive episode, the chances of experiencing subsequent episodes increase exponentially (Kessing, 1998). Depression is also a financial cost to universities as it is one of the main reasons that students drop out (Meilman, Manley, Gaylor, & Turco, 1992). Thus, it is imperative that universities have the resources available to address this problem. This should include increasing funding to university counselling centres and ensuring that staff are properly trained to diagnose and treat mental health problems using empirically proven effective methods.

Kadison and Digeronimo (2004) outline a number of excellent recommendations for addressing depression and other mental health concerns at universities and colleges. For example, they suggest good collaboration between faculty, administration, and counselling staff. They also recommend that all university staff including faculty, clergy, and residence assistants be aware of early warning signs of depression and the university and community resources available to students. Students could also be educated about these things so that they can provide peer

support to students at risk. Kadison and Digeronimo also note a number of novel approaches taken by American universities. For example, the University of Maryland provides credit courses that educate students about stress and time management. The University of Rochester allows students to drop their first-year grades from their transcripts and at MIT, physicians and mental health professionals socialize with students in their residences.

Given the numbers of students that are likely at risk for developing depression as identified in our study, universities need to support efforts aimed at prevention. This might include raising awareness around risk factors for depression such as violence in the family-of-origin, relationship break-up, maternal depression, dependence, and poor self-concept (Hammen & Brennan, 2003; Hammen, Henry, & Daley, 2000; Lewinsohn et al., 1998; Monroe et al., 1999). Reducing the stigma surrounding mental health problems is also key to prevention. Universities are prime environments for changing unhealthy attitudes and thus should be leading institutions for reducing stigma.

One of the questions that arises from this study is how generalizable are these results to other Canadian universities? The study was conducted at a Canadian university with a relatively small population of students from all regions across the country. The university also has a sizeable international student population. Given our results, evidence from other studies such as Adlaf et al. (2001), and the age range of the university population, there is reason to believe that considerable numbers of students are experiencing MDD and other mental health problems at all universities. Thus, we believe that a full-scale epidemiological study of Canadian university students should be conducted to get a better understanding of this issue.

Notes

1. These include Panic Disorder, Generalized Anxiety Disorder, Specific Phobias, Social Anxiety Disorder, Obsessive Compulsive Disorder, and Posttraumatic Stress Disorder.
2. 90% and 65% of the sample from first and second years, respectively.
3. This was done in an attempt to increase the number of participants in Phase 2 of the study.
4. Seventeen individuals met the criteria for other DSM-IV disorders. Eleven of these had at least one MAD (one with comorbid Bipolar Disorder). The six who did not meet the criteria for an anxiety disorder had: Bipolar Disorder, Pain Disorder, Conversion Disorder ($n = 2$), Delusional Disorder, and Brief Psychotic Disorder.

References

- Adlaf, E. M., Gliksman, L., Demers, A., & Newton-Taylor, B. (2001). The prevalence of elevated psychological distress among Canadian undergraduates: Findings from the 1998 Canadian Campus Survey. *Journal of American College Health, 50*(2), 67–72.
- American College Health Association. (2005). The American College Health Association National College Health Assessment (ACHA-NCHA), spring 2003 reference group report. *Journal of American College Health, 53*(5), 199–210.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Andrews, B., & Wilding, J. M. (2004). The relation of depression and anxiety to life-stress and achievement in students. *British Journal of Psychology, 95*, 509–521.

- Andrews, G., & Peters, L. (1998). The psychometric properties of the Composite International Diagnostic Interview. *Social Psychiatry & Psychiatric Epidemiology*, *33*(2), 80–88.
- Benton, S. A., Robertson, J. M., Tseng, W. C., Newton, F. B., & Benton, S. L. (2003). Changes in counseling center client problems across 13 years. *Professional Psychology: Research and Practice*, *34*(1), 66–72.
- Brown, T. A., & Barlow, D. H. (1992). Comorbidity among anxiety disorders: Implications for treatment and DSM-IV. *Journal of Consulting and Clinical Psychology*, *60*(6), 835–844.
- Canadian Mental Health Association. (1995). *Depression: An overview of the literature*. Ottawa, ON: Author.
- CIDI Advisory Committee. (1997). *Composite International Diagnostic Interview overview*. Retrieved January 26, 2006, from <www.crufad.unsw.EDU.AU/cidi/cidi.htm>.
- Clarke, G. N., Hawkins, W., Murphy, M., Sheeber, L. B., Lewinsohn, P. M., & Seeley, J. R. (1995). Targeted prevention of unipolar depressive disorder in an at-risk sample of high-school adolescents: A randomised trial of a group cognitive intervention. *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*, 312–321.
- Cole, D. A., Peeke, L. G., Martin, J. M., Truglio, R., & Seroczynski, A. D. (1998). A longitudinal look at the relation between depression and anxiety in children and adolescents. *Journal of Consulting and Clinical Psychology*, *66*(3), 451–460.
- Coyne, J. C., Pepper, C. M., & Flynn, H. (1999). Significance of prior episodes of depression in two patient populations. *Journal of Consulting and Clinical Psychology*, *67*, 76–81.
- Dozois, D. J. A., & Westra, H. A. (2004). The nature of anxiety and depression: Implications for prevention. In D. J. A. Dozois & K. S. Dobson (Eds.), *The prevention of anxiety and depression* (pp. 9–41). Washington, DC: American Psychological Association.
- Essau, C. A. (2004). Primary prevention of depression. In D. J. A. Dozois & K. S. Dobson (Eds.), *The prevention of anxiety and depression* (pp. 185–204). Washington, DC: American Psychological Association.
- Fergusson, D. M., Horwood, J. L., Ridder, E. M., & Beautrais, A. M. (2005). Subthreshold depression in adolescence and mental health outcomes in adulthood. *Archives of General Psychiatry*, *62*(1), 66–72.
- Gotlib, I. H., Lewinsohn, P. M., & Seeley, J. R. (1995). Symptoms versus a diagnosis of depression: Differences in psychosocial functioning. *Journal of Consulting and Clinical Psychology*, *63*, 90–100.
- Hammen, C. (2001). Vulnerability to depression in adulthood. In R. E. Ingram & J. M. Price (Eds.), *Vulnerability to psychopathology: Risk across the lifespan* (pp. 226–257). New York: Guilford.
- Hammen, C., & Brennan, P. A. (2003). Severity, chronicity, and timing of maternal depression and risk for adolescent offspring diagnoses in a community sample. *Archives of General Psychiatry*, *60*, 253–258.
- Hammen, C., Henry, R., & Daley, S. E. (2000). Depression and sensitization to stressors among young women as a function of childhood adversity. *Journal of Consulting and Clinical Psychology*, *68*, 782–787.
- Heiligenstein, E., Guenther, G., Hsu, K., & Herman, K. (1996). Depression and academic impairment in college students. *Journal of American College Health*, *45*(2), 59–64.
- Jamison, R. K. (1999). *Night falls fast*. New York: Vintage.
- Kadison, R. D., & Digeronimo, T. F. (2004). *College of the overwhelmed: The campus mental health crisis and what to do about it*. San Francisco: Jossey-Bass.
- Kessing, L. (1998). Recurrence in affective disorder: II. Effect of age and gender. *British Journal of Psychiatry*, *56*, 322–327.
- Kessler, R. C., & Walters, E. E. (1998). Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the national co-morbidity survey. *Depression and Anxiety*, *7*, 3–14.
- Kisch, J., Leino, V., & Silverman, M. M. (2005). Aspects of suicidal behavior, depression, and treatment in college students: Results from the spring 2000 National College Health Assessment Survey. *Suicide and Life-Threatening Behavior*, *35*(1), 3–13.

- Lewinsohn, P. M., & Essau, C. E. (2002). Depression in adolescents. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 541–559). New York: Guilford.
- Lewinsohn, P. M., Klein, D. N., Durbin, E. C., Seeley, J. R., & Rohde, P. (2003). Family study of subthreshold depressive symptoms: Risk factor for MDD? *Journal of Affective Disorders, 77*, 149–157.
- Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1998). MDD in older adolescents: Prevalence, risk factors, & clinical implications. *Clinical Psychology Review, 18*, 765–794.
- Meilman, P. W., Manley, C., Gaylor, M. S., & Turco, J. H. (1992). Medical withdrawals from college for mental health reasons and their relation to academic performances. *College Health, 40*, 217–223.
- Monroe, S. M., Rohde, P., Seeley, J. R., & Lewinsohn, P. M. (1999). Life events and depression in adolescence: Relationship loss as a prospective risk factor for first onset of Major Depressive Disorder. *Journal of Abnormal Psychology, 108*, 606–614.
- Patten, S. B. (2000). Major depression prevalence in Calgary. *Canadian Journal of Psychiatry, 45*, 923–926.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.
- Radloff, L. S. (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*(2), 149–166.
- Roberts, R. E., Andrews, J. A., Lewinsohn, P. M., & Hops, H. (1990). Assessment of depression in adolescents using the Center for Epidemiologic Studies Depression Scale. *Psychological Assessment, 2*(2), 122–128.
- Roberts, R. E., Lewinsohn, P. M., & Seeley, J. R. (1991). Screening for adolescent depression: A comparison of depression scales. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 58–66.
- Rohde, P., Lewinsohn, P. M., & Seeley, J. R. (1991). Comorbidity of unipolar depression: II. Comorbidity with other mental disorders in adolescence and adults. *Journal of Abnormal Psychology, 100*, 214–222.
- Statistics Canada. (2002). *Canadian Community Health Survey: Mental health and well being*. Data Tables: CANSIM Table number 01051100. Retrieved November 24, 2005, from <<http://www.statcan.ca/english/freepub/82-617-XIE/htm/5110015.htm>>.
- Surtees, P. G., Wainwright, N. W. J., & Pharoah, P. D. P. (2002). Psychosocial factors and sex differences in high academic attainment at Cambridge University. *Oxford Review of Education, 28*(1), 21–38.
- Whiteford, H. (2000). Introduction: The Australian mental health survey. *Australian and New Zealand Journal of Psychiatry, 34*, 193–196.
- Whittal, M., & Dobson, K. S. (1991). An investigation of the temporal relationship between anxiety and depression as a consequence of cognitive vulnerability to interpersonal evaluation. *Canadian Journal of Behavioural Science, 23*, 391–398.
- Wittchen, H. U., Nelson, C. B., & Lachner, G. (1998). Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. *Psychological Medicine, 28*, 109–121.
- Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1086–1093.
- World Health Organization. (1997). *Composite International Diagnostic Interview, version 2.1*. Geneva, Switzerland: Author.

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