ABSTRACT

Objective: To evaluate cross-sectional associations between depressive episodes and a set of potential biopsychosocial determinants in Calgary, Canada.

Methods: Random digit dialling (RDD) was used to select a sample consisting of 2,542 household residents in Calgary. These subjects were interviewed over the telephone using the Composite International Diagnostic Interview (CIDI) short form for major depression, and a questionnaire evaluating a variety of biopsychosocial variables.

Results: The prevalence of major depression was associated with biological (family history of major depression, alcohol consumption, street drug use), psychological (ratings of stress, recent life events) and social factors (social support, marital status, income, level of education).

Conclusion: This study confirms that major depression is correlated with a diverse set of potential determinants in community populations, and that the impact of these determinants may differ between different populations. Prospective studies will be needed to further investigate these associations.

ABRÉGÉ

Objectif : Évaluer les liens transversaux entre les accès dépressifs et un ensemble de déterminants bio-psycho-sociaux possibles à Calgary.

Méthode : Nous avons sélectionné par composition aléatoire un échantillon de 2 542 ménages à Calgary. Les sujets ont été interviewés au téléphone à l'aide de la forme abrégée pour la dépression majeure du Composite International Diagnostic Interview et d'un questionnaire évaluant une gamme de variables bio-psycho-sociales.

Résultats : La prévalence de la dépression majeure était associée à des facteurs biologiques (antécédents familiaux de dépression majeure, consommation d'alcool ou de drogues illicites), psychologiques (perception du stress, récents événements marquants) et sociaux (soutien social, état matrimonial, revenu, scolarité).

Conclusion : L'étude confirme que la dépression majeure est corrélée avec un ensemble diversifié de déterminants dans les populations locales, et que les incidences de ces déterminants peuvent varier d'une population à l'autre. Il faudrait mener des études prospectives pour élucider ces corrélations.

Descriptive Epidemiology of a Depressive Syndrome in a Western Canadian Community Population

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An expanding literature has begun to explore the etiology of major depression from a biopsychosocial epidemiological perspective. For example, a series of studies by Kendler and others,^{1,2} based on a female twin sample, have confirmed the shared contribution of genetic and environmental factors to major depression etiology. Studies from an ECA survey reported an elevated incidence of major depression in relation to poverty,³ a finding consistent with more recent data from other sources.^{4,5} The National Comorbidity Survey (NCS) in the United States⁶ evaluated an expanded set of risk factors compared to earlier studies, but family history of depression as well as other potentially important risk factors were not evaluated.

The available literature suggests that major depression is associated with biological as well as psychosocial factors in community populations. The objective of this study was to describe cross-sectional correlations between major depression and a series of biological, psychological and social variables in a western Canadian community population.

METHODS

Data collection took place between February 1, 1998 and July 1, 1999. The sample was selected by random digit

dialling (RDD), using the Mitofsky-Waksberg method⁷ with a modification described in a review by Potthoff.⁸ The modification involved random generation of a set of 10 phone numbers from each sampling "block," rather than repeating second stage calling until a pre-set number of interviews were completed. When a residential household was reached, one member of the household having had the most recent birthday was selected for an interview. The target population consisted of adults aged 18 years or older who were residents of telephone-containing households in Calgary.

Subjects selected for inclusion in the study were interviewed over the telephone using the Composite International Diagnostic Interview Short Form for Major Depression (CIDI-SFMD).⁹ This is a brief instrument used to identify depressive episodes that have occurred in the preceding 12 months. Questions in the CIDI-SFMD derive from the CIDI, a fully structured research diagnostic interview.^{10,11} These interviews are designed for use by non-clinician interviewers, and are intended to identify diagnosable mental disorders. The CIDI-SFMD includes two branched series of questions. A different branch is followed for subjects reporting a two-week period of depressed mood versus a two-week period of loss of interest. Each branch includes questions about eight other depressive symptoms relevant to the DSM-IV¹² definition of major depressive episode, and five symptoms are required for a diagnosis. For some symptoms, additional probe questions are asked in order to confirm clinical significance. For example, insomnia must happen "every night" or "almost every night" to be considered significant. These clinical significance criteria are less rigorous than those of the full CIDI, however, and the CIDI-SFMD does

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not include several exclusion criteria (e.g., normal bereavement, drug-induced symptoms) contained in the CIDI. As a result, the CIDI-SFMD identifies a broader spectrum of depressive morbidity than that embodied by the DSM-IV category of major depression (as operationalized by the CIDI). The original CIDI-SFMD validation data suggested that the positive predictive value of the short form was approximately 90%,⁹ but this validation was based on the same data set used to develop the instrument. An independent validation study placed the positive predictive value of the CIDI-SFMD at 75%;¹³ the negative predictive value was nearly 100%. For these reasons, the term “depressive syndrome” rather than major depression is used in this report. It is estimated that approximately 75% of those identified as having this depressive syndrome would meet DSM-IV criteria for major depressive episode in the preceding 12 months.

Demographic data were collected using questions from the 1996 Canadian Census Form. Interviews were tightly scripted, including the use of standardized introductory statements, transitional statements, and a series of “fall back” questions for responding to subject queries. A questionnaire evaluating potential determinants of depression was formulated using items contained in a Canadian health survey.¹⁴ These questions evaluated level of education, employment status, stressful recent life events, self-reported sources of ongoing stress, perceived health, alcohol use and social support. Since family history of depression may be a risk factor for depressive disorders, an instrument designed to evaluate family history of depression¹⁵ was incorporated into the data collection interview. A question¹⁶ about early parental loss was also included, as this may be a risk factor for major depression. A question about street drug use was also asked: “In the past month, have you taken any street drugs?” Where use was reported, the specific substance(s) used were recorded.

A sampling weight for each subject was calculated as described by Pothoff.⁸ After examination of the data, an adjustment to the weighting was made to accommodate an over-representation of women in the sample. Notably, an over-representation of

TABLE I Demographic Features of the Study Sample*		
Age (years)	Mean	38.9
	Range	18-91
Marital Status	Legally Married	50.5%
	Separated	2.7%
	Divorced	7.8%
	Widowed	2.8%
	Never Married	36.2%
Employment Status (Main Activity)	Caring for Family	14.2%
	Working for Pay or Profit	26.2%
	Working and Caring for Family	33.0%
	Going to School	7.1%
	On Disability Support	8.7%
	Looking for Work	6.6%
	Retired	1.8%
	Other	2.3%
Education Level	< High School Graduation	6.3%
	HS & Incomplete Post Secondary	29.5%
	Non-University Diploma/Cert.	35.6%
	Baccalaureate or Higher Degree	28.6%

* The estimates are weighted to the sex distribution of the Calgary population

TABLE II Depressive Syndrome in Female and Male Subjects, by Age					
Age (years)	Male		Female		Prevalence Ratio for Age (95% C.I.)*
	%	95% C.I.	%	95% C.I.	
<25	13.4	7.3 - 19.5	25.0	18.1 - 31.9	2.3 (1.5 - 3.5)
25-34	13.7	8.8 - 18.6	22.1	17.5 - 26.7	2.1 (1.5 - 3.1)
35-54	12.3	8.7 - 16.0	18.8	15.6 - 22.0	1.9 (1.4 - 2.7)
55+	4.3	0.7 - 7.8	11.5	7.6 - 15.3	—

* The 55+ age group is the baseline denominator for each prevalence ratio

TABLE III Depressive Syndrome, by Education Level			
Education Level	Prevalence (%)	Prevalence Ratio*	95% C.I.
< High School Graduation	33.7	3.6	2.5 - 5.3
High School Graduation	16.3	1.8	1.3 - 2.4
Trade Diploma or Certification (non-university)	16.9	1.8	1.4 - 2.5
Baccalaureate or Higher University Degree	9.2	—	—

* The baseline category consists of subjects with Baccalaureate or Higher University Degree

women has been reported previously in association with the use of the last birthday method.¹⁷ Tabular analyses utilized the ‘CSAMPLE’ program in Epi Info;¹⁸ logistic regression was carried out using the STATA¹⁹ survey analysis commands.

RESULTS

Description of the sample

A total of 15,819 randomly generated telephone numbers were called. Of these, 2,849 (18.0%) were disconnected or not working, 3,541 (22.4%) were businesses or fax numbers, and an additional 1,730 (10.9%) could not be classified after the protocol’s six required call backs. In the case of 476 numbers (3.0%), it was possi-

ble to determine residential status, but no other information could be gathered. In 4,083 instances (25.8%), a household was reached, but the household contact refused further participation in the survey. In the remaining households (n=3,140), an effort was made to randomly select one member for the survey after successful contact with the household was made. However, in 15 households (0.48%), no eligible members were present (for example, all residents were too young) and in an additional 114 (3.6%), the selected subjects were unavailable. Eight subjects (0.25%) were excluded because they were found to be members of households already sampled, 5 (0.16%) because of protocol violations, and 17 (0.54%) because of language barriers. Of

TABLE IV
Depressive Syndrome, by Level of Income

Level of Income	Proportion of Study Population	Prevalence of Depression	Prevalence Ratio	95% C.I.
Lowest Income	9.7%	42.0%	4.8	3.2 - 7.0
Low Middle	15.0%	30.0%	3.4	2.3 - 5.0
Middle	25.9%	18.3%	2.1	1.5 - 3.0
High Middle	32.6%	15.0%	1.7	1.2 - 2.4
Highest Income	16.8%	8.9%	—	—

TABLE V
Depressive Syndrome, by Exposure to Recent Life Events (RLE)

RLE Exposure	Proportion of Study Population	Prevalence of Depression	Prevalence Ratio	95% C.I.
No RLE	52.1%	8.4%	—	—
One RLE	26.9%	17.6%	2.12	1.6 - 2.7
Two RLE	12.2%	23.9%	2.86	2.1 - 3.9
3+ RLE	8.8%	41.2%	4.93	3.8 - 6.4

TABLE VI
Specific Recent Life Events and Prevalence of the Depressive Syndrome

Life Event	Frequency of Event	Prevalence Ratio	95% C.I. for Prevalence Ratio
Physical Attack (self or someone close)	8.2%	1.94	1.47 - 2.56
Unwanted Pregnancy (self or someone in family)	2.8%	3.45	2.60 - 4.57
Major Financial Crisis (self or someone in family)	20.0%	3.12	2.57 - 3.79
Fail at School or Training (self or someone in family)	5.3%	1.76	1.24 - 2.50
Demotion or Pay Cut (self or partner)	12.7%	1.58	1.22 - 2.04
Increased Arguments with Partner (if married or Common Law)	19.1%	3.68	2.76 - 4.90
Going on Welfare (respondent, personally)	2.1%	4.27	3.27 - 5.58
Child Moving Back Home (if has children)	10.7%	1.44	0.96 - 2.17

the remaining 2,981 randomly selected household members who were successfully contacted, 2,542 (85.3%) consented to participate in the study.

Demographic variables and depressive syndrome

Characteristics of the study sample are presented in Table I. The weighted proportion of study subjects positive on the CIDI-SFMD was 15.6%, which included 11.8% of males and 19.4% of females. Scoring in the positive range on the CIDI-SFMD was more frequently observed in younger subjects (see Table II). The prevalence ratio (PR) for female gender was 1.64 (95% CI: 1.30 - 2.07). Subjects who were divorced, separated or widowed were more likely to be depressed (PR 2.01, 95% CI: 1.57 - 2.59), as were single (never married) subjects (PR 1.45, 95% CI: 1.14 - 1.84). Subjects who were involuntarily unem-

ployed or disabled had an elevated prevalence (PR 2.77, 95% CI: 2.17 - 3.55). Education level (Table III) and income (Table IV) were also strongly associated with the depressive syndrome.

The divorced, separated and widowed subjects were, on average, older than the married subjects (mean age 52.4 years versus 41.6 years). Hence the strength of this association might have been impacted by confounding. On the other hand, previously married status in Canadian populations may be associated with depressive episodes only in males.²⁰ To evaluate these effects, age, gender and marital status were fit into a logistic regression model. Gender by marital status interaction terms were not significant in these models, and after adjustment for age and gender, 'never married' marital status was no longer significantly associated with the depressive syndrome (OR 1.20, 95% CI: 0.87 - 1.64).

Divorced, separated or widowed marital status continued to be strongly associated (OR 2.93, 95% CI: 2.10 - 4.09).

The observed association of depression with level of education (Table III) and employment status persisted without substantial alteration after adjustment for demographic variables (age, gender and marital status) in a series of models. Also, when involuntary unemployment and low income were included simultaneously in a logistic regression model, along with age and sex, the effects of both variables remained significant, with no evidence of interaction.

Psychosocial factors

Ten stressful recent life events were evaluated in the study questionnaire. Forty-eight percent of the sample was exposed to one or more of these events. Table V shows adjusted (for age and sex) odds ratios representing exposure to one, two or more than two recent life events. Table VI presents associations with specific recent life events.

Indicators of deficient social support were also associated with the depressive syndrome. Subjects who reported having no one to confide in about private feelings or concerns (PR 2.22, 95% C.I. 1.68 - 2.93), no one that they could count on in a crisis situation (PR 2.57, 95% C.I. 1.93 - 3.43), no one to count on for advice in making important decisions (PR 2.48, 95% C.I. 1.95 - 3.16) and no one in their life to make them feel loved and cared for (2.96, 95% C.I. 2.26 - 3.86) all had an elevated prevalence.

Biological and biomedical factors

Having a family history of major depression was associated with the depressive syndrome (PR 1.54, 95% CI: 1.23 - 1.93). Most subjects (86.1%) reported consuming at least some alcoholic beverages. These subjects were not more likely to have the depressive syndrome (PR 0.89, 95% CI: 0.69 - 1.16). On the other hand, subjects who reported drinking five or more drinks on any one occasion (45.1% of the sample), were more likely to have the depressive syndrome (PR 1.37, 95% CI: 1.11 - 1.68). A proportion (7.4%) of the subjects had used street drugs in the preceding year,

predominantly cannabis (5.8%). Taking one or more street drugs was strongly associated with the depressive syndrome (PR 2.36, 95% CI: 1.79 - 3.13). Men were approximately three times as likely to use street drugs as women, and street drug users had a lower mean age than non-users (29.7 years versus 39.8 years). However, the association remained statistically significant in a logistic regression model incorporating adjustments for age and sex (OR 3.32, 95% CI: 2.16 - 5.11).

DISCUSSION

As noted above, the depressive syndrome evaluated here is not completely concordant with the syndrome of major depression, as defined in DSM-IV. This may explain why the observed 12-month period prevalence was higher than that of the Mental Health Supplement of the Ontario Health Survey, 4.1%.²¹ If the positive predictive value of the CIDI-SFMD is in the range of 75% as the validation data suggest, then a 15.6% prevalence is reasonably consistent with other CIDI-based Canadian estimates²² and that of the National Comorbidity Survey in the US,⁶ where 12-month prevalence estimates were 10.4% and 10.3%, respectively.

Selection bias resulting from RDD refusals may have inflated the prevalence estimate if those agreeing to participate were more likely to be depressed. This could impact upon the estimated associations if various determinants also influenced the probability of selection in a way that differed by mood status. Whereas the data were weighted on some factors, other factors that may have impacted upon selection (e.g., level of education, disability status) may have influenced the study's estimates. Prevalence may have been underestimated if subjects were hesitant to disclose psychiatric symptoms to a stranger over the telephone. However, one study

has suggested that the increased emotional distance associated with telephone interviewing may actually increase the probability of symptom disclosure.²³

The public health significance of depressive disorders is considerable, and is projected to increase over the next 20 years.²⁴ Public health strategies will need to accommodate the complex epidemiology of this condition. The strong associations of various factors with depression observed in this study probably represent important effects. Some potential determinants of depression may also be caused by depression, such as the occurrence of stressful life events, or a lower level of education, so that the direction of causal effect requires clarification by prospective studies. Prevalence is not determined exclusively by incidence. Some of the potential determinants of depression evaluated in this study may impact upon factors such as prognosis, mortality or migration which could, in turn, influence prevalence. Additional prospective studies in Canadian populations are needed to clarify these factors.

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