Health Promotion and Chronic Disease Prevention in Canada

Research, Policy and Practice

Volume 37 · Number 5 · May 2017

Special Issue: Mood and Anxiety Disorders, Part II

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To promote and protect the health of Canadians through leadership, partnership, innovation and action in public health.
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Published by authority of the Minister of Health.

ISSN 2368-738X
Pub. 160628
Journal_HPCDP-Revue_PSPMC@phac-aspc.gc.ca

Également disponible en français sous le titre : *Promotion de la santé et prévention des maladies chroniques au Canada : Recherche, politiques et pratiques*

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Indexed in Index Medicus/MEDLINE, SciSearch® and Journal Citation Reports/Science Edition

Public Health Agency of Canada | Agence de la santé publique du Canada

Canada

https://doi.org/10.24095/hpcdp.37.5.01

Introduction

Siobhan O'Donnell, MSc, Guest Editor

We are pleased to bring you the second of two special issues on mood and anxiety disorders focussing on data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorder Component (SLCDC-MA).[1] In December of 2016, we published the first issue, which included three articles describing various aspects of Canadian adults with a self-reported diagnosed mood and/or anxiety disorder including their sociodemographic characteristics,[2] health status, activity limitations and level of disability[3] and factors associated with well-being.[4] The three articles in this (second) issue investigate topics related to the management of these disorders.[5-7] Collectively, the articles explore key sociodemographic factors known to influence health-related outcomes and discuss strategies aimed at promoting the recovery and well-being of Canadian adults with a self-reported mood and/or anxiety disorder diagnosis.

The first article within this issue, *Factors associated with delayed diagnosis of mood and/or anxiety disorders*,[5] by Cheung et al., examines the association between time to diagnosis and sociodemographic and clinical characteristics, level of disability, activity limitations, perceived general and mental health, and life satisfaction. This was achieved by classifying respondents into one of three "time to diagnosis" subgroups (more than 5 years; 1 to 5 years; and less than 1 year). Results are discussed in the context of the evidence regarding the importance of early diagnosis and timely treatment of these disorders.

The second article, *Self-management of mood and/or anxiety disorders through physical activity/exercise*,[6] by Pelletier et al., explores the self-management of mood and/or anxiety disorders through physical activity/exercise. Similarly, it examines the associations between exercise frequency in the context of managing a mood and/or anxiety disorder (i.e. not exercising; exercising 1 to 3 times per week; and exercising 4 or more times per week) and sociodemographic and clinical characteristics, perceived general and mental health, and life satisfaction. In addition, it explores facilitators and barriers to engaging in exercise as a means to help manage these disorders. Findings are discussed in relation to the evidence regarding the benefits of physical activity/exercise and ways to support the uptake and ongoing engagement of this self-management strategy.

The last article, *Use of medication and psychological counselling among Canadians with mood and/or anxiety disorders*,[7] by O'Donnell et al., reports on the use of prescription medications and psychological counselling in the management of mood and/or anxiety disorders, the sociodemographic and clinical characteristics associated with their use; and the reasons for not using them. This study is the first to report national-level data on the use of medication and counselling among community dwelling Canadian adults with a self-reported mood and/or anxiety disorder diagnosis. Results are discussed in the context of factors known to influence individuals' choice and use of these treatments.

About the data source

The 2014 SLCDC-MA, a cross-sectional follow-up survey to the 2013 Canadian Community Health Survey (CCHS), is the only national survey to collect information on the experiences of Canadians self-reporting a professionally diagnosed mood and/or anxiety disorder. It surveyed Canadians aged 18 years and older living in private dwellings in the 10 provinces identified through the 2013 CCHS as having responded "yes" to having received a mood and/or an anxiety disorder diagnosis from a health professional that had lasted or was expected to last six months or more. The 2014 SLCDC-MA provides detailed information on a wide variety of topics related to mood and anxiety disorders, including disorder-attributable impacts on usual and work-related activities; clinical and self-management approaches used to manage them; and barriers to care and self-management. The full questionnaire and supporting documentation is available on Statistics Canada's website at: http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5160.

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Tribute to Dr. Elliot Goldner

October 29, 1953–November 27, 2016

Dr. Elliot Goldner, MD, FRSPC (Psychiatry), MHSc, Professor, Associate Dean (Research) and Director of the Centre for Applied Research in Mental Health & Addiction, Faculty of Health Sciences, Simon Fraser University

The authors of both issues wish to pay tribute to an esteemed colleague and a co-author of two articles within this collection, Dr. Elliot Goldner, who passed away unexpectedly on November 27th, 2016. Elliot began his career as a psychiatrist helping individuals with mental illness and addiction in Vancouver's Downtown Eastside. A founding member of the Faculty of Health Sciences at Simon Fraser University, Elliot's research program addressed the full range of mental health and addiction problems. In addition, he mentored many faculty and students in both the undergraduate and graduate programs over the years. Among his many extraordinary contributions and accomplishments, Elliot developed a research unit specifically to provide research support to governments in their efforts to advance mental health and addiction services, including providing expert input into the development of the Public Health Agency of Canada's Positive Mental Health Surveillance Indicator Framework. Elliot's dedication and passion for the work coupled with a warm, kind and humble demeanor set him apart. His passing is a huge loss to those who had the privilege of working with him and to the mental health community at large.

https://doi.org/10.24095/hpcdp.37.5.02

Factors associated with delayed diagnosis of mood and/or anxiety disorders

Ricky Cheung, PhD (1); Siobhan O'Donnell, MSc (1); Nawaf Madi, PhD (2); Elliot M. Goldner†, MD (3)

This article has been peer reviewed.

Abstract

Introduction: This study examined the association between time to diagnosis and sociodemographic and clinical characteristics as well as time to diagnosis and physical and mental health status, among Canadian adults with a self-reported mood and/or anxiety disorder diagnosis.

Methods: We used data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component. The study sample (n = 3212) was divided into three time to diagnosis subgroups: long (> 5 years), moderate (1–5 years) and short (< 1 year). We performed descriptive and multinomial multivariate logistic regression analyses. Estimates were weighted to represent the Canadian adult household population living in the 10 provinces with diagnosed mood and/or anxiety disorders.

Results: The majority (61.6%) of Canadians with a mood and/or anxiety disorder diagnosis reported having received their diagnosis more than one year after symptom onset (30.0% reported a moderate delay and 31.6% a long delay). Upon controlling for individual characteristics, we found significant associations between a moderate delay and having no or few physical comorbidities; a long delay and older age; and both moderate and long delays and early age of symptom onset. In addition, a long delay was significantly associated with "poor" or "fair" perceived mental health and the greatest number of activity limitations.

Conclusion: These findings affirm that a long delay in diagnosis is associated with negative health outcomes among Canadian adults with mood and/or anxiety disorders. Time to diagnosis is particularly suboptimal among older adults and people with early symptom onset. Tailored strategies to facilitate an early diagnosis for those at greatest risk of a delayed diagnosis, especially for those with early symptom onset, are needed.

Keywords: *mood disorders, anxiety disorders, delayed diagnosis, health status, health surveys, population surveillance, Survey on Living with Chronic Diseases in Canada*

Highlights

- Only a minority (38.4%) of Canadian adults with a mood and/or anxiety disorder diagnosis reported having received their diagnosis within a clinically acceptable time frame, i.e. less than a year after symptom onset.
- Affected Canadians with a moderate delay in diagnosis (1–5 years) were more likely to have no or few physical comorbidities; those with a long delay (> 5 years) were more likely to be older; and those with either a moderate or long delay were more likely to have experienced early symptom onset.
- A long delay in diagnosis was associated with worse mental and physical health outcomes.
- Tailored strategies to facilitate an early diagnosis for those at greatest risk of a delayed diagnosis are needed.

Introduction

Early diagnosis and timely treatment are important in optimizing the overall health and well-being of those affected by mood and anxiety disorders.[1-3] However, despite the existence of effective treatments, a large proportion of Canadians with these disorders experience a delay in diagnosis, or remain undiagnosed.[4-9] Individual factors such as low mental health literacy, fear of stigmatization and a preference to manage one's own health, as well as health system factors such as limited access to mental health services and health professionals' insufficient knowledge, skills or time may all play a role.[5-7]

Given the high prevalence of mood and anxiety disorders in Canada and throughout the world,[10] delayed diagnosis or lack of diagnosis has important public health implications, since a diagnosis usually precedes treatment initiation. A delay in treatment of common mental disorders is associated with poorer health outcomes including a worsening of mental health status, the development of other mental disorders and an increased risk of suicide.[3,11,12] In addition, many social consequences are associated with early-onset untreated mental disorder, including school failure, teenage pregnancy, marital violence and inability to maintain employment and/or relationships.[13-15]

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Several international studies have attempted to quantify the average time to diagnosis and explore potential factors involved in delayed diagnosis and treatment after initial symptom onset among those with mood and/or anxiety disorders.[16-19] The only Canadian study on this topic, to our knowledge, was published almost 20 years ago and was based on data from the Ontario Health Survey; therefore, the results are not nationally representative.[20]

Using data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component (SCLDC-MA), our objectives were two-fold: (1) to identify the sociodemographic and clinical characteristics associated with time to diagnosis; and (2) to examine the relationship between time to diagnosis and physical and mental health status in a nationally representative sample of community-dwelling Canadian adults with a self-reported mood and/or anxiety disorder diagnosis.

Methods

Data source and study sample

The 2014 SLCDC-MA surveyed Canadians aged 18 years and older living in private dwellings from the 10 provinces who were identified through the 2013 Canadian Community Health Survey (CCHS) by way of responding "yes" to having received a mood and/or an anxiety disorder diagnosis from a health professional that had lasted, or was expected to last, six months or more (n = 3361; response rate = 68.9%).[21] Those excluded from the survey included residents of the three territories, persons living on Indian reserves or Crown lands, people in institutions, full-time members of the Canadian Forces and residents of certain remote regions, which together represent approximately 3% of the target population. The methodology of the 2014 SLCDC-MA and the sociodemographic profile of the final sample have been described elsewhere.[22] The term "mood and/or anxiety disorders" used when describing the results from this study refers to those who have self-reported professionally diagnosed mood disorders only, anxiety disorders only, or concurrent mood and anxiety disorders.

Study measures

Time to diagnosis subgroups

We calculated the time to diagnosis for each respondent by subtracting the age at which their symptoms first appeared from the age at which they first received their diagnosis. For those respondents with *concurrent* mood and anxiety disorders, time to diagnosis was calculated by subtracting the age of the respondent at the time of symptom onset for the disorder that emerged later from the age of the respondent at the time they received their latest diagnosis, regardless of whether these were the same disorder. We then categorized respondents into four mutually exclusive subgroups based on their calculated time to diagnosis: (1) symptoms preceded diagnosis by more than five years (long); (2) symptoms preceded diagnosis between one and five years (moderate); (3) symptoms occurred in the same year as diagnosis (short); and (4) symptoms followed diagnosis. The time interval for the specified subgroups was informed by previous studies, which found the receipt of a diagnosis within the same year as symptom onset to be associated with better health-related outcomes among those with mood and/or anxiety disorders.[1,2,12]

After excluding those respondents with symptoms that followed their diagnosis due to small subgroup size (n = 50), as well as those with missing responses to either of the questions used to calculate the time to diagnosis (n = 99), we were left with a final study sample of 3212 (Figure 1).

Sociodemographic characteristics

The sociodemographic characteristics we studied included cohort age, i.e. the age of the respondent at time of interview (age groups 18–34, 35–49, 50–64 and ≥ 65 years, and mean age); sex (female, male); marital status (single/never married, widowed/separated/divorced, married/living common-law); respondent's highest level of education (less than secondary school graduation, secondary school graduation/no post-secondary, some post-secondary education, post-secondary graduation); adjusted household income adequacy quintile (deciles, derived by Statistics Canada,* transformed into quintiles); place of residence (rural, urban); geographic region (Atlantic region, British Columbia, Ontario, Prairie region and Quebec); immigrant status (yes, no); and Aboriginal status (yes, no).

Clinical characteristics

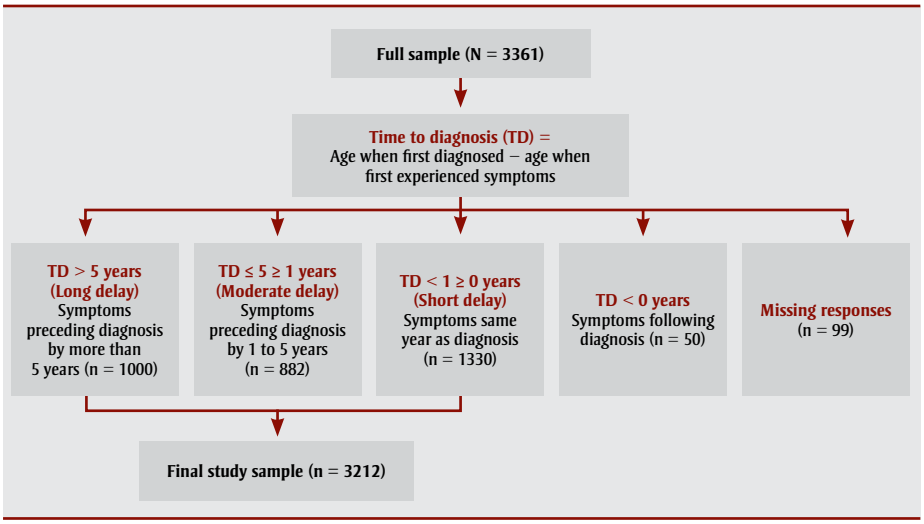
The clinical characteristics we analyzed included age of symptom onset (age groups ≤ 19, 20–29 and ≥ 30 years, and mean age); number of physical comorbidities (0, 1-2 and ≥ 3); and type of disorder (mood disorders only, anxiety disorders only, and concurrent mood and anxiety disorders). The age of symptom onset was based on respondents' answers to the following questions: "How old were you when you first started experiencing symptoms related to your mood disorder?" and "How old were you when you first started experiencing symptoms related to your anxiety disorder?" The three age groups we chose for age of symptom onset were informed by previous studies and correspond to the following life stages: childhood/adolescence (≤ 19 years), young adulthood (20–29 years) and adulthood (≥ 30 years).[19,24,25] We determined the number of physical comorbidities using responses to questions regarding conditions diagnosed by a health professional that had lasted or were expected to last six months or longer, i.e. asthma, arthritis, back problems, chronic obstructive pulmonary disease, diabetes, heart disease, cancer, stroke, bowel disorder/Crohn's disease/colitis and Alzheimer disease/dementia. Each condition was counted as one physical comorbidity. The type of disorder was determined by asking respondents if they have or ever had a mood disorder (such as depression, bipolar disorder, mania or dysthymia) and if they have or ever had an anxiety disorder (such as phobia, obsessive-compulsive disorder or panic disorder) diagnosed by a health professional.

Physical and mental health status

The physical and mental health status measures included level of disability (severe, moderate, mild, none); number of activity limitations (≥ 3, 1–2, 0); perceived general health; perceived mental health; and satisfaction with life in general. Level of disability categories were derived from the Health Utilities Index (HUI), which measures the utility functions of eight domains including vision, hearing, speech,

* This derived variable is a distribution of respondents in deciles (10 categories including approximately the same percentage of residents for each province) based on the adjusted ratio of their total household income to the low-income cut-off corresponding to their household and community size. It provides, for each respondent, a relative measure of their household income to the household incomes of all other respondents.[23]

FIGURE 1
Flowchart illustrating how respondents were categorized into the mutually exclusive time to diagnosis subgroups, 2014 SLCDC-MA



Abbreviations: n, unweighted number; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component; TD, time to diagnosis.

ambulation, dexterity, emotion, cognition and pain.[26] The four disability categories based on these global utilities scores were proposed by Feeny and Furlong[27] and validated by Feng et al.[28] using Canadian data. Number of activity limitations was categorized based on the number of times a respondent answered that they had experienced "a lot of restriction" in the past 12 months in "activities such as recreation, leisure, or hobbies"; "exercising or playing sports"; "social activities with family or friends"; "doing household chores"; "running errands or shopping"; "travelling or taking vacations"; and "taking care of yourself (such as dressing, bathing, and maintaining personal hygiene)" due to their mood and/or anxiety disorders. Perceived general health and perceived mental health were measured by asking respondents to rate their general and mental health as "excellent," "very good," "good," "fair," or "poor." Satisfaction with life in general was determined by asking respondents to rate how satisfied they are with their life using a scale of 0 to 10, where 0 means "very dissatisfied" and 10 means "very satisfied."

All of the sociodemographic and clinical characteristics and health status measures were collected as "current status" at the time of the interview.

Statistical analysis

We used cross-tabulation analyses to describe respondents' sociodemographic and clinical characteristics and physical and mental health status by time to diagnosis subgroup. We performed chi-square tests (for categorical variables) and logistic regression analyses (for count variables, i.e. cohort age and age of symptom onset) to explore relationships between time to diagnosis subgroups and respondents' characteristics and health status. We used multinomial multivariate logistic regression analyses to examine the independent associations between respondent characteristics and time to diagnosis, adjusting for all other respondent characteristics, as well as health status factors and time to diagnosis, adjusting for all respondent characteristics.

We also conducted several supplemental analyses to examine (1) the distribution of respondents by time to diagnosis subgroup and disorder type, and median time to diagnosis by disorder type; (2) the association between sociodemographic and clinical characteristics (with cohort age and age of symptom onset as count variables) and time to diagnosis (as a count variable) using a negative binomial regression analysis; and (3) the association between physical and mental health status and time to diagnosis (as a count variable) using multinomial multivariate logistic regression analysis. With respect to our median time to diagnosis calculation, we excluded those respondents within the short delay subgroup (i.e. time to diagnosis < 1 year) to permit a comparison of results with previous studies.[16-19,29] Data from the above supplemental analyses may be obtained by contacting the corresponding author.

To account for sample allocation and survey design, all estimates were based on weighted data using survey weights[†] generated by Statistics Canada so that the data would be representative of the Canadian household population aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis living in the 10 provinces. Furthermore, we generated variance estimates (95% confidence intervals and coefficients of variation) using the bootstrap weights provided with the data.[30] Only those results with a coefficient of variation of less than 33.3% are reported, as per Statistics Canada guidelines.[21] *P*-values less than .05 were considered statistically significant. We conducted all statistical analyses in SAS Enterprise Guide version 5.1 (SAS Institute Inc., Cary, NC, USA).

Results

The majority (61.6%) of Canadians aged 18 years and older with a mood and/or anxiety disorder diagnosis reported having received their diagnosis over a year after symptom onset. Of these, 30.0% received a diagnosis between one and five years after symptom onset (moderate delay) and 31.6% more than five years after symptom onset (long delay) (Table 1). The median time to diagnosis (excluding those who received a diagnosis within a year of symptom onset) among those with mood disorders only, anxiety disorders only, or both types of disorder was 5.0, 5.4, and 5.2 years, respectively (data not shown; available upon request).

Sociodemographic and clinical characteristics by time to diagnosis subgroup

We found significant relationships between time to diagnosis subgroups and cohort age, marital status, household income adequacy, geographical region, age of symptom

[†] Statistics Canada adjusted sample weights for exclusions, sample selection, in-scope rates, non-response and permission to link and share.[21]

TABLE 1
Sociodemographic and clinical characteristics by time to diagnosis subgroup among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Sociodemographic and clinical characteristics (cat)	Time to diagnosis subgroups			Chi-square test *p*-value
	Short[a] (n = 1330; 38.4%) % (95% CI)	Moderate[b] (n = 882; 30.0%) % (95% CI)	Long[c] (n = 1000; 31.6%) % (95% CI)	
Cohort age (years)				< .001*
≥ 65	19.0 (16.5–21.4)	8.2 (6.3–10.2)	14.7 (11.7–17.6)	
50–64	35.8 (31.7–39.9)	23.8 (18.9–28.7)	32.4 (27.7–37.1)	
35–49	25.1 (21.3–28.9)	27.1 (21.8–32.4)	33.0 (27.5–38.6)	
18–34	20.1 (16.7–23.5)	40.9 (35.4–46.4)	19.9 (15.1–24.7)	
Sex				.902
Female	64.5 (60.0–69.0)	63.9 (58.6–69.3)	62.7 (57.3–68.1)	
Male	35.5 (31.0–40.0)	36.1 (30.7–41.4)	37.3 (31.9–42.7)	
Marital status				< .001*
Single/never married	22.3 (18.6–25.9)	34.7 (29.0–40.5)	22.9 (18.7–27.1)	
Widowed/separated/divorced	19.7 (16.5–22.9)	11.0 (7.8–14.1)	21.4 (17.1–25.8)	
Married/living common-law	58.0 (53.8–62.2)	54.3 (48.4–60.3)	55.7 (50.2–61.2)	
Respondent's highest level of education				.054
Less than secondary	16.0 (12.8–19.1)	10.3 (7.8–12.8)	10.0 (6.5–13.4)[d]	
Secondary	22.5 (18.3–26.7)	22.1 (17.6–26.5)	19.2 (15.0–23.4)	
Less than post-secondary	4.6 (2.8–6.4)[d]	6.7 (4.0–9.5)[d]	5.7 (3.3–8.1)[d]	
Post-secondary	57.0 (52.2–61.7)	60.9 (55.5–66.4)	65.2 (60.0–70.4)	
Household income adequacy quintile				.004*
Q1	25.1 (21.1–29.1)	19.8 (15.3–24.3)	22.7 (18.4–26.9)	
Q2	22.5 (18.5–26.5)	17.0 (12.7–21.3)	13.8 (10.5–17.2)	
Q3	21.3 (17.1–25.5)	25.9 (20.3–31.6)	19.9 (15.5–24.3)	
Q4	14.6 (11.8–17.5)	20.1 (15.2–25.0)	25.0 (20.1–29.9)	
Q5	16.5 (13.0–20.0)	17.2 (12.9–21.5)	18.7 (14.0–23.3)	
Place of residence				.332
Rural	17.8 (14.9–20.8)	19.0 (15.8–22.8)	15.5 (12.4–18.7)	
Urban	82.2 (79.3–85.1)	81.0 (77.2–84.7)	84.5 (81.3–87.6)	
Geographical region				< .001*
British Columbia	12.1 (9.1–15.2)	16.3 (12.0–20.5)	13.5 (10.3–16.7)	
Prairie	16.3 (13.3–19.2)	18.6 (14.4–22.8)	17.4 (13.3–21.5)	
Ontario	35.4 (31.1–39.7)	41.5 (35.6–47.3)	44.3 (39.1–49.5)	
Quebec	27.8 (24.0–31.6)	17.5 (13.1–21.8)	12.9 (9.4–16.4)	
Atlantic	8.4 (6.9–10.0)	6.2 (4.6–7.7)	12.0 (9.5–14.5)	
Immigrant status				.283
Immigrant	15.2 (10.4–20.0)	11.6 (6.9–16.2)[d]	10.5 (6.5–14.5)[d]	
Non-immigrant	84.8 (80.1–89.6)	88.4 (83.8–93.1)	89.5 (85.5–93.5)	
Aboriginal status				.102
Aboriginal	4.3 (2.7–6.0)[d]	6.9 (3.7–10.1)[d]	3.9 (2.3–5.5)[d]	
Non-Aboriginal	95.7 (94.0–97.3)	93.1 (89.9–96.3)	96.1 (94.5–97.7)	

Continued on the following page

TABLE 1 (continued)
Sociodemographic and clinical characteristics by time to diagnosis subgroup among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Sociodemographic and clinical characteristics (cat)	Time to diagnosis subgroups						Chi-square test *p*-value
	Short[a] (n = 1330; 38.4%) % (95% CI)		Moderate[b] (n = 882; 30.0%) % (95% CI)		Long[c] (n = 1000; 31.6%) % (95% CI)		
Age of symptom onset (years)							<.001*
≤19	13.4 (10.3–16.4)		35.3 (29.4–41.2)		55.2 (49.7–60.7)		
20–29	20.9 (17.3–24.5)		29.4 (23.4–35.5)		21.4 (17.0–25.9)		
≥ 30	65.8 (61.5–70.0)		35.3 (30.2–40.3)		23.4 (18.6–28.1)		
Physical comorbidities (number)							< .001*
0	34.5 (29.7–39.3)		50.8 (44.7–56.8)		39.0 (33.7–44.3)		
1–2	49.7 (45.0–54.3)		42.0 (36.3–47.8)		46.6 (40.9–52.2)		
≥ 3	15.8 (12.7–18.9)		7.2 (5.3–9.2)		14.4 (11.1–17.8)		
Disorder type							.936
Concurrent mood and anxiety disorders	29.9 (25.5–34.3)		31.5 (26.4–36.6)		32.5 (27.1–37.9)		
Anxiety disorder only	23.7 (19.9–27.5)		24.0 (18.4–29.6)		24.3 (19.6–29.0)		
Mood disorder only	46.4 (42.0–50.8)		44.5 (38.6–50.3)		43.2 (37.5–48.8)		
Sociodemographic characteristics (count)	**Mean**	**SE (*p*-value)[e]**	**Mean**	**SE (*p*-value)[e]**	**Mean**	**SE (*p*-value)[e]**	
Cohort age (years)	49.8	0.6 (Ref)	41.2	0.8 (< .001)*	48.5	0.7 (.184)	
Age of symptom onset (years)	37.5	0.7 (Ref)	28.1	0.7 (< .001)*	20.6	0.6 (< .001)*	

Abbreviations: cat, categorical variable; CI, confidence interval; count, count variable; n, unweighted number; Q, quintile; Ref, reference group; SE, standard error; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages, 95% CIs, means and SEs are based on weighted data.

[a] Short = time to diagnosis within one year.

[b] Moderate = time to diagnosis between one and five years.

[c] Long = time to diagnosis more than five years.

[d] High sampling variability (coefficient of variation between 16.6% and 33.3%).

[e] Linear regression analyses.

* Statistically significant at *p*-value < .05 level.

onset and number of physical comorbidities (Table 1). In addition, we found that the mean age of symptom onset decreased with increasing time to diagnosis (i.e. 37.5, 28.1 and 20.6 years among those with short, moderate and long delay, respectively).

Upon adjusting for all sociodemographic and clinical characteristics, affected Canadians with moderate (vs. short) delay were more likely to have experienced symptom onset during childhood/adolescence or early adulthood (adjusted odds ratio [OR] = 3.5 and 1.9, respectively), and have no or few physical comorbidities (adjusted OR = 2.5 and 1.8, respectively) (Table 2). Those with long (vs. short) delay were more likely to be in the older cohort (adjusted OR = 7.5, 7.6 and 5.5 for those aged 65 + , 50–64 and 35–49 years, respectively), and to have experienced symptom onset during childhood/adolescence or young adulthood (adjusted OR = 33.7 and 3.7, respectively). We observed an estimated 8.0% decrease in time to diagnosis for every year increase in age of symptom onset, and a 5.0% increase in time to diagnosis for every year increase in age of respondents (data not shown; available upon request).

Physical and mental health status by time to diagnosis subgroup

We found a significant relationship between time to diagnosis subgroups and all five health status measures (level of disability, number of activity limitations, perceived general health, perceived mental health and satisfaction with life in general) (Table 3). After controlling for individual characteristics, affected Canadians with long (vs. short) delay in diagnosis were more likely to report the greatest number of activity limitations (i.e. ≥ 3), and "poor" or "fair" mental health (adjusted OR = 2.1 and 2.3, respectively) (Table 4). For every year increase in time to diagnosis, there was an increase in odds of having the most activity limitations (compared to no activity limitations) and "poor" or "fair" mental health (compared to "very good" or "excellent" mental health) of 5.0% and 4.0%, respectively (data not shown; available upon request).

Discussion

To our knowledge, this is the first study to examine factors associated with time to diagnosis among Canadian adults with a self-reported mood and/or anxiety disorder using a population-based sample. Results demonstrated that only a minority (38.4%)

TABLE 2
Association between sociodemographic and clinical characteristics and time to diagnosis subgroup among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Sociodemographic and clinical characteristics	Time to diagnosis subgroups				Type 3 analysis of effect *p*-value
	Moderate[a] (n = 882) vs. short[b] (n = 1330) OR[d] (95% CI)	*p*-value	Long[c] (n = 1000) vs. short[b] (n = 1330) OR[d] (95% CI)	*p*-value	
Cohort age (years)					< .001*
≥ 65	0.8 (0.4–1.5)	.456	7.5 (3.4–16.4)	< .001*	
50–64	1.1 (0.6–1.9)	.825	7.6 (3.8–15.2)	< .001*	
35–49	1.3 (0.8–2.2)	.324	5.5 (2.6–11.5)	< .001*	
18–34	1.0 (Ref)		1.0 (Ref)		
Sex					.662
Female	1.1 (0.7–1.5)	.752	0.9 (0.6–1.3)	.500	
Male	1.0 (Ref)		1.0 (Ref)		
Marital status					.103
Single/never married	1.1 (0.7–1.7)	.599	0.7 (0.4–1.2)	.235	
Widowed/separated/ divorced	0.8 (0.5–1.3)	.413	1.4 (0.9–2.2)	.177	
Married/living common-law	1.0 (Ref)		1.0 (Ref)		
Respondent's highest level of education					.742
Less than secondary	0.7 (0.5–1.1)	.137	0.7 (0.4–1.3)	.270	
Secondary	1.0 (0.7–1.4)	.818	0.8 (0.5–1.2)	.349	
Less than post-secondary	1.2 (0.6–2.5)	.688	1.1 (0.5–2.5)	.896	
Post-secondary	1.0 (Ref)		1.0 (Ref)		
Household income adequacy quintile					.152
Q1	1.0 (0.6–1.7)	.925	0.8 (0.4–1.4)	.372	
Q2	0.9 (0.5–1.6)	.781	0.7 (0.4–1.3)	.214	
Q3	1.3 (0.7–2.1)	.390	0.9 (0.5–1.8)	.843	
Q4	1.4 (0.8–2.4)	.274	1.5 (0.8–2.7)	.224	
Q5	1.0 (Ref)		1.0 (Ref)		
Place of residence					.089
Rural	1.1 (0.8–1.6)	.438	0.7 (0.5–1.1)	.089	
Urban	1.0 (Ref)		1.0 (Ref)		
Geographic region					.001*
British Columbia	2.3 (1.3–4.1)	.007*	1.8 (1.0–3.3)	.072	
Prairie	1.7 (1.0–2.8)	.063	1.5 (0.9–2.8)	.146	
Ontario	1.9 (1.2–2.9)	.007*	2.1 (1.3–3.5)	.004*	
Atlantic	1.2 (0.7–1.9)	.582	2.5 (1.5–4.3)	.001*	
Quebec	1.0 (Ref)		1.0 (Ref)		
Immigrant status					.472
Immigrant	1.4 (0.4–5.5)	.625	2.4 (0.6–9.7)	.220	
Non-immigrant	1.0 (Ref)		1.0 (Ref)		
Aboriginal status					.335
Aboriginal	1.5 (0.7–2.9)	.293	0.9 (0.4–1.8)	.701	
Non-Aboriginal	1.0 (Ref)		1.0 (Ref)		

Continued on the following page

TABLE 2 (continued)
Association between sociodemographic and clinical characteristics and time to diagnosis subgroup among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Sociodemographic and clinical characteristics	Time to diagnosis subgroups				Type 3 analysis of effect *p*-value
	Moderate[a] (n = 882) vs. short[b] (n = 1330) OR[d] (95% CI)	*p*-value	Long[c] (n = 1000) vs. short[b] (n = 1330) OR[d] (95% CI)	*p*-value	
Age of symptom onset (years)					< .001*
≤ 19	3.5 (2.1–6.0)	< .001*	33.7 (17.6–64.7)	< .001*	
20–29	1.9 (1.2–3.0)	.007*	3.7 (2.2–6.3)	< .001*	
≥ 30	1.0 (Ref)		1.0 (Ref)		
Physical comorbidities (number)					.019*
0	2.5 (1.5–4.3)	.001*	1.5 (0.9–2.4)	.152	
1–2	1.8 (1.1–2.9)	.013*	1.0 (0.7–1.7)	.859	
≥ 3	1.0 (Ref)		1.0 (Ref)		
Disorder type					.472
Concurrent mood and anxiety disorders	1.1 (0.8–1.5)	.650	1.4 (0.9–2.2)	.114	
Anxiety disorder only	0.8 (0.5–1.3)	.444	1.1 (0.7–1.7)	.690	
Mood disorder only	1.0 (Ref)		1.0 (Ref)		

Abbreviations: CI, confidence interval; n, unweighted number; OR, odds ratio; Q, quintile; Ref, reference group; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: ORs and 95% CIs are based on weighted data.

[a] Moderate = time to diagnosis between one and five years.

[b] Short = time to diagnosis within one year.

[c] Long = time to diagnosis more than five years.

[d] Adjusted for all other sociodemographic and clinical characteristics in the model.

* Statistically significant at *p*-value < .05 level.

of affected Canadians received a diagnosis within a clinically acceptable time frame, i.e. less than a year after symptom onset. These findings are consistent with those from an international study involving 11 countries, which found 40% of respondents with mood and anxiety disorders sought treatment in the same year as symptom onset.[25] Since affected individuals who had not yet received a diagnosis from a health professional were not included in the 2014 SLCDC-MA, our results likely overestimate the proportion of those who received a timely diagnosis.

Studies suggest that individuals with a mood disorder are, in general, quicker to seek and receive a diagnosis compared to those with an anxiety disorder. For instance, the median time to diagnosis (excluding those who received a diagnosis within the same year as symptom onset) was found to be one and 16 years in Belgium,[19] one and 21 years in China,[31] four and 23 years in US,[29] four and 29 years in Australia,[18] and 14 and 30 years in Mexico[17] for mood and anxiety disorders, respectively. While results from our supplemental analysis demonstrated somewhat similar median time to diagnosis among Canadians with mood and anxiety disorders (i.e. 5.0 and 5.4 years, respectively), we found a larger difference in median time to diagnosis upon exploring specific types of mood and anxiety disorders, e.g. depression (4.4 years) and general anxiety disorder (6.2 years) (data not shown; available upon request). These findings may be explained by what we know about these disorders in terms of the patient's severity of symptoms (i.e. symptom severity predicts health service use) and perceived need and help-seeking behaviours (i.e. mood disorders and concurrent mood and anxiety disorders are strong predictors of perceived need).[32,33]

Our findings with respect to the association between sociodemographic and clinical characteristics and time to diagnosis are generally corroborated by those in the literature. For instance, we found affected Canadians' age of symptom onset to be associated with a delayed diagnosis (i.e. those with symptom onset during childhood/adolescence [≤ 19 years] and early adulthood [20–29 years] compared to those older [≥ 30 years] were more likely to fall into the moderate and long vs. the short time to diagnosis subgroup) which was also the case in previous studies.[16-20,25,34,35] Results from our supplemental analysis provided further confirmation of this association by demonstrating that for every year increase in age of symptom onset, there was an 8.0% decrease in time to diagnosis upon controlling for all other respondent characteristics (data not shown; available upon request).

Potential explanations for our findings include, but are not limited to, the fact that younger individuals are (1) dependent on the assistance of adults to initiate a mental health referral;[36] (2) often limited

TABLE 3
Physical and mental health status factors by time to diagnosis subgroup among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Physical and mental health status factors	Time to diagnosis subgroups			Chi-square test *p*-value
	Short[a] (n = 1330) % (95% CI)	Moderate[b] (n = 882) % (95% CI)	Long[c] (n = 1000) % (95% CI)	
Level of disability				.032*
Severe	38.9 (34.4–43.4)	29.3 (24.0–34.5)	40.0 (34.6–45.4)	
Moderate	22.8 (18.3–27.3)	22.7 (17.9–27.4)	23.0 (18.2–27.8)	
Mild	27.0 (23.1–31.0)	36.5 (30.4–42.5)	25.3 (20.8–29.7)	
None	11.3 (8.0–14.6)	11.6 (8.1–15.1)	11.7 (8.2–15.3)	
Activity limitations (number)				.001*
≥ 3	15.1 (11.8–18.4)	13.7 (9.9–17.4)	25.2 (19.7–30.7)	
1–2	17.2 (13.8–20.7)	20.0 (15.0–24.9)	18.7 (14.7–22.7)	
0	67.7 (63.4–72.0)	66.4 (60.8–71.9)	56.1 (50.5–61.7)	
Perceived general health				.045*
Poor or fair	29.7 (25.4–34.1)	19.1 (15.1–23.2)	25.3 (20.6–30.1)	
Good	33.5 (28.7–38.3)	37.8 (32.0–43.7)	36.5 (31.0–41.9)	
Very good or excellent	36.8 (32.2–41.3)	43.1 (36.6–49.6)	38.2 (32.6–43.9)	
Perceived mental health				.021*
Poor or fair	22.5 (18.4–26.7)	25.0 (20.3–29.7)	31.3 (25.7–36.9)	
Good	43.8 (38.9–48.6)	40.9 (35.0–46.8)	43.8 (38.0–49.5)	
Very good or excellent	33.7 (29.6–37.8)	34.1 (28.4–39.8)	25.0 (20.8–29.2)	
Satisfaction with life in general				.005*
Very dissatisfied or dissatisfied	11.0 (8.4–14.1)	6.3 (3.7–9.0)	12.1 (8.5–15.7)	
Neither satisfied nor dissatisfied	13.5 (10.1–17.0)	7.5 (4.5–10.5)	12.2 (8.9–15.6)	
Very satisfied or satisfied	75.5 (71.4–79.6)	86.2 (82.3–90.1)	75.7 (71.0–80.4)	

Abbreviations: CI, confidence interval; n, unweighted number; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages and 95% CIs are based on weighted data.

[a] Moderate = time to diagnosis between one and five years.

[b] Short = time to diagnosis within one year.

[c] Long = time to diagnosis more than five years.

* Statistically significant at *p*-value < .05 level.

in their ability to communicate their mental health problems, and as a result do not generate enough concern to initiate a mental health referral;[34] (3) inclined to develop coping strategies such as behaviour modification in order to lessen the impact of living with a mental disorder;[16] (4) less likely to be in contact with medical practitioners compared to adults, especially primary care physicians, who often make the initial diagnosis;[37] and (5) limited in their understanding and ability to recognize mental health issues such as symptoms associated with mood or anxiety disorders.

In addition to age of symptom onset, we found cohort age to be associated with delayed diagnosis, i.e. older cohorts (groups aged 65+, 50–64 and 35–49 years) were more likely to fall into the long versus short time to diagnosis subgroup compared to the younger cohort (aged 18–34 years). Results from our supplemental analysis provided further confirmation of this association by demonstrating that for every year increase in age there was a 5.0% increase in time to diagnosis holding all other individual characteristics constant (data not shown; available on request). These findings are consistent with previous reports demonstrating that older cohort and early age of symptom onset were associated with a delay in seeking initial treatment for more than one year.[16-20,25,34,35] Collectively, these results may offer some evidence that younger Canadian adults with mood and/or anxiety disorders are more apt to seek care than their older counterparts as a result of improved help-seeking behaviours among younger cohorts in recent years. This behaviour could in part be due to recent public mental health campaigns targeting youth in an effort to reduce stigma and increase awareness of mental illness. Such efforts have previously been shown to positively affect help-seeking patterns in mental illness.[38]

We found that those with no physical comorbidities, and to a lesser extent those with one to two, were more likely to fall into the moderate (vs. short) time to

TABLE 4
Association between physical and mental health status factors and time to diagnosis subgroups among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 3212), 2014 SLCDC-MA

Physical and mental health status factors	Time to diagnosis subgroups				Type 3 analysis of effect *p*-value
	Moderate[a] (n = 882) vs. short[b] (n = 1330)		Long[c] (n = 1000) vs. short[b] (n = 1330)		
	OR[d] (95% CI)	*p*-value	OR[d] (95% CI)	*p*-value	
Level of disability					.269
Severe	0.9 (0.5–1.6)	.741	0.9 (0.5–1.7)	.746	
Moderate	1.2 (0.7–2.1)	.528	1.1 (0.5–2.1)	.880	
Mild	1.2 (0.7–2.0)	.501	0.7 (0.4–1.3)	.246	
None	1.0 (Ref)		1.0 (Ref)		
Activity limitations (number)					.036*
≥ 3	0.9 (0.6–1.5)	.788	2.1 (1.2–3.5)	.007*	
1–2	1.1 (0.8–1.7)	.535	1.4 (0.9–2.3)	.186	
0	1.0 (Ref)		1.0 (Ref)		
Perceived general health					.386
Poor or fair	1.0 (0.6–1.7)	.919	1.0 (0.6–1.7)	.964	
Good	1.4 (0.9–2.0)	.159	1.4 (0.9–2.2)	.098	
Very good or excellent	1.0 (Ref)		1.0 (Ref)		
Perceived mental health					.008*
Poor or fair	1.2 (0.8–1.8)	.483	2.3 (1.5–3.6)	.000*	
Good	1.0 (0.7–1.4)	.804	1.4 (1.0–2.2)	.077	
Very good or excellent	1.0 (Ref)		1.0 (Ref)		
Satisfaction with life in general					.156
Very dissatisfied or dissatisfied	0.7 (0.4–1.4)	.304	1.2 (0.6–2.4)	.601	
Neither satisfied nor dissatisfied	0.6 (0.3–1.0)	.035*	1.1 (0.6–2.0)	.739	
Very satisfied or satisfied	1.0 (Ref)		1.0 (Ref)		

Abbreviations: CI, confidence interval; n, unweighted number; OR, odds ratio; Ref, reference group; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: ORs and 95% CIs are based on weighted data.

[a] Moderate = time to diagnosis between one and five years.

[b] Short = time to diagnosis within one year.

[c] Long = time to diagnosis more than five years.

[d] Adjusted for age, sex, marital status, highest level of education attained (respondent), household income adequacy, place of residence, geographic region, immigration status, Aboriginal status, age of symptom onset, number of physical comorbidities and disorder type.

* Statistically significant at *p*-value < .05 level.

diagnosis subgroup, relative to those with three or more physical comorbidities. This finding is supported by previous studies showing that those without comorbid physical chronic conditions have fewer health care encounters and are therefore less likely to be diagnosed and treated for their mental health issues than those with them.[39,40]

Regarding affected Canadians' health status, we found those with long delay were more likely to report the most (≥ 3) activity limitations and "poor" or "fair" mental health. Results from our supplemental analysis provided further confirmation of this, demonstrating that for every year increase in time to diagnosis there was a 5.0% and 4.0% increase in odds of having three or more activity limitations (relative to those with no activity limitations) and "poor" or "fair" mental health (relative to those with "very good" or "excellent" mental health), respectively, upon controlling for all other individual characteristics (data not shown; available upon request). A lack of negative health status findings among those with a moderate (vs. short) delay may in part be attributed to a possible threshold effect for both activity limitations and mental health status, which could take up to five years (at the rate of 5.0% and 4.0% per year, respectively) to reach a significant health impact.

Our findings related to age of symptom onset and time to diagnosis are of significant public health importance given that almost half of Canadian adults with mental illness experience symptom onset during childhood or adolescence.[41] Moreover, the early onset of mental health issues has been shown to be strongly associated with adverse social events[13-15] that are more severe and debilitating than when these

issues occur later.[42] Furthermore, those experiencing early onset of mental health issues are more likely to develop secondary comorbid conditions, which in turn can worsen symptoms related to their primary mental disorder and impede treatment responsiveness.[43] As a result, public health policy and programs that target the young, parents and educators are key in the early detection and timely diagnosis of those with childhood and adolescent onset of mood and/or anxiety disorders. To that end, several national initiatives, including the Canadian Collaborative Mental Health Initiative,[44] the Patient's Medical Home initiative[45] and the Adolescent/young adult Connections to Community-driven, Early, Strengths-based and Stigma-free services (ACCESS) program,[46] as well as provincial initiatives[47,48] have been implemented. In addition to public health policy and programs that target youth, other important initiatives include prevention and early intervention programs that focus on reducing risk factors associated with mental illness and enhancing protective factors among those whose symptoms are still subclinical.[49]

Other countries have successfully implemented innovative anti-stigma campaigns which targeted young people with the goal of improving their mental health help-seeking behaviours. For instance, in Germany, a film festival featuring films and documentaries on the subject of mental illness has been effective in reducing stigma and improving help-seeking attitudes among adolescents.[50] Similarly, an Australian youth mental health community awareness campaign designed to improve mental health literacy and early help seeking among young people has had positive outcomes in terms of increased mental illness awareness and reduced perceived barriers to help seeking.[51] Furthermore, some countries that have employed youth mental health service access programs have also demonstrated positive results. For example, an Australian program called "Headspace," aimed at promoting and supporting early intervention for young people aged 12 to 25 years with mental health issues, has been evaluated with a 93% service satisfaction rate among its users.[52] Also, in the UK, community screening programs using the Strengths and Difficulties Questionnaire (SDQ) have been successful in facilitating early detection of child psychiatric disorders.[53]

Strengths and limitations

This study has a number of strengths, including its large, population-based sample and survey administration by trained personnel; however, its results should be interpreted in consideration of a number of limitations.

First, the estimated time to diagnosis is subject to recall bias and dating inaccuracies as the calculation is based on the respondents' ability to recall the age at which their symptoms first occurred and the age at which they were diagnosed with their mood and/or anxiety disorder. The most common form of dating error is telescoping, in which past experiences are recalled as having occurred more recently than they actually did. This effect is more prominently found in older adults,[54] and can lead to an underestimation of the time to diagnosis.[16] The changing nature of mood and anxiety disorders poses a particular challenge in this regard, given that the respondents' most recent or most severe episode is likely easier to recall than their first episode.

Second, we were not able to stratify our main analyses by disorder type due to sample size limitations. Being able to do so would have made it easier to detect and interpret any potential differences in the associations between time to diagnosis and individual characteristics as well as physical and mental health status by disorder type. Furthermore, while research has found acceptable-to-good agreement between self-reported physical health conditions and diagnoses made by medical professionals,[55] validation of the questions used in the 2013 CCHS and 2014 SLCDC-MA to ascertain self-reported mood and anxiety disorder diagnosis, and the questions used in the 2014 SLCDC-MA to capture self-reported mood and anxiety disorder subtypes, have not been conducted.

Third, ethnicity has previously been reported as an important factor in delayed treatment;[16] however, due to sample size limitations we were not able to explore the impact of ethnicity on time to diagnosis.

Fourth, despite the fact that access to mental health services varies by jurisdiction due to differences in factors such as health care policy and mental health services access and availability, consideration of these issues in our analysis was beyond the scope of this study.

Fifth, in those cases where symptoms reported were subclinical, time since symptom onset may have erroneously translated into a diagnostic delay given that the reporting of such symptoms may have prolonged the reported time to diagnosis unnecessarily.

Conclusion

Our findings affirm that a long delay in diagnosis is associated with negative physical and mental health status among Canadian adults with mood and/or anxiety disorders. Among the several factors associated with a lengthy delay, symptom onset in childhood/adolescence or early adulthood is of particular importance. In addition to increasing public awareness of the importance of early symptom recognition, public health initiatives should target children and adolescents and their support networks in order to improve their help-seeking behaviours, which ultimately may facilitate an early diagnosis and timely treatment. Further research with more detailed stratification by type of disorder is required to better understand the factors associated with an early diagnosis and the ensuing health impacts. Furthermore, longitudinal trials evaluating the long-term effects of assertive outreach to increase awareness of the significance of timely diagnosis, with a particular focus on children and adolescents, would be of value.

Acknowledgements

The 2014 SLCDC-MA was funded by the Public Health Agency of Canada and developed in collaboration with Statistics Canada. This survey was developed through the contribution of time and expertise from members of PHAC's Mental Health and Mental Illness Advisory Committee. The 2013 CCHS was conducted by Statistics Canada in partnership with Health Canada and PHAC with funding from the Canadian federal government.

No external financial or material support was obtained for this study.

L. Loukine and H. Orpana provided technical advice on statistical analysis.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

RC contributed to the study concept, carried out the data analysis and writing of

the manuscript. SO contributed to the study concept and writing of the manuscript. All authors informed the data analysis, assisted in the interpretation of results, critically revised the manuscript and approved the final version.

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https://doi.org/10.24095/hpcdp.37.5.03

Self-management of mood and/or anxiety disorders through physical activity/exercise

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This article has been peer reviewed.

Abstract

Introduction: Physical activity/exercise is regarded as an important self-management strategy for individuals with mental illness. The purpose of this study was to describe individuals with mood and/or anxiety disorders who were exercising or engaging in physical activity to help manage their disorders versus those who were not, and the facilitators for and barriers to engaging in physical activity/exercise.

Methods: For this study, we used data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component. Selected respondents (n = 2678) were classified according to the frequency with which they exercised: (1) did not exercise; (2) exercised 1 to 3 times a week; or (3) exercised 4 or more times a week. We performed descriptive and multinomial multiple logistic regression analyses. Estimates were weighted to represent the Canadian adult household population living in the 10 provinces with diagnosed mood and/or anxiety disorders.

Results: While 51.0% of the Canadians affected were not exercising to help manage their mood and/or anxiety disorders, 23.8% were exercising from 1 to 3 times a week, and 25.3% were exercising 4 or more times a week. Increasing age and decreasing levels of education and household income adequacy were associated with increasing prevalence of physical inactivity. Individuals with a mood disorder (with or without anxiety) and those with physical comorbidities were less likely to exercise regularly. The most important factor associated with engaging in physical activity/exercise was to have received advice to do so by a physician or other health professional. The most frequently cited barriers for not exercising at least once a week were as follows: prevented by physical condition (27.3%), time constraints/too busy (24.1%) and lack of will power/self-discipline (15.8%).

Conclusion: Even though physical activity/exercise has been shown beneficial for depression and anxiety symptoms, a large proportion of those with mood and/or anxiety disorders did not exercise regularly, particularly those affected by mood disorders and those with physical comorbidities. It is essential that health professionals recommend physical activity/exercise to their patients, discuss barriers and support their engagement.

Keywords: *mood disorders, depression, anxiety disorders, physical activity, exercise, self-management*

Highlights

- Even though physical activity/exercise is effective in decreasing mood and anxiety symptoms, 51% of those affected by a mood and/or anxiety disorder do not exercise at least once a week on a regular basis.
- Canadians with a mood disorder and those with physical comorbidities were less likely to exercise regularly (at least once a week).
- The most important factor associated with engaging in physical activity was to have received advice to do so by a physician or other health professional.
- Health professionals play a critical role in recommending and supporting engagement in physical activity/exercise, particularly for those with a mood disorder and physical comorbidities.

Introduction

While self-management has been part of an overall management strategy for chronic physical conditions such as diabetes, asthma and arthritis for some decades,[1,2] its use in mental illness is more recent.[3] Self-management is defined as the training, skill acquisition and interventions through which individuals who suffer from a disease take care of themselves in order to manage their illness.[3,4] The objectives of self-management are to decrease symptoms, enhance quality of life and prevent relapse or recurrence.[3,5]

Self-management in mental illness can be used as a complement to conventional clinical therapies such as medication and psychotherapy or as a first-line low-intensity intervention, especially among individuals with mild-to-moderate symptoms.[6] Among the many self-management interventions proposed for mood and anxiety disorders, the most frequently studied include bibliotherapy or computer-based cognitive behavioural therapy (CBT),[7-9] herbal therapies,[10-12] meditation or relaxation techniques[13-16] and physical activity/exercise.[17-22]

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Physical activity/exercise is thought to improve depression and anxiety symptoms through a number of physiological mechanisms as well as through its effect on sleep, sense of mastery and social interactions.[20,23,24] In general, it has been shown that an exercise program of at least 10 weeks or more, with relatively intense physical activity for at least 20 to 30 minutes at a frequency of 3 to 4 times per week, is effective for depression and for some anxiety disorders.[19,24,25]

Physical activity/exercise as a treatment has consistently been shown to be superior to control interventions and sometimes comparable to mainstream therapies (e.g. medication or CBT) for mild and moderate depression.[17-21] A limited number of studies on the effects of exercise as a treatment strategy for anxiety disorders have shown generally positive effects of exercise,[19,22] but the impact (effect size) is usually smaller than that observed for depressive symptoms.[26]

There is a lack of data describing individuals who engage in or conversely who do not engage in physical activity/exercise to help manage their mood and/or anxiety disorders. This is the first study in Canada to examine the uptake of this strategy in a nationally representative sample of people with mood and/or anxiety disorders living in the community. This knowledge could assist in developing or adapting interventions to promote the engagement of physical activity/exercise in this population. Thus, the objectives of the present study were

(1) to describe individuals with mood and/or anxiety disorders who are currently exercising (1 to 3 times a week and 4 or more times a week) versus those who are not engaging in exercise, in terms of sociodemographic and clinical characteristics;

(2) to determine whether there are associations between exercise frequency and perceived general and mental health and life satisfaction; and

(3) to describe facilitators and barriers for engaging or not engaging in exercise as a means to help manage mood and/or anxiety disorders in the population affected.

Methods

Data source

This study was based on data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component (SLCDC-MA), a cross-sectional follow-up survey to the 2013 Canadian Community Health Survey (CCHS)—Annual Component. The 2014 SLCDC-MA was developed by the Public Health Agency of Canada, in collaboration with Statistics Canada and external experts, to provide information on the impact and management of mood and/or anxiety disorders among Canadian adults. Respondents aged 18 years and older who reported having a mood and/or an anxiety disorder as part of the 2013 CCHS were eligible to participate in the 2014 SLCDC-MA. The 2014 SLCDC-MA surveyed individuals living in private dwellings in the 10 Canadian provinces. Full-time members of the Canadian Forces, people living on reserves and other Aboriginal settlements, those residing in institutions and residents of certain remote regions and Canada's three territories (Nunavut, Northwest Territories and Yukon) were excluded from the sampling frame. These exclusions represented less than 3% of the overall target population. The 2014 SLCDC-MA was administered by trained personnel via a structured telephone interview (in English or French) during two data collection periods: November to December 2013 and February to March 2014. The methodology of the 2014 SLCDC-MA was described in an earlier publication.[27]

Study sample

In the 2013 CCHS, 5875 respondents indicated that they had been diagnosed with a mood and/or anxiety disorder by a health professional and met the eligibility criterion to participate in the 2014 SLCDC-MA. Of these respondents, 3361 participated in the 2014 SLCDC-MA and consented to share their data with the Public Health Agency of Canada (response rate = 68.9%). For the purpose of this study, respondents who replied "no" to *having* a mood and/or anxiety disorder that has been diagnosed by a health professional but "yes" to *having ever been diagnosed* were excluded from the study (n = 445). In addition, respondents who indicated that they were already engaging in physical activity for reasons other than to help manage their mood and/or anxiety disorders (n = 238) were also excluded from this study since physical activity/exercise frequency data were not collected from them. A total of 2678 Canadians with a mood and/or an anxiety disorder were included in our study (1134 with a mood disorder only, 576 with an anxiety disorder only and 968 with concurrent mood and anxiety disorders). The term "mood and/or anxiety disorders" used throughout this article refers to those who have self-reported, professionally diagnosed mood disorders only, anxiety disorders only, or concurrent mood and anxiety disorders. Figure 1 illustrates how respondents were selected for the final study sample.

Measures

In the 2014 SLCDC-MA, respondents were asked the following questions to confirm diagnosis of mood and/or anxiety disorders: (1) "Do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia that has been diagnosed by a health professional?" and (2) "Do you have an anxiety disorder such as phobia, obsessive-compulsive disorder, panic disorder that has been diagnosed by a health professional?" Those who responded "yes" to either or both of these questions were included in this study.

Exercise subgroups

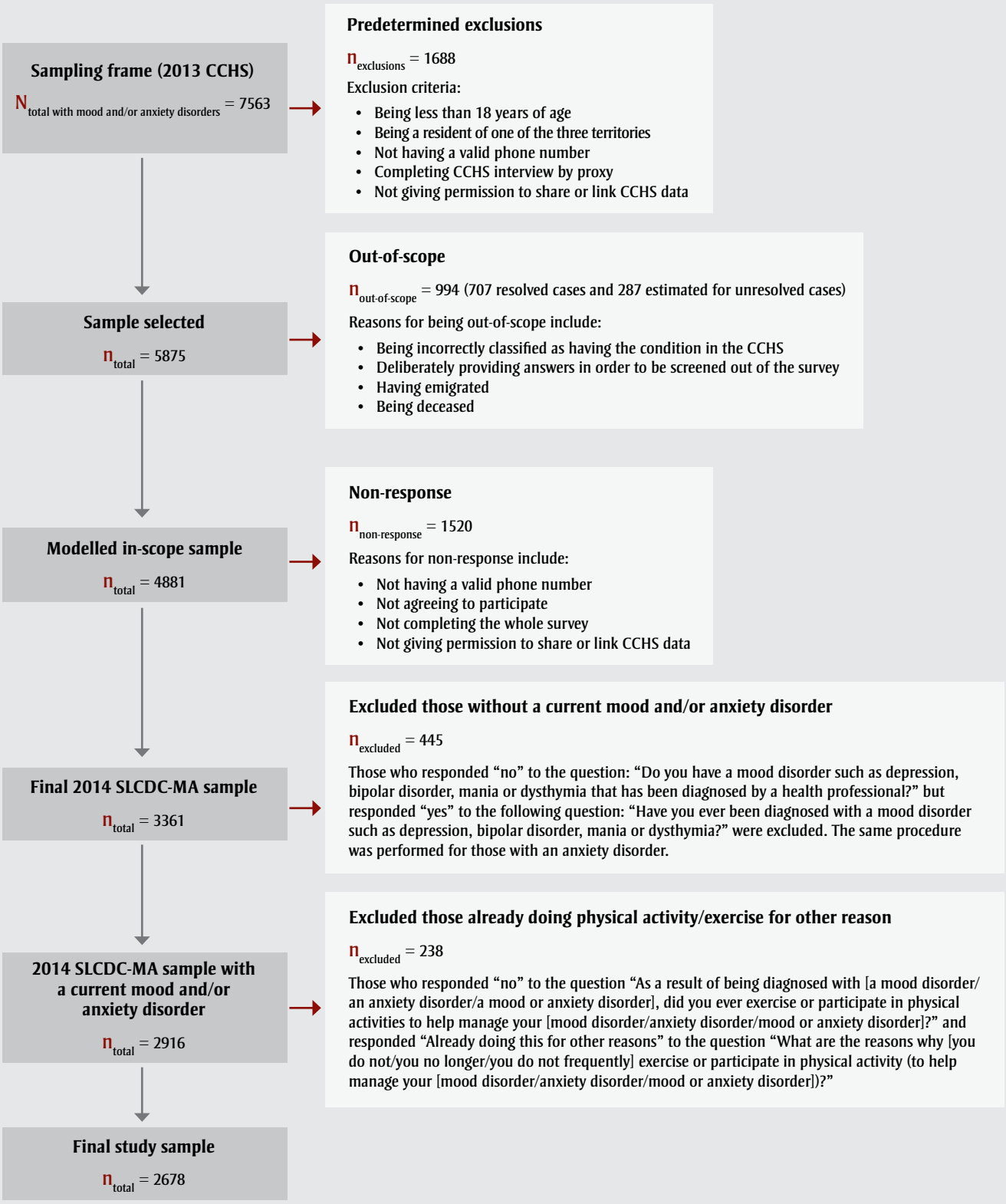
Respondents who answered "yes" to the question "As a result of being diagnosed with [a mood disorder/an anxiety disorder/a mood or anxiety disorder], did you ever exercise or participate in physical activities to help manage your [mood disorder/anxiety disorder/mood or anxiety disorder]?" were subsequently asked "Are you still doing this?" If the answer was affirmative, they were asked about the frequency of the activity with the following question: "How often do you do this?" Possible responses included every day, 4 to 6 times per week, 2 to 3 times per week, once a week, less than once a week and less than once a month. These frequencies were combined in the following three subcategories:

(1) "No exercise" (included those who responded "No" to the question "Did you ever exercise or participate in physical activities to help manage your [mood disorder/anxiety disorder/mood or anxiety disorder]?" and those who answered that they were engaging in exercise less than once a week or less than once a month);

(2) "1 to 3 times a week" (combined those who reported engaging in physical activity/exercise once a week or 2 to 3 times per week); and

(3) "4 or more times a week" (included those who were exercising 4 to 6 times a week or daily).

FIGURE 1
Flowchart illustrating how respondents were identified for the final study sample (n = 2678), 2014 SLCDC-MA



Abbreviations: CCHS, Canadian Community Health Survey; n, unweighted number; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Component.

While "physical activity" refers to any activity that contracts muscles, expends energy and includes work, household or leisure activities, "exercise" refers to a planned, structured and repetitive body movement performed to improve or maintain physical fitness.[28] Despite the differences, these terms were used interchangeably in the survey questions and we are therefore using them interchangeably in this paper. In addition, given that we did not have information on the duration and the intensity of the physical activity/exercise sessions, we were not able to directly relate the observed frequency to the current Canadian Physical Activity Guidelines, which recommend at least 150 minutes of moderate-to-vigorous physical activity per week for adults aged 18 to 64 years.[29] While more physical activity provides greater health benefits, it is recognized that engaging in amounts below the recommended levels can still provide some health benefits.[30] Therefore, we considered that individuals incorporating physical activity/exercise at least once a week in their schedule were doing "regular" physical activity/exercise for the purpose of this study.

Sociodemographic and clinical characteristics

Sociodemographic variables included age (age groups were 18–34, 35–49, 50–64, and 65+ years), sex (female, male), respondent's level of education (less than secondary school graduation, secondary school graduation/no post-secondary, some post-secondary, and post-secondary graduation), household income adequacy quintiles (deciles, a derived variable by Statistics Canada,* transformed into quintiles), marital status (single/never married, widowed/divorced/separated, married/living common-law), geographic regions (British Columbia, Prairie region, Ontario, Quebec, Atlantic region), place of residence (urban, rural), and immigrant and Aboriginal statuses (yes, no).

Clinical characteristics included the type of disorders (mood disorder only, anxiety disorder only, and concurrent mood and anxiety disorders), the number of years since diagnosis (0–4, 5–19, and 20+), the number of physical comorbidities, the receipt of recommendation to exercise and the receipt of clinical treatment.

The number of physical comorbidities was determined by asking respondents if they had any of the following conditions diagnosed by a health professional that had lasted or were expected to last six months or longer: asthma, chronic obstructive pulmonary disease, arthritis, back problems, bowel disorder/Crohn disease or colitis, diabetes, heart disease, cancer, stroke and Alzheimer disease or any other dementia. Each reported disease was counted as a separate comorbidity and their summation was categorized in three groups (none, 1–2 and 3+). Receipt of a clinical recommendation to exercise was determined by asking respondents "Has a doctor or other health professional ever suggested participating in physical activity or exercise to help you manage your [mood disorder/anxiety disorder/mood or anxiety disorder]?", with a yes-or-no response format. Receipt of clinical treatment was defined as current use of prescription medications and/or psychological counselling as determined by the following questions: "Currently, are you taking any prescription medications for your [mood and/or anxiety] disorder?" (response options: "yes," "no"); and "In the past 12 months, did you receive psychological counselling to help manage your [mood and/or anxiety] disorder?" (response options: "yes," "no"). Those who responded "yes" to either were considered to be receiving clinical treatment.

Barriers to engaging in exercise

Those respondents who indicated that they do not or no longer exercise or participate in physical activity since their diagnosis were asked to specify the reason(s) why from the following list of barriers: "lack of will power/self-discipline," "time constraints/too busy," "prevented by physical condition," "didn't know it is important/recommended," "too costly/financial constraints," "other" and "no reason."

Health status

Perceived general health and mental health were evaluated using self-reported general health and mental health questions. From the five possible response options, we defined three categories: "poor health" included those who reported their health as "fair" or "poor"; "good health" was a category in itself; and "very good health" included those who reported their health as "very good" or "excellent." Life satisfaction was assessed by asking respondents how they feel about their life as a whole right now using a scale from 0 to 10, where 0 was "very dissatisfied" and 10 was "very satisfied." In our study, satisfaction with life was defined as "dissatisfied" (a response of 0–4), "neutral" (5) or "satisfied" (6–10).

Statistical analyses

To account for sample allocation and survey design, all estimates were based on weighted data using weights generated by Statistics Canada so that the data would be representative of the Canadian population aged 18 years and older living in the community, in the 10 provinces, with mood and/or anxiety disorders. Weights were adjusted for exclusions, sample selection, in-scope rates, non-response and permission to share and link.[32] Furthermore, variance estimates (95% confidence intervals and coefficients of variation) were generated using bootstrap weights provided with the data.[33] Only results with a coefficient of variation less than 33.3% are reported, as per Statistics Canada guidelines.[32]

We performed chi-square analyses to explore the relationships between the three physical activity/exercise subgroups and respondents' sociodemographic characteristics, number of comorbidities, type of disorders, number of years since diagnosis and use of conventional clinical treatment, and whether they had received a clinical recommendation to participate in physical activity or exercise.

We used multinomial multivariate logistic regression analysis to examine potential associations between exercise frequency (defined as no exercise, 1–3 times a week, 4 times or more a week) and perceived general and mental health, and life satisfaction, adjusting for all sociodemographic and clinical characteristics found statistically significant in the bivariate analyses. It should be noted that the data did not meet the proportional odds assumption

* This derived variable is a distribution of respondents in deciles (ten categories including approximately the same percentage of residents for each province) based on the adjusted ratio of their total household income to the low-income cut-off corresponding to their household and community size. It provides, for each respondent, a relative measure of their household income to the household incomes of all other respondents.[31]

required to use ordinal regression. Statistical significance was determined at the $p < .05$ level. We used SAS Enterprise Guide version 5.1 (SAS Institute Inc., Cary, NC, USA) for the data analyses.

Results

While 51.0% of the Canadians affected were not exercising to help manage their mood and/or anxiety disorders, about half were exercising at least once a week, with 23.8% exercising from 1 to 3 times a week and 25.3% exercising 4 or more times a week. Furthermore, we found important differences among those who exercised regularly (i.e. at least once a week) and those who did not (Table 1). Increasing age and decreasing levels of education and household income were associated with increasing frequency of inactivity. Differences were also observed among the provinces or regions of residence: while those from British Columbia (67.6%) were the most active, slightly more than 50% of individuals from Ontario and the Atlantic and Prairie regions did not exercise regularly.

In terms of clinical characteristics, Canadians with mood disorders (with or without anxiety) and those with physical comorbidities were less likely to exercise regularly. In addition, individuals with a more recent diagnosis (< 5 years) or long-term disease duration (20+ years) were less likely to exercise. Those who were treated with conventional clinical therapy (medication and/or psychotherapy) were slightly more likely to exercise 1 to 3 times a week; conversely, those with no clinical treatment were more likely to exercise 4 or more times a week. Finally, another important factor associated with doing physical activity/exercise was having received advice to do so by a doctor or other health professional.

After we adjusted for all sociodemographic and clinical characteristics, we compared those exercising 1 to 3 times a week to those who did not exercise (Table 2). Individuals with less than secondary school education (vs. post-secondary diploma), those in the lowest income quintiles (Q1–Q3 vs. Q4–Q5), those with mood disorders with or without anxiety disorders (vs. those with anxiety only), those who were not advised to exercise by a health professional (vs. those who were) and those who were not treated with conventional clinical therapy (vs. those who were) were less likely to exercise 1 to 3 times a week. When we compared those who exercised 4 or more times a week to those who did not exercise, individuals' province or region (e.g. those living in all other regions vs. in British Columbia), type of disorders and advice by a health professional remained significant. The most important factor associated with physical activity/exercise participation (at any level) was to have had physical activity or exercise recommended by a health professional. Depending on the frequency of exercise, those not receiving advice to exercise had approximately 3 to 5 times lower odds of using exercise for self-management than those receiving such advice. Therefore, receiving or not receiving advice, based on the point estimate of the OR, is more strongly associated with physical activity/exercise than education, age, province and type of disorder.

Table 3 presents the associations between perceived well-being and physical activity/exercise frequency. In general, individuals who did not engage in exercise were more likely to rate their perceived general and mental health as "fair/poor" and to be dissatisfied with life. However, the association between self-reported mental health and physical activity/exercise frequency was not statistically significant. Even after adjusting for sociodemographic and clinical characteristics that could have impacted general well-being, the inverse association between exercising 1 to 3 times a week (vs. no exercise) and "fair/poor" or "good" general health (vs. "very good/excellent") and dissatisfaction (vs. satisfaction) with life remained (Table 4). Similarly, after adjustment, those exercising 4 or more times a week were less likely to report "fair/poor" or "good" general health (vs. "excellent"), "fair/poor" mental health (vs. "excellent") and dissatisfaction with life (vs. satisfaction) compared to those not exercising.

Among those with mood and/or anxiety disorders, the most frequently cited barriers to exercising at least once a week were as follows: "prevented by physical condition" (27.3%), "time constraints/too busy" (24.1%) and "lack of will power/self-discipline" (15.8%). Other unspecified reasons were mentioned by 25.0%. Cost was seldom mentioned as a barrier (2.1%).

Discussion

While regular physical activity/exercise has been shown to improve depression and anxiety symptoms,[26] approximately 50% of those diagnosed with these disorders in our study did not exercise regularly (i.e. at least once a week), highlighting an opportunity for improvement in the care and management of such individuals. Even though physical activity/exercise is usually considered an adjunct therapy to conventional clinical treatment (medication and/or psychotherapy) in most clinical guidelines,[34-36] it could also be used as a first-line, low-intensity intervention for mild-to-moderate mood and anxiety disorders, along with other self-management strategies.[6,37,38]

Findings from this study show that affected Canadians who were less likely to engage in physical activity/exercise were older, less educated, belonged to the lowest income quintiles and resided in Ontario and the Atlantic provinces compared to those who engaged. These results are similar to those of the general Canadian population who are inactive.[38]

As shown in other studies,[39,40] those with physical comorbidities were less likely to exercise (although this finding disappeared when we adjusted for age and other sociodemographic variables). Similarly, physical conditions (along with time constraints) were one of the most frequently cited barriers in our study. While the presence of a physical comorbidity may compound the perceived barriers to engaging in physical activity/exercise, a few recent reviews have strongly recommended the prescription of physical activity/exercise for the treatment and management of a large number of physical chronic conditions, as long as the type and intensity of physical activity/exercise are tailored to the condition.[40,41]

Although lack of will power/self-discipline was cited as a barrier by only 15% of those not engaging in physical activity/exercise, it has been shown previously that those with depression lack motivation and energy in a number of activities, particularly those requiring a certain level of effort and regularity.[42,43] This is supported by our study, which showed that those with a mood disorder (with or without a concurrent anxiety disorder) were less likely to exercise than those with an

TABLE 1
Sociodemographic and clinical characteristics among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis by exercise frequency (n = 2678), 2014 SLCDC-MA

Variable	Category	Did not exercise		Exercised 1 to 3 times per week		Exercised 4+ times per week		Chi-square test
		%	95% CI	%	95% CI	%	95% CI	*p*-value
Sex	Male	46.4	(40.2–52.6)	25.8	(19.6–32.0)	27.8	(22.2–33.4)	.44
	Female	48.6	(44.7–52.5)	27.7	(23.9–31.5)	23.6	(20.6–26.7)	
Age (years)	18–34	45.0	(38.3–51.6)	28.4	(21.5–35.3)	26.6	(20.1–33.2)	.055
	35–49	47.2	(40.1–54.3)	32.8	(25.4–40.1)	20.0	(14.8–25.2)	
	50–64	49.2	(43.8–54.6)	22.5	(17.9–27.2)	28.3	(23.8–32.8)	
	65+	52.5	(46.7–58.3)	21.7	(16.8–26.7)	25.8	(20.1–31.5)	
Marital status	Single, never married	50.3	(43.9–56.7)	24.0	(18.6–29.5)	25.7	(19.8–31.5)	.074
	Widowed/divorced/separated	51.5	(44.5–58.5)	20.2	(15.2–25.2)	28.3	(22.0–34.7)	
	Married/living common-law	45.7	(40.8–50.5)	30.6	(25.6–35.6)	23.7	(19.9–27.6)	
Respondent's education level	Less than secondary school	63.4	(55.6–71.1)	16.9[a]	(11.4–22.4)	19.7[a]	(13.4–26.1)	.001*
	Secondary school graduation	52.2	(45.7–58.6)	23.5	(17.7–29.3)	24.3	(18.5–30.1)	
	Some post-secondary	46.8[a]	(33.2–60.5)	32.3[a]	(18.2–46.4)	20.9[a]	(10.7–31.0)	
	Post-secondary graduation	42.8	(38.3–47.4)	30.2	(25.4–34.9)	27.0	(23.1–30.9)	
Household income adequacy quintiles	Q1–Q2 (lowest)	56.5	(51.6–61.4)	19.1	(15.2–23.1)	24.4	(20.1–28.6)	< .001*
	Q3 (middle)	49.5	(41.7–57.3)	23.6[a]	(16.7–30.4)	26.9	(19.9–33.9)	
	Q4–Q5 (highest)	36.9	(31.6–42.1)	38.3	(32.1–44.6)	24.8	(20.5–29.2)	
Immigrant	Yes	47.8	(36.1–59.6)	24.5[a]	(14.6–34.4)	27.7[a]	(17.0–38.4)	.80
	No	47.9	(44.2–51.5)	27.4	(23.8–31.1)	24.7	(21.9–27.5)	
Aboriginal	Yes	54.8	(43.6–65.9)	19.9	(10.7–29.2)	25.3[a]	(16.1–34.6)	.32
	No	47.6	(43.9–51.2)	27.6	(23.9–31.2)	24.9	(21.9–27.9)	
Place of residence	Rural	49.7	(44.1–55.2)	24.0	(18.5–29.5)	26.4	(21.3–31.4)	.52
	Urban	47.5	(43.6–51.4)	27.7	(23.8–31.6)	24.8	(21.6–28.1)	
Geographic region	British Columbia	32.4	(24.2–40.7)	26.3	(18.0–34.6)	41.2	(30.4–52.1)	< .001*
	Prairie	51.5	(43.6–59.4)	26.4[a]	(18.9–34.0)	22.0	(16.4–27.6)	
	Ontario	50.6	(44.4–56.7)	25.0	(19.3–30.6)	24.5	(19.9–29.0)	
	Quebec	48.2	(40.3–56.0)	35.3	(27.1–43.5)	16.5	(11.7–21.4)	
	Atlantic	50.8	(43.4–58.2)	22.5[a]	(15.8–29.2)	26.7	(19.7–33.8)	
Physical comorbidities (number)	None	43.3	(37.5–49.1)	33.0	(26.6–39.3)	23.7	(19.2–28.3)	.004*
	1–2	49.8	(45.1–54.6)	22.3	(18.5–26.0)	27.9	(23.6–32.3)	
	3+	54.8	(47.4–62.3)	25.1[a]	(18.1–32.2)	20.0[a]	(14.4–25.6)	
Disorder type	Mood disorder only	51.8	(47.0–56.6)	22.2	(17.9–26.6)	25.9	(21.6–30.3)	.005*
	Anxiety disorder only	37.6	(31.0–44.3)	35.5	(27.3–43.6)	26.9	(21.0–32.8)	
	Concurrent disorders	49.9	(44.1–55.6)	27.2	(21.7–32.7)	22.9	(18.4–27.5)	
Time since diagnosis (years)	0–4	51.7	(44.8–58.6)	27.1	(20.8–33.4)	21.2	(16.3–26.1)	.008*
	5–19	42.2	(37.2–47.1)	30.6	(25.1–36.1)	27.3	(22.8–31.8)	
	≥ 20	54.4	(48.4–60.5)	19.9	(15.5–24.3)	25.6	(20.4–30.8)	
Clinical treatment	Yes	47.5	(43.6–51.3)	29.3	(25.5–33.1)	23.2	(20.3–26.1)	.001*
	No	49.7	(41.7–57.6)	16.6[a]	(11.2–21.9)	33.8	(25.6–42.0)	
PA/exercise advice by HP	Yes	37.5	(33.6–41.5)	33.4	(29.0–37.8)	29.1	(25.5–32.7)	< .001*
	No	70.2	(64.9–75.4)	13.4[a]	(8.8–18.0)	16.4	(12.4–20.4)	

Abbreviations: CI, confidence interval; HP, health professional; OR, odds ratio; PA, physical activity; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages and 95% CIs are based on weighted data.

[a] High sampling variability (coefficient of variation between 16.6 and 33.3%).

* Statistically significant at the $p < .05$ level.

TABLE 2
Adjusted odds ratio of having exercised "1 to 3 times a week" or "4 or more times a week" compared to "did not exercise" by sociodemographic and clinical characteristics among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 2678), 2014 SLCDC-MA

Variable (reference)	Category	Exercised 1 to 3 times per week vs. did not exercise			Exercised 4+ times per week vs. did not exercise		
		OR	95% CI	*p*-value	OR	95% CI	*p*-value
Sex (female)	Male	0.83	(0.54–1.25)	.37	1.13	(0.77–1.67)	.53
Age (18–34 years)	35–49 years	0.89	(0.51–1.55)	.68	0.68	(0.40–1.14)	.14
	50–64 years	0.69	(0.39–1.22)	.20	1.05	(0.61–1.80)	.86
	65+ years	1.10	(0.57–2.12)	.79	1.23	(0.67–2.28)	.51
Marital status	Single/never married	0.91	(0.55–1.50)	.71	1.16	(0.75–1.80)	.50
(married/living common-law)	Widowed/divorced/separated	0.95	(0.58–1.55)	.84	1.43	(0.87–2.35)	.16
Respondent's education level	Less than secondary school	0.55	(0.32–0.94)	.028*	0.66	(0.40–1.11)	.12
(post-secondary graduation)	Secondary school graduation	0.84	(0.53–1.34)	.46	0.74	(0.49–1.12)	.16
	Some post-secondary	1.00	(0.45–2.23)	.99	0.54	(0.24–1.23)	.14
Household income adequacy quintiles (Q4–Q5; highest)	Q1–Q2 (lowest)	0.39	(0.25–0.60)	< .001*	0.63	(0.42–0.96)	.033*
	Q3 (middle)	0.47	(0.28–0.78)	.003*	0.78	(0.48–1.26)	.31
Immigrant (no)	Yes	0.51	(0.13–2.03)	.34	1.56	(0.44–5.49)	.49
Aboriginal (no)	Yes	0.69	(0.30–1.60)	.39	0.94	(0.50–1.77)	.84
Place of residence (urban)	Rural	0.95	(0.61–1.49)	.83	1.08	(0.73–1.58)	.71
Geographic region (British Columbia)	Prairie	0.63	(0.31–1.30)	.21	0.36	(0.20–0.68)	.001*
	Ontario	0.69	(0.37–1.28)	.24	0.44	(0.25–0.80)	.007*
	Quebec	0.84	(0.43–1.65)	.61	0.32	(0.17–0.62)	< .001*
	Atlantic	0.53	(0.27–1.04)	.065	0.49	(0.25–0.95)	.035*
Physical comorbidities (none)	1–2	0.77	(0.50–1.18)	.22	0.87	(0.60–1.26)	.47
	3+	0.92	(0.53–1.62)	.78	0.70	(0.40–1.21)	.20
Disorder type	Concurrent disorders	0.51	(0.31–0.83)	.007*	0.43	(0.27–0.70)	< .001*
(anxiety disorder only)	Mood disorder only	0.53	(0.33–0.87)	.011*	0.69	(0.45–1.05)	.080
Time since diagnosis	0–4 years	0.77	(0.47–1.25)	.29	0.74	(0.47–1.14)	.17
(5–19 years)	≥ 20 years	0.68	(0.44–1.07)	.10	0.80	(0.52–1.22)	.30
Clinical treatment (yes)	No	0.68	(0.40–1.16)	.16	1.63	(1.02–2.61)	.043*
PA/exercise advice by HP (yes)	No	0.21	(0.15–0.31)	< .001*	0.31	(0.22–0.45)	< .001*

Abbreviations: CI, confidence interval; HP, health professional; OR, odds ratio; PA, physical activity; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: ORs and 95% CIs are based on weighted data. ORs adjusted for all sociodemographic and clinical characteristics.

* Statistically significant at the $p < .05$ level.

anxiety disorder only. New types of approaches and therapies such as motivational interviewing[44] and behavioural activation[45] may help individuals who lack motivation and energy to initiate and maintain new lifestyle behaviours. One of the objectives of behavioural activation is to increase positive reinforcement from the environment by encouraging individuals to increase engagement in pleasant and rewarding activities.[45,46]

The advice from a doctor or other health professional to participate in physical activity/exercise was the most important factor associated with being active at least once a week. Although the lack of knowledge and time constraints have been cited as the main barriers for prescribing physical activity/exercise by health professionals,[47-50] research has shown that family physicians are effective in increasing physical activity/exercise among primary care patients.[47,51] In light of these findings, it is essential that health professionals recommend physical activity/exercise to their patients with

TABLE 3
Perceived health and life satisfaction status among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis by physical activity/exercise frequency (n = 2678), 2014 SLCDC-MA

Variable	Category	Did not exercise		Exercised 1–3 times per week		Exercised 4+ times per week		Chi-square test
		%	95% CI	%	95% CI	%	95% CI	*p*-value
Perceived general health	Excellent/very good	35.6	(29.8–41.5)	35.6	(28.7–42.5)	28.8	(23.6–34.0)	< .001*
	Good	50.0	(44.5–55.5)	25.1	(20.7–29.5)	24.9	(20.1–29.7)	
	Fair/poor	61.7	(55.5–67.9)	17.9	(13.2–22.6)	20.4	(15.3–25.5)	
Perceived mental health	Excellent/very good	43.7	(37.9–49.6)	26.2	(20.1–32.3)	30.1	(24.7–35.4)	.053
	Good	45.7	(40.4–51.1)	30.5	(24.9–36.1)	23.8	(19.4–28.1)	
	Fair/poor	54.6	(48.2–60.9)	23.2	(17.4–28.9)	22.3	(17.0–27.6)	
Life satisfaction	Satisfied	43.3	(39.4–47.2)	30.9	(26.8–35.0)	25.8	(22.6–29.0)	< .001*
	Neutral	55.6	(45.9–65.3)	17.2[a]	(10.6–23.7)	27.2[a]	(18.4–36.1)	
	Dissatisfied	71.2	(62.4–79.9)	11.0[a]	(6.3–15.7)	17.8[a]	(10.1–25.5)	

Abbreviations: CI, confidence interval; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages and 95% CIs are based on weighted data.

[a] High sampling variability (coefficient of variation between 16.6 and 33.3%).

* Statistically significant at the $p < .05$ level.

mood and/or anxiety disorders and support their engagement.

A recent systematic review of studies on physical activity/exercise and depression suggests the following guidelines for health professionals: (1) both aerobic and anaerobic activity are effective, therefore the choice should be based on patient's preference; and (2) in terms of duration and frequency, sessions should last for at least 30 minutes three times a week.[52] Participation in group activities and regular supervision and monitoring appear to increase the chance of successful outcomes by sustaining motivation and adherence.[47,52] Simple and practical strategies such as prescription of physical activity/exercise and use of pedometers and logbooks have also been shown to be helpful.[47,53,54] Most importantly, the primary goal is to encourage the patient to be active (regardless of the type, duration and frequency of activity) and to ensure that the selected physical activity/exercise is seen as pleasurable.[24,51,52] Lastly, interventions designed to increase self-management through exercise will need to address the barriers presented by comorbid chronic conditions and develop strategies to deal with the issue of time constraints.

Finally, our study demonstrated an association between physical activity/exercise and perceived well-being. Individuals who did not engage in exercise were more likely to report "fair/poor" general health and dissatisfaction with life compared to those who exercised at least once per week, even after adjusting for all sociodemographic and clinical characteristics that could affect perceived well-being. However, since the 2014 SLCDC-MA is a cross-sectional survey, the direction of the association could

TABLE 4
Adjusted odds ratio of having exercised "1 to 3 times a week" or "4 or more times a week" compared to "did not exercise" by perceived health and life satisfaction status among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 2678), 2014 SLCDC-MA

Variable (reference)	Category	Exercised 1–3 times per week vs. did not exercise			Exercised 4 + times per week vs. did not exercise		
		OR	95% CI	*p*-value	OR	95% CI	*p*-value
Perceived general health	Fair/poor	0.33	(0.19–0.56)	< .001*	0.40	(0.25–0.64)	< .001*
(excellent/very good)	Good	0.50	(0.32–0.77)	.002*	0.59	(0.40–0.88)	.010*
Perceived mental health	Fair/poor	0.69	(0.41–1.15)	.15	0.57	(0.37–0.90)	.015*
(excellent/very good)	Good	0.96	(0.62–1.49)	.85	0.71	(0.49–1.04)	.078
Satisfaction about life	Dissatisfied	0.29	(0.16–0.50)	< .001*	0.46	(0.25–0.83)	.011*
(satisfied)	Neutral	0.53	(0.31–0.93)	.027*	0.87	(0.54–1.41)	.58

Abbreviations: CI, confidence interval; OR, odds ratio; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Notes: ORs and 95% CIs are based on weighted data. ORs adjusted for: sex, age, marital status, education, household income, region, comorbidity, diagnosis type, clinical management and advice by health professional.

* Statistically significant at the $p < .05$ level.

not be determined and we were not able to assess whether respondents reported better health and life satisfaction because they were engaging in exercise, or alternatively, whether they were exercising because they felt better. Also, it is interesting to note that there were no major differences in terms of well-being among those reporting exercising 1 to 3 times a week versus 4 or more times a week. This may reflect the fact that the psychological (e.g. self-esteem, self-efficacy) and social impact of engaging in physical activity/exercise are as important as its physiological effects.[52]

Strengths and limitations

The 2014 SLCDC-MA is the only national survey to have collected detailed information on the experiences of a large sample of Canadians with a diagnosed mood and/or anxiety disorder, allowing us to study the association between physical activity/exercise as a self-management strategy and the affected individuals' sociodemographic and clinical characteristics, perceived well-being and reported barriers.

This study has a few limitations that warrant mentioning. First, the 2014 SLCDC-MA had a lower response rate (68.9%) compared to previous cycles (75%–83%).[55,56] This phenomenon has been observed in other health surveys, both nationally and internationally.[57] While this may introduce bias due to non-response, it should be noted that Statistics Canada made adjustments accounting for those who were excluded or did not respond to the survey.[32] Second, the absence of questions on type, duration and intensity of physical activity/exercise and severity of the disease limited the focus of our study. Third, the fact that we excluded those who were already exercising for reasons other than self-management may have had an impact on some of the results, although they accounted for less than 10% of the sample (8.4%). On the other hand, given that the focus of this study was on self-management strategy and finding ways to improve participation in this intervention, they would not have been representative of this specific population. Fourth, since the 2014 SLCDC-MA is a cross-sectional survey, causal inferences between perceived well-being and physical activity/exercise cannot be drawn.

Conclusion

While physical activity/exercise has been shown to reduce depression and anxiety symptoms in addition to many other health benefits such as increasing overall wellness and preventing or mitigating other chronic diseases, its uptake was challenging for at least 50% of those affected by these disorders in our study. Individuals who were more likely not to exercise shared many of the sociodemographic characteristics also observed in the general population. Engaging in physical activity/exercise was particularly difficult for those affected by a mood disorder and those with physical comorbidities, although exercise may be particularly important for these individuals.

The most important factor associated with exercising was the recommendation by a doctor or other health professional. Health practitioners play a critical role in recommending physical activity/exercise and supporting its engagement, particularly for those with a mood disorder and physical comorbidities.

Acknowledgements

The authors would like to thank Siobhan O'Donnell for her thorough review. Scott B. Patten is a Senior Health Scholar with Alberta Innovates, Health Solutions. No external financial or material support was obtained for this study.

Conflicts of interest

The authors declare no conflict of interest.

Authors' contributions

Louise Pelletier (LP), Alain Demers (AD) and Shamila Shanmugasegaram (SS) conceptualized the study, AD analyzed the data and LP and SS drafted the paper. All four authors contributed to the interpretation of the data and provided comments to the draft paper.

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https://doi.org/10.24095/hpcdp.37.5.04

Use of medication and psychological counselling among Canadians with mood and/or anxiety disorders

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This article has been peer reviewed.

Abstract

Introduction: This study describes the use of prescription medications and psychological counselling in the past 12 months among Canadian adults with a self-reported mood and/or anxiety disorder diagnosis; the sociodemographic and clinical characteristics associated with their use; and reasons for not using them.

Methods: We used data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component. The study sample (n = 2916) was divided into four treatment subgroups: (1) taking medication only; (2) having received counselling only; (3) both; or (4) neither. We combined the first three subgroups and carried out descriptive and multivariate logistic regression analyses comparing those who are taking medication and/or have received counselling in the past 12 months, versus those doing neither. Estimates were weighted to represent the Canadian adult household population living in the 10 provinces with diagnosed mood and/or anxiety disorders.

Results: The majority (81.8%) of Canadians with a mood and/or an anxiety disorder diagnosis reported they are taking medications and/or have received counselling (47.6% taking medications only; 6.9% received counselling only; and 27.3% taking/having received both). Upon controlling for individual characteristics, taking medications and/or having received counselling was significantly associated with older age; higher household income; living in the Atlantic region or Quebec versus Ontario; and having concurrent disorders or mood disorders only. Symptoms controlled without medication was the most common reason for not taking medications, while preferring to manage on their own and taking medications were among the common reasons for not having received counselling.

Conclusion: The majority of Canadian adults with a mood and/or an anxiety disorder diagnosis are taking medications, while few have received counselling. Insights gained regarding the factors associated with these treatments, and reasons for not using them, emphasize the importance of discussing treatment options and perceived barriers with patients to ensure they receive the best treatment according to their needs and preference.

Keywords: *mood disorders, anxiety disorders, medications, counselling, treatment, health surveys, population surveillance, Survey on Living with Chronic Diseases in Canada*

Highlights

- The majority (81.8%) of Canadian adults with a self-reported mood and/or anxiety disorder diagnosis stated they were taking prescription medication and/or had received psychological counselling in the past 12 months.
- Prescription medication was more commonly reported in the treatment of these disorders than psychological counselling.
- Taking/having received medication and/or counselling was significantly associated with age, household income and type of disorder.
- Symptoms controlled without medication was the most common reason for not taking medications to help manage their disorder.
- Preferring to manage on their own, and taking medication were among the most common reasons for not having received counselling.
- Findings from this study emphasize the importance of discussing treatment options and perceived barriers with patients in order to ensure they receive the optimal treatment according to their needs and preference.

Introduction

Mood and anxiety disorders are among the most common types of mental illnesses in Canada,[1] with an estimated 3 million Canadian adults having self-reported a mood and/or an anxiety disorder diagnosis in 2013.[2] Effective treatments exist; however, a number of recent studies have shown that these mental health disorders are underdiagnosed[3-7] or, when diagnosed, are often suboptimally treated or not treated at all.[7-10] Increased emphasis on strategies that aim to improve access to and receipt of evidence-based treatment could improve the well-being of people living with these disorders.[11]

Treatments come in many forms, ranging from the more established therapies such as pharmacotherapy and psychotherapy,[12-14] to newer treatments (used either alone or

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as an adjunct) such as Internet-based cognitive behavioural therapy (CBT),[15] herbal therapies,[16] meditation[17] and physical activity/exercise.[18,19]

Pharmacotherapy and psychotherapy are both considered effective "first-line" treatments[12] and are often used in combination to optimize response.[14,20] Besides treatment effectiveness, decisions regarding the choice of pharmacological and/or psychological treatment are influenced by other factors, including patient preference and adherence, response to treatment, availability and accessibility of treatments, services and trained health care providers, and financial considerations.[21,22]

A few studies have documented the diagnosis and treatment status of people with symptoms compatible with mood and/or anxiety disorders.[23-25] However, to our knowledge, none have reported national-level data on the use of the two most established treatments (i.e. prescription medications and psychotherapy) among Canadian adults with these disorders.

Thus, using data from the 2014 Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component (SLCDC-MA), we report on the use of prescription medications and psychological counselling in a nationally representative sample of community dwelling Canadian adults with a self-reported diagnosis of a mood and/or an anxiety disorder. More specifically, we (1) describe their use of prescription medications and/or psychological counselling to help manage their disorder(s); (2) compare the sociodemographic and clinical characteristics associated with the use of these treatment strategies; and (3) examine the reasons for not using them.

Methods

Data source and study sample

The 2014 SLCDC-MA, a cross-sectional follow-up survey to the 2013 Canadian Community Health Survey (CCHS)—Annual Component, surveyed Canadians aged 18 years old and older who are living in private dwellings within the 10 provinces with a self-reported professionally diagnosed mood and/or anxiety disorder. The survey was administered by trained personnel via a structured telephone interview (in English or French) during two data collection periods: November to December 2013 and February to March 2014.

Respondents were identified through the 2013 CCHS by way of responding "yes" to having received a mood and/or an anxiety disorder diagnosis from a health professional that had lasted or was expected to last six months or more.[26] Of the 5875 respondents selected for the 2014 SLCDC-MA, a total of 3361 completed the survey (response rate = 68.9%). Excluded from the survey's coverage were residents of the three territories (Yukon, Northwest Territories and Nunavut), persons living on Indian reserves or Crown lands, people in institutions, full-time members of the Canadian Forces and residents of certain remote regions, which altogether represent about 3% of the target population. For the purpose of this study, respondents who reported "no" to *having* a mood and/or an anxiety disorder diagnosis (vs. *having ever* been diagnosed) were excluded (n = 445) thus, our final study sample consisted of 2916 respondents.

The methodology of the 2014 SLCDC-MA and the sociodemographic characteristics of the final sample have been described elsewhere.[27] The term "mood and/or anxiety disorders" used throughout this article refers to those who have self-reported diagnosed mood disorders only, anxiety disorders only, and concurrent mood and anxiety disorders.

Measures

Treatment subgroups

Respondents were classified into one of four mutually exclusive treatment subgroups based on their responses to the following three questions regarding their current use of prescription medications and psychological counselling: "Currently, are you taking any prescription medications for your [mood and/or anxiety] disorder?" (response options: "yes," "no"); "During the past 12 months, have you seen or talked on the telephone to any of the following people about your [mood and/or anxiety] disorder?" (response options: "family doctor or general practitioner"; "psychiatrist"; "psychologist"; "social worker, counsellor, or psychotherapist"; "nurse or nurse practitioner"; "other medical doctor or specialist"; "other health professional"; "none"); and those who chose any answer option to the second question other than "none" were then asked "In the past 12 months, did you receive psychological counselling to help manage your [mood and/or anxiety] disorder?" (response options: "yes," "no").

Based on responses to these questions, respondents were categorized into one of the following four subgroups: (1) taking prescription medication only; (2) having received psychological counselling in the past 12 months only; (3) taking/having received both treatments; or (4) taking/having received neither treatment. For analytic purposes, the first three treatment subgroups were combined to form a subgroup "taking medications and/or having received counselling." Figure 1 illustrates how respondents were categorized into one of the four aforementioned mutually exclusive subgroups.

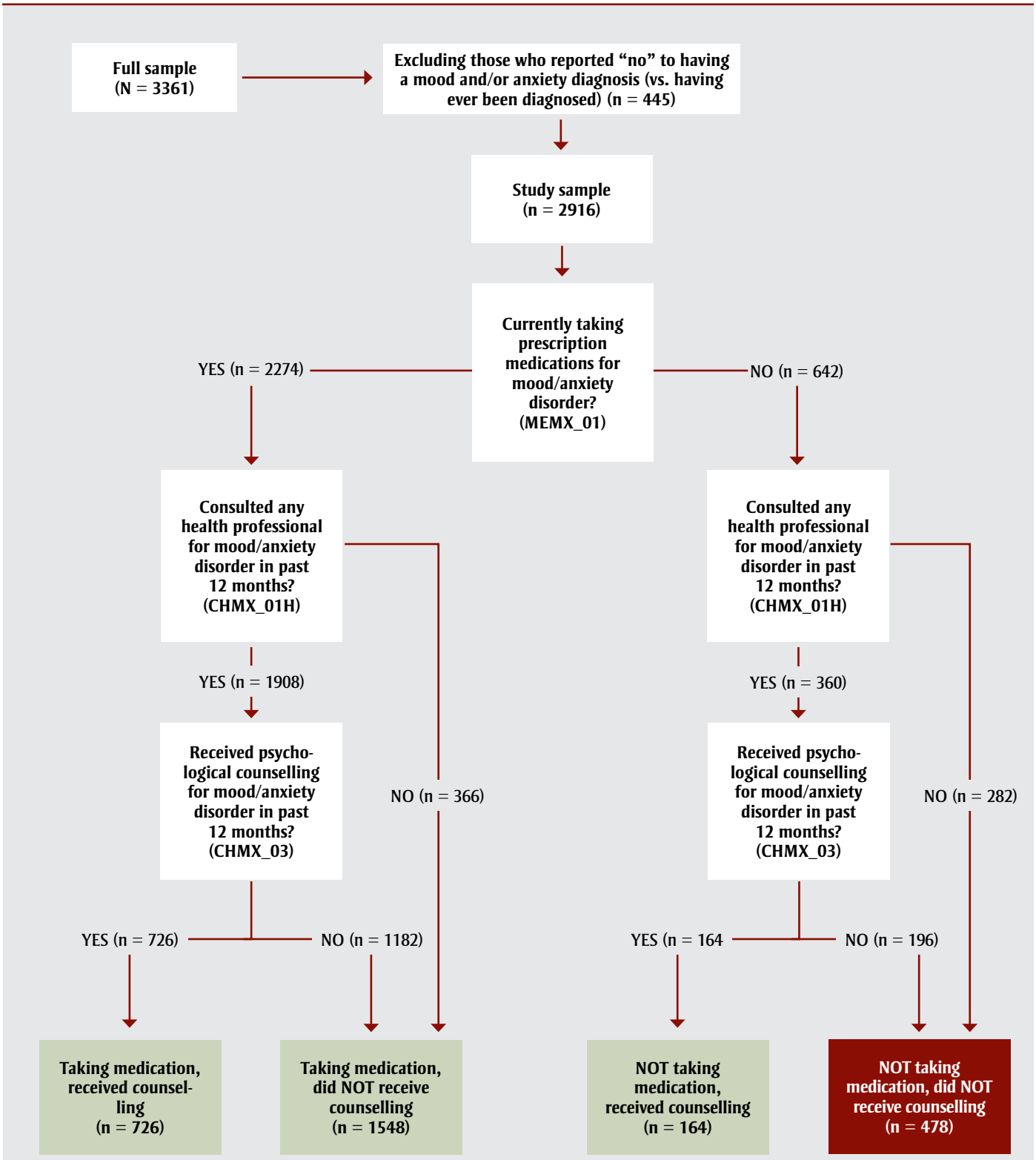
Sociodemographic and clinical characteristics

The sociodemographic characteristics we studied included sex (female, male); age (age groups 18–34, 35–49, 50–64 and 65 + years), marital status (single/never married, widowed/separated/divorced and married/living common-law); respondent's highest level of education (less than post-secondary education, post-secondary graduation); immigrant status (yes, no); Aboriginal status (yes, no); geographic region (British Columbia, Prairie region, Ontario, Quebec and Atlantic region); place of residence (urban, rural); and adjusted household income adequacy quintiles (deciles, derived by Statistics Canada,* transformed into quintiles). The quintiles were then categorized as follows: (1) first or second quintile (lowest); (2) third quintile (middle); and (3) fourth or fifth quintile (highest).

The clinical characteristics we explored included type of disorder (mood disorders only, anxiety disorders only, and concurrent mood and anxiety disorders); duration of disorder, i.e. number of years since being diagnosed (0–4, 5–19 and 20 + years);

* This derived variable is a distribution of respondents in deciles (10 categories including approximately the same percentage of residents for each province) based on the adjusted ratio of their total household income to the low-income cut-off corresponding to their household and community size. It provides, for each respondent, a relative measure of their household income to the household incomes of all other respondents.[27]

FIGURE 1
Flowchart illustrating how respondents were identified and categorized into one of the four mutually exclusive treatment subgroups (n = 2916), 2014 SLCDC-MA



Abbreviations: n, unweighted number; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: MEMX_01, CHMX_01H and CHMX_03 are variable names. Treatment subgroups in green boxes were combined to form a "medications and/or counselling" subgroup for analytical purposes.

and number of physical comorbidities (0, 1–2 and 3 +). We determined the number of physical comorbidities using responses to the question regarding conditions diagnosed by a health professional that had lasted or were expected to last six months or longer, including asthma, arthritis, back problems, chronic obstructive pulmonary disease, diabetes, heart disease, cancer, stroke, bowel disorder/Crohn disease/colitis and Alzheimer disease/dementia. Each condition was counted as one physical comorbidity.

Reasons for not taking prescription medication(s) and/or receiving psychological counselling to help manage mood and/or an anxiety disorder symptoms

Respondents who responded "no" to taking prescription medications or "no" to having received psychological counselling in the past 12 months were asked why. These were open ended questions with a mark-all-that-apply response option. The interviewer categorized the respondent's answer according to a list of potential response options. Reasons for no longer taking or never having taken any prescription medications included "no medication prescribed," "side-effects," "too costly/no insurance," "controlled without medication," "embarrassed/uncomfortable/concerned what others would think," "do not want to become dependent," "other" and "no reason." Reasons for not having received psychological counselling included "don't know who to go to," "time constraints (too busy, family responsibilities, work schedule)," "wait time too long," "too costly/not covered by insurance," "prefer to manage the condition themselves," "taking medication to manage the condition," "too embarrassed/uncomfortable/concerned what others would think," "other" and "no reason."

Statistical analysis

We conducted cross-tabulation descriptive analyses to describe the sociodemographic and clinical characteristics of respondents by treatment status. We used chi-square tests (categorical variables) and a linear regression analysis (count variables, i.e. age) to explore the relationship between respondent characteristics and taking medications and/or having received counselling versus taking/receiving neither. A multivariate logistic regression analysis was used to examine the independent association between respondents' characteristics and taking medications and/or having received counselling versus doing neither. Missing data accounted for less than 10% of the original data in the model. Statistical significance was determined at the p-value < .05 level. In addition, we performed descriptive analyses to examine reasons for not taking prescription medications and/or not having received psychological counselling in the past 12 months.

To account for sample allocation and survey design, all estimates were based on weighted data using sample weights generated by Statistics Canada so that the data would be representative of the Canadian household population aged 18 years and older living in the 10 provinces with a self-reported mood and/or anxiety disorder diagnosis. Sample weights were adjusted by Statistics Canada for exclusions, sample selection, in-scope rates, non-response and permission to share and link.[28] Variance estimates, including 95% confidence intervals and coefficients of variation, were calculated using bootstrap weights provided with the data and using the bootstrap technique.[29] Only results with a coefficient of variation less than 33.3% are reported, as per Statistics Canada guidelines.[28] We used SAS Enterprise Guide, version 5.1 (SAS Institute Inc., Cary, NC, USA) for the data analyses.

Results

Study population by treatment subgroup

The majority (81.8%) of Canadians 18 years and older with a self-reported mood and/or anxiety disorder diagnosis reported they are taking prescription medications and/or have received psychological counselling in the past 12 months. Of these, close to half (47.6%) reported taking medications only, 6.9% having received counselling only and 27.3% taking/having received both. Close to one-fifth (18.2%) reported doing neither. The relationship between individuals' characteristics and taking medications and/or having received counselling (vs. neither) was significant for age, marital status and disorder type. Those who reported taking/having received neither treatment were more likely to be younger, to be single/never married and to have an anxiety disorder only (Table 1).

Association between individual characteristics and taking medications and/or having received counselling versus neither

Upon adjusting for all sociodemographic and clinical characteristics,[†] results demonstrated that taking medications and/or having received counselling (vs. neither) was significantly associated with (adjusted odds ratio [OR] [95% CI]) being older (3.9 [1.8–8.2], 2.4 [1.3–4.5] and 2.5 [1.4–4.5] among those 65 + , 50–64 and 35–49 years, respectively, vs. 18–34 years); having higher household income (1.9 [1.3–2.9] in the Q4 and Q5 adequacy quintiles vs. Q1 and Q2); living in the Atlantic region or Quebec versus Ontario (2.4 [1.4–4.2] and 1.8 [1.1–3.0], respectively); and having concurrent mood and anxiety disorders or mood disorders only versus anxiety disorders only (2.2 [1.4–3.5] and 1.9 [1.2–2.9], respectively) (Table 2).

Reasons for not taking prescription medications and not having received psychological counselling

The three most common reasons reported for not taking medications to help manage mood and/or anxiety disorder symptoms were "controlled without medication" (41.8%), "other" reasons (29.4%) and "side-effects" (24.6%). As for not having received psychological counselling in the past 12 months, the three most common reasons stated were "prefer to manage the condition themselves" (31.0%), "other reasons" (30.8%) and "taking medication to manage the condition" (30.2%) (Figure 2).

Discussion

To help manage their disorder(s), the majority (81.8%) of Canadian adults with a self-reported mood and/or anxiety disorder diagnosis reported taking medications and/or having received counselling; however, close to one-fifth (18.2%) reported taking/having received neither. The sociodemographic and clinical characteristics associated with taking medications and/or

[†] Sex, age, marital status, respondent's level of education, adjusted household income adequacy quintiles, immigrant status, Aboriginal status, geographic region, place of residence, type of disorder, duration of disorder and number of physical comorbidities.

TABLE 1
Sociodemographic and clinical characteristics among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis by treatment type (n = 2916), 2014 SLCDC-MA

	Medication AND/OR counselling (n = 2438; 81.8%)	Medication ONLY (n = 1548; 47.6%)	Counselling ONLY (n = 164; 6.9%)	Medication AND counselling (n = 726; 27.3%)	Neither (n = 478; 18.2%)	Medication AND/OR counselling vs. neither Chi-square test
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	*p*-value
SOCIODEMOGRAPHIC CHARACTERISTICS						
Sex						
Female	81.8 (78.8–84.8)	47.9 (44.0–51.8)	7.2 (5.0–9.3)	26.7 (23.1–30.4)	18.2 (15.2–21.2)	.966
Male	81.7 (77.4–85.9)	47.0 (41.0–53.0)	6.4[a] (3.2–9.5)	28.3 (22.5–34.1)	18.3 (14.1–22.6)	
Age (years)						
Mean age	48.0 (47.1–48.4)	51.0 (49.8–52.2)	35.1 (32.4–37.8)	46.0 (44.4–47.5)	42.2 (40.3–44.2)	< .001[b,*]
Age groups						
18–34	71.4 (65.5–77.4)	30.5 (24.0–36.9)	15.3[a] (10.0–20.7)	25.7 (19.1–32.2)	28.6 (22.6–34.5)	< .001*
35–49	85.0 (80.5–89.5)	44.3 (37.2–51.5)	6.5[a] (3.4–9.5)	34.2 (26.6–41.9)	15.0 (10.5–19.5)	
50–64	84.7 (80.8–88.6)	56.0 (50.6–61.3)	2.8[a] (1.3–4.4)	25.9 (21.2–30.5)	15.3 (11.4–19.2)	
65+	87.3 (83.5–91.0)	66.6 (61.0–72.2)	NR[c]	19.4 (14.4–24.3)	12.7 (9.0–16.5)	
Marital status						
Single/never married	76.1 (71.2–81.0)	37.4 (31.5–43.3)	12.6[a] (8.4–16.7)	26.1 (20.7–31.5)	23.9 (19.0–28.8)	.006*
Widowed/ separated/ divorced	85.8 (81.6–90.0)	50.5 (43.6–57.4)	NR[c]	30.5 (24.1–36.9)	14.2 (10.0–18.4)	
Married/living common-law	83.1 (79.9–86.2)	51.3 (46.7–56.0)	4.9[a] (2.8–7.0)	26.8 (22.4–31.3)	16.9 (13.8–20.1)	
Respondent's education level						
Less than post-secondary	79.1 (75.3–83.0)	51.2 (46.7–55.7)	7.0[a] (4.6–9.5)	20.9 (17.1–24.7)	20.9 (17.0–24.7)	.084
Post-secondary	83.5 (80.3–86.7)	45.3 (40.7–50.0)	6.8[a] (4.4–9.2)	31.4 (26.8–36.1)	16.5 (13.3–19.7)	
Household income adequacy quintile						
Q1 or Q2 (lowest)	78.7 (74.9–82.6)	45.1 (40.6–49.7)	5.3[a] (3.4–7.2)	28.3 (23.7–32.8)	21.3 (17.4–25.1)	.103
Q3 (middle)	83.4 (78.2–88.6)	53.4 (45.5–61.3)	8.3[a] (3.8–12.9)	21.6 (15.4–27.9)	16.6 (11.4–21.8)	
Q4 or Q5 (highest)	84.2 (80.6–87.7)	46.8 (41.2–52.4)	7.7[a] (4.3–11.1)	29.7 (23.8–35.5)	15.8 (12.3–19.4)	
Immigrant status						
Non-immigrant	82.2 (79.7–84.8)	47.1 (43.5–50.7)	7.4 (5.4–9.3)	27.7 (24.3–31.3)	17.8 (15.2–20.3)	.459
Immigrant	79.8 (69.9–87.8)	51.0 (39.4–62.6)	NR[c]	24.6[a] (15.9–33.3)	21.2[a] (12.2–30.1)	
Aboriginal status						
Non-Aboriginal	81.8 (79.1–84.4)	46.4 (42.7–50.1)	7.2 (5.2–9.2)	28.2 (24.5–31.8)	18.2 (15.6–20.9)	.942
Aboriginal	81.5 (74.1–88.9)	50.6 (40.2–61.0)	NR[c]	22.2[a] (12.4–31.9)	18.5[a] (11.1–25.9)	
Geographic region						
British Columbia	81.3 (74.4–88.2)	57.1 (47.7–66.4)	NR[c]	16.3[a] (9.4–23.3)	18.7[a] (11.8–25.6)	.078
Prairie	79.4 (74.1–84.7)	45.8 (38.7–53.0)	8.0[a] (3.3–12.8)	25.5 (18.2–32.9)	20.6 (15.3–25.9)	
Ontario	79.5 (75.1–83.9)	42.6 (37.3–47.9)	5.9[a] (3.1–8.8)	31.0 (25.2–36.8)	20.5 (16.1–24.9)	
Quebec	85.8 (81.1–90.5)	46.8 (39.4–54.2)	7.7[a] (3.5–12.0)	31.2 (24.6–37.9)	14.2[a] (9.5–18.9)	
Atlantic	88.6 (84.7–92.5)	60.6 (53.4–67.7)	NR[c]	22.5 (16.3–28.7)	11.4[a] (7.5–15.3)	

Continued on the following page

TABLE 1 (continued)
Sociodemographic and clinical characteristics among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis by treatment type (n = 2916), 2014 SLCDC-MA

	Medication AND/OR counselling (n = 2438; 81.8%)	Medication ONLY (n = 1548; 47.6%)	Counselling ONLY (n = 164; 6.9%)	Medication AND counselling (n = 726; 27.3%)	Neither (n = 478; 18.2%)	Medication AND/OR counselling vs. neither Chi-square test
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	*p*-value
Place of residence						
Rural	81.8 (77.0–86.5)	55.2 (49.2–61.2)	5.6[a] (2.9–8.4)	20.9 (16.1–25.7)	18.2 (13.5–23.0)	.995
Urban	81.8 (79.0–84.5)	46.0 (42.2–49.8)	7.1 (5.1–9.2)	28.6 (24.8–32.4)	18.2 (15.5–21.0)	
CLINICAL CHARACTERISTICS						
Disorder type						
Mood disorder only	81.9 (78.1–85.7)	58.4 (53.2–63.6)	3.2[a] (1.9–4.5)	20.3 (16.3–24.3)	18.1 (14.3–21.9)	.049*
Anxiety disorder only	76.9 (71.3–82.5)	44.1 (37.2–50.9)	12.5[a] (7.4–17.5)	20.4[a] (13.0–27.8)	23.1 (17.5–28.7)	
Concurrent mood and anxiety disorders	85.0 (81.3–88.6)	36.5 (31.3–41.7)	7.6[a] (4.1–11.1)	40.8 (35.0–46.6)	15.0 (11.4–18.7)	
Disorder duration (years)						
0–4	80.8 (75.8–85.9)	35.1 (29.0–41.3)	15.0 (10.4–19.7)	30.7 (24.1–37.2)	19.2 (14.1–24.2)	.857
5–19	82.0 (78.3–85.6)	52.0 (46.9–57.2)	4.6[a] (2.3–6.9)	25.3 (20.6–30.1)	18.0 (14.4–21.7)	
20+	82.7 (78.6–86.8)	52.1 (46.4–57.7)	2.4[a] (0.8–4.0)	28.2 (22.6–33.9)	17.3 (13.2–21.4)	
Physical comorbidities (number)						
0	82.4 (78.6–86.1)	45.6 (40.1–51.2)	9.3[a] (5.8–12.8)	27.5 (21.9–33.0)	17.6 (13.9–21.4)	.271
1–2	80.1 (76.6–83.6)	46.7 (42.1–51.3)	6.1[a] (3.9–8.3)	27.4 (22.9–31.8)	19.9 (16.4–23.4)	
3+	85.4 (80.3–90.6)	56.6 (49.1–64.1)	NR[c]	26.6 (19.0–34.1)	14.6[a] (9.4–19.7)	

Abbreviations: CI, confidence interval; n, unweighted number; NR, non-reportable; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages and 95% CIs are based on weighted data.

[a] High sampling variability (coefficient of variation between 16.6% and 33.3%).

[b] Linear regression analysis.

[c] Coefficient of variation > 33.3%.

* Statistically significant at *p*-value < .05 level.

having received counselling included age, household income adequacy, geographic region and disorder type.

Being older (age 35 + years vs. 18–34 years) was associated with taking medications and/or having received counselling. This finding was mainly driven by the large proportion of older individuals (35 + years) taking medications, as those in the younger age group (18–34 years) were more likely to report having received counselling only or neither treatment. Without detailed knowledge of the respondents' symptomatology, it is not possible to discern whether these age-related findings pertaining to treatment use are due to symptom severity (i.e. symptoms being less severe among those who were younger vs. those older) or other factors such as age-related treatment preferences, treatment accessibility and availability, etc. Having said that, studies have shown that younger adults prefer psychological to pharmacological treatment[30] and they are also more reluctant to seek professional help[31-33] compared to older adults.

We found that a higher household income adequacy was associated with taking medications and/or having received counselling. There is a range of evidence that demonstrates that those with a higher socioeconomic status have increased access to almost every health service available, despite having a generally higher health status.[34] A study examining determinants that lead Canadian adults to consult family physicians, psychiatrists, psychologists, psychotherapists and other health professionals for mental health reasons found that those with lower levels of education and income adequacy were less likely to use mental health services, specifically specialty providers of psychotherapy.[35] Furthermore, a Canadian study that examined barriers to mental health care using data from the Canadian Community Health Survey concluded that "despite universal health insurance, there are significant inequities in access to mental health care for low-income Canadians."[36,p.1]

Living in the Atlantic region or Quebec (vs. Ontario) was associated with taking medications and/or having received counselling. Provincial differences in the use of mental health services have previously

TABLE 2
Association between sociodemographic and clinical characteristics and use of "medication and/or counselling" compared to "neither" among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 2916), 2014 SLCDC-MA

	Adjusted OR[a] (95% CI)	*p*-value
SOCIODEMOGRAPHIC CHARACTERISTICS		
Sex		
Female	1.4 (0.9–2.1)	.150
Male	Referent	
Age groups (years)		
35–49	2.5 (1.4–4.5)	.002*
50–64	2.4 (1.3–4.5)	.007*
65+	3.9 (1.8–8.2)	.000*
18–34	Referent	
Marital status		
Single/never married	1.1 (0.7–1.8)	.638
Widowed/separated/divorced	1.2 (0.8–2.0)	.385
Married/living common-law	Referent	
Respondent's education level		
Post-secondary	1.3 (0.9–1.9)	.140
Less than post-secondary	Referent	
Household income adequacy quintile		
Q3 (middle)	1.4 (0.9–2.3)	.135
Q4 or Q5 (highest)	1.9 (1.3–2.9)	.002*
Q1 or Q2 (lowest)	Referent	
Immigrant status		
Non-immigrant	2.0 (0.7–6.1)	.206
Immigrant	Referent	
Aboriginal status		
Non-Aboriginal	0.9 (0.4–1.7)	.637
Aboriginal	Referent	
Geographic region		
British Columbia	1.1 (0.7–2.0)	.650
Prairie	0.9 (0.5–1.4)	.615
Quebec	1.8 (1.1–3.0)	.032*
Atlantic	2.4 (1.4–4.2)	.002*
Ontario	Referent	
Place of residence		
Urban	1.1 (0.7–1.7)	.615
Rural	Referent	
CLINICAL CHARACTERISTICS		
Disorder type		
Mood disorder only	1.9 (1.2–2.9)	.007*
Concurrent mood and anxiety disorders	2.2 (1.4–3.5)	.001*
Anxiety disorder only	Referent	
Duration of disorder (years)		
0–4	1.7 (0.9–3.0)	.101
5–19	1.3 (0.8–2.2)	.246
20+	Referent	

Continued on the following page

been shown to exist[35,37] and results from our study might well reflect real regional differences. However, given the many nested factors that may contribute to our observations, we refrain from drawing any specific inferences from these findings.

Finally, having concurrent mood and anxiety disorders or mood disorders only (vs. anxiety disorders only) was associated with taking medications and/or having received counselling. Given that concurrent disorders have been shown to be associated with more severe symptomatology and worse health-related outcomes compared to a single disorder,[38,39] it is not surprising that individuals with concurrent mood and anxiety disorders were more likely to report using both treatments. This finding aligns with available evidence that favours the concomitant use of pharmacological and psychological therapies such as cognitive-behavioural therapy when managing individuals with concurrent mood and anxiety disorders.[40-42] Furthermore, it is expected that those with mood disorders only (vs. anxiety disorders only) would be more likely to take medications in light of the evidence that demonstrates lower treatment adequacy for anxiety disorders compared to depression.[8]

We found no significant adjusted ORs between treatment type and sex, marital status, respondent education level, immigrant status, Aboriginal status, place of residence, duration of disorder or number of physical comorbidities.

As previously mentioned, the choice to use pharmacological and/or psychological treatment is influenced by a number of factors including clinical evidence regarding effectiveness, patient's preference and adherence, treatment response, availability and accessibility, trained health care providers and financial considerations. While psychological counselling has been shown to have comparable effects as medication in several depressive and anxiety disorders,[43] and there is evidence to suggest that psychotherapy is generally preferred over pharmacotherapy, [44,45] findings from our study demonstrated that individuals with mood and/or anxiety disorders are more likely to be treated with medication. This could be due to a number of factors, including individuals' limited knowledge of the benefits of psychotherapy treatments, availability and access to

TABLE 2 (continued)
Association between sociodemographic and clinical characteristics and use of "medication and/or counselling" compared to "neither" among Canadians aged 18 years and older with a self-reported mood and/or anxiety disorder diagnosis (n = 2916), 2014 SLCDC-MA

	Adjusted OR[a] (95% CI)	*p*-value
Physical comorbidities (number)		
0	1.0 (0.5–1.9)	.948
1–2	0.8 (0.5–1.4)	.427
3+	Referent	

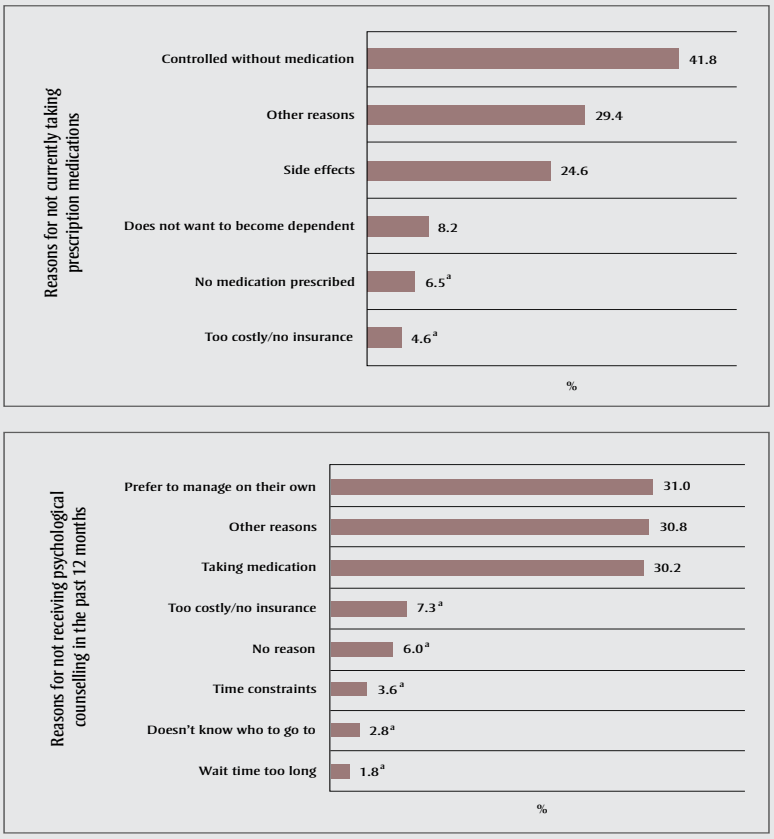
Abbreviations: CI, confidence interval; n, unweighted number; OR, odds ratio; Q, quintile; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: ORs and 95% CIs are based on weighted data.

[a] Adjusted for all variables in the model including sex, age, marital status, respondent's level of education, adjusted household income adequacy quintiles, immigrant status, Aboriginal status, geographic region, place of residence, type of disorder, duration of disorder and number of physical comorbidities.

* Statistically significant at *p*-value < .05 level.

FIGURE 2
Reasons for not taking prescription medications (n = 642) or not receiving psychological counselling in the past 12 months (n = 1378) among Canadians aged 18 and older with a self-reported mood and/or anxiety disorder diagnosis, 2014 SLCDC-MA



Abbreviations: n, unweighted number; SLCDC-MA, Survey on Living with Chronic Diseases in Canada—Mood and Anxiety Disorders Component.

Note: Percentages are based on weighted data and do not add up to 100% because respondents could report more than one reason.

[a] High sampling variability (coefficient of variation between 16.6% and 33.3%).

such mental health services, physicians' treatment preferences and treatment-related costs. Some international efforts to overcome treatment accessibility issues have shown promise, as demonstrated in Australia and England, where publicly funded psychotherapy programs have increased access to care and resulted in positive clinical outcomes.[46,47] A few provinces in Canada are also exploring this issue.[48-50]

Among the most common reasons for not taking medications were "controlled without medication," and "side effects." The most common reasons for not having received counselling included "prefer to manage the condition themselves," and "taking medication." According to the literature, low perceived need and attitudinal barriers, particularly the desire to handle the problem on one's own, are the most common reasons for not initiating or continuing any form of treatment among individuals with common mental disorders.[51] In addition, treatment-related side effects are a well-documented barrier in the use of pharmacological treatments, especially among those with depressive disorders,[52] and difficulty recognizing one's need for help, self-reliance and cost are among the most common barriers to seeking and continuing psychological treatment.[53] Understanding the disorder and the treatment course as well as having a positive relationship with the treating physician improve uptake and adherence to treatment in the management of mood and anxiety disorders.[13,52]

Despite having a self-reported mood and/or anxiety disorder diagnosis, close to one-fifth (18.2%) of affected Canadians reported they are not taking medications and have not received counselling in the past 12 months. These individuals tended to be younger (aged 18–34 years), have lower household income and have an anxiety disorder only compared to those taking medications and/or having received counselling. Interestingly, it has been shown that younger adults who strongly preferred psychological counselling over pharmacological treatment, but did not receive it, were likely to go without treatment altogether.[44] In addition, income-related barriers affect people's use of specialty providers of psychotherapy.[35] However, we do not know the severity of these individuals' symptoms nor their need for treatment. Also, we need to keep in mind the normal process by which

people decide to pursue treatment and that individuals may decline treatment on principle or for other reasons.

Finally, it is important to note that while our study focusses on those who self-reported a mood and/or an anxiety disorder diagnosis, as shown in a recent Canadian study,[25] up to 50% of those with symptoms compatible with a mood disorder are not diagnosed. Therefore, our study sample is a subset of all those who could potentially benefit from receiving a diagnosis and ultimately, treatment.

Strengths and limitations

Our study has a number of strengths, including a sample that was population-based and a survey that was administered by trained personnel using a structured format. However, the findings should be considered in light of several limitations. First, the generalizability of our study findings is limited due to the exclusion of Canada's three territories and some populations known to be at greatest risk for mental illness, such as Aboriginal peoples[54,55] living on Indian reserves or Crown lands, the homeless,[56] institutionalized patients[57] and prison residents[58] from the survey.

Second, our study findings are based on self-report data; therefore, recall bias, social desirability bias and/or conscious nonreporting may have resulted in misclassification of the outcome or explanatory variables.

Third, the 68.9% response rate for the 2014 SLCDC-MA may introduce bias due to non-response; however, Statistics Canada performed adjustments to the weights of responding persons to account for the loss of excluded or non-responding persons who are part of the SLCDC target population.[28]

Fourth, the survey did not collect information on some important topics related to the management of mood and/or anxiety disorders. For example, it lacked questions on newer modes of psychological counselling such as Internet-based cognitive behavioural therapy and support, the adequacy of treatment received and the severity of the respondents' symptoms. In order to further our understanding of the use of medications and/or counselling in the management of mood and/or anxiety disorders, these topics could be explored in a future survey. However, to ensure numbers are large enough to draw meaningful conclusions, targeting individuals with known mental health disorders rather than a subsample drawn from a population-based survey may be a preferred approach.

Fifth, there was an unexpectedly high proportion of respondents who selected the "other" response option when reporting reasons for not taking medications and/or having received psychological counselling, which we were not able to explore. Studies involving an in-depth qualitative analysis of the potential barriers followed by cognitive testing of the set items are warranted to ensure the response options in future surveys are more informative. Also, the inclusion of an open-ended question after the "other" response option to permit further exploration of potential barriers in future surveys is recommended.

Finally, there were a number of limitations due to limited sample size. For instance, our immigrant status measure lacked sensitivity related to the challenges faced by newer Canadians because we were not able to disaggregate this characteristic by time since immigration, due to small numbers in our immigrant classification. In addition, given the limited number of respondents in the counselling-only subgroup (n = 164) we were obliged to collapse both household income adequacy quintiles and education levels to ensure our estimates met Statistics Canada's sampling variability release guidelines.[28] Furthermore, a number of estimates relating to the characteristics of those within the counselling-only subgroup had high sampling variability (i.e. high coefficient of variation), limiting our ability to draw conclusions regarding potentially significant differences between the four treatment subgroups.

Conclusion

The vast majority of Canadian adults with a self-reported mood and/or anxiety disorder diagnosis reported taking prescription medications and/or having received psychological counselling in the past 12 months. While psychological counselling has been shown to have effects comparable with medication in several depressive and anxiety disorders, findings from our study demonstrated that most Canadian adults diagnosed with mood and/or anxiety disorders take medication; therefore, further exploration regarding access to and receipt of psychological counselling is warranted. Insights gained from exploring the factors associated with the use of these well-established treatments, and the reasons for not using them, emphasize the importance of discussing treatment options and perceived barriers with patients in order to ensure they receive the best treatment according to their need and preference.

Acknowledgements

The 2014 SLCDC-MA was funded by the Public Health Agency of Canada (PHAC) and developed in collaboration with Statistics Canada. This survey was developed through the contribution of time and expertise from members of PHAC's Mental Health and Mental Illness Advisory Committee. The 2013 Canadian Community Health Survey was conducted by Statistics Canada in partnership with Health Canada and PHAC with funding from the Canadian federal government.

Conflicts of interest

The authors declare no conflict of interest. No external financial or material support was obtained for this study.

Authors' contributions

SO carried out the statistical analysis and writing of the manuscript. All authors contributed to the study concept, informed the data analysis, assisted in the interpretation of results, critically revised the manuscript and approved the final version.

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https://doi.org/10.24095/hpcdp.37.5.05

Letter to the Editor

The implications of the professionalization of health promotion in Canada: a response to JR Graham's letter to the editor

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Health promotion is often understood through two related definitions: a discourse on the place of health in societies and a specialized field of intervention (e.g. practice) within the broader field of public health.[1] To strengthen health promotion practice in Canada, starting in 2006, Health Promotion Ontario (HPO) members conducted literature reviews and developed the first set of discipline-specific competencies in line with the Public Health Agency of Canada's (PHAC) 2005 Core Competencies for Public Health in Canada. Following this work, a Pan-Canadian Network for Health Promoter Competencies (PCNHPC) was consolidated and conducted practitioner consultations across Canada that culminated in the publication of the national Health Promoter Competencies in November 2015.[2]

JR Graham recently questioned whether this focus on competencies will lead to a narrowed "professionalization" of health promotion, which may in turn hinder the capacity of its discourse to influence other public health professional bodies.[3] Critics may further question any attempt to professionalize health promotion: how can health promotion proponents advocate for an independent profession when they also promote moving beyond professional cleavages and working collaboratively with other sectors? Such critiques may also find an echo in keeping with the fledgling state of the health promotion discourse in Canada today, which has endured repeated downfalls since its modern inception with the 1986 WHO Ottawa Charter for Health Promotion and its ensuing "Golden Age" in the late eighties and nineties among Canadian governmental and academic institutions.[4]

We argue that such critiques miss the diversified and often precarious nature of health promotion practice in Canada today. Unlike Graham suggests, health promoters are no longer "the new kids on the block" and represent instead an increasingly marginalized fringe in the public health workforce in keeping with narrowing budget priorities and strict mandate orientations. In this context, health promotion competencies that contribute to the legitimization of their work become vital resources. The function of creating a distinct professional space for health promoters is not to turn health promotion into the next public health, but to create an identity and space for people who are doing important health promotion work but who are rarely professionally represented in the many diverse settings and sectors in which they work.

Sustaining health promotion may involve its joint development as both a discourse and a field of practice. Unbeknownst to Graham at the time of his publication, members of the PCNHPC continued working together after November 2015 towards a new organization, Health Promotion Canada (HPC), with the intention of promoting a broader mandate related to health promotion.[5] Building on its earlier achievements, HPC aims to facilitate the development of provincial chapters dedicated to health promotion professionals with an overarching national infrastructure. While championing a core professional mandate, HPC broadened its strategy by integrating senior and junior academics as executive members. In addition, it is now planning to foster a larger space for academic and professional exchange and knowledge transfer as well as integrate other regional, national and international organizations already devoted to advancing health promotion.

We thank JR Graham and the HPCDP journal for engaging in a challenging debate on the development of health promotion in Canada. Professionalization indeed fits into broader problematic trends of neoliberalism, to which the health sector is not immune, and a critical stance is essential to ensure that any professionalizing actions do not detract or distract from the core efforts of promoting health. We argue here that the Competencies and the formation of HPC contribute to the development and sustainability of the field, but we invite others to join and continue in this discussion.

Highlights

- Health promotion represents two related concepts: a discourse on the place of health in societies and a specialized field of intervention within the broader field of public health.
- A singular focus on professionalizing health promotion may impede the capacity of its discourse to permeate other public health professional bodies.
- Initiatives that include and go beyond the development of professional resources are needed to help sustain its dedicated workforce and institutionalization.

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Other PHAC publications

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