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Anxiety disorders among older Canadians: Focus on Indigenous and racialized population groups

by Md Kamrul Islam and Heather Gilmour

ABSTRACT

Background
Anxiety disorders are among the most common mental health problems. However, few studies have examined the prevalence of, and factors associated with, anxiety disorders among older Canadians (65 years or older), with a particular focus on Indigenous and racialized population groups.

Data and methods
Data from eight cycles of the annual Canadian Community Health Survey (CCHS)—2015 to 2022—were used to examine anxiety disorders among older Canadians. Multivariable logistic regression, stratified by sex, was carried out on a pooled sample of 151,755 respondents aged 65 years or older.

Results
From 2015 to 2022, on average, 6.0% of older Canadians reported a diagnosis of an anxiety disorder, with females (7.5%) more likely than males (4.2%) to have done so. Indigenous males had higher odds of having an anxiety disorder than non-Indigenous, non-racialized males, while Chinese and other racialized females had lower odds of having an anxiety disorder than non-Indigenous, non-racialized females.

Interpretation
Findings of this study highlight the importance of considering Indigenous and racialized population groups disaggregated by sex when examining anxiety disorders among older Canadians to inform screening and intervention programs.

Keywords
anxiety disorder, older Canadians, Indigenous people, racialized populations, sex at birth

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What is already known on this subject?

- Anxiety disorders are the most common mental illness among Canadians. Females are more likely to have an anxiety disorder than males.

- Consequences of anxiety disorders can include poor physical and mental health, worsening psychosocial conditions, and deteriorating quality of life.

- Stressful life events and demographic, economic, and social factors are associated with anxiety disorders.

What does this study add?

- Among older Canadians, females had significantly higher odds of having anxiety disorders than males, even after accounting for demographic, socioeconomic, health-related, and geographic factors.

- Indigenous males had higher odds of having anxiety disorders than non-Indigenous, non-racialized males.

- Chinese and other racialized females were significantly less likely to have anxiety disorders than non-Indigenous, non-racialized females.

Anxiety disorders can be characterized by excessive fear and anxiety or avoidance of perceived threats, and they meet diagnostic criteria when symptoms are severe and enduring or disrupt normal functioning.[1] Anxiety disorders are the most common mental illness among Canadians[2] and include various conditions, such as social anxiety disorder, specific phobias, generalized anxiety disorder (GAD), and panic disorder. While treatable, these conditions can have many negative consequences on health and well-being, such as poor physical and mental health, worsening psychosocial conditions (e.g., social isolation and loneliness), and deteriorating quality of life.[3-7] Based on 204 countries and territories, Santomauro and colleagues[8] estimated that anxiety disorders caused 44.5 million disability-adjusted life years (DALYs) globally in 2020. Anxiety disorders are also associated with high needs for health care services at the individual level and increased expenditure at the health-system level.[5,9]

The prevalence of anxiety disorders tends to be lower in older adults compared with younger adults,[2,10] but uncertainty remains as to whether this is a true effect. It is possible that anxiety in older adults is under-recognized because of factors such as lower mental health literacy, lack of age-specific measurement of mental disorders, challenges of differentiating anxiety from symptoms of physical and cognitive comorbid conditions, or methodological issues such as the exclusion of older people living in institutions from survey data.[11-16] There may also be true age effects, such as psychological well-being improving with age or a healthy survivor effect such that the healthiest individuals survive to older ages.[14] Despite a lower prevalence of anxiety disorders in older adults, as the population ages, a growing number of older Canadians will be affected by anxiety disorders, and this will have implications for mental health care needs and costs for this age group.[17]

Drawing on life course theory,[18-19] previous studies have identified a range of factors contributing to a higher likelihood of anxiety disorders among people, including traumatic family history, stressful life events, and negative early life experiences.[20-22] Relying on the paradigm for social determinants of mental health,[23] others have identified a host of demographic, economic, and social factors associated with anxiety disorders.[10,24-25] Following the guidelines of Gender-based Analysis Plus (GBA+),[26] a growing body of research has evaluated the extent to which socioeconomic and identity factors (including race or ethnicity, and sexual orientation) interact with sex in relation to anxiety disorders among people.[10,11] For example, Yeretzian and colleagues[10] noticed that the association of employment and higher income with lower odds of anxiety disorders was stronger among males compared with females. A recent study also detected a positive association between the COVID-19 pandemic and anxiety disorders among Canadian women compared with men.[27]

However, previous studies have mostly focused on general populations (12 years and older), youth (18 to 24 years), and middle-aged Canadians (45 to 64 years). There is limited research on anxiety disorders among older Canadians,[15,27] particularly for Indigenous and racialized populations. While higher prevalence of anxiety disorders among females compared with males is well documented in the literature,[15,28] little is known about sex differences in anxiety disorders across Indigenous and racialized populations in Canada. Racialized groups in Canada have poorer health status overall, lower access to health care, and differences in mental health disorder prevalence at younger ages.[29-30] Recent survey data indicate that approximately half of racialized and Indigenous people (living off-reserve) experienced discrimination or unfair treatment and that this experience was associated with poorer mental health.[31] Additionally, a recent literature review concluded that discrimination and other forms of marginalization experienced by racialized populations have a detrimental effect on mental health, and specifically on anxiety disorders.[32]

The detrimental effect of discrimination and other forms of marginalization on mental health is in accordance with the presumption of social stress theory. Social stress theory posits that marginalized populations are more susceptible to stressors (e.g., discrimination) and obstacles to resources, which should result in a higher prevalence of mental disorders.[33-34] However, previous studies have also documented a lower prevalence of psychiatric disorders, including anxiety disorders, among racialized populations.[2,35-36] This paradoxical finding has led to several hypotheses, including racial biases in clinical interviews, selection biases, and measurement artefacts.[33-34,37] Further research is needed to better understand factors associated with anxiety disorders among marginalized groups of older Canadians. This will help inform the development of programs and prevention measures aimed at supporting older Canadians.

The objective of this study was to examine the prevalence of, and factors associated with, anxiety disorders among older Canadians (65 years or older) by sex, with particular interest in Indigenous and racialized population groups. Multiple years of Canadian Community Health Survey (CCHS; 2015 to 2022) data needed to be pooled to provide a large enough sample to disaggregate the analysis by sex and examine population subgroups. Drawing on the paradigm for social determinants of mental health,[23] the analysis included a host of demographic, socioeconomic, geographic, and health-related correlates of anxiety disorders.

Methods

Data sources

The CCHS is a nationally representative cross-sectional survey that collects information from the Canadian population aged 12 years and older living in private dwellings covering all provinces and territories. People living on First Nations reserves and other Indigenous settlements in the provinces, full-time members of the Canadian Forces, institutionalized populations, and residents of certain remote regions are excluded from the survey (about 2% of the Canadian population). The CCHS sample is selected using different sampling frames (area frame and list frame) according to the age group. A detailed description of the sampling frames and household sampling strategies is available at https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1383236#a2.

The survey collects a wide range of information related to health status, health care utilization, and determinants of health. For the 2015 to 2020 cycles of the CCHS, two separate computer-assisted interviewing (CAI) applications were used to collect data: telephone interviews (CATI) and personal interviews (CAPI). In the 2021 CCHS, all interviews were conducted using CATI because of the COVID-19 pandemic. In the 2022 CCHS, data were collected using an electronic questionnaire (EQ) through (1) self-response by EQ, (2) interviewer-administered EQ by telephone, and (3) interviewer-administered EQ in person. The response rates for the CCHS were 57.5% in 2015, 61.3% in 2016, 62.8% in 2017, 58.8% in 2018, 54.4% in 2019, 29.7% in 2020, 24.1% in 2021, and 42.7% in 2022. Detailed documentation of the most recent survey is available at https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1383236.

Study sample from the Canadian Community Health Survey—2015 to 2022

The study sample is restricted to people aged 65 years and older. Those who did not respond to the question on anxiety disorders (n=356) were excluded from the analysis. In addition, respondents living in the three territories were also excluded because those data were not available in single-year data files (2021 and 2022). Thus, the final sample for the study included 151,755 respondents aged 65 years or older (66,855 males and 84,900 females), representing 6.2 million older Canadians living in private households in the 10 provinces from 2015 to 2022. The large sample afforded by pooled data was needed to examine population subgroups (e.g., Indigenous people, and South Asian, Chinese, and other racialized groups). Background characteristics of the study sample are shown in Appendix A.

Definitions

Anxiety disorders

A diagnosis of an anxiety disorder was established by asking respondents: "Do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?" People were instructed to respond "yes" if their condition had been diagnosed by a health professional and had lasted, or was expected to last, at least six months.

Indigenous and racialized population groups

Respondents were asked whether they were First Nations (includes Status and non-Status Indians), Métis, or Inuk (Inuit), and, if not, whether they belonged to one or more racial or cultural groups. Based on these questions and available sample size, five population groups were created: Indigenous; South Asian; Chinese; other racialized; and non-Indigenous, non-racialized. The other racialized category combines groups for which the sample was too small for separate analysis in this study (Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean, Japanese, visible minority not indicated elsewhere, and multiple visible minorities).

Covariates

The selection of covariates for the multivariable analyses was guided by the literature and data availability in the CCHS, and selected covariates included demographic, socioeconomic, and health variables that have been associated with mental health.

Before 2019, the CCHS collected information on respondents' sex at birth only. In 2019 and subsequent cycles, respondents' self-reported sex at birth and gender identity were both collected. Thus, since the gender variable was not available for the full period of this study, sex at birth (male and female) was used in this analysis. Respondents' ages were categorized into three groups: 65 to 74, 75 to 84, and 85 or older. Living arrangements were classified as living alone and living with family or others.

Among socioeconomic factors, respondents' level of education (highest certificate, diploma, or degree completed) was classified as less than postsecondary or postsecondary. The postsecondary category includes postsecondary certificates and diplomas and university degrees. Adjusted household income quintiles were labelled as lowest, low-middle, middle, high-middle, and highest. Immigrant status was categorized as immigrant or Canadian-born person.

Eight chronic conditions were consistently available in all cycles of the CCHS from 2015 to 2022: arthritis (e.g., osteoarthritis, rheumatoid arthritis, gout), high blood pressure, high blood cholesterol or lipids, heart disease, stroke, diabetes, cancer, and Alzheimer's disease or any other dementia. Multimorbidity was defined as having two or more of these chronic conditions diagnosed by a health professional.

Place of residence was classified as rural (less than 1,000 population) and urban (1,000 or greater population). Timing of the survey was coded as before the COVID-19 pandemic (January 2015 to March 2020) and during the COVID-19 pandemic (September 2020 to December 2022).

Analytical approach

Eight cycles of the CCHS, 2015 to 2022, were combined following the pooled approach, where sample data are combined at the individual level so that the resulting dataset can be treated as if it were a sample from one population.[38] Original sampling weights were rescaled by a factor of eight; resulting estimates are interpreted as representing the characteristics of the average population from 2015 to 2022. A detailed description of the pooled approach for combining CCHS cycles is available at https://www150.statcan.gc.ca/n1/pub/82-003-x/2009001/article/10795-eng.htm.

The pooled approach can obscure cycle-to-cycle trends in anxiety disorders. While assessing trends in anxiety prevalence over time is not an objective of this study, it was necessary to evaluate the overall prevalence of anxiety disorders among older Canadians by two-year cycle to determine the appropriateness of using the pooled cycle approach. In this case, the prevalence of anxiety disorders remained stable over the study period, with the exception of an increase for both males and females in 2021 and 2022 (Table 1). This may be a result of the COVID-19 pandemic, which has been associated with increased prevalence of anxiety among older adults.[27] Thus, the analytical technique of pooling cycles was judged to be appropriate for this study. A survey timing variable (before the COVID-19 pandemic and during the COVID-19 pandemic) was included in the multivariable model to adjust for a potential cycle effect. Additionally, to determine whether the prevalence of anxiety among Indigenous and racialized population groups was disproportionately affected by the pandemic, interaction effects between population groups and the pandemic were investigated—none were significant.

Weighted percentages and cross-tabulations of anxiety disorders among older Canadians were estimated. Multivariable logistic regression evaluated the extent to which the presence of anxiety disorders varied across Indigenous and racialized population groups in relation to the non-Indigenous, non-racialized population, while controlling for demographic, socioeconomic, geographic, and health-related covariates. The percentages of missing cases in the covariates were relatively low, ranging from 0.02% (multimorbidity) to 1.9% (population groups). List-wise deletion of missing cases was applied in the regression analysis.

Sampling weights were used in the analyses to account for the survey design and non-response. Bootstrap weights were also included in the analyses using SAS-callable SUDAAN 11.0.3 to account for the underestimation of standard errors.[39] The significance level was set at $p < 0.05$.

Table 1

Percentage reporting an anxiety disorder, household population aged 65 years or older, Canada, excluding territories, 2015 to 2022

Year	Males %	Males 95% confidence interval from	Males 95% confidence interval to	Females %	Females 95% confidence interval from	Females 95% confidence interval to
2015-2016[†]	3.8	3.3	4.4	6.7	6.1	7.3
2017-2018	3.8	3.3	4.4	6.9	6.3	7.4
2019-2020	3.9	3.4	4.3	6.8	6.3	7.3
2021-2022	5.3 *	4.9	5.8	9.5 *	8.9	10.1

[†] reference category

* significantly different from reference category ($p < 0.05$)

Sources: Canadian Community Health Survey, 2015 to 2022.

Table 2

Percentage reporting an anxiety disorder by sex at birth and selected characteristics, household population aged 65 years or older, Canada, excluding territories, 2015 to 2022

Characteristics	Males %	95% confidence interval from	to	Females %	95% confidence interval from	to
Overall	4.2	4.0	4.5	7.5 ‡	7.2	7.8
Population group						
Indigenous	7.2 *	5.5	9.4	10.4 *‡	8.9	12.2
South Asian	3.8 E	2.4	5.8	7.1 E	4.5	11.1
Chinese	2.3 *E	1.2	4.1	4.2 *E	2.7	6.5
Other racialized	3.6 E	2.6	5.1	4.9 *	3.8	6.2
Non-Indigenous, non-racialized†	4.3	4.1	4.6	7.8 ‡	7.5	8.1
Age group						
65 to 74†	4.4	4.1	4.7	8.3 ‡	7.9	8.7
75 to 84	3.8 *	3.4	4.3	6.6 *‡	6.1	7.0
85 or older	4.1	3.3	5.3	5.7 *‡	4.9	6.5
Living arrangement						
Living alone	5.4 *	5.0	5.9	7.9 *‡	0.2	7.5
Living with family or others†	3.9	3.6	4.2	7.2 ‡	0.2	6.9
Highest level of education						
Less than postsecondary	4.6 *	4.3	5.0	8.0 *‡	7.5	8.4
Postsecondary†	3.9	3.6	4.3	7.1 ‡	6.7	7.5
Household income quintile						
Lowest (Q1)	6.0 *	5.4	6.7	9.4 *‡	8.8	10.0
Low-middle (Q2)	4.4 *	3.9	4.9	7.7 *‡	7.1	8.3
Middle (Q3)	3.9 *	3.5	4.5	6.6 *‡	6.0	7.3
High-middle (Q4)	3.3	2.9	3.8	6.7 *‡	6.0	7.5
Highest (Q5)†	3.0	2.5	3.6	5.1	4.5	5.8
Living with multimorbidity						
Yes	5.6 *	5.2	6.0	9.4 *‡	9.0	9.9
No†	2.9	2.6	3.2	5.6 ‡	5.3	6.0
Immigrant status						
Immigrant	3.9	3.3	4.4	5.9 *‡	5.4	6.6
Canadian-born†	4.4	4.2	4.7	8.1 ‡	7.8	8.4
Place of residence						
Urban	4.4 *	4.1	4.7	7.6 ‡	7.3	8.0
Rural†	3.7	3.3	4.0	7.1 ‡	6.6	7.6
Timing of the survey						
Before COVID-19†	3.9	3.6	4.2	6.7 ‡	6.3	7.0
During COVID-19	4.8 *	4.4	5.2	8.8 *‡	8.4	9.4

† reference category

* significantly different from reference category (p < 0.05)

‡ significantly different from males (p < 0.05)

E use with caution

Sources: Canadian Community Health Survey, 2015 to 2022.

Results

Characteristics of the study population

The study population represents 2.9 million males and 3.3 million females (46.4% and 53.5%, respectively) from 2015 to 2022 living in the 10 provinces. The majority were in the age group of 65 to 74 years and in the non-Indigenous, non-racialized population.

A significantly higher percentage of females (36.9%) lived alone compared with males (20.9%). Lower percentages of females had a postsecondary education and belonged to the highest income quintile, compared with males. About half of the study population was living with multimorbidity (49.8% of males and 49.3% of females). The majority were born in Canada and living in urban areas (Appendix A).

Prevalence of anxiety disorders

Based on pooled CCHS data from 2015 to 2022, on average, 6.0% of older Canadians (95% confidence interval: 5.8% to 6.2%) reported a diagnosis of an anxiety disorder, with prevalence significantly higher for females compared with males (7.5% and 4.2%, respectively). The prevalence of anxiety disorders was higher among Indigenous people than the non-Indigenous, non-racialized population—for both males and females (Table 2). The prevalence of anxiety disorders was lower among Chinese people than non-Indigenous, non-racialized people—for both males and females. In contrast, among other racialized populations, the prevalence of anxiety disorders was lower for females—but not for males—compared with the non-Indigenous, non-racialized population. The prevalence of anxiety disorders across other selected covariates is shown in Table 2.

Factors associated with anxiety disorders

In multivariable analysis that accounted for demographic, socioeconomic, health-related, and geographic factors, females were nearly twice as likely (adjusted odds ratio [aOR]=1.8) as males to have anxiety disorders (Appendix B). Analyses stratified by sex revealed that Indigenous males had 1.5 times the odds of having anxiety disorders compared with non-Indigenous, non-racialized males (Table 3). Conversely, females belonging to the Chinese (0.6 times) and other racialized (0.7 times) population groups had lower odds of having anxiety disorders than non-Indigenous, non-racialized females after controlling for other factors. There were no significant differences in the odds of having anxiety disorders among South Asian populations when compared with the non-Indigenous, non-racialized population.

Among females, the odds of having anxiety disorders were lower for older age groups compared with those aged 65 to 74 years. For males, the lower odds of having anxiety disorders were significant only for those aged 75 to 84 years compared with those aged 65 to 74 years. People living alone were more

likely to have an anxiety disorder, but this association persisted only for males in the multivariable model (1.2 times).

A strong gradient was evident in the association between income and anxiety, whereby older Canadians in lower-income households had higher odds of having anxiety disorders compared with those living in the households with the highest incomes. For example, both males and females in the lowest-income households had 1.9 times the odds of having anxiety compared with those in the highest-income households, whereas both males and females in middle-income households had 1.3 times the odds of having anxiety compared with those in the highest-income households.

Among females, immigrants were less likely than their Canadian-born counterparts to have an anxiety disorder (aOR=0.8). For both sexes, those living with multimorbidity or in urban areas had higher odds of having anxiety disorders, as did those surveyed during the pandemic compared with before the pandemic.

Discussion

This study examined prevalence of, and factors associated with, anxiety disorders among older Canadians, with a focus on Indigenous and racialized population groups. Based on pooled CCHS data from 2015 to 2022, on average, 6.0% of older Canadians had anxiety disorders. Overall, females were more likely to have an anxiety disorder than males after accounting for demographic, socioeconomic, health-related, and geographic factors. The higher likelihood of having anxiety disorders for females compared with males is well documented in the literature and remains present in older adults.[15,24,28,40-41]

This study detected a lower likelihood of anxiety disorders with increasing age—consistent with previous research,[13,24,42] with one exception.[11] This finding may be attributable to healthy survivor bias (healthier people are more likely to survive and live in private dwellings) and the exclusion of those living in long-term care homes from the analysis. Alternatively, this may represent a true age effect. The lower likelihood of having a diagnosed anxiety disorder with increasing age may stem from a lower propensity to seek mental health care for various reasons, such as stigma, lower mental health literacy, or accessibility barriers.[14,42]

Previous research has found that Indigenous people are more likely to have anxiety disorders.[43-45] A number of factors behind poor mental health outcomes of Indigenous people have been identified, including historical and intergenerational trauma, socioeconomic disparities, geographical barriers to health care access, and persistent inequities in access to health care services.[44-46] In this study, Indigenous males had higher odds of having anxiety disorders than non-Indigenous, non-racialized males. However, Indigenous females were more likely than non-Indigenous, non-racialized females to have an anxiety disorder, but this association did not persist in multivariable analysis. In stepwise regression analysis (not shown), increased odds of having anxiety for Indigenous females persisted when

sociodemographic factors were accounted for, but they were no longer significant when multimorbidity was included in the model. This is consistent with evidence that physical multimorbidity is predictive of anxiety in older adults.[47] Worry and difficulty adjusting to the burden of multiple health conditions or the effect of symptoms such as sleep problems, pain, or disability may increase the risk of anxiety among those living with multimorbidity.[47]

Lower odds of anxiety disorders were not significant for those belonging to the South Asian population group compared with the non-Indigenous, non-racialized population. However, Chinese and other racialized females were less likely to have anxiety disorders than non-Indigenous, non-racialized females. Using data from the 2022 Mental Health and Access to Care Survey, Stephenson[2] revealed a lower prevalence of anxiety disorders among South Asian, Chinese, Filipino, and Black

Table 3

Adjusted odds ratios of reporting an anxiety disorder, household population aged 65 years or older, Canada, excluding territories, 2015 to 2022

Characteristics	Males			Females		
	Odds ratio	95% confidence interval		Odds ratio	95% confidence interval	
		from	to		from	to
Population group						
Indigenous	1.5 *	1.1	2.1	1.2	1.0	1.4
South Asian	0.8	0.5	1.3	0.9	0.5	1.5
Chinese	0.5	0.2	1.1	0.6 *	0.3	1.0
Other racialized	0.8	0.5	1.2	0.7 *	0.5	0.9
Non-Indigenous, non-racialized[†]	1.0	...	...	1.0	...	...
Age group						
65 to 74[†]	1.0	...	...	1.0	...	...
75 to 84	0.8 *	0.7	0.9	0.7 *	0.6	0.8
85 or older	0.8	0.6	1.1	0.5 *	0.4	0.6
Living arrangement						
Living alone	1.2 *	1.1	1.4	1.0	0.9	1.1
Living with family or others[†]	1.0	...	...	1.0	...	...
Highest level of education						
Less than postsecondary	1.0	0.9	1.2	1.1	1.0	1.2
Postsecondary[†]	1.0	...	...	1.0	...	...
Household income quintile						
Lowest (Q1)	1.9 *	1.5	2.4	1.9 *	1.7	2.3
Low-middle (Q2)	1.5 *	1.2	1.8	1.6 *	1.3	1.8
Middle (Q3)	1.3 *	1.0	1.7	1.3 *	1.1	1.5
High-middle (Q4)	1.1	0.8	1.4	1.3 *	1.1	1.6
Highest (Q5)[†]	1.0	...	...	1.0	...	...
Immigrant status						
Immigrant	1.0	0.8	1.2	0.8 *	0.7	0.9
Canadian-born[†]	1.0	...	...	1.0	...	...
Living with multimorbidity						
Yes	2.0 *	1.7	2.2	1.8 *	1.6	1.9
No[†]	1.0	...	...	1.0	...	...
Place of residence						
Urban	1.2 *	1.1	1.4	1.1 *	1.0	1.2
Rural[†]	1.0	...	...	1.0	...	...
Timing of the survey						
Before COVID-19[†]	1.0	...	...	1.0	...	...
During COVID-19	1.2 *	1.1	1.3	1.3 *	1.2	1.4

... not applicable

[†] reference category

* significantly different from reference category ($p < 0.05$)

Sources: Canadian Community Health Survey, 2015 to 2022.

people in Canada compared with the non-racialized population. Stigma associated with reporting mental disorders is thought to be higher among racialized people[48] and may contribute to the lower likelihood of anxiety disorder diagnosis among racialized population groups. Also, many of the clinical tools used to assess anxiety disorders might have been developed on non-racialized populations, raising the issue of the cultural relevance of these tools for diagnosing racialized populations and Indigenous people.

Lower household income was found to be associated with higher odds of having anxiety disorders—this has been consistently reported in previous research.[49-51] The association between household income and anxiety disorders is likely to involve interactions of multiple mechanisms. One of the mechanisms may be that lower household income results in increased psychological stress, diminished social support, and reduced capacity to cope with adversity, leading in turn to negative mental health outcomes, including anxiety disorders.[51-52]

Both males and females were more likely to have anxiety disorders during the COVID-19 pandemic than before the pandemic, consistent with previous research.[2,53-55] Previous studies have documented several contributing factors to the higher likelihood of having anxiety disorders, including COVID-19 restrictions, physical distancing measures, limited support networks, fear of contracting COVID-19, and difficulty accessing health care services during the pandemic.

Strengths and limitations

To the best of the authors' knowledge, this is the first study that evaluated the extent to which anxiety disorders vary among Indigenous and racialized groups of older Canadians in relation to the non-Indigenous, non-racialized population. The large sample size facilitated separate analysis for males and females, and examination of population subgroups.

However, this study has some limitations. The data are cross-sectional and causality cannot be inferred. It was not possible to examine the association of gender (versus sex) with anxiety disorders. Types of anxiety disorders (e.g., social anxiety disorder, specific phobias, post-traumatic stress disorder) could not be differentiated. This analysis is based on self-reported anxiety disorders diagnosed by a health professional—not measured directly (e.g., clinically)—and this could lead to biased estimates of anxiety disorders among older Canadians. However, O'Donnell and colleagues[56] have reported a similar prevalence of anxiety disorders derived from the CCHS and administrative data (hospital discharge records and physician claims).

In 2022, the CCHS implemented a collection mode change from CATI and CAPI to an EQ format with CATI and CAPI follow-up for non-response. In addition, there were some changes in questionnaire wording. For example, from 2015 to 2021, in the question on anxiety disorders, respondents were asked: "Do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?" In the 2022 CCHS, respondents were asked: "Do you have an anxiety disorder such as phobia, panic, or generalized anxiety?" As a result, effect estimates based on the CCHS before the change in design may be different from those based on the 2022 CCHS. A separate analysis was carried out based on combined CCHS data from 2015 to 2021 to evaluate the extent to which the effect estimates differ from the estimates of this study. In both cases, the odds ratios of anxiety disorders were very similar (data not shown).

Survey response rates varied over the analytical period. However, in each cycle, survey weights were adjusted (non-response adjustments and calibration using available auxiliary information) to minimize any potential bias that could arise from survey non-response. Despite the sizable sample size afforded by the pooling method, detailed breakdowns of population groups of interest (e.g., more racialized groups; First Nations people, Métis or Inuit; groups based on age at immigration or time since immigration) were not possible. Additionally, data on type of immigrant (economic immigrants, family immigrants, or refugees) were not available. Finally, the findings of this study are not representative of the total Indigenous population, since the CCHS excludes those living on reserves and Indigenous settlements in the provinces. In addition, a large proportion of the Inuit population is excluded because data from the territories are not included.

Conclusion

Using a large representative sample of older Canadians, this study detected significant variations in the prevalence of anxiety disorders among Indigenous and racialized populations in relation to non-Indigenous, non-racialized people. The findings of this study highlight the importance of considering racialized population groups disaggregated by sex when examining anxiety disorders among older Canadians. Other factors that were associated with higher odds of having anxiety disorders for both males and females included lower household income, multimorbidity, urban residence, and the COVID-19 pandemic, while increasing age was associated with lower odds. For females, being an immigrant, and for males, living alone were significantly associated with increased odds of having anxiety disorders. Future research could focus on examining mental health care service use and unmet mental health care needs among older Canadians living with anxiety disorders.

Appendix A

Weighted percentage distribution by sex at birth and selected characteristics, household population aged 65 years or older, Canada, excluding territories, 2015 to 2022

	Males				Females			
			95% confidence interval				95% confidence interval	
Characteristics	Number ('000)	Percent	from	to	Number ('000)	Percent	from	to
Population group								
Indigenous	57	2.0	1.9	2.2	62	1.9	1.8	2.1
South Asian	89	3.2	2.9	3.5	79	2.4 ‡	2.2	2.7
Chinese	88	3.1	2.8	3.4	82	2.5 ‡	2.3	2.8
Other racialized	168	5.9	5.6	6.4	195	6.0	5.6	6.4
Non-Indigenous, non-racialized	2,420	85.8	85.1	86.4	2,828	87.1 ‡	86.6	87.6
Age group								
65 to 74	1,797	62.1	61.7	62.6	1,955	58.7 ‡	58.3	59.1
75 to 84	859	29.7	29.3	30.2	1,026	30.8 ‡	30.4	31.2
85 or older	236	8.2	7.8	8.5	350	10.5 ‡	10.2	10.9
Living arrangement								
Living alone	602	20.9	20.1	21.8	1,224	36.9 ‡	35.7	38.0
Living with family or others	2,276	79.1	78.2	79.9	2,097	63.1 ‡	62.0	64.3
Highest level of education								
Less than postsecondary	1,188	41.9	41.2	42.5	1,654	50.7 ‡	50.1	51.3
Postsecondary	1,648	58.1	57.5	58.8	1,609	49.3 ‡	48.7	49.9
Household income quintile								
Lowest (Q1)	588	20.3	19.8	20.9	934	28.0 ‡	27.5	28.6
Low-middle (Q2)	727	25.2	24.6	25.7	879	26.4 ‡	25.9	26.9
Middle (Q3)	608	21.0	20.5	21.5	637	19.1 ‡	18.7	19.6
High-middle (Q4)	499	17.3	16.8	17.8	474	14.2 ‡	13.8	14.6
Highest (Q5)	470	16.2	15.8	16.7	406	12.2 ‡	11.8	12.6
Immigrant status								
Immigrant	796	28.0	27.4	28.7	863	26.5 ‡	25.9	27.0
Canadian-born	2,046	72.0	71.3	72.6	2,399	73.5 ‡	73.0	74.1
Living with multimorbidity								
Yes	1,440	49.8	49.2	50.4	1,641	49.3	48.7	49.8
No	1,452	50.2	49.6	50.8	1,689	50.7	50.2	51.3
Place of residence								
Urban	2,242	77.5	77.0	78.1	2,696	81.0 ‡	80.5	81.4
Rural	650	22.5	21.9	23.0	634	19.0 ‡	18.6	19.5
Timing of the survey								
Before COVID-19	1,777	61.5	61.2	61.7	2,063	61.9 ‡	61.7	62.2
During COVID-19	1,115	38.5	38.3	38.8	1,267	38.1 ‡	37.8	38.3

‡ significantly different from males ($p < 0.05$)

Note: The study population represents 6.2 million Canadians aged 65 years or older from 2015 to 2022 (46.4% males and 53.5% females).

Sources: Canadian Community Health Survey, 2015 to 2022.

Appendix B
Adjusted odds ratios of reporting an anxiety disorder, household population aged 65 years or older, Canada, excluding territories, 2015 to 2022

Characteristics	Males and females		
	Odds ratio	95% confidence interval	
		from	to
Population group			
Indigenous	1.3 *	1.1	1.5
South Asian	0.8	0.6	1.2
Chinese	0.6 *	0.4	0.8
Other racialized	0.7 *	0.6	0.9
Non-Indigenous, non-racialized[†]	1.0	…	…
Sex at birth			
Female	1.8 *	1.6	1.9
Male[†]	1.0	…	…
Age group			
65 to 74[†]	1.0	…	…
75 to 84	0.7 *	0.7	0.8
85 or older	0.6 *	0.5	0.7
Living arrangement			
Living alone	1.1	1.0	1.1
Living with family or others[†]	1.0	…	…
Highest level of education			
Less than postsecondary	1.0	1.0	1.1
Postsecondary[†]	1.0	…	…
Household income quintile			
Lowest (Q1)	1.9 *	1.7	2.2
Low-middle (Q2)	1.5 *	1.3	1.8
Middle (Q3)	1.3 *	1.1	1.5
High-middle (Q4)	1.2 *	1.1	1.4
Highest (Q5)[†]	1.0	…	…
Immigrant status			
Immigrant	9.0 *	0.8	1.0
Canadian-born[†]	1.0	…	…
Living with multimorbidity			
Yes	1.8 *	1.7	2.0
No[†]	1.0	…	…
Place of residence			
Urban	1.1 *	1.1	1.2
Rural[†]	1.0	…	…
Timing of the survey			
Before COVID-19[†]	1.0	…	…
During COVID-19	1.3 *	1.2	1.4

… not applicable
[†] reference category
* significantly different from reference category ($p < 0.05$)
Sources: Canadian Community Health Survey, 2015 to 2022.

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