

Title: Are Indigenous determinants of health associated with self-reported health professional-diagnosed anxiety disorders among Canadian First Nations adults?: Findings from the 2012 Aboriginal Peoples Survey

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ABSTRACT

We estimated the prevalence of self-reported health professional-diagnosed anxiety disorders among Canadian First Nations adults living off-reserve, and assessed the relationship between anxiety disorders and Indigenous determinants of health (Status Indian, residential school attendance, knowledge of Indigenous language, and participation in traditional activities) using the 2012 Aboriginal Peoples Survey. Multivariable logistic regression models were performed using bootstrap weights. The prevalence of anxiety disorders was 14.5% among off-reserve First Nations adults. There was an increased odds of anxiety disorders among those participating in traditional activities compared to their counterparts (aOR: 1.46, 95% CI: 1.12 to 1.90). No association was found between anxiety disorders and other Indigenous determinants of health. There is a high prevalence of self-reported anxiety among First Nations adults living off-reserve. However, further studies are warranted to identify and assess the role of Indigenous determinants of health for anxiety disorders and other prevalent mental health conditions in this population.

Key words (3-6 MeSH key words and subjects): Indigenous population; Canada; Anxiety disorders;

INTRODUCTION

Anxiety disorders encompass a wide range of conditions and lead to a substantial economic and societal burden through medical costs for psychiatric and non-psychiatric treatments, emergency care, hospitalization and prescription medication, reduced productivity and absenteeism, and suicide (Lepine, 2002). Generalized anxiety disorder is highly prevalent among the Canadian population (Watterson, Williams, Lavorato, & Patten, 2017), with a lifetime prevalence of 8.7% in 2012 among those aged 15 years and over (Pearson, Janz, & Ali, 2013). Few studies have examined the prevalence of anxiety disorders among Indigenous populations. In Canada, Indigenous populations comprise First Nations (60.8%), Métis (32.3%), and Inuit (4.2%) who live in Indian reserves and settlements (on reserve) and other areas (off-reserve), and represent 4% of Canadian population (Statistics Canada, 2013). As a result, the burden of anxiety disorders for the off-reserve population at the national level remains undetermined. However, based on the results from studies examining other mental health outcomes, the prevalence among the Indigenous population of Canada is expected to be higher than in the general Canadian population. For example, using data from the 2002 Canadian Community Health Survey (CCHS), Caron and Liu found that Indigenous Canadians living off-reserve (>15 years old) were more likely to report suffering from psychological distress, mental health disorders, or substance abuse compared to the general Canadian population (Caron & Liu, 2010). The aforementioned burden of anxiety disorders in Canadians were estimated using the standardized World Health Organization Composite International Diagnostic Interview (WHO – CIDI), which is based on respondent reported symptoms in the CCHS. WHO – CIDI was found to have satisfactory concordance with Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnoses for life time and 12-month prevalence of anxiety disorders (Haro et al., 2006). During 2009-2010, 39% of First Nations adult study participants (n=554) residing in the urban area of Hamilton, Ontario likely suffered from anxiety and/or depression based on their Kessler Psychological Distress Scale K-10 scores (Firestone et al., 2015). However, anxiety and depression were combined in this study making it difficult to speculate on the burden of anxiety disorders alone. Even higher rates were found in the First Nations Regional Health Survey 2008-2010, where 50.7% of First Nations adult survey respondents living on-reserve reported feeling moderately or highly distressed, a proxy measure of depression and anxiety symptoms using the Kessler Psychological Distress Scale (First Nations Information Governance Centre (FNIGC), 2012). Of note, Kessler Psychological Distress Scale has been found to be valid and reliable in Canadian Indigenous peoples and a higher mean score was found among respondents with self-

reported diagnosed anxiety disorders (Bougie, Arim, Kohen, & Findlay, 2016). Contrastingly, findings from a retrospective chart review on Indigenous and non-Indigenous patients living in Bella Coola Valley, British Columbia (n=2375) suggest that depression-anxiety disorder prevalence rates were similar among the two populations (Thommasen, Baggaley, Thommasen, & Zhang, 2005). However, the later study focused on only one rural community and therefore may not be generalizable to other Indigenous populations in Canada.

Age, sex, marital status, education, income, and place of residence are well-established socio-demographic determinants of health among Canadian Indigenous and non-Indigenous peoples (Native Women's Association of Canada, 2007; Reading & Wien, 2009b; Wilson & Rosenberg, 2002). Additionally, several Indigenous determinants of health, factors that are unique to the lives of Indigenous people, may play an important role in affecting the mental health of Indigenous peoples. Status Indian, a legal term that indicates who is recognized as a Registered or Treaty Indian as defined by the Indian Act of Canada (not applicable for Métis and Inuit peoples), may be regarded as an important factor relating to mental health for several reasons. Not only does it provide endorsement of Indigenous ancestry, identity, and a sense of belongingness for many Indigenous peoples (Bonita, 2004), but it also provides supplementary access to non-insured health benefits, one of which is mental health counseling services (Health Canada, 2015). However, not all First Nations have Status Indian; three-fourths of First Nations reported having Status Indian in 2011 (Kelly-Scott & Smith, 2015). Indigenous languages are important components of Indigenous identity as they depict the unique histories and cultures of various Indigenous groups (Norris, 2007). High cultural continuity, or intact cultural identity, has been found to be associated with a decreased risk of suicide among Indigenous peoples (Chandler & Lalonde, 1998; Mussell, Cardiff, & White, 2004). Participation in traditional activities was found to decrease the risk of having mental or psychological conditions among First Nations and Inuit populations living on and off-reserve (Kant, Vertinsky, Zheng, & Smith, 2013; Richmond & Ross, 2009). Lastly, residential school attendance may be considered an important mental health predictor as many Indigenous children faced reclusion from their families and communities while they were forced to attend these schools until 1996 (Aboriginal Healing Foundation, 2002). Furthermore, ancestral (i.e., family members from previous generations) residential school attendance was found to be associated with an increased likelihood of having lower self-perceived mental health, mental distress, suicidal ideation, and suicide attempts (Hackett, Feeny, & Tompa, 2016).

The majority (68%) of the First Nations people lived off-reserve in 2011 (Kelly-Scott & Smith, 2015). No prior study examining Indigenous factors as determinants of anxiety among off-reserve First Nations population was found although Status Indian, knowledge of Indigenous language, participation in traditional activities, and residential school attendance are increasingly being recognized as important determinants of general and mental health within this population. Focusing research activities on the role of the Indigenous determinants of health will enhance our understanding of the impact of these factors on mental health and, ultimately, may help to design culturally appropriate interventions to prevent and alleviate the consequences of anxiety disorders among off-reserve First Nations peoples.

The objectives of this study were to 1) estimate the prevalence of self-reported health professional-diagnosed anxiety disorders among First Nations adults living off-reserve in Canada in 2012, and 2) assess the relationship between anxiety disorders and four specific Indigenous determinants of health (Status Indian, residential school attendance, knowledge of Indigenous language, and participation in traditional activities), while controlling for the following socio-demographic determinants of health: age, sex, marital status, educational attainment, total personal income, and place of residence. We hypothesized that Status Indian, knowledge of an Indigenous language, and participation in traditional activities may decrease the risk of anxiety disorders whereby personal or family members' attendance at a residential school may increase the risk of anxiety disorders.

METHODS

Study design

This study used a cross-sectional design using secondary data from Statistics Canada (Statistics Canada, 2012).

Data

The 2012 Aboriginal Peoples Survey (APS) public use micro-data file (PUMF) was used for this study. (Statistics Canada, 2017) This post-Census survey was administered to all people who identified themselves as Indigenous (First Nations, Métis, and Inuit) Canadians who were over the age of six and living off-reserve (Cloutier & Langlet, 2014). The 2012 survey was the fourth cycle of the APS, conducted between February 6, 2012 and July 30, 2012, collecting information from 24,803 respondents with an overall response rate of 76%.

Inclusion/exclusion criteria

Our study sample consisted of 6,160 respondents, aged 19 years or older, who self-identified themselves as single identity First Nations. We also limited the analysis to those who did not require a proxy to respond to the survey as questions related to mental health were not asked through the proxy responses.

Measurement instruments

Anxiety disorders, the outcome of interest, was measured by a binary variable and was self-reported by the respondents answering to a single survey question assessing if they had any health professional diagnosed anxiety disorders such as a phobia, obsessive-compulsive disorder or panic disorder that had lasted or expected to last six months or more. While the validity of self-reported diagnosis of anxiety disorders is not available, adequate validity of self-reported physician-diagnosed depression has been reported among university graduates in Spain (Sanchez-Villegas et al., 2008). Status Indian was categorized as “yes” for those who reported being a Status Indian and “no” for those who were not Status Indian. Knowledge of Indigenous language was categorized as “yes” for those who either spoke or understood an Indigenous language, even if only a few words, and “no” for those who neither spoke nor understood an Indigenous language. APS questions on Indigenous traditional activities asked respondents whether they participated in activities such as making clothing or footwear; arts or crafts; hunting, fishing, or trapping; and gathering wild plants. Respondents were categorized into two groups: “yes” for those who engaged in one or more traditional activities and “no” for those who did not do any of these activities in the past year. We measured residential school attendance by a categorical variable with the following three groups: “neither the respondent nor any family member attended”, “only family member (parents/grandparents/other) attended”, and “respondent or respondent and any family member attended”.

In terms of the socio-demographic determinants of health, age was grouped into five categories: “19–24 years”, “25–34 years”, “35–44 years”, “45–54 years”, and “55 years and older”. Marital status was classified into three categories: “single”, “married/living common-law”, and “separated/divorced/widowed”. Sex was reported as “male” or “female”. Educational attainment was categorized into “high school diploma or equivalent or less” and “any post-secondary education.” Total personal income was grouped into two categories based on median income: “less than

\$20,000” and “more than \$20,000”. The median income of \$20,000 is consistent with the 2012 Canadian national average low-income cut-off (Statistics Canada, 2014). Finally, place of residence was categorized into “rural” for those living in areas with a population between 1,000 to 29,999 and “urban” for those living in areas with a population more than 30,000.

Missing Data

Overall, 70% respondents had full information. A small number of the respondents had missing values for anxiety disorders, knowledge of Indigenous language, participation in traditional activities, marital status, and educational attainment while Status Indian, age, sex, and place of residence did not have any missing values (see Table 1). However, a relatively large proportion of respondents had missing data for variables measuring residential school attendance (24.9%) and personal income (8.5%). We assumed that the missing data mechanism for these two variables could not be disregarded and thus, created separate categories for respondents with missing data points. For all other variables with missing values, we conducted 100 imputations using SAS’s *proc mi/mianalyze* procedures (SAS Institute Inc.). The imputation model employed discriminant function for categorical variables and consisted of all variables that were used in the analysis. For the sensitivity analysis, we also conducted the statistical analyses on the list-wise deleted file which consisted of 5,840 respondents (approximately 94.8% of the eligible 6,160 respondents) who did not have any missing values for anxiety disorders, knowledge of Indigenous language, participation in traditional activities, marital status and educational attainment and had a missing category for residential school attendance and personal income. We reported and interpreted only the results from the data with imputed missing values as there were no differences between these results and those obtained from the list-wise deleted file.

Statistical analyses

Unadjusted logistic regression models (Models 1) were performed separately to assess the independent association between anxiety disorders and each of the four Indigenous determinants of health (i.e., Status Indian, knowledge of Indigenous language, traditional activities, and residential school attendance). Each of these associations were then assessed while controlling for the effects for socio-demographic factors: age, sex, marital status, educational attainment, personal income, and place of residence (Models 2). Lastly, multivariable logistic regression was

performed to estimate the effects of all Indigenous determinants of health on anxiety disorders, controlling for the socio-demographic factors (Model 3). Sampling weights and bootstrap weights were used for all analyses to account for sampling design effects. The Fay adjustment factor was applied while using the bootstrap method.(Budinski & Langlet, 2015) All analyses were performed using *proc surveylogistic* procedure in SAS 9.4 (SAS Institute Inc., Cary, NC, USA). The Statistics Canada guidelines were followed for the analyses and reporting of the results from the survey by rounding off frequencies to the base of 10. The results are reported as odds ratios (OR) with 95% confidence intervals (CIs).

RESULTS

Sample characteristics

Of the 6,160 First Nations adults in the selected (unweighted) sample, over two-thirds (70.6%) had Indian Status while 7.0% attended residential school and 42.7% indicated that only their family members attended residential school (Table 1). Nearly two-thirds (62.3 %) of First Nations adults reported that they participated in Indigenous traditional activities, and more than half (55.7%) spoke or understood an Indigenous language. In terms of the socio-demographic profile, more than half of the survey respondents were female (56.8 %) and were married (51.8%). The majority of the respondents obtained some postsecondary education (55.7%), had an income greater than \$20,000 (52.8%), and lived in an urban area (81.0%).

Prevalence of anxiety disorders

The overall prevalence of self-reported health professional diagnosed anxiety disorders among First Nations adults living off-reserve in 2012 was 14.51% (95% CI 12.95% to 16.07%), based on the results from the analysis of the list-wise deleted file with sampling and bootstrapped weights.

Association between anxiety disorders and Indigenous determinants of health

In all three models exploring the relationship between the four Indigenous determinants of health and anxiety disorders, none of the associations between measures of Indian Status, residential school attendance, and knowledge of Indigenous language were statistically significant (Table 2). Nevertheless, adults who participated in Indigenous traditional activities were found to have a significantly higher odds of anxiety disorders compared to those who did

not participate in any Indigenous traditional activity. These results were stable across all models from the unadjusted Model 1 (OR: 1.32, 95% CI: 1.02 to 1.71) to the multivariate Model 3 (aOR: 1.46, 95% CI: 1.12 to 1.90) suggesting that the relationship between anxiety disorder and participation in traditional activities is not affected by the other three Indigenous determinants of health and the socio-demographic factors.

Association between anxiety disorders and socio-demographic determinants of health

Based on the results from the multivariate model (Model 3), adults aged 45–54 years had a significantly higher odds of anxiety disorders compared to younger adults aged 19–24 years (aOR: 2.12, 95% CI: 1.21 to 3.73) (Table 2). Males (aOR: 0.64, 95% CI: 0.48 to 0.87) and adults with an income higher than the group median (aOR: 0.43, 95% CI: 0.31 to 0.59) had a significantly lower odds of anxiety disorders than females and adults with a lower than median income, respectively. Adults residing in urban areas had significantly higher odds of anxiety disorders compared to those living in rural areas (aOR: 1.66, 95% CI: 1.13 to 2.42). Marital status and educational attainment, however, did not have a statistically significant association with anxiety disorders.

DISCUSSION

This study estimated the prevalence of self-reported health professional diagnosed anxiety disorders and assessed the relationship between Indigenous determinants of health and anxiety disorders among off-reserve First Nations adults based on the data from the 2012 APS. To our knowledge, this is the first study using national level data to examine the role of various Indigenous factors in relation to anxiety disorders among the First Nations population living off-reserve, although these factors have been presupposed as key determinants of mental health. One in seven First Nations adults (14.51%) were estimated to have self-reported anxiety disorders. Compared to other Indigenous groups, off-reserve First Nations people tend to have a greater prevalence of anxiety disorders; with one in twenty-five Inuit (>18 years old) reporting a diagnosis of an anxiety disorder (Anderson, 2015), and one in eleven Manitoban Métis having anxiety disorders (Sanguins et al., 2013) and one in sixteen Indigenous people in British Columbia reporting depression/anxiety disorders (Thommasen et al., 2005). Our findings suggest that the burden of anxiety disorders among off-reserve First Nations adults in Canada is greater than the rates reported previously in other studies.

Contrary to our hypothesis, First Nations adults who participated in Indigenous traditional activities had a 46% increased odds of anxiety disorders compared to those who did not participate in these activities. Due to the structure of the measurement tool used to assess this construct, we were unable to tease out whether survey respondents participated in traditional activities for financial or leisure-related purposes. Furthermore, as the study utilized a cross-sectional design, temporality is also important to consider when interpreting these results. Given the strong relationship between cultural continuity and health, there is also the potential that, for some respondents, participation in traditional activities is a form of healing for anxiety disorders. As such, individuals who are burdened with anxiety may be more likely to participate in traditional activities to reconnect with their culture. This connection, according to participants in a study by Oster and colleagues (Oster, Grier, Lightning, Mayan, & Toth, 2014), is said to impact and balance the four corners of the Medicine Wheel. Another possible explanation for our unexpected result is that survey respondents were enquired only about their participation in the traditional activities such as hunting, fishing or trapping, and gathering wild plants for sustenance or income generation. Participation in these cultural activities may represent a surrogate marker for lack of financial resources rather than cultural attachment, thereby increasing the odds of anxiety disorders to be reported among these respondents. Indeed, it has been reported by Wilson and Rosenberg that First Nations individuals who did not obtain food through hunting, fishing, or trapping have reported better self-assessed health status (Wilson & Rosenberg, 2002). Distinguishing the purpose of the traditional activities (e.g., for sustenance or leisure) is necessary to understand their impact on health. For example, participation in traditional activities such as making clothing or footwear and arts or crafts could have been done leisurely, potentially lowering the odds of anxiety disorders, or done for the purposes of sustenance. Moreover, there are other traditional activities such as traditional dancing, fiddle playing, jigging, and pow-wows that may be better aligned with the concept of cultural activities but they were not inquired about in the 2012 APS.

We did not find Status Indian, residential school attendance, or knowledge of Indigenous language to be significantly associated with anxiety disorders. Specifically, although respondents with Status Indian had 22% lower odds of anxiety disorders, this association was not statistically significant. The direction of this effect may be attributed to the fact that those with Indian Status have a greater connectedness with their cultural identity and/or because they have supplementary access to non-insured health benefits, such as mental health counseling services

(Health Canada, 2015). Our finding of a statistically non-significant association between knowledge of Indigenous language and anxiety disorders is contrary to the findings from a previous study where this Indigenous determinant of health was found to improve mental health by decreasing suicide rates in youth (Hallett, Chandler, & Lalonde, 2007). Our non-significant result may be due to the nature of the measurement tool used to assess knowledge of Indigenous language, as it includes a spectrum of ability to speak/understand Indigenous language (e.g., from being fluent to understanding only a few phrases).

Residential schooling is only one of the many components of historical trauma, a concept in which various historical factors interact with modern day stressors to negatively affect the health and well-being of Indigenous individuals, families, and communities (Wesley-Esquimaux & Smolewski, 2004). In the current study, the estimate for personal or combined personal and family member attendance was statistically non-significant and the estimate for only familial attendance approached significance. Examination of these non-significant regression estimates suggest that personal or combined personal and family member attendance at residential school had 17% higher odds of anxiety disorders whereas those with only familial attendance had 45% higher odds. These results may depict the intergenerational effect of familial attendance at residential schools. Similar findings among First Nations adults were found by Bombay, Matheson, and Anisman (Bombay, Matheson, & Anisman, 2011), who reported that offspring of residential school survivors were at an increased risk for depression.

In our study, First Nation adults aged 45–54 years had a significantly higher odds of self-reported health professional diagnosed anxiety disorders compared to younger adults aged 19–24 years. This is contrary to the findings that younger individuals had higher prevalence of anxiety disorders compared to older adults in Canada (Meng & D'Arcy, 2012). First Nation women, adults with lower than the median income and urban residents were also found to have higher odds of anxiety disorders compared to their counterparts. These findings are similar to the results from other studies on risk factors for anxiety disorders in general Canadian population and determinants of health in Indigenous population (Bellamy & Hardy, 2015; Meng & D'Arcy, 2012; Wilson & Rosenberg, 2002). Marital status and educational attainment, however, were not associated with anxiety disorders among respondents in the current study contrary to findings from other research where unmarried individuals had higher prevalence of

anxiety disorders and those with less than high school education reported reduced health outcomes compared to their counterparts (Meng & D'Arcy, 2012; Reading & Wien, 2009a).

A major strength of our study is that the 2012 APS dataset includes a nationally representative sample of First Nations adults living off-reserve in Canada. Additionally, being the first study of its kind, it is contributing to the knowledge on the association between under-studied Indigenous determinants of health and anxiety disorders. Our study, however, is not without limitations. The outcome of interest, anxiety disorders, was self-reported, not physician reported and consequently there is potential for measurement error. For instance, if participants under-reported health professional diagnosed anxiety disorders, this would lead to an underestimation of the burden of this disorder among the First Nations peoples. Furthermore, the 2012 APS asked respondents about any anxiety disorders including phobia, obsessive-compulsive disorder, or a panic disorder, limiting our ability to estimate the prevalence of individual anxiety disorders. Use of a validated tool (similar to the Kessler Psychological Distress Scale K6) that can be easily administered in large national self-report surveys including the APS could more objectively identify individuals with anxiety disorders rather than asking participants to self-report. As no such validated tool currently exists for the Indigenous populations, future studies on identification and validation of suitable tools for surveillance purposes would be beneficial for use in population surveys such as future waves of the APS. Employment of administrative health data linked to survey or census data could also provide better estimates of the prevalence of mental health disorders in absence of a validated tool. The indicator of participation in traditional Indigenous activities considered in this study is a mix of sustenance related and leisure-time cultural activities and excludes other important traditional activities that may potentially be related to mental health outcomes. Activities with demonstrated cultural attachment need to be considered in future research.

Considering a high prevalence of self-reported health professional diagnosed anxiety disorders among the First Nations population living off-reserve, more resources for mental health service providers serving Indigenous people are required. Health service centers such as the Aboriginal Health Access Centres (AHACs) and Aboriginal Community Health Centers (CHCs) in Ontario, provide a range of services, including traditional healing, primary care, cultural programs, health promotion programs, community development initiatives, and social support services that are integral to health and wellness of Indigenous peoples. By blending Western best practices and Indigenous

healing approaches, these centers provide primary care that addresses the complexity of client care and the social and spiritual determinants that effect health. It was found that those who received services at such centers typically require 30-50% more primary care than the average Ontarian. As many Indigenous peoples in Canada have greater healthcare needs, there is a need to provide more resources and support to Indigenous health and wellness institutions that provide culturally safe care (Association of Ontario Health Centres, n.d.).

However, not all Indigenous people in Canada can access mental health services at Indigenous health and wellness institutions. Instead, many have to rely on mental health services offered by the universal health care providers, most of which employ contemporary medical treatments to mental health and often fail to incorporate holistic approaches to health when treating Indigenous peoples (Mussell et al., 2004). As a consequence, approximately half of those who actually seek care are likely to quit prior to the end of their treatment (Reading & Wien, 2009a). Thus, more cultural training for universal services providers is required in order to make the available services more culturally appropriate (Kirmayer, Gill, Adelson, & Tanner, 2001) and more accessible. As an example of such initiative, in 2014, the Southwest Ontario Aboriginal Health Access Centre (SOAHAC) launched the Indigenous Cultural Safety (ICS) training program (Association of Ontario Health Centres, n.d.), which aims to “transform our health care system into one that is based on respect and understanding of the unique history of the Indigenous population” (Southwest Ontario Aboriginal Health Access Centre, 2014). By encouraging professionals or healthcare organizations to participate in a course such as the ICS program, universal service providers would be better prepared to provide appropriate, culturally safe, respectful care to First Nations, Métis, and Inuit peoples. Such initiatives could result in improved patient-provider relationships, better patient experiences, and more points of access for those who need preventative services or treatment (Association of Ontario Health Centres, n.d.).

CONCLUSION

In conclusion, we found a high prevalence of self-reported health professional diagnosed anxiety disorders among the First Nations population living off-reserve. It is essential for healthcare providers to be aware of the higher risk among this population in order to diagnose and treat symptoms to reduce the negative outcomes associated with these disorders. Clinicians can corroborate our findings of high prevalence if they look out for anxiety disorders in this population, particularly among individuals corresponding to the socio-demographic profile identified in this

study. Participation in traditional activities was found to be associated with anxiety disorders while the remaining three Indigenous determinants of health (e.g., Indian Status, residential school attendance, and knowledge of Indigenous languages), were not. It can be argued that the Indigenous determinants of health are part of a complex domain encompassing a wide range of factors pertaining to the Indigenous culture. Further studies are required to identify and measure key Indigenous determinants of health, especially those related to colonial practices and those that can be modified by program and policy interventions for anxiety disorders and other prevalent mental health conditions. Identification of these unique determinants may also allow for better detection of sub-populations that are at a higher risk of mental health disorders. Understanding the role of these factors would, for instance, allow service providers to offer more targeted and culturally sensitive mental and wellness programs. Finally, considering the high rates of anxiety disorders among off-reserve First Nations, more resources for Indigenous service providers are required.

COMPLIANCE WITH ETHICAL STANDARDS

Ethical Approval:

Ethical approval was not needed as the study relied on anonymous and confidential secondary data from Statistics Canada. Consent from respondents was obtained at the time of data collection. Formal consent is not required for our study. Data were provided by Statistics Canada through the Research Data Centres program and accessed under the Statistics Act of Canada. The analyses and the interpretation are the authors' alone.

Conflict of Interest:

The authors declare that they have no conflict of interest.

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TABLES

Table 1: Characteristics of First Nations adults in Canada, 2012 (unweighted N=6,160)*

Characteristics	Unweighted N* (%)
Status Indian	
No	1,820 (29.5)
Yes	4,350 (70.6)
Residential schooling	
No one attended	1,570 (25.5)
Respondent/respondent and any family member attended	430 (7.0)
Only family member attended	2,630 (42.7)
Missing	1,530 (24.8)
Knowledge of Indigenous language	
No	2,600 (42.2)
Yes	3,430 (55.7)
Missing	130 (2.1)
Participated in traditional activity	
No	2,130 (34.6)
Yes	3,840 (62.3)
Missing	200 (3.2)
Age group	
19–24 years	1,150 (18.7)
25–34 years	1,570 (25.5)
35–44 years	1,720 (27.9)
45–54 years	740 (12.0)
≥55 years	990 (16.1)
Sex	
Female	3,500 (56.8)
Male	2,670 (43.3)
Marital status	
Single	2,270 (36.9)
Married/living in common-law	3,190 (51.8)
Separated/divorced/widowed	700 (11.4)
Missing	0 (0.0)
Educational attainment	
High school diploma/equivalent or less	2,580 (41.9)
Any postsecondary education	3,430 (55.7)
Missing	150 (2.4)
Total personal income	
Less than \$20,000	2,390 (38.8)
More than \$20,000	3,250 (52.8)
Missing	520 (8.4)
Place of residence	
Rural	1,170 (19.0)
Urban	4,990 (81.0)

*Frequency counts for all variables were rounded to the base of ten

Table 2: Association between different Indigenous cultural factors and anxiety disorders among First Nations adults in Canada, 2012 (unweighted N=6,160)

Variable	Unadjusted Model 1		Adjusted Model 2*		Multivariable Model 3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Status Indian						
No	1.00	-	1.00	-	1.00	-
Yes	0.86 (0.63–1.16)	0.32	0.80 (0.59–1.08)	0.15	0.78 (0.57–1.07)	0.13
Residential schooling						
No one attended	1.00	-	1.00	-	1.00	-
Respondent/respondent and any family member attended	1.30 (0.81–2.10)	0.28	1.05 (0.65–1.70)	0.85	1.17 (0.72–1.91)	0.53
Only family member attended	1.44 (0.95–2.20)	0.09	1.30 (0.87–1.95)	0.21	1.45 (0.96–2.18)	0.08
Missing	1.37 (0.82–2.31)	0.23	1.33 (0.82–2.16)	0.25	1.34 (0.83–2.17)	0.23
Knowledge of Indigenous language						
No	1.00	-	1.00	-	1.00	-
Yes	0.95 (0.74–1.23)	0.71	0.93 (0.72–1.20)	0.58	0.89 (0.66–1.20)	0.45
Participated in traditional activity						
No	1.00	-	1.00	-	1.00	-
Yes	1.32 (1.02–1.71)	0.04	1.46 (1.12–1.91)	0.005	1.46 (1.12–1.90)	0.01
Age						
19–24 years					1.00	-
25–34 years					1.32 (0.86–2.02)	0.21
35–44 years					1.36 (0.83–2.21)	0.22
45–54 years					2.12 (1.21–3.73)	0.01
55 years or older					0.75 (0.45–1.26)	0.28
Sex						
Female					1.00	-
Male					0.64 (0.48–0.87)	0.00
Marital status						
Single					1.00	-
Married/living common-law					0.81 (0.53–1.22)	0.31
Separated/divorced/widowed					1.21 (0.73–2.02)	0.47
Educational attainment						
High school diploma/equivalent or less					1.00	-
Any post-secondary education					1.02 (0.73–1.44)	0.89
Total personal income						
Less than median \$20,000					1.00	-
More than median \$20,000					0.43 (0.31–0.59)	<0.0001
Missing					0.61 (0.34–1.11)	0.10
Place of residence						

Rural	1.00	-
Urban	1.66 (1.13–2.42)	0.01

* *Adjusted for age, sex, marital status, educational attainment, total personal income and place of residence*