Term Paper

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# **Perceived Life Stress and Anxiety Disorder Among British Columbians: An Analysis of the Canadian Community Health Survey**

# **Introduction**

Anxiety disorders, which are characterized by excessive worry or fear (Cleveland Clinic, 2020), are the most common of all mental health conditions(Government of Canada, 2009). They develop when feelings of anxiety and panic disrupt daily activities, are difficult to regulate, and are out of proportion to the situation. Those with anxiety disorders often experience recurring bouts of acute anxiety, dread, or terror that peak within minutes (i.e., panic attacks). There are many types of anxiety disorders, including generalized anxiety disorder, social anxiety disorder, specific phobia-related disorders, separation anxiety disorder, and panic disorder. Individuals can suffer from more than one anxiety disorder at a time and over their lifetime(Cleveland Clinic, 2020). These disorders can often cause or exacerbate other mental and physical problems, such as depression or other mental health disorders, substance abuse, headaches and chronic pain, and digestive or bowel problems(Mayo Foundation for Medical Education and Research [MFMER], 2018). Furthermore, they frequently go undiagnosed and untreated; however, those that do get the right treatment can experience improved quality of life, relationships, and productivity(Cleveland Clinic, 2020).

As anxiety disorder is the most common mental illness in the world, it has a significant impact on the global disease burden (Yang et al., 2021). In fact, in 2020, mental illnesses were the leading causes of global health burden, with anxiety and depression being the most significant contributors (Brito et al., 2022). Moreover, according to the Global Burden of Diseases 2019 Study, there were 45.82 million incident cases and 301.39 million prevalent cases of anxiety disorders globally. In addition, 28.68 million disability-adjusted life years were calculated(Yang et al., 2021). As for the Canadian context, it is estimated that anxiety disorders afflict around 2.5 million Canadians throughout the course of their lives, with an annual prevalence of approximately 12%-18%(Canadian Association of Schools of Nursing, n.d.).

Anxiety disorders aren't fully understood; it is impossible to predict what may lead someone to develop an anxiety disorder(MFMER, 2018). However, they are thought to be caused by a mix of biological factors, brain functions, and personal situations, combined with social and economic factors(Government of Canada, 2009). In particular, one of these risk factors is exposure to stressful and negative life or environmental events (MFMER, 2018) as both stress and anxiety are controlled by the same intermingled neural circuits (Daviu et al., 2019). Additionally, anxiety and stress both trigger the same “fight, flight, or freeze” responses (Canadian Mental Health Association, 2015). Thus, the aim of this study was to discover to what extent experienced life stress is associated with the presence of anxiety disorders in British Columbian residents. Given the large incidence and frequency of anxiety disorders, these types of studies are particularly significant and necessary for prescribing preventative measures and developing innovative treatment strategies.

# **Methods**

**Study design**

This is a cross-sectional study utilizing data from the 2015-2016 Canadian Community Health Survey (CCHS) public use microdata file to examine the extent to which perceived life stress is associated with anxiety disorders for individuals residing in British Columbia (BC). The CCHS is a cross-sectional survey conducted by Statistics Canada that collects information related to health status, health care utilization and health determinants for the Canadian population (Statistics Canada, 2017).

**Study population**

The CCHS covers approximately 98% of the Canadian population aged 12 and over living in private dwellings in over 100 health regions covering all provinces and territories. The sampling frame excluded people living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, youth aged 12 to 17 living in foster homes, and residents of certain remote regions. For the purpose of this study, the population of interest was British Columbian residents (n = 14,367). Subjects with missing information for any of the included variables (i.e., perceived life stress [n = 92], anxiety disorder [n = 36], and study covariates [n = 1743]) were excluded (Figure 1). Therefore, the study population consisted of 12,496 British Columbians.

**Figure 1.** Selection of study population

Diagram

Description automatically generated

**Measures**

***Main outcome variable***

Anxiety disorder, the main outcome variable in this study, was measured by asking respondents the following question: “Do you have an anxiety disorder such as a phobia, obsessive-compulsive disorder or a panic disorder?” with the response options being: “Yes”, “No”, “Don’t know”, “Refusal”, and “Not stated”. Responses other than “Yes” or “No” were treated as missing values and were dropped from the dataset during the data analysis.

***Primary exposure variable***

Perceived life stress, the primary exposure variable, was measured by asking respondents the following question: “Thinking about the amount of stress in your life, would you say that most of your days are...?” with the response options being: “Not at all stressful”, “Not very stressful”, “A bit stressful”, “Quite a bit stressful”, “Extremely stressful”, “Don’t know”, and “Refusal”. The two latter responses were treated as missing values and were dropped from the dataset during the data analysis.

***Covariates***

The model was adjusted for covariates that are considered to be potential confounders. The socio-demographic covariates entered in the analysis were: gender, age (>20, 20-39, 40-59, 60-79, 80+), highest level of education (less than secondary school graduation, secondary school graduation, no post-secondary education, and post-secondary certificate diploma or university degree), marital status (married, common-law, widowed/divorced/separated, and single), total household income (no income or less than $20,000, $20,000-$39,999, $40,000-$59,999, $60,000-$79,999, and $80,000 or more), and cultural/racial background (white and non-white [Aboriginal or Other Visible Minority]).

Behavioural covariates considered included respondents’ alcohol use and illicit drug use over the last 12 months. Alcohol use was determined by asking respondents to indicate the type of drinker they were, with the response options being: “Regular drinker”, “Occasional drinker”, “Did not drink in the last 12 months”, and “Not stated”. Illicit drug use responses were: “Illicit drug use”, “No drug use”, and “Not stated”. In both instances, “Not stated” was treated as a missing value and was dropped from the data set during the data analysis.

Finally, physical and other mental health problems were also assessed. Respondents’ overall health status was determined by asking them the following question: “In general, would you say your health is... ?” with the response options being: “Excellent”, “Very good”, “Good”, “Fair”, “Poor”, “Don’t know”, “Refusal”, and “Not stated”. The three latter responses were treated as missing values and were dropped from the dataset during the data analysis. The presence of other mental health problems was determined by asking respondents the following question: “Do you have a mood disorder such as depression, bipolar disorder, mania or dysthymia?” with the response options being: “Yes”, “No”, “Don’t know”, “Refusal”, and “Not stated”. Responses other than “Yes” or “No” were treated as missing values and were dropped from the dataset during the data analysis.

***Analysis***

Firstly, descriptive statistics for the selected study variables were computed using frequency tables. Afterwards, the association between each socio-demographic factor/predictor and the outcome (anxiety disorder) was examined and unadjusted odds ratios and p-values were reported. Finally, the association between the exposure (perceived life stress) and the outcome was examined and odds ratios adjusted for covariates and p-values were reported. A p-value below 0.05 suggested a statistically significant association. Statistical analyses were completed in SAS Studio (see Appendix A for full SAS code).

# **Results**

**Data Analysis**

***Characteristics of the study population***

Table 1 shows the characteristics of the study population. 12,496 observations with complete data were analyzed in the study. The largest segment of the study population was made up of individuals who perceive their life as a bit stressful, do not have an anxiety disorder, are women, are 60–79 years old, have a post-secondary certificate diploma or university degree, are married, have a household income of $80,000 or more, are white, perceive their health as very good, are regular drinkers, do not use any illicit drugs, and do not have a mood disorder.

***Association between socio-demographic factors/predictor variables and anxiety disorder***

Table 2 shows the results of the univariate association between socio-demographic factors/predictor variables and the outcome by reporting unadjusted odd ratios. There was a positive association between perceived life stress and anxiety: as respondents’ perceived life stress increased, so did their odds of having an anxiety disorder. In fact, those who rated their life as “a bit stressful”, “quite a bit stressful”, and “extremely stressful” were, respectively, approximately 2, 5, and 12 times more likely to have an anxiety disorder than those with no stress. On the other hand, anxiety was negatively related to the highest level of education attained, total household income, alcohol use, and perceived health status. In fact, as respondents’ level of education, household income, and perceived health status improved, their odds of having an anxiety disorder decreased. Similarly, as respondents’ alcohol use decreased, their odds of having an anxiety disorder increased. For age, the odds were higher in the 20-39 age group than in the reference age group (>20), but odds subsequently steadily decreased with each older age group. Moreover, those who were widowed/divorced/separated had the highest odds of having an anxiety disorder, while married respondents had the lowest odds. Finally, females, white respondents, illicit drug users, and those with a mood disorder were all more likely to have an anxiety disorder than their respective counterparts.

***Association between perceived life stress and anxiety disorder***

Table 3 shows the association between perceived life stress and anxiety disorder among British Columbians by reporting odds ratios adjusted for covariates. In opposition to the unadjusted odd ratios, those who perceived their life as “not very stressful” were slightly less likely to suffer from an anxiety disorder than those who perceived it as “not at all stressful” (the reference category) (OR = 0.820 vs 1.000). However, after crossing this threshold, odds steadily increased as perceived life stress increased (“A bit stressful” OR = 1.071, “Quite a bit stressful” OR = 1.433, “Extremely stressful” OR = 2.422).

**Table 1.** Characteristics of study population

|  |  |  |
| --- | --- | --- |
| **Characteristics** | **Frequency** | **Percentage\*** |
| Perceived life stress  Not at all stressful  Not very stressful  A bit stressful  Quite a bit stressful  Extremely stressful  Has an anxiety disorder  Yes  No  Gender  Male  Female  Age  >20  20-39  40-59  60-79  80+ | 1797  3575  4802  2003  319  948  11548  5670  6826  1166  2903  3759  3902  766 | 12.22  27.60  40.79  16.78  2.60  7.79  92.21  49.12  50.88  31.23  32.90  22.76  3.28  9.83 |
| Highest level of education  Less than secondary school graduation  Secondary school graduation, no post-secondary education  Post-secondary certificate diploma or univ degree  Marital status  Married  Common-law  Widowed/Divorced/Separated  Single  Total household income  No income or less than $20,000  $20,000-$39,999  $40,000-$59,999  $60,000-$79,999  $80,000 or more  Cultural / racial background  White  Non-white (Aboriginal or Other Visible Minority)  Perceived health  Poor  Fair  Good  Very good  Excellent  Type of drinker - 12 months  Regular drinker  Occasional drinker  Did not drink in the last 12 months  Any illicit drug use - 12 months  Illicit drug use  No drug use  Has a mood disorder  Yes  No | 2021  2950  7525  5425  852  2740  3479  1123  2310  2114  1756  5193  10043  2453  433  1137  3527  4520  2879  7636  1946  2914  1394  11102  1218  11278 | 13.76  24.40  61.83  48.88  8.55  12.62  29.95  6.77  14.60  15.32  14.69  48.62  70.69  29.31  2.75  7.39  28.25  36.17  25.43  61.81  15.43  22.75  12.46  87.54  9.40  90.60 |

*\*Weighted to the Canadian population*

**Table 2.** Unadjusted odds ratios with corresponding p-values for socio-demographic factors/predictors of anxiety disorder

|  |  |  |
| --- | --- | --- |
| **Characteristics** | **Unadjusted odds ratios** | **p-Value** |
| Perceived life stress  Not at all stressful  Not very stressful  A bit stressful  Quite a bit stressful  Extremely stressful  Gender  Male  Female  Age  >20  20-39  40-59  60-79  80+ | Ref. category  1.144  2.185  5.060  11.673  Ref. category  2.007  Ref. category  1.138  1.067  0.523  0.455 | <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001 |
| Highest level of education  Less than secondary school graduation  Secondary school graduation, no post-secondary education  Post-secondary certificate diploma or univ degree  Marital status  Married  Common-law  Widowed/Divorced/Separated  Single  Total household income  No income or less than $20,000  $20,000-$39,999  $40,000-$59,999  $60,000-$79,999  $80,000 or more  Cultural / racial background  White  Non-white (Aboriginal or Other Visible Minority)  Perceived health  Poor  Fair  Good  Very good  Excellent  Type of drinker - 12 months  Regular drinker  Occasional drinker  Did not drink in the last 12 months  Any illicit drug use - 12 months  Illicit drug use  No drug use  Has a mood disorder  Yes  No | Ref. category  0.885  0.847  Ref. category  1.452  1.948  1.814  Ref. category  0.729  0.514  0.523  0.495  Ref. category  0.482  Ref. category  0.522  0.239  0.120  0.052  Ref. category  1.094  1.230  Ref. category  0.361  Ref. category  0.042 | <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001  <.0001 |

**Table 3.** Adjusted odds ratios with corresponding p-values for perceived life stress as a predictor of anxiety disorder

|  |  |  |
| --- | --- | --- |
| **Characteristics** | **Adjusted odds ratios** | **p-Value** |
| Perceived life stress  Not at all stressful  Not very stressful  A bit stressful  Quite a bit stressful  Extremely stressful | Ref. category  0.820  1.071  1.433  2.422 | <.0001  <.0001  <.0001  <.0001 |

**Literature Review**

The studies reviewed (see Appendix C for full literature analysis) showed a correlation between stressful life events and anxiety disorder. For example, a study of college students found that anxiety was causally influenced by stress and that anxiety had positive contemporaneous links to stress. Similarly, another study conducted during the COVID-19 pandemic concluded that there was a high positive relationship between stress and anxiety. Finally, a study conducted with female patients of the same general practitioner in London found that, in particular, stressful events rated as severe dangers were significantly associated with the onset of anxiety disorder.

**Discussion**

The study results revealed that British Columbians with higher perceived life stress were more likely to suffer from self-reported diagnoses of anxiety disorders compared to those who were stress-free, even after adjusting for gender, age, mood disorders, cultural/racial background, income, marital status, alcohol and illicit drug use, education, and perceived health. These results were consistent with the findings from the literature. Although the prevalence of life stress in British Columbians living with anxiety disorders was able to be captured, this study did have limitations. Firstly, due to the self-reported nature of the survey, the variables considered in this study were susceptible to misclassification errors as well as non-response, reporting, and recall biases. In particular, there may have been differences between respondents and non-respondents, and mental health issues may have been underreported, leading to an underestimation of the connection. It is also possible that individuals who reported having an anxiety disorder were more likely to report life stress, leading to an overestimation of the findings. These factors negatively impact the study’s internal validity. Secondly, individuals with an anxiety disorder constituted a small proportion of the study population (7.79%). Thirdly, as individuals with missing data for multiple variables of interest were excluded, there may have been selection bias since these excluded individuals may have differed from the individuals studied. These two limitations mean the results may not be generalizable to other populations, thus negatively impacting the study’s external validity. Next, there was the potential for reverse causality; individuals with an anxiety disorder might be more likely to report higher levels of stress. Finally, although odds were adjusted for multiple variables, it is possible that there were other confounders that were not accounted for that could have influenced both the exposure and outcome variable, causing a spurious association between the two. These two factors also have a negative effect on the study’s internal validity.

Despite these limitations, the study did meet several criteria necessary for establishing causality. First, the study presented facts related to the biological plausibility of the relationship by mentioning the significant overlap between stress and anxiety in terms of both emotional components and the underlying neurocircuitry. Second, the evidence of a causal relationship was further strengthened by the fact that this study’s findings have been replicated in different populations and by different investigators, as discussed in the literature analysis. Third, the study did mention several limitations, including the possibility of confounding. Next, as the intensity of stress experienced increased, so did the odds of having an anxiety disorder, which suggests a dose-response relationship. Finally, the strength of the association was demonstrated by the low P values, which show that the probability that the differences between the different stress levels could have arisen by chance alone is very low. Despite this evidence for causality, deficiencies lay in the fact that a temporal relationship and cessation effects were not established due to the study utilizing cross-sectional data.

**Conclusion**

In conclusion, this study found that British Columbians who perceive their life as extremely stressful are more likely to suffer from an anxiety disorder than those who experience lower levels of stress. This highlights the importance of addressing life stress and the need to seriously consider implementing and effectively utilizing psychosocial interventions for improvement in those with anxiety disorders. Further research involving a longitudinal study is needed to understand how anxiety disorders are affected by variations in stress levels within individuals.

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