

# Examining the Impact of Social Support on Psychological Well-Being Among Canadian Individuals With COPD: Implications for Government Policies

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Chronic obstructive pulmonary disease (COPD) is a significant respiratory disease and is globally ranked as the third leading cause of death. In Canada, the direct healthcare costs associated with COPD are estimated to be \$1.5 billion annually. This study utilized quantitative analyses to examine the impact of specific dimensions of social support, namely, guidance, reliable alliance, reassurance of worth, attachment, and social integration within a clinically identified population of individuals with COPD who exhibit symptoms of depression and anxiety. The study was based on the Social Provisions Theory and stress-buffering hypothesis, utilizing large-scale population data from Statistics Canada's 2012 Canadian Community Health Survey (CCHS) Mental Health component. On a national scale, individuals were more likely to report a decreased sense of belonging to a group of friends (social integration) and struggle to depend on others in stressful times (reliable alliance) while experiencing symptoms of anxiety and depression. These findings underscore the potential benefits of integrating peer support, socialization initiatives, and caregiver training into clinical programs designed for individuals with COPD.

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a respiratory disease characterized by “dyspnea (breathlessness), coughing, the production of sputum, and often irreversible impairment in lung functioning [1] and it is estimated that “328 million people have COPD worldwide [2].” COPD is the third leading cause of death worldwide [3]; statistics report that 2 million Canadians

are currently living with COPD [4]. Alarming, it is estimated that 1 in 4 Canadians over 35 years of age will develop COPD [5]. This evolving landscape underscores the urgency to explore avenues for improving the quality of life for COPD patients in Canada.

The symptoms of COPD impact both the physical and emotional well-being of individuals [6,7]. Those with COPD often experience feelings of isolation, increased negative emotions, and higher rates of depression and

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Abbreviations: COPD, Chronic Obstructive Pulmonary Disease; CCHS, Canadian Community Health Survey; CCHS-MH, Canadian Community Health Survey Mental Health; ED, Emergency Department; K10, Kessler Psychological Scale; PR, Pulmonary Rehabilitation; PUMF, Public Use Microdata File; WHO, World Health Organization.

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anxiety [8]. Additionally, individuals with COPD and mental health concerns like depression and anxiety exhibit greater rates of exacerbations, leading to ED visits and hospital admissions [9,10]. Preliminary research suggests that informal social support from family and friends may play a pivotal role in helping combat these issues [11]. Consequently, this study will examine the impact of social support on depression and anxiety levels among Canadians with COPD.

## PURPOSE OF THE STUDY

The purpose of this research was to identify the impact of specific dimensions of social support, namely, guidance, reliable alliance, reassurance of worth, attachment, and social integration within a clinically identified Canadian population of individuals with COPD who exhibit symptoms of depression and anxiety. The analysis was based on the Social Provisions Theory and stress-buffering hypothesis, utilizing large-scale population data from Statistics Canada's 2012 Canadian Community Health Survey (CCHS) Mental Health component. The following article will outline the Social Provisions Theory and relevant literature along with information regarding trends with COPD and mental health. The following research questions will be answered using quantitative analyses within the article:

1. What is the relationship between informal social support based on the Social Provision subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration and levels of depression within a national sample?
2. What is the relationship between informal social support based on the Social Provision subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration and anxiety levels within a national sample?

To conclude, Canadian healthcare policy recommendations and suggestions for future research will be outlined.

## SOCIAL SUPPORT

Within the literature, social support may be categorized as informal, such as family members, friends, co-workers, and formal, including health care professionals, or support workers [12]. Different network members are likely to provide varying amounts and types of support [13].

The different facets of social support are identified in the research literature. Social support has a structural dimension that focuses on the size and frequency of social interactions and functional dimension with "emotional (such as receiving love and empathy) and instrumental

(practical help such as gifts of money or assistance with child care) components ([14] p. 37)." Functional social support may also include informational support, or the "provision of advice, suggestions, and information that a person can use to address problems ([12] p. 191)." Studies have shown that the function of social support may often have a greater impact than its structure [14,15]. A research study examining an elderly population of over 3,000 Australians found that lack of satisfaction with social support was negatively correlated with the comfortability of activities of daily living [15]. Therefore, the number of individuals within the participants' social network did not impact their mobility or ability within the home. The researchers note that social support and expectations may change with aging [15].

### *Benefits of Social Support*

The benefits of informal social support were well-documented in the research literature [16-19]. A groundbreaking and longitudinal study by Berkman and Syme [20] found that individuals with more social relationships reported living longer. The researchers defined social ties as marriage, interactions with friends and relatives, and membership in community organizations, such as church. The study determined that "the association between social ties and mortality was independent of self-reported physical health status, year of death, socioeconomic status, and health practices such as smoking and obesity ([20] p. 186)."

Berkman and Syme "provided provocative evidence that social environments are associated with important health outcomes ([21] p. 6)." Berkman and Syme's study led to further research that linked the benefits of social support to improved physical and mental health and strengthened family relationships [17,19,20,22]. For individuals with chronic illnesses, diabetes, and cancer, social support has been shown to increase positive health behaviors as well as improve their quality of life [16,23]. In addition, social support has been correlated to higher self-esteem and self-efficacy and has been viewed as a buffer to the negative effects associated with stress [11,24,25].

### *Stress Buffering Theory*

Cohen and Wills studied the impact of stress and determined that "social resources will ameliorate the potentially pathogenic effects of stressful events" ([24] p. 781)." They found that stress acted as a positive buffer for an individual who was experiencing a stressful event. Cohen and Wills have studied the concept among populations including the chronically ill [24]. The theory supports the research questions that investigate the impact of social support among individuals with COPD. Social

support may be one intervention to address mental health issues in individuals diagnosed with COPD. Studies show that social support and psychosocial resources can reduce the impact of chronic diseases like diabetes [26].

### **Social Provisions Theory**

Weiss developed a model of social support, the Theory of Social Provisions, where he theorized “multiple needs must be satisfied by an individual’s support network ([27] p. 498).” He found that individuals required six dimensions of social support to “maintain wellbeing and to avoid loneliness ([27] p. 488).” He determined the six dimensions as the following: guidance, reliable alliance, reassurance of worth, attachment, social integration, and opportunity for nurturance [27,28]. The concept of guidance translates to receiving advice or information, albeit reliable alliance is “an assurance that others can be counted on in times of stress ([29] p. 39).” Reassurance is defined as “recognition of one’s competence, skills, and value by others” whereas attachment is described as having an emotional bond with an individual. Social integration is when an individual has a sense of belonging to a group of friends. The last concept, opportunity for nurturance, is “the sense that others rely upon one for their wellbeing ([29] p. 40).” Cutrona and Russell [29] developed the Social Provisions Scale, a survey instrument to determine the nature of social relationships and the types of support received. The tool has strong psychometric properties including reliability and validity with different populations. It was studied amongst a population of elderly individuals (over age 65) and yielded high discriminant and convergent validity [30].

## **COPD AND MENTAL HEALTH**

COPD presents as “persistent airflow limitation that is typically progressive, not fully reversible, and associated with an abnormal inflammatory response of the lungs to noxious particles or gases (eg, exposure to cigarette smoke) [31].” The disease consists of emphysema and chronic bronchitis, either independently or as a combination of both conditions. The first condition is the destruction of the alveoli (or air sacs). The second presents as an inflammation of the bronchial tubes [32]. Both conditions make it difficult for an individual to breathe comfortably.

Within the literature, the narrative surrounding COPD focuses on the physicality of chronic illness, specifically reduced lung function. However, it is important to recognize that the impact of COPD symptoms on quality of life, coping strategies, and day-to-day activities may result in mental health concerns, like depression and anxiety. Thus, researchers have begun to examine the impact of anxiety and depression on the management of

COPD [7]. Research has found that “comorbid anxiety and depression are more common in patients with COPD than with other chronic conditions (such as osteoarthritis) and other respiratory diseases such as pulmonary tuberculosis [8].”

Dalal et al. conducted a cohort study in the US involving individuals with COPD, finding that nearly half of them also had depression [9]. The study found substantial increases in the risk of COPD-related hospitalizations (77%) and ED visits due to COPD (48%) for individuals diagnosed with both COPD and depression.

Stein et al. examined a representative Canadian population of over 100,000 individuals. Their findings determined that a diagnosis of major depressive disorder was linked to double the frequency of healthcare utilization by individuals managing a chronic illness. The study examined six of the most common chronic illnesses, including COPD [33].

The literature extensively explores the prevalence of COPD and its related variables. Higher rates of COPD were traditionally found among a male population; however, recent research has identified that females are at a greater risk for COPD [34,35]. Several studies have indicated that lower socioeconomic status, including income and education level, serves as a predictive factor for COPD [36-38]. These characteristics are linked to poor health status in the general population within the literature [37].

Research findings have also shown an association between cigarette smoking and obesity with COPD, increasing the risk of comorbidities like cardiovascular issues and further pulmonary complications [39-41]. Due to the nature of the chronic illness, researchers have identified problems with sleep, increased chronic pain, and issues with mobility as strongly linked to the diagnosis of COPD [42-44].

## **CANADIAN CONTEXT OF COPD**

Smoking is a specific demographic trend correlated with COPD rates. Research identified that “approximately half of Canadians smoked in 1965, compared to just 13% in 2015 [45].” Smoking rates within Canada, and Ontario specifically, have decreased steadily since the 1980s, reflecting legislative changes, such as a ban on public smoking and increased taxation on tobacco products [46]. However, in recent years, one concern of policymakers is the increase in contraband tobacco, particularly in the northwestern and southwestern regions of the province [47]. Within Ontario, Canada’s most populated province, all residents diagnosed with COPD account for 24% of hospital admissions and 24% of emergency department (ED) visits [44]. COPD, at 18.8%, is also “responsible for the highest percentage of 30-day readmissions to

Emergency Departments within the province [44].” Most often, these readmissions stem from COPD flare-ups or exacerbations. The estimated rates of COPD within Ontario vary from 4% to 12% [44].

The Ontario Lung Association estimates that the overall direct economic costs of COPD within the province, including “prescription drug costs, physician visits, emergency room visits, hospitalization costs, and over-the-counter medications [48]” will amass to \$310 billion by 2041.

At present, there is no comprehensive federal plan developed by the Canadian government to address the economic burden of COPD in the country. However, over the past 5 years, the Ontario Lung Association has advocated for a provincial strategy to address lung diseases, including COPD, asthma, and lung cancer [48]. Their plan was developed into a legislative bill, known as Bill 71, the Lung Health Act of 2016. This bill received unanimous approval from the Ontario legislature and was enacted into law in December 2017 [48,49].

The suggested plan emphasizes continued research to incorporate evidence-based strategies aimed at improving the quality of life for individuals affected with COPD and other lung diseases [49].

## METHODOLOGY

The data were analyzed using IBM SPSS (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). The study examined data from a nationally representative population collected from the 2012 CCHS Mental Health component, conducted by Statistics Canada. The dependent variables within the study encompassed self-perceptions of physical health and general life satisfaction, and anxiety and depression diagnoses. The independent variables included the Social Provisions Scale (positive social support) and its subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration. The quantitative data were controlled for age, gender, and smoking status.

The CCHS gathers information regarding health status, healthcare utilization, and health determinants for Canadians. Available in both French and English, the general version of the CCHS is a large cross-sectional population sample health survey designed to offer reliable estimates at the health region level.

Starting in 2000/2001, the CCHS occurred every 2 years until 2008 when it transitioned to an annual survey. In 2000/2001 and 2012, an annual component focused on general health questions. In 2002 and 2012, a specialized survey included questions regarding emotional health, social supports, and access to mental health care. Within both types of the CCHS, only individuals 12 years of age

and older were surveyed.

Regarding the CCHS sample, less than 3% of the target population is not included in the survey’s sampling frame. The excluded individuals consist of residents of the three territories, those living on reserves or other Aboriginal settlements, full-time members of the armed forces, and those who are institutionalized [50].

In consideration of the research sample, individuals are diagnosed with COPD at or after the age of 40. Thus, the study will examine individuals 40 years of age and older who responded to the survey and selected “yes” to the question regarding a diagnosis of COPD.

Statistics Canada utilizes a population-based framework to ensure the most accurate representativeness in data collection. This involves a three-part process to determine the sample population, wherein geographical areas (clusters) are selected. Then, households are chosen within each sampled cluster. Finally, one respondent per household was randomly selected [50]. The study was on a voluntary basis, with individuals contacted by letter and phone calls regarding participation. Individuals who consented were interviewed by Statistics Canada representatives. The computer-assisted personal interviewing (CAPI) tool was used to gather information, and the individuals were surveyed in person and via telephone by trained Statistics Canada staff [50].

## ETHICS/ACCESS TO DATA

Statistics Canada adheres to the Tri-Council Policy for Research involving Humans. Participants were allowed to withdraw from the study at any time during the telephone or in-person interview. The survey was voluntary and confidentiality was maintained by Statistics Canada staff [51].

The researcher had restricted access to the Public Use Microdata File (PUMF). The PUMF, which omits identifying information, presents data by province and provincial region. For example, variables like age are grouped into categories, and gender is treated as a dichotomous variable. To obtain the PUMF files for CCHS-MH 2012, the researcher signed agreements with Statistics Canada. These PUMF files are developed from Statistics Canada’s master files to ensure respondent confidentiality. Before release, the PUMF were approved by Statistics Canada senior staff. The data is released to Canadians who request it through a written agreement, allowing use for scholarly purposes, with the requirement that Statistics Canada is credited for data collection rather than the analyses.

## **INSTRUMENTATION**

### *CCHS-Mental Health (MH) 2012*

The CCHS-MH survey was updated in 2012, incorporating more instruments rather than questions regarding mental health and emotional well-being. Statistics Canada utilized an expert panel from various organizations like Health Canada, Public Health Agency of Canada, Mental Health Commission of Canada, provincial health ministries, Department of National Defence, Citizenship, and Immigration, and Correctional Service Canada. To ensure the validity and reliability of the survey, a pilot test was conducted in five large cities across Canada [50,52]. Table S1 outlines the relevant variables used in the CCHS-MH 2012 (Appendix A).

### *Variables in CCHS-MH 2012*

Table S1 provides the variables utilized in the analysis of the CCHS-MH 2012 (Appendix A). For the analysis, the researcher modified two questions: age and smoking status. An adjustment was made to the age categories by combining 40-44 and 45-49 into a single category: 40-49. Similarly, the smoking status variable was modified to combine both daily and occasional smokers as confirmatory smokers. However, Statistics Canada did not categorize or describe the terms “daily” or “occasional” to participants during the survey; instead, individuals were asked to self-report the number of cigarettes they smoked.

The CCHS-MH 2012 consists of many different instruments within the survey, including a shortened version of the Social Provisions Scale, which has a total of 10 questions and was validated with a French-speaking population. The original Social Provisions Scale, developed by Caron had 24 questions and six subscales [53,54]. The shortened Social Provisions Scale used in this survey is divided into five subscales: (1) guidance; (2) reliable alliance; (3) reassurance of worth; (4) attachment; and (5) social integration. The subscale “opportunity for nurturance” is omitted from this version of the scale. See Table S1 for the specific questions.

The abbreviated Social Provisions Scale, or SPS-10, is estimated to retain 95% of the predictive power of the original version. Caron found that “the alpha for the global scale is 0.880 and the alphas for the five subscales ranged from 0.528 to 0.690 [54].”

To assess emotional well-being, Statistics Canada used the WHO version of Composite International Diagnostic Interview criteria for Generalized Anxiety Disorder and Depression [55]. However, the PUMF produced either a “yes” or “no” answer for the diagnosis rather than providing the detailed criteria questions.

The Kessler Psychological Scale (K10), integrated

into the CCHS-MH, is an assessment for “non-specific psychological distress symptoms [56].” Individuals respond to a series of 10 questions regarding feelings of distress, rating them on a scale from 1 to 5, where 1 indicates “none of the time” and 5 indicates “all of the time.” A higher score on the scale indicates a greater number of distress symptoms or feelings of distress, suggesting the individual may be experiencing a depressive or anxiety disorder. Scores on the K10 may range from 10 to 50 [56]. The K10 scale has been validated and found reliable for determining mental health concerns among the general Canadian population [57].

## **DATA ANALYSIS**

Statistics Canada provides coefficients of variation (CVs) for the researcher to use to assess the data quality. The CV is the ratio of the standard deviation to the mean, representing “the margin of error expressed as a percentage of the estimate to which it refers [58].” This method helps the researcher understand how representative the dataset will be when compared to the Canadian population. There are three types of CVs: (1) acceptable; (2) marginal; and (3) unacceptable. Acceptable values have CVs that fall within 0% to 16.5% and are applicable to estimates of 30 individuals or more [55]. The study has established CVs of 7% for sex and 11% for age, both of which were in the acceptable range.

### *Quantitative Analysis*

Descriptive statistics of the data were calculated. A logistic regression analysis was conducted to examine the impact of specific social support. The independent variable was social support, categorized into five categories from the Social Provisions Scale: (1) guidance; (2) reliable alliance; (3) reassurance of worth; (4) attachment; and (5) social integration. A higher score indicated a more prevalent social interaction characteristic. The dependent variable consisted of the individual’s confirmation of an anxiety or depressive disorder based on the WHO diagnostic criteria. Within the analyses, including those for the main research question and the two sub-questions, controls for gender, age, and smoking status were implemented. The results highlighted and discussed significant values from the analyses.

## **RESULTS**

### *Descriptive Statistics of the Samples*

Data were weighted as per Statistics Canada guidelines to ensure representativeness for the federal (Canadian) sample. Table 1 clearly identified the four most populated provinces—Alberta, British Columbia, On-

**Table 1. Provincial Distribution of the Federal COPD Sample**

Province	Frequency	Percent (%)
Prince Edward Island	4,654	0.7
Newfoundland and Labrador	10,793	1.6
Saskatchewan	18,993	2.9
Manitoba	20,298	3.1
New Brunswick	22,538	3.4
Nova Scotia	31,788	4.8
Alberta	54,720	8.3
Quebec	148,211	22.4
British Columbia	80,311	12.2
Ontario	281,015	40.6
Total	660,444	100

tario, and Quebec—have a greater percent distribution. Additionally, most Canadians live within the province of Ontario [59].

COPD is usually diagnosed at the age of 40 or older. Table 2 includes ages ranging from 40 to 80 or higher. Most Canadian individuals who self-reported a COPD diagnosis fell between the ages of 55 to 59 and 60 to 64. Within Ontario, the highest number of self-reported COPD diagnoses occurred in the age groups of 60 to 64 and 65 to 69.

Table 3 provided three categories related to the type of smoker, allowing the individual respondent to choose. For individuals who identified as a daily or occasional smoker, the CCHS-MH 2012 provided follow-up questions regarding the number of daily cigarettes smoked. Upon review of the table, it appeared that most individuals were currently non-smokers at the time of the survey. Furthermore, individuals who smoked daily made up the next highest percentage of smokers.

#### *Reliability of Scales Used*

Table 4 provided the Cronbach's alpha value, a measure of reliability, for each of the scales within the next section. As evident from the values, strong internal consistency within the scales ensured reliability for the quantitative analysis.

## **EXAMINATION OF DEPRESSION AND ANXIETY**

The results examine informal social support based on the Social Provision subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration and levels of depression and anxiety within a national sample.

### *Depression*

The following section addressed the first research question: What is the relationship between informal social support based on the Social Provision subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration and levels of depression within a national sample?

A binomial logistic regression was performed to ascertain the effects of guidance, reliable alliance, reassurance of worth, attachment, and social integration on the likelihood that participants have a diagnosis of depression. The model was run with and without controls of age, sex, and smoking status. The first logistic regression model was statistically significant,  $\chi^2(4) = 9.625$ ,  $p < .05$ . As identified within Model 1 in Table 5, individuals with a diagnosis of depression were less likely to receive the facets of reliable attachment and social integration from their informal and positive social relationships. The model explained 8% (Nagelkerke  $R^2$ ) of the variance in depression. The second logistic regression model was also statistically significant  $\chi^2(4) = 4.493$ ,  $p < .05$ . The Nagelkerke  $R^2$  for the second model was 0.124. The model identified that men were less likely to have a diagnosis of depression compared to women within the sample of Canadians with self-reported COPD. After controlling for age, sex, and smoking status, reliable attachment and social integration remained significant. Furthermore, the strength of reliable alliance increased to  $p < .01$  and social integration remained the same.

### *Anxiety*

The following section addressed the second research question: What is the relationship between informal social support based on the Social Provision subscales of guidance, reliable alliance, reassurance of worth, attachment, and social integration and levels of anxiety within a national sample?

A binomial logistic regression was performed to determine the effects of guidance, reliable alliance, reassurance of worth, attachment, and social integration on the likelihood that participants have a diagnosis of anxiety. The model was run with and without controls of age, sex, and smoking status. The first logistic regression model was statistically significant,  $\chi^2(4) = 6.723$ ,  $p < .05$ . As identified within Model 1 in Table 6, individuals with a diagnosis of anxiety were less likely to receive the facets of reliable attachment and social integration from their informal and positive social relationships. The model explained 14% (Nagelkerke  $R^2$ ) of the variance in anxiety scores. The second logistic regression model was also statistically significant  $\chi^2(4) = 7.755$ ,  $p < .01$ . The Nagelkerke  $R^2$  for the second model was 0.155. The model identified that men were less likely to have a diag-

**Table 2. Age Distribution of the Federal and Provincial COPD Samples**

Age Bracket	Canada		Ontario	
	Frequency	Percent (%)	Frequency	Percent (%)
40-44 years	35,950	5.4	25,054	9.3
45-49 years	44,338	6.7	13,127	4.9
50-54 years	55,645	8.4	20,922	7.8
55-59 years	104,571	15.8	32,309	12.0
60-64 years	108,685	16.5	50,262	18.7
65-69 years	84,487	12.8	41,787	15.6
70-74 years	81,240	12.3	34,018	12.7
75-79 years	73,044	11.1	28,913	10.8
80 years or older	72,484	11.0	21,748	8.1
<b>Total</b>	<b>660,444</b>	<b>100</b>	<b>268,140</b>	<b>100</b>

**Table 3. Type of Smoker Within the Federal and Provincial Samples**

Type of Smoker	Canada		Ontario	
	Frequency	Percentage	Frequency	Percentage
Daily	248,525	37.6	109,352	40.8
Occasionally	9,526	1.4	1873	0.7
Not at all	401,541	60.8	156,914	58.5

**Table 4. Cronbach’s Alpha Values for Internal**

Scale Name	Cronbach’s alpha $\alpha$
Social Provisions Scale	.913
<i>Social Provisions Subscale</i> Guidance	.833
<i>Social Provisions Subscale</i> Reliable Alliance	.842
<i>Social Provisions Subscale</i> Reassurance of Worth	.788
<i>Social Provisions Subscale</i> Attachment	.801
<i>Social Provisions Subscale</i> Social Integration	.903
Kessler Psychological Distress Scale	.873

nosis of anxiety compared to women within the sample of Canadians with self-reported COPD. After controlling for age, sex, and smoking status, reliable attachment and social integration remained significant predictors.

**DISCUSSION**

The impact of COPD is becoming prevalent within the Canadian healthcare system. The impact of COPD is more than physical symptoms. In fact, it includes the emotional well-being of the individual diagnosed. Anxiety and depression are more likely within individuals

with COPD and may lead to decreased physical health and increased flare-ups or exacerbations. However, social support has been shown to address emotional well-being and improve the quality of life for individuals with COPD.

**CHARACTERISTICS OF SOCIAL SUPPORT**

The study results found that Canadian individuals with low facets of reliable attachment and social integration from their informal and positive social relationships were more likely to be diagnosed with anxiety and de-

**Table 5. Logistic Regression Predicting Likelihood of Depression Based on Social Provision Score Subscales, Age, Sex, and Smoking Status**

	Model 1			Model 2		
	$\beta$	SE	e <sup><math>\beta</math></sup> (odds ratio)	B	SE	e <sup><math>\beta</math></sup> (odds ratio)
<b>Attachment</b>	.113	.129	1.12	.107	.130	1.11
<b>Guidance</b>	.023	.154	1.02	.050	.156	1.05
<b>Reliable Attachment</b>	-.106*	.042	.899	-.089*	.064	.915
<b>Reassurance of Worth</b>	.010	.075	1.01	.117	.104	1.12
<b>Social Integration</b>	-.094*	.032	.391	-.022*	.007	.802
<b>Age 40-49</b>				-.968	.497	.380
<b>Age 50-59</b>				-.160	.341	.852
<b>Age 60-69</b>				-.127	.298	.881
<b>Age 70-79</b>				-.398	.275	.672
<b>Age 80+</b>				-.270	.273	.764
<b>Sex, (Male)</b>				-.127*	.268	.880
<b>Smoking Status</b>				-.148	.221	.862
<b>Nagelkerke R<sup>2</sup></b>			.087		.124	

Note: \*p < .05, \*\*p < .01

**Table 6. Logistic Regression Predicting Likelihood of Anxiety Based on Social Provision Score Subscales, Age, Sex, and Smoking Status**

	Model 1			Model 2		
	$\beta$	SE	e <sup><math>\beta</math></sup> (odds ratio)	B	SE	e <sup><math>\beta</math></sup> (odds ratio)
<b>Attachment</b>	-.016	.052	.984	-.001	.022	.999
<b>Guidance</b>	.205	.148	1.228	.204	.049	1.230
<b>Reliable Attachment</b>	-.123*	.047	.885	-.117**	.079	.890
<b>Reassurance of Worth</b>	-.139	.028	.870	-.135	.099	.874
<b>Social Integration</b>	-.105*	.032	.900	-.097*	.073	.180
<b>Age 40-49</b>				.117	.014	1.12
<b>Age 50-59</b>				-.157	.049	.855
<b>Age 60-69</b>				-.108	.016	.898
<b>Age 70-79</b>				-.238	.023	.788
<b>Age 80+</b>				-.335	.027	.716
<b>Sex, (Male)</b>				-.048*	.030	.953
<b>Smoking Status</b>				-.117	.043	.889
<b>Nagelkerke R<sup>2</sup></b>			.142		.155	

Note: \*p < .05, \*\*p < .01

pression. After controlling for age, sex, and smoking status, reliable attachment and social integration remained significant for both statistical analyses. The model identified that men were less likely to have a diagnosis of depression or anxiety compared to women within the sample of Canadians with self-reported COPD.

The results of the study provided evidence for the Social Provisions Theory developed by Weiss [28], which suggests that different needs must be met by an individu-

al's support network for optional emotional functioning. The study analyzed five facets of social support: (1) guidance; (2) reliable alliance; (3) reassurance of worth; (4) attachment; and (5) social integration. The results found that lower levels of social integration and reliable alliance were associated with higher levels of depression and anxiety within a population of Canadian individuals with self-reported COPD. Social integration occurs when an individual has a sense of belonging to a group of friends,



while reliable alliance involves the ability to rely on others during stressful moments. This analysis provided further explanation of the characteristics of social support associated with mental health. As stated, the chronic illness of COPD may cause individuals to become isolated [8], and the physical and emotional changes that occur with COPD can affect their ability to connect with others. Furthermore, the study supported the idea that reliable alliance is related to levels of anxiety and depression, consistent with how the literature describes the impact of these mental health issues in individuals with COPD [60,61].

### Limitations

The main limitation of this study centered on the lack of data collected on individuals' specific spirometry results or detailed COPD behaviors, such as the frequency of shortness of breath or the diagnostic stage of COPD. To address this, the author incorporated a question regarding a self-rating of the individual's physical health status, providing some insight into the research. For example, an individual with a poor health status would presumably experience more intense COPD symptoms.

Furthermore, acquiring information regarding the individual's stage of COPD might have included additional information about the severity of the disease and its correlation with social support. Similarly, understanding the timing of diagnosis, such as how recently the individual was diagnosed, would also be helpful during the analysis. Addressing such limitations could allow further investigation among this population.

The research examined cigarette smoking and did not include other forms of smoking, such as vaping or marijuana. The incorporation of different types of smoking or allowing for options like "Other" could enrich future studies. This variable may be reconsidered in subsequent research efforts within this population.

## POLICY IMPLICATIONS

The study highlights the benefits of social support in relation to overall mental health. The Canadian government plays a key role in determining each province's healthcare funding level. Between 2002 and 2017, it is estimated that the rate of COPD hospitalization admissions in Canada increased by 30% [62]. Higher levels of COPD exacerbations are found in individuals with increased symptoms of depression and anxiety. Consequently, these individuals will have increased ED visits and hospital admissions.

Canadian hospitals, community programs, and public health units currently offer pulmonary rehabilitation (PR) programs, including exercise and education for individuals with COPD in Canada [63]. However, the

increased rates of COPD have not led to an increase in programming, and it is estimated that only 0.4% of Canadians with COPD may access a PR program [63]. It is recommended that additional PR programs be funded by the Canadian government or territorial/provincial funding and include an emphasis on psychosocial support along with social skills training. The additional specific education groups would assist in helping people with COPD develop friendships or friendly relationships. Building rapport and trust would address characteristics of social integration and reliable alliance.

Additionally, individuals with COPD, along with depression or anxiety, demonstrated lower levels of social integration and reliable alliance within their informal social support. Upon examination of this impact, it is recommended that the Canadian government enhance their healthcare strategy to reduce COPD hospital admissions and ER visits. A proactive approach would be to assess social support/relationships upon hospital discharge. If an individual with COPD does not have friendly relationships, a specific plan with a social worker or community service worker is developed, along with connecting to local resources. Within the areas of the country with higher levels of COPD, such as Ontario, programming to enhance social relationships and address mental health may include peer support groups held in person or virtually.

Furthermore, COPD Canada is a national non-profit patient advocacy association that has a social media campaign #SpeakUpForCOPD along with a community newsletter and further resources for those in Canada with COPD [64]. They could assist with the coordination of peer support programming.

Another idea is a telephone support line specifically for individuals with COPD. It could be provided via government funds and COPD Canada and callers would have the option of emotional support or connection to specific mental health professionals for support. Both peer support and the telephone support line would encompass social integration and reliable alliance characteristics, respectively. Furthermore, there are future concerns for individuals with COPD in light of the legalization of marijuana in Canada. While research on the impact of marijuana is inconclusive, it is an inhaled substance that may irritate one's respiratory system and lungs [65,66]. There is a possibility that increased inhalation of marijuana may potentially impact future COPD rates. With the increasing number of individuals with chronic respiratory disease, it is important that Canadian policymakers ensure that safeguards are in place, such as a continued ban on public smoking, including smoking marijuana.

The study recommendations suggest that integrating social support to foster and develop friendships among participants would be a simple way to improve their emotional well-being. Additionally, the study highlights

the importance of the type of social support, emphasizing that higher levels of depression and anxiety are related to lower levels of social integration and reliable alliance. Social integration and reliable alliance simply translate to having trustworthy friends.

This research has provided further evidence regarding the impact of social support on the emotional well-being of individuals with COPD in Canada. The study set a foundation for future research exploring the stress-buffering theory and Social Provisions Theory in the context of COPD. Furthermore, rather than focusing on the structural components of social relationships, such as the number of friends an individual has, the study uncovered different functions and characteristics of informal positive relationships for individuals coping with COPD.

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**Appendix A**

Table S1. Variables from the CCHS-MH 2012

Variable Name	Question	Response Format	Type of Variable
COPD	Do you have COPD/emphysema/chronic bronchitis?	Yes/No	Dichotomous
Sex	What is your sex?	Male/Female/Do Not Answer	Dichotomous (Control/Predictor)
Age	What is your year of birth?	40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80+	Categorical (Control/Predictor)
*Smoking status	At the present time, do you smoke cigarettes daily, occasionally, or not at all?	Daily/Occasionally / Not At All	Categorical (Control/Predictor)
**Social Provisions Scale	Rate response to statement: <ul style="list-style-type: none"> <li>• There are people I can depend on to help me if I really need it.</li> <li>• There are people who enjoy the same social activities that I do.</li> <li>• I have relationships where my competence and skill are recognized.</li> <li>• I have close relationships that provide me with a sense of emotional security and well-being.</li> <li>• There is someone I can talk to about important decisions in my life.</li> <li>• There is a trustworthy person I can turn to for advice if I am having problems.</li> </ul>	Rate on a scale of 1-4 1 Strongly Agree 2 Agree 3 Disagree 4 Strongly Disagree  Total the scores	Scale/Continuous

	<ul style="list-style-type: none"> <li>• I feel part of a group of people who share my attitudes and beliefs.</li> <li>• I feel a strong emotional bond with at least one other person.</li> <li>• There are people who admire my talents and abilities.</li> <li>• There are people I can count on in an emergency.</li> </ul>		
Social Provisions Score - Subscales	<ul style="list-style-type: none"> <li>• Guidance</li> <li>• Reliable Alliance</li> <li>• Reassurance of Worth</li> <li>• Attachment</li> <li>• Social Integration</li> </ul>	Answers summed from different combinations or reversal of Social Provisions Scale answers	Scale/Continuous
Kessler Psychological Scale (K10)	<p>During the past month (from ____ to yesterday), about how often did you feel:</p> <ul style="list-style-type: none"> <li>• ... tired for no good reason?</li> <li>• ... nervous?</li> <li>• ... so nervous that nothing could calm you?</li> <li>• ... hopeless?</li> <li>• ... restless or fidgety?</li> <li>• ... so restless you could not sit still?</li> <li>• ... sad or depressed?</li> <li>• ... so depressed that nothing could cheer you up?</li> <li>• ... that everything was an effort?</li> <li>• ... worthless?</li> </ul>	<p>All of the time Most of the time Some of the time A little of the time None of the time</p> <p>Total Score ranges from 10-50</p> <p>Can categorize scores &lt; 20 Well 20-24 Mild Mental Disorder 25-29 Moderate Mental Disorder 30+ Severe Mental Disorder</p>	Categorical or Nominal

Physical Health	In general, would you say your physical health is...	1 Excellent 2 Very Good 3 Good 4 Fair 5 Poor	Categorical or Nominal
Mental Health	In general, would you say your physical health is...	1 Excellent 2 Very Good 3 Good 4 Fair 5 Poor	Categorical or Nominal
General Life Satisfaction	In general, how would you rate your satisfaction with life?	1 Very Satisfied 2 Satisfied 3 Neither Satisfied Nor Dissatisfied 4 Dissatisfied 5 Very Dissatisfied	Categorical or Nominal
Screeener: Generalized Anxiety Disorder	<ul style="list-style-type: none"> <li>WHO version of Composite International Diagnostic Interview criteria</li> </ul>	Yes/No (within PUMF)	Dichotomous
Screeener: Depression	<ul style="list-style-type: none"> <li>WHO version of Composite International Diagnostic Interview criteria</li> </ul>	Yes/No (within PUMF)	Dichotomous

\*Modified for the analysis