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The Impact of Socioeconomic Status and Ethnicity on Chronic Obstructive Pulmonary Disease Patients

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Walden University
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Abstract

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By

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MPA, Grand Canyon University, 2015

BS, Grand Canyon University, 2013

Doctoral Study Submitted in Partial Fulfillment

Of the Requirements for the degree of

Doctor of Public Health

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Abstract

Chronic obstructive pulmonary disease (COPD) is a progressive and debilitating respiratory condition that leads to significant medial and financial burdens. For many patients with COPD, multiple socioeconomic factors contribute to health disparities, including income, education, employment status, and race/ethnicity. The purpose of this study was to examine the impact of SES and race/ethnicity on COPD patients. For this cross-sectional study, using secondary data analysis, the Social-Ecological Model (SEM), which discusses five levels of influence, was utilized. Data from over 3,222 participants aged 18 and over, living in Nevada were obtained from the 2018 Behavioral Risk Factor Surveillance System (BRFSS) study. Research questions were assessed using Pearson's Chi-square and binomial logistic regression; bivariate analysis was used to determine the impact that SES and race/ethnicity had on COPD patients. According to the binomial logistic regression models, income p =.004, education p = .026, and employment status p = .000 were statistically significant and had an impact on Nevada COPD patients in 2018. However, race/ethnicity, p = .199, was not statistically significant thus did not have an impact on COPD patients in Nevada in 2018. Strategies based on this study could decrease cigarette sales that target individuals with low SES. The positive social change benefits from this study could reduce the number of people with low SES contract COPD. Initialing laws around the marketing of cigarettes in low-income areas might bring positive social change by decreasing the number of individuals who contract COPD, improvising their quality of life, and reducing medical expenses.

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Dedication

I would like to dedicate this dissertation to my wife, my best friend and soul mate Joy Abshier for her support, patience and guidance through this journey. To my beautiful children Ashley Joy, Kara Bryce, and my son-in-law Jesse Aaron for your encouragement, support, and understanding that I was not always available to be there when needed. To my two granddaughters Aubrey Aurora and Olivia Mae, seeing you all makes me work harder every day. To my mother and father Randy and Dianne Abshier, thank you for always checking in to make sure I was doing well and giving me encouragement. To my father-in-law Romeo Sr. and brother-in-law Romeo Jr and my niece Dylan thank you for always being there. Finally, to an amazing woman, the rock of our family, my mother-in-law Aurora Udan, I know you are looking down on me, and wish I could tell you again thank you for everything you have done. I love you all and thank you for your support.

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I would like to say thank you to everyone who provided guidance and support along this journey and chapter of my life. First, my lord and savior Jesus Christ, who without you this would not be possible. To my committee chair, Dr. Pelagia Melea, for all your feedback, support, and patience. I know I could not have done this journey with anyone but you. Dr. Nam, thank you for your feedback and constructive comments, I learned a lot from them. Lastly, Dr. Chester Jones the University Research Reviewer for your patience through this process.

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Section 1: Foundation of the Study and Literature Review

Introduction to the Study

Chronic obstructive pulmonary disease (COPD) is a progressive and debilitating respiratory condition that leads to a significant burden, both medically and financially. It affects millions of people worldwide and causes substantial morbidity and mortality. Much of the published data is related to its prevalence, morbidity, and mortality comes in high-income countries, but 90% of COPD-related deaths occur in low- and middle-income countries (May & Li, 2015). Besides, the hardship of COPD occurs in people of low socioeconomic status (SES) due to differences in health behaviors, political affiliations, and unhealthy exposures caused by the environment and businesses (Pleasants, Riley, & Mannino, 2016).

COPD is often accompanied by multiple comorbidities, which are associated with higher rates of exacerbation, and reduced health-related quality of life (Lee et al., 2018). However, Lee et al. (2018) stated that differences in comorbidities by race and ethnicity in COPD patients has not been extensively studied. COPD is a lifelong, incurable respiratory disease that includes two main conditions emphysema and chronic bronchitis. Emphysema develops when the air sacs of the lungs are damaged, causing the lungs to lose their elastic nature; chronic bronchitis, is a chronic inflammation of the airway lining that causes a thickening of mucus and an increase in the production of mucus (Medical News Today, n.d.).

The purpose of this study is to increase the knowledge about SES and the ethnicity of COPD patients. Moreover, this study is to improve the management, and

care of patients with COPD and build strategies that may help in efforts to provide quality health care in this population (Pleasants et al., 2016).

For many patients with COPD, a multiplex of socioeconomic factors contribute to health disparities in income, education, employment status, residential segregation, stress, and access to affordable health care (Pleasants, Riley, & Mannino, 2016). A study in the United States showed that for people who had similar health insurance, those with low SES had worse health outcomes than those with high SES (Pleasants et al., 2016b).

Uninsured patients with low SES are more likely to seek care from the emergency department than those who are insured. This could lead to a higher rate of emergency department visits thus leading to an increase in hospital re-admissions (Baker, Zou, & Su, 2013). Hospitals in the most upper quartile of the Centers for Medicare and Medicaid Services (CMS) disproportionate share index, which provides care to low-income patients, are referred to as "safety net" hospitals. These facilities maybe unfairly penalized under the COPD Hospital Readmission Reduction Program based on the amount of hospital re-admissions (Shah, Press, Huisingh-Scheetz, & White, 2016).

Furthermore, Pleasants et al. (2016) posited that an excessive burden of COPD occurs in people of low SES due to tobacco use, occupations with exposure to inhalant toxins, and indoor biomass fuel exposure (Pleasants et al., 2016). Gershon et al. (2019) stated there were only three large population's studies that examined the impact of low socioeconomic status on COPD hospital admissions; however, none examined varying aspects of SES.

Nevada was selected for this study based on its high prevalence of patients who suffer from COPD. Nevada is the seventh-largest state in the United States, with an estimated population of 2.8 million and 7% who suffer from COPD (Lung.org, n.d.). This study sought a better understanding of whether SES and ethnicity increase the risk of COPD related health outcomes.

Problem Statement

COPD is underdiagnosed in the general population throughout the United States. It affects millions of people worldwide and causes significant morbidity and mortality (May & Li 2015). COPD is a prevalent disease that is of great concern to the United States public health care systems (Rezaee et al., 2018). An estimated 24 million Americans (7.5%) suffer from COPD, which is the third leading cause of death in the United States (Grigsby et al., 2016). Hospital admissions for patients with COPD are high, on the rise, and have become a focus of pay-for-performance and quality improvement programs (Rezaee et al., 2018). Moreover, SES is one of the most potent determinants of health across a range of chronic diseases (Grigsby et al., 2016).

People of low SES experience an unequal burden of COPD due to differences in health behaviors such as smoking, substance use, and social and structural environmental exposures (Pleasants et al., 2016). Tobacco use, occupations with excessive exposure to inhalant toxins, and indoor biomass fuel (B.F.) exposure are more common in communities of low SES (Pleasants et al., 2016).

Approximately 12 million Americans have been diagnosed with COPD, however, another 12 million Americans may be under diagnosed or not diagnosed at all (CDC,

n.d.). A group of chronic diseases describes COPD, including emphysema and chronic bronchitis, which impair the flow of air in the lungs and make breathing difficult (CDC, n.d.). Besides, CDC (n.d.) stated approximately 75% of COPD cases have been associated with cigarette smoking. Occupation-related exposures may account for another 15% of COPD cases, and genetic factors, asthma, respiratory infections, and indoor and outdoor exposures to air pollutants also contribute to the disease.

Lung.org (n.d.) stated that in Nevada, COPD is the third leading cause of death and has an age-adjusted mortality rate between 43.4 – 48.4 deaths per 100,000 people. In addition, Nevada in 2018 has the ninth highest smoking rate in the United States, with an estimated current cigarette smoking percentage statewide rate of 21.3% of adults (Lung.org, n.d.).

Lung.org (n.d.) states that with a high rate of smoking and an increasing population of older adults, it is expected that the rates for COPD in Nevada will continue to increase every year. Rezaee et al. (2018) stated that COPD is a prevalent disease that is of immense concern to the United States public systems. Hospital admissions for patients with COPD are high, on the rise, and have become a focus of pay-for-performance and quality improvement programs (Rezaee et al., 2018).

The gap in research is as follows: Earlier published works on SES focused on symptoms, disease severity, racial disparities, and COPD within a general population (Pleasants et al., 2016). However, the effect of low income, education attainment, employment status, and lack of insurance as a factor in disease progression along with ethnicity has not been assessed comprehensively (Lowe et al., 2018). Further research

will need to be conducted to determine the relationship between SES and ethnicity as it relates to COPD health outcomes. There remains a limited understanding of the association between SES, ethnicity, and COPD prevalence (Grigsby et al., 2016). Previous studies have demonstrated that people of higher SES have better chronic obstructive pulmonary disease (COPD) health outcomes than those of lower SES. The mortality of people with COPD has decreased since 2010; however, it is not known if all individuals with COPD have benefitted equally based on their SES (Gershon, Hwee, Victor, Wilton, & To, 2014). In the spring of 2010, the CDC and other public health agencies examine the knowledge of COPD prevention throughout community hospitals (CDC, n.d.). The purpose was to design and provide a structured framework that could be used by the public health community to address COPD as an essential public health issue and decrease the contract of COPD through low-income communities.

Purpose of the Study

The purpose of this study was to examine the impact of SES and ethnicity on chronic obstructive pulmonary disease patients. Previous studies have demonstrated an inverse association between SES and various COPD outcomes (Gershon et al., 2014). However, there is a lack of research on how the impact has changed over time. According to Grigsby et al. (2016) SES is defined as an individual's social and economic standing and serves as a proxy for a social or financial position or rank in a social group. It is more than a measure of income; SES encompasses other measures, including education, occupation, housing, assets, insurance, and participation in social organizations.

When public health helps communities on social change by developing new community policies to improve health everyone benefits. Generally, men and women of higher SES have better health (Miravitlles & Ribera, 2017). Understanding associations between SES and ethnicity are essential for the development of policies to reduce health inequalities among individuals with COPD

Research Questions and Hypothesis

This study was guided by the following four research questions and associated hypothesis:

RQ1: What is the relationship between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{01}: There is no statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a1}: There is a statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ2: What is the relationship between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{o2}: There is no statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a2}- There is a statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ3: What is the relationship between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{o3}: There is no statistically significant association between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a3}: There is a statistically significant association between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ4: What is the association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{04}:There is no statistically significant association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Ha_4:There is a statistically significant association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Theoretical Foundation

The theoretical foundation for the study was the social-ecological model, first introduced as a conceptual model for understanding human development by Bronfenbrenner in the 1970s (Kilanowski, 2017). According to the social models of health, our health is influenced by a wide rand of individual, interpersonal, organization, social, environmental, political, and economic factors (Sustaining Community, 2015). The social-ecological model, in particular describes the five levels of influence on the development of ill health: intrapersonal, interpersonal, institutional, community, and public policy factors (McDaniel, 2018).

Moreover, Sustaining Community (2015) states there is plenty of discussion that people who live in marginalized, low-socioeconomic communities have poorer health than people from higher socioeconomic communities and succumb to diseases at a younger age. Health is remarkably sensitive to social environments, and thus it is a complex problem that needs to be addressed at multiple levels.

The social-ecological model is reflected in the research questions because they discuss the effects of an individual's personal factors (income and education) as well as the environment in which they live, which is directly related to SES. The Social-Ecological Model is broad in scope. Each level overlaps with other levels. This signifies how the best public health strategies are those that encompass and target a wide range of perspectives, such as one's environment and social standings (McDaniel, 2018). A public health organization may struggle to promote healthy habits in a community if it does not consider how other factors affect the behavior of the community. Such factors may increase COPD health outcomes (Pleasants et al., 2016).

Researchers found that multiple factors influenced decision making on COPD health outcomes such as: difficulty in paying for health care, fear, embarrassment, denial associated with a diagnosis of illness, and weak interaction with medical personnel (Reininger et al., 2014).

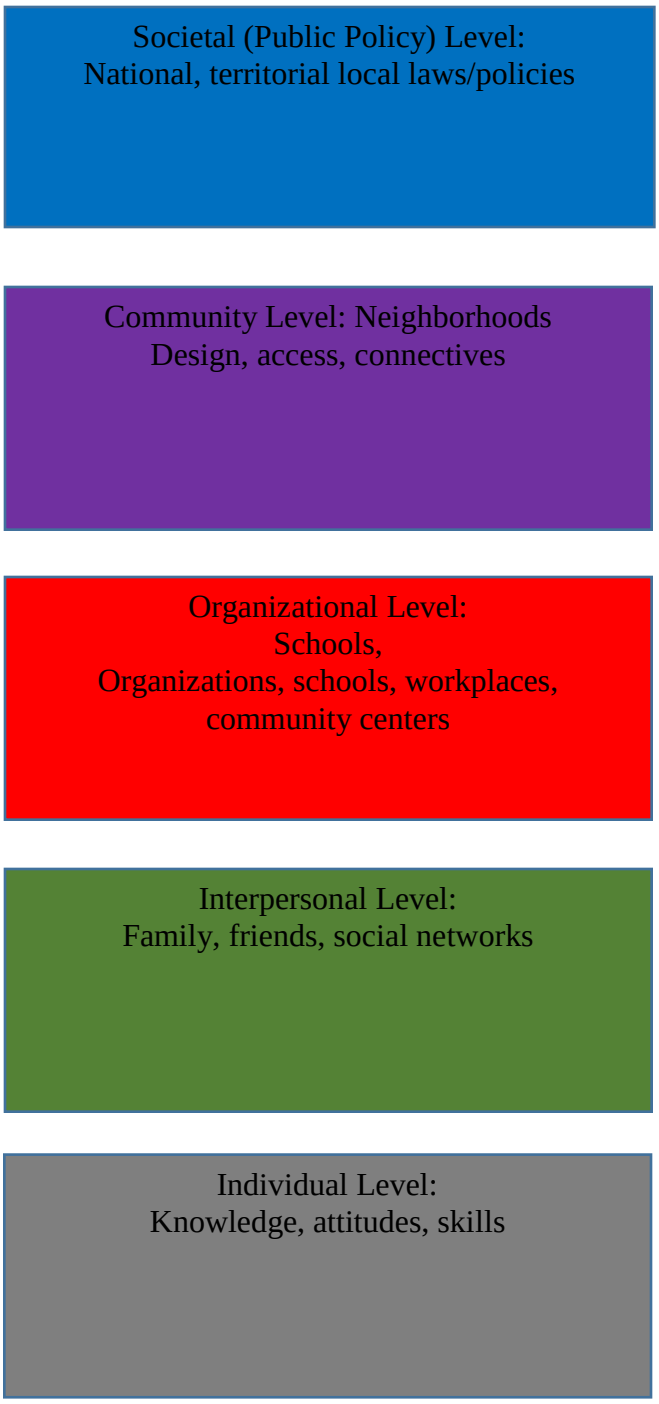

Figure 1. The Social – Ecological Model

The social-ecological model has five levels. The individual-level focuses on influences that change behavior and includes knowledge, attitude, behavior, self-efficacy, gender, age, racial identity, sexual orientation, and stigma (RHI Hub, n.d.). The interpersonal level focuses on interactions with other people, which can be essential for providing social support. The organizational level includes rules and regulations, policies and procedures, and structures to promote healthy behaviors (RHI Hub, n.d.). The community level is essential because it focuses on groups, and organizations. Finally, the societal (public policy) includes local, state, and federal policies that support health actions (RHI Hub, n.d.).

Nature of the Study

This quantitative study used a cross-sectional design to identify the impact of SES and ethnicity on chronic obstructive pulmonary disease health outcomes. The variables were nominal, categorical, and continuous. The independent variables were income, occupation, education, and ethnicity, while the development of COPD was the dependent variable. The mediating variables were age, sex, and lack of insurance for all research questions

The population was adults living in Nevada, where 7% had COPD in 2018 (Sodoma, 2014). The individuals had multiple income levels, different levels of education, different occupations, and different ethnicities. Smoking, which is a leading cause of COPD, was identified in17.6% of adults in Nevada while the national rate was 17.1% (Truth Initiative, 2019). Besides, Truth Initiative (2019) stated 6.7% of high school students smoked cigarettes, while the national average was 8.8%. Health

disparities have multiple determinants, including SES, reduced health care access and reduced access to quality health care providers, health literacy, cultural beliefs, individual choices, social and family situations, legal and structural constraints, and racial and ethnic discrimination (Thakur et al., 2014).

Literature Review

Introduction

In this quantitative study, I will be examining the impact of socioeconomic status (SES), and ethnicity has on COPD health outcomes among adults in Nevada in 2018. The goal was to use data to determine if SES and ethnicity do affect patients with COPD (Healthline, n.d.).

There have been studies on SES and COPD; however, there has been little study, as well as little understanding of how SES and ethnicity affect COPD patients (Lowe et al., 2018). The influence of health disparities and SES on the diagnosis and outcomes of major non-communicable chronic diseases is more evident in patients with COPD than patients without (Pleasants et al., 2016).

Search Strategy

To identify relevant articles, I used the following databases: CINAHL and MEDLINE combined search, CINAHL PLUS with full text, PROQUEST, MEDLINE with full text and Google Scholar. I also used two websites the Centers for Disease Control & Prevention (CDC) and the National Institutes of Health (NIH). Within the databases, I used the following and pairings: *socioeconomic status, SES, chronic obstructive pulmonary disease, COPD, race, ethnicity, COPD health outcomes,*

disparities between COPD and *Health, dangers of COPD, Americans living with COPD, adults in Nevada with COPD, Smoking, and COPD, race, a*nd *COPD, social determinants of health and COPD, health illiteracy* and *COPD, lack of Insurance and COPD, education and COPD, income, and COPD, the burden of living with COPD, occupation,* and *COPD, SES* and *ethnicity and COPD.* The collection date was limited to the following five years 2014 and 2019.

Literature Review Related to Key Variables and Concepts

The variables in this study will be nominal, categorical, and continuous. The independent variables are SES and ethnicity, while the development of COPD is the dependent variable. The mediating variables for this study are age, sex, and lack of insurance. There are minimal studies on SES and ethnicity as it pertains to COPD health outcomes. SES is one of the most critical aspects of the social determinants of health model (Grigsby et al., 2016). In addition, Grigsby et al. (2016) stated there remains little understanding between SES and COPD prevalence in low-income and middle-income countries where a vast majority of COPD related mortality and morbidity occur.

Grigsby et al. (2016) stated SES is defined as social and economic standing and ranks in social groups. Many patients with a lack of insurance find themselves at risk for continuous COPD exacerbations. Patients with COPD who were, enrolled in high deductible plans or had no insurance report putting off or skipping care and end up being admitted into the hospital for COPD treatment (Livingston, 2019).

In recent years, studies have shown COPD has evolved to increasingly affect women, minorities, and individuals from low socioeconomic groups (Kamil, Pinzon, &

Foreman, 2013). However, other studies found in research show COPD affects blacks and Asians at a lower rate than white individuals (Gilkes et al., 2016). Multiple studies have detailed various data yielding different results of who is at the highest risk of COPD based on SES and ethnicity. In the only population study to assess COPD prevalence by ethnicity to date, Martin et al. (2012) found a lower amount of COPD in Blacks and Asians. The data showed there were fewer numbers of Blacks vs other ethnicities in the study (Gilkes et al., 2016). Furthermore, Gilkes et al. (2016) stated a study by Nacul et al., who predicted that the highest prevalence of COPD would be among Black men in deprived areas, using the relatively small numbers of data from the Health Survey for England. Mortality from COPD appears higher in Blacks in the USA.

The Burden of COPD

Chronic respiratory diseases, such as COPD, receive little attention and funding in comparison to other global mortality and morbidity issues (Quaderi & Hurst, 2018). COPD is the result of lungs being exposed to environmental stimulants such as tobacco, and household air pollutants (Quaderi & Hurst, 2018). In addition, Quaderi and Hurst (2018) stated COPD is a quiet killer that affects low and middle-income families. An estimated 328 million individuals are living with COPD and millions more living with COPD that have not been diagnosed (Quaderi & Hurst, 2018).

Past studies have shown tobacco smoking is associated with morbidity and mortality from non-communicable respiratory diseases, including 600,000 people who are estimated to die every year from the effects of second-hand smoke (Quaderi and Hurst, 2018); also, air pollution is the most significant environmental cause of death

worldwide. Quaderi and Hurst (2018) stated in their study that the lower an individual's socioeconomic position, the higher their risk of poor health: women and children living in severe poverty have the most considerable exposure to household air pollutants.

Risk factors associated with COPD

The Global Initiative for Chronic Obstructive Lung Disease stated COPD is an irreversible, yet preventable and treatable disease and is characterized by airflow limitations in the lungs (Antuni & Barnes, 2016). Smoking has been discovered to be the number one risk factor for COPD. Antuni & Barnes (2016) posit a range of 25% to 50% of all smokers have been diagnosed with COPD later in their lifetime.

However, while smoking is the leading cause of COPD, other inhalational agents responsible for the development of this disease like biomass fuel smoke, which is still used in developing countries and is estimated to affect 3 billion people worldwide.

Not all smokers will develop COPD in their lives; researchers have found that genetics may play a role in the development of COPD. There is a close rapport between alpha-1 antitrypsin deficiency and COPD (Antuni & Barnes, 2016). While it is challenging to compare the decline in lung function between men and women because of bias, there is increasing evidence that women are more likely to develop COPD (Antuni & Barnes, 2016). Antuni & Barnes (2016) stated in a meta-analysis of 55,079 individuals assessed at least twice with spirometry, and it was observed that women who smoked had a more rapid decline in lung function between 45 to 50 years of age compared to men who smoke.

Socioeconomic Status, Educational, and Occupational Risks of COPD

SES and the level of education are the most important in the development of and increased mortality from COPD and is the second most important risk factor to smoking (Antuni & Barnes, 2016). In a study conducted in Belgian, Antuni & Barnes (2016) stated out of the 52,000 participants, a low level of education was an apparent risk factor in COPD.

In previously documented studies, it has been demonstrated that individuals with a higher level of SES and education have a better than average chance for COPD health-related outcomes than those of lower SES (Gershon et al., 2014). Gershon et al. (2014) posit in previous studies has demonstrated an inverse association between SES and various COPD outcomes, such as mortality. To the best of our knowledge, however, no studies have examined how this relationship has changed over time.

Smoking is not the only factor for individuals to be examined for COPD. Although tobacco smoking is widely recognized as the dominant risk factor for COPD, other causes, such as environmental and occupational exposure, need to be considered. The attributable population at risk (PAR) for COPD associated with occupational exposure has been estimated at 31% for smokers and 20% for nonsmokers (Kraïm-Leleu, Lesage, Drame, Lebargy, & Deschamps, 2016). Approximately 25% of adults with COPD have never smoked, as workplace exposure is likely the reason behind the diagnosis of this disease (Syamlal, Doney, & Mazurek, 2019).

Moreover, Kraïm-Leleu et al. (2016) state a dose-dependent relationship has been found between exposure to dust, gas/fume, and the presence of chronic pulmonary

symptoms like cough and dyspnea with documented sectors of mining, construction, foundry, and welding.

Lack of Insurance and COPD Outcome

Limited accessibility to health care can be a barrier to obtaining health care needed for COPD patients. There have been limited studies linking health care to COPD health outcomes (Kim et al., 2016). The total economic burden in the United States is estimated to be higher than $50 billion; this includes the direct medical cost to exceed $32 billion, and morbidity cost to exceed $10 billion (Kim et al., 2016). Hospitalization and emergency room cost represent an estimated 72% of all medical expenses.

Not all states help patients who suffer from COPD. Patients with COPD, who are insured with high-deductible insurance plans are most likely to skip appointments and be non-compliant with COPD medications (Boyles, 2019). In addition, those with high deductibles were also more likely to report struggling to pay monthly bills and report family out-of-pocket healthcare costs that exceeded $5,000 in a year (Livingston, 2019).

Physical Activity related to COPD Health Outcomes

Three outcome categories are of most significant importance to chronic obstructive pulmonary disease (COPD) patients, their families, and their caregivers: health-related quality of life, hospital admissions or re-admissions, and mortality (Zuwallack & Esteban, 2014). In COPD patients, there is a low-level baseline in physical activity and harms the three significant categories of importance. Zuwallack & Esteban (2014) stated in past studies show an increase in physical activity can increase health-related quality of life and decrease hospitalizations.

A study of 391 patients who had COPD and were on a physical regiment and had an assessment at baseline and five years later showed meaningful improvements in their quality of life (Zuwallack & Esteban, 2014).

In a study conducted by Vaes et al. (2014), they were able to link physical activity to the outcome by showing evidence that changes to physical activity decrease mortality risk in patients with COPD (Zuwallack & Esteban, 2014).

Nutrition Related to COPD Health Outcomes

The vast majority of individuals who live and suffer from COPD are thin, and for the most part, malnourished or in an undernourished state, which is often referred to as Pulmonary Cachexia Syndrome (Rawal & Yadav, 2016). This syndrome is often characterized by a loss of body fat, causing atrophy. In addition, Rawal and Yadav (2016) stated based on past studies that it occurs in approximately 40% of patients who suffer from COPD. Patients who suffer from Pulmonary Cachexia syndrome have increased mortality and decreased skeletal muscle function (Rawal & Yadav, 2016).

Many such patients must take nutritional supplement therapy, which as shown promising results and a decrease in muscle atrophy (Rawal & Yadav, 2016). Due to the atrophy of muscles in patients that suffer from COPD, approximately 40% will have low body weight and low body mass. Many patients who suffer from COPD find themselves in hypermetabolism and must consume more calories than usual, which is likely due to an increase in the work of breathing that many suffer from (Rawal & Yadav, 2016). Rawal and Yadav (2016) stated that along with supplemental nutritional therapy, patients with

COPD should consume high fat, low-carbohydrate diets, and an increase in fruits and vegetables.

Definitions

Defining terms is essential to ensure an understanding of terminology and fundamental concepts shared between a dissertation and the audience (Goes & Simon, n.d.). The following are the terms and definitions used throughout this literature paper and supported by the study.

Chronic Obstructive Pulmonary Disease (COPD): An irreversible yet preventable disease in the respiratory system that makes it difficult to breathe. COPD is made up of chronic bronchitis (long-term cough with mucus) and emphysema (damage to the lungs over time). Smoking is the leading cause of COPD (MedlinePlus Medical Encyclopedia, n.d.).

Education: The level of training an individual has achieved in their lives. There are several levels of education: kindergarten/elementary, high school or equivalent, some college, post-secondary, associate degree, bachelor's degree, a master's degree and a doctoral or professional degree (Torpey & Watson, 2014)

Income: Refers to earnings such as wages, salaries, and self-employment earnings. Income is experienced differently by low-income, middle income, and high-income individuals and households (Congressional Research Service [CRS], n.d.)

Occupation/Employment Status: A person's usual or principal work or business, means to earn a living (Dictionary.com, n.d.).

Race/Ethnicity: Race is seen as biological, and ethnicity is viewed as a social science that describes cultural identity. Race refers to a distinct population within a broader community (Nittle, 2019). The revisions to the Office of Management and Budget (OMB) directive 15 define each racial and ethnic category as American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander and White (NIH.gov, n.d.).

Socioeconomic Status (SES): The social standing or class of the individual or group. It is often measured by education, occupation, and income. It also reveals issues related to power, control, and privilege (APA.org, n.d.).

Assumptions

For this cross-sectional study, I used secondary data for my analysis and assumed that the questions were asked in a manner that could be understood, the participants answered honestly, that their answers were transcribed accurately. I assume that SES and ethnicity do have an impact on COPD health outcomes. I also expect that smoking, age, sex, and insurance status contribute to the effects of COPD health outcomes. I further assume that proper education, occupation, and income level can improve health outcomes in patients with COPD.

Scope and Delimitations

The study surveilled men and women over the age of 45 living in Northern Nevada in 2018; it was based on the Behavioral Risk Factor Surveillance System (BRFSS) survey. This age was selected because COPD is commonly diagnosed after the age of 45 and is considered a disease of the elderly (Holm et al., 2014). Individuals under

the age of 45 were excluded from this study since they were less likely to have acquired COPD early in their lives. The study included White, Black, Asian, American Indian/Alaskan Native, Hispanic, and other races (non-Hispanic).

Limitations

This study which was based on secondary data could have incorporated human error since it was researched, and the data were entered, by someone else (Thompson, 2017). In secondary data, there is the chance for bias. Inconsistencies in documentation can alter the results and give false positives. I was concerned data skew in the data where not all races were accounted for equally. If one race/ethnicity had more participants than another, the data may not yield satisfactory results. More limitations are based on participants answering the questions honestly without the fear of the stigma attached to them. Furthermore, this study is from a single year (2018) from BRFSS.

Significance

COPD is one of the most prevalent and debilitating diseases in adults worldwide. It reduced the quality of life of the affected patient (Almagro & Castro, 2013). While there has been much research about the prevention and treatment of COPD, there has been minimal research on the impact of SES and ethnicity as it relates to COPD health outcomes (Rezaee et al., 2018).

The interplay between race-ethnicity, SES, and COPD health outcomes remains poorly characterized or studied (Eisner et al., 2011). SES is one of the most potent determinants of health; using an original approach, I Sought to determine the magnitude and consistency of SES and COPD outcomes among income, education, occupation, and

ethnicity to determine whether one race was at a higher risk than other races when it comes to COPD based on their SES.

There are crucial social change implications regarding individuals who have COPD. Social change can increase quality of life, decrease suffering and reduce medical cost. The stigma that surrounds COPD can be devastating to an individual. Stigma is a social construction that defines people in terms of a distinguishing characteristic or mark and devalues them and occurs when society labels someone as tainted, less desirable, or handicapped (Johnson, Campbell, Bowers, & Nichol, 2007). Subjects with COPD also perceived emotional support less often compared to non-COPD subjects. There is a relationships between COPD symptoms and disease burden in regards to quality of life, health status, daily activities, physical activity, sleep, comorbid anxiety, and depression, as well as the risk of exacerbations and disease prognosis (Miravitlles & Ribera, 2017).

In addition, Miravitlles & Ribera (2017) stated many individuals with COPD perceive symptom burden as a significant ongoing challenge to performing their day-to-day activities. The number of falls in the last year, the experience of pain, sleep quality, self-reported sedentary behavior, handgrip strength, and use of aids in daily life are increased for individuals with COPD (Franssen et al., 2018a).

Identifying those factors and others, such as ethnicity and SES, could influence social change by aiding my research on why particular races are at a higher risk than others in developing COPD are. Besides, Franssen et al. (2018) stated to help with social change HELP-COPD study suggested that physical, psychological, social support should

be offered from mild disease progression, routinely providing a holistic approach throughout the life-long course of the disease.

The COPD National Action Plan was introduced in 2017 as part of a multi-stakeholder endeavor to encourage collaboration among various patients, caregivers, physicians, researchers, and policymakers to optimize awareness, diagnosis, and treatment of this disease (Criner & Han, 2018). COPD is the fourth leading cause of death in America, and it is time to make COPD care a public health priority. Criner & Han (2018) states COPD is a costly disease, and as its prevalence rises, associated costs will increase. In 2010, the total burden of COPD-attributable expenses in the United States was an estimated $36 billion, accounting for both direct medical costs as well as absenteeism costs. By the year 2020, it is projected national medical costs for COPD will total $49 billion (Criner & Han, 2018).

Moreover, Kangovi et al. (2013) stated low SES is commonly measured by race, education, occupation, and income. Many COPD patients are unable to afford regular ambulatory visits, leaving them no choice but to rely on hospital charity care when they became ill, at times increasing re-admission rates (Kangovi et al., (2013). Studies have examined the association between race and health-related quality of life, hospitalization, intensive care unit admission, and mortality in COPD with mixed results, not accounting for SES (Eisner et al., 2011). More studies need to be identified regarding the relationship between SES and ethnicity to determine if these variables increase health outcomes such as a decrease in quality of life or an increase in hospitalization.

Some specific efforts may help lessen these health injustices in individuals from low SES areas such as better testing to diagnose or undiagnosed COPD, and educating the public and those involved in health care about the disease progression. In addition, improving access to cost-effective health care insurance, and increasing the efforts to prevent disease through smoking cessation classes, and reduce the accessibility to cigarettes in low-income areas (Pleasants et al., 2016).

The outcome of the study will benefit public health officials in understanding the relationship between SES (income, education, occupation) and ethnicity (White, Black, Hispanic, and Asian) and the role they on increased COPD exacerbations. The reduction in life expectancy associated with low income is significantly influenced by regional differences in health behaviors, especially smoking (Lowe et al., 2018). Public health officials must understand how low-income, lack of education, race, age, sex, and culture should be addressed to decrease the dangers of COPD health outcomes.

Summary

COPD is a prevalent disease and a significant concern to public health system in the United States. An estimated 24 million Americans are living with this preventable, yet irreversible disease. Furthermore, COPD is the third leading cause of death in the world and has been a burden on the health care system in the United States. The total economic hardship in the United States is estimated to be higher than $50 billion; this includes the direct medical cost to over $32 billion, and morbidity cost over $10 billion.

COPD is a common cause of death and disability; however, little is known about the relationship between SES and race-ethnicity on health outcomes. The purpose of this

study aims to identify if SES (income, education, and occupation) and Ethnicity (White, Black, Hispanic, and Asian) have a part in individuals who suffer from COPD

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to examine the impact of SES and ethnicity on chronic obstructive pulmonary disease health outcomes. In this section, I will focus on the research design and data collection to test my hypothesis. I will use secondary data retrieved from BRFSS, "which is the nation's premier system of health-related telephone surveys that collects data from United States residents about their health-related behaviors (CDC, n.d.)"

Research Variables and Design

The study sought to determine if SES and ethnicity have an impact on COPD health-related outcomes. The variables were nominal, categorical, and continuous. The independent variables were income, employment status, education, and ethnicity, while the development of COPD was the dependent variable. The mediating variables for this study were smoking, age, sex, and lack of insurance. Variance is the difference; that is, a variation that occurs naturally in the world or change that we create because of manipulation. Variables are names given to the variance we wish to explain (Office of Research Integrity, n.d.).

This study was a secondary analysis of data that is archived in the 2018 BRFSS. The dataset identification is LLCP 2018 and it was used to identify health-related risk behaviors, chronic health behaviors, and the use of preventative services.

Methodology

Population

The BRFSS data, which is managed by the CDC, is the secondary source of data that was used for this study. For this study, I used the 2018 codebook, which has a sample size for Nevada of 3,173 participants with COPD.

The individuals had varying income levels, education levels, employment statuses, and ethnicities. Smoking, which is a leading cause of COPD, was identified in17.6% of adults in Nevada while the national rate was 17.1% (Truth Initiative, 2019). In addition, Nevada was selected for the amount of youths that smoke. Truth Initiative (2019) stated 6.7% of high school students in Nevada smoked cigarettes, while the national average is 8.8%.

Study Design

In this observational study I used a cross-sectional design to measure the exposure and outcome of the participants at the same time (Setia, 2016). Cross-sectional designs are used for population-based surveys and to assess the prevalence of diseases in clinical-based studies (Setia, 2016).

To prevent bias, the BRFSS had to have enough participants not to skew the data. The total participants for the 2018 BRFSS data set are 437,436, in which 37,377 were told they had COPD (emphysema, chronic bronchitis) and 3,222 were from Nevada. For the selection process for this study, all participants are adults over the age of 18. Today, the BRFSS does random calls consisting of three parts; core questions, and optional

modules (CDC, 2018). All individuals who lived in Nevada, where BRFSS was conducting its survey, had an opportunity to participate.

Participant Framework

I selected this study based on several questions that were asked in the BRFSS database. An essential aspect of using BRFSS for the research is that it is entirely random, which decreases the chance of bias or skewed data. The framework consisted of adults living in Nevada in 2018, race/ethnicity value, income level, education level, employment status, and ever been told you have COPD, emphysema or chronic bronchitis. The sample for this study was based on adults living in Nevada; therefore, any individuals younger than 18 years of age will be disqualified.

Access to the Data Set and Permission

BRFSS is a free data set that any individual doing research can use. Ordinarily, data and materials produced by federal agencies are in the public domain and may be reproduced without permission (CDC 2018). However, they do require that any published material derived from the data acknowledge CDC's BRFSS as the original source.

Power Analysis and Sample Size

The study being conducted is a cross-sectional analysis, and all participants in this study were analyzed using a priori in G*Power 3.1.9.4. (See Appendix A). For the test family, I used the Z test, and the statistical analysis I will use is logistic regression. I selected a two tail, α err prob. = 0.05, power (1-β err prob.) = 0.95, the actual power for this analysis is 0.9500770, with a total sample size needed of 337 participants. The odds

ratio for this study is 1.5, which is in line with other studies such as A. S. Gershon, Dolmage, Stephenson, & Jackson, (2012) and (Grigsby et al., 2016). A sample size that is too small reduces the power of the study and increases the margin of error, which can render the study meaningless (Deziel, 2018).

Inclusion Criteria

Inclusion criteria are defined as the critical features of the target population that the investigators will use to answer their research question, typical inclusion criteria include demographic, clinical, and geographic characteristics (Patino & Ferreira, 2018). Inclusion criteria for this study is over the age of 18, identify as White, Black, Hispanic or Asian, male or female, and reside in the Nevada.

Exclusion Criteria

Exclusion criteria is defined as features of the potential study participants that meet the inclusion criteria but present with additional characteristics that could interfere with the success of the study or increase their risk for an unfavorable outcome (Patino & Ferreira, 2018). Exclusion criteria for this study were all cases where the participants answered not sure, refused to answer, missed answering the question, and I do not know to the research questions. Participants who did not reside in the Nevada and are younger than 18 were excluded.

Instrumentation Constructs

The BRFSS is a federally funded database, which is overseen by the CDC and collects information in all 50 states on health behaviors, which play a significant role in morbidity and mortality (CDC, 2018). The data that I will use for this study was

collected in 2018, in Nevada on adults over the age of 18. BRFSS became a nationwide surveillance system in 1993, and today does more than 506,000 interviews, overall, 50 states to include the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, America Samoa, and Palau (CDC, 2018). Besides, BRFSS is a cross-sectional telephone survey that state health departments conduct monthly over landline telephones and cellular telephones with a standardized questionnaire and technical and methodologic assistance from CDC (CDC, 2018).

BRFSS is used to collect prevalence data among adult U.S. residents regarding their risk behaviors and preventive health practices that can affect their health status. Respondents' data are forwarded to CDC to be counted for each state, returned with standard tabulations, and published at year's end by each state (CDC, 2018). The BRFSS database is essential for this study based on the variety of individuals conducted via the random phone call screening method. BRFSS is not biased on its data collection due to the random call in each state.

Operationalization Constructs

Table 1 describes each variable that will be used in this study to answer the research question. The variables listed in table 1 include COPD (chronic bronchitis, emphysema), ethnicity, sex, age, education, income level, employment status, smoking, health insurance. Table 1 is broken out into four parts, name of the variable, meaning or definition of the variable, respondents of the variable, and measurement.

Table 1

Independent and Dependent Variables

Name	Meaning
COPD	A chronic inflammatory lung disease
Chronic bronchitis	Inflammation in the bronchial tubes
Emphysema	Air sacs in the lungs are damaged
Smoking	Smoking history of an individual
Ethnicity	A person culture, language, and race
Sex	Male or female
Age	Length of time a person has lived
Employment	Employed vs. unemployed
Health insurance	Insurance cover or lack of insurance
Education	The amount of schooling achieved
Income	The amount of money made

Table 2 shows the breakdown of variables that are essential to operationalize the research question as well as the responses given by each participant. In addition, it shows the measurement for each variable and if it is the independent, dependent variable or a co-variate variable.

Operationalization for Each Variable

Table 2

Definition of variables

Definition	Category	Variable type	Measurement
COPD (chronic bronchitis & emphysema)	1=Yes 2=No	Dichotomous	DV

Ethnicity	1=White 2=Black 3=Asian 4=Hispanic 5=Other	Nominal	IV
Age	1= 18-24 2= 25-34 3= 35-44 4= 45-54 5= 55-64 6= 65 and older	Ordinal	Covariate
Income Level	1= < $10,000 2= < $15,000 3= < $20,000 4= < $25,000 5= < $35,000 6= < $50,000 7= < $75,000 8= < $75,000 99= Refused	Ordinal	IV
Smoking Status	1= Current Smoker-Every day 2= Current smoker-some days 3= Former smoker 4= Never Smoked 9=Don't know /Refused/missing	Ordinal	Covariate
Health Coverage	1= Yes 2= No 3= Refused	Nominal	Covariate
Sex	1=Male 2=Female 3= Refused	Nominal	Covariate
	1= No ed. / Kind.		

Education Level	2= Grades 1-8 3= Grades 9-11 4= Grade 12 / GED 5= Coll. 1-3 years 6= Coll. 4 years 7= Refused	Ordinal	IV
Employment Status	1=Employed 2= Self Employed 3= No work < 1 Yr. 4= No work > 1 Yr. 5= Homemaker 6= Student 7= Retired 8= Unable to work 9= Refused	Nominal	IV

Independent Variables

For this study, the independent variables are income, education, and employment status. The variables for this study will be taken from the 2018 BRFSS database.

Dependent Variables

The dependent variable for this study is ever being told you have COPD (chronic bronchitis or emphysema) before. This variable will be taken from the BRFSS 2018 database and participants who said yes and no will be used for this study.

Covariate Variables

Co-variates are essential in the study as they can affect the outcome. The co-variate variables for this study are smoking, sex, age, and health insurance. All four co-variates were taken from the BRFSS database. These co-variates will be used as they can alter the outcome of the study.

Data Analysis Plan

IBM SPSS Statistics Version 25 will be used to run the data analysis plan, and the same statistical software is being used to clean any missing data. I will use the 2018 BRFSS data plan from the CDC website. During my study, I will use descriptive analysis, which will show the frequency and percentage distributions to analyze the demographic characteristics of the population and sample.

Secondly, I will use chi-square analysis to analyze variables to see if there is an association between SES and COPD patients and ethnicity and COPD patients. I choose to use chi-square analysis because it examines the difference between categorical variables in the same population (Foley, 2018). Furthermore, it informs us whether there is a statistically significant difference between how the categories answered a given question. The chi-square test of independence (also known as the Pearson chi-square test, or merely the chi-square) is one of the most useful statistics for testing hypotheses when the variables are categorical, nominal, as often happens in clinical research (McHugh, 2012). In addition, for chi-square tests results, Cramer's V ranges for association are .2 or less is a week relationship, .2-.3 is a moderate relationship and greater than .3 is a strong relationship.

Third, I will use binomial logistic regression since I have a single dichotomous DV (ever been diagnosed with COPD) and multiple IV (income, education, and employment status). A binomial logistic regression (often referred to simply as logistic regression), predicts the probability that an observation falls into one of two categories of

a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical (Leard, n.d.).

To determine which statistical test, I will use for my research questions and hypothesis, I used a form called Statistical Procedures per Research Question and Hypothesis (see Appendix B). In this form, I entered the research question, hypothesis, independent, and dependent variables. This allowed me to select the best statistical analysis to perform on my research questions and hypothesis.

Research Questions and Hypothesis

RQ1: What is the relationship between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{01}: There is no statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a1}: There is a statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ2: What is the relationship between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{o2}: There is no statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a2}- There is a statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ3: What is the relationship between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{o3}: There is no statistically significant association between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

H_{a3}: There is a statistically significant association between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, when smoking, age, sex, and lack of insurance are controlled for?

RQ4: What is the association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

H_{04}:There is no statistically significant association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Ha_4:There is a statistically significant association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Threats to Validity

Threats to the validity of a study might include factors outside the program that could account for results obtained from the evaluation. Therefore, validity means you can be more confident that your intervention of the program did cause the effect observed, and the fact is not because of other causes (Child Youth and Families at Risk, n.d.).

Internal Validity

Internal validity includes selection bias, attrition or mortality, history, maturation, and instrumentation. Besides, internal validity resembles the truth about inferences surrounding cause-effect and casual relationships (Research Methods Knowledge Base, n.d.). An internal threat to the BRFSS data set is due the participants fully understand the question that are asked and are the answers they are giving correct answers to their diagnosis.

External Validity

External validity includes situational/contextual factors, pretest and posttest effects, Hawthorne effects, and experimenter effects. Moreover, external validity is related to generalizing. Also, it refers to the relative truth of the conclusion (Research Methods Knowledge Base, n.d.). To improve external validity, the researcher would need to have an adequate sample from a population you wish to study. The best way to do this is to use a random selection. An external threat to this study is the possibility of selection bias. The BRFSS data set is not designed only for patients with COPD, it is a broad study that focuses on many heath related issues and behaviors.

Ethical Procedures

The BRFSS database is a free database for the public to use and does not require permission to utilize its data. Generally, data and materials produced by federal agencies are in the public domain and may be reproduced without permission (CDC 2018). Ethical concerns I have for the data is the honesty of the participant answering the question and if he/she answered all the questions. However, they do ask that any published material derived from the data acknowledge CDC's BRFSS as the original source. An Institutional Review Board request was submitted and received approval no 09-18-20-0750429.

All participants in the secondary study were treated with respect as only behavioral and demographic questions are asked from the participants. The data that I will be using for this study will be password protected and stored in my G drive. I will be

the only individual having access to this data in my drive. The data can and will be destroyed 3 to 5 years after completion of the project.

Summary

The purpose of this section was to describe the methodology that will be used to determine the relationship between SES and ethnicity on COPD patients. I was able to provide the sample population size, and the analysis that will be needed to answer the research questions. The secondary data that I will use for the study is BRFSS and is a free database provided by the CDC. This data set has the questions needed for my research and will be able to answer the research questions. Since the BRFSS, calls individuals' randomly and there are no unique identifiers there are no ethical issues to address. In section 3, the results of the data analysis will be presented.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this study is to determine the impact of SES and ethnicity on COPD patients. The study analyzed what impact the independent variables, SES (income, employment status, and education) and ethnicity have against the dependent variable development of COPD (chronic bronchitis and emphysema) while smoking, age, sex, and lack of insurance are controlling for. Discoveries that come out of statistical analysis may help public health officials and health professionals build policies and protocols to better care for patients with COPD. This section of the paper will discuss the binomial logistic regression results to determine the impact of SES and ethnicity on patients with COPD. This study was guided by four-research question that were used as noted in the previous two sections.

RQ1: What is the relationship between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

RQ2: What is the relationship between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

RQ3: What is the relationship between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

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RQ4: What is the association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Data Collection of Secondary Data Set

For this study, I used secondary data from the 2018 BRFSS data set that met my inclusion criteria. BRFSS data were collected from all 50 states as well as Guam and Puerto Rico. Of the 437,436 participants, 374,197 completed the interview process and 3,222 were from Nevada. In addition, approx. 38% received calls via a landline and 272,154 approx. 62% utilized a cell phone for responses.

Time Frame and Response Rates

Of the 437,436 participants, I focused on Nevadans over the age of 18. I excluded all cases where participants did not reside in Nevada, missed the question or left it blank, who refused to answer it. After cleaning the data in SPSS, the total sample size from the data set was 1,619 participants who answered the question “ever been told you have COPD”, where 226 participants said yes and 1,393 said no.

There is the possibility that some participants did not answer the survey questions truthfully or may have misunderstood the questions in its entirety. There is a possibility that SES, ethnicity, ever been told you have COPD along with other variables might have not been clearly understood by the respondent.

Descriptive Demographics of the Sample

In 2018, 3,222 residents were contacted via landline or cell phone to participate in a BRFSS study conducted by the CDC. For this study, 302 (10%) of the participants stated they have been told they have COPD, however, after cleaning the data, 226 participants stated yes to having COPD.

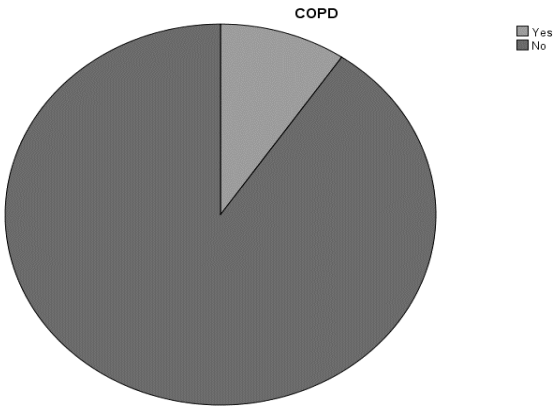

Figure 2. Distribution of participant questioned for COPD in Nevada BRFSS, 2018

Representativeness of the Sample

The BRFSS has always used landlines to reach participants for their survey, however now they are also using cell phones to reach participants. By including cell phones in the survey, BRFSS can reach segments of the population that were previously inaccessible those who have a cell phone but not a landline, and produce a more representative sample and higher quality data (CDC, n.d.). Moreover, CDC (n.d.) add new weighting methodology raking, or iterative proportional fitting replaced the post stratification weighting method that had been used with previous BRFSS data sets. In addition to age, gender, and race/ethnicity, raking permits more demographic variables to

be included in weighting such as education attainment, marital status, tenure (property ownership), and telephone ownership.

Univariate Characteristics of the Sample

Table 3 displays the results of the univariate characteristics from the BRFSS dataset from 2018. In the dataset, there were 3,222 participants from Nevada that participated in the survey. After cleaning the data, there were 1,619 participants for this study where 226 participants said yes, they have been told they have COPD and 1,393 said no they have never been told they have COPD. The independent variables are income, employment, education and race/ethnicity and the covariates are health insurance, sex, smoking status, and age. One issue with the independent variable of race/ethnicity showed 71.5% were White/non-Hispanic showing possible data limitations regarding race/ethnicity

Table 3

Univariate Characteristics of COPD BRFSS 2018

Variable	Characteristics	N	%
Ever told you have COPD	Yes	226	14
	No	1393	86
Employment Status	Self-employed	279	17.2
	Out of work > 1 year	46	2.8
	Out of work < 1 year	53	3.3
	A homemaker	163	10.1
	A student	86	5.3
	Retired	796	49.2
	Unable to work	196	12.1
Education Level	No school/Kindergarten	2	0.1
	Grades 1-8	49	3.0
	Grades 9-11	120	7.4
	Grade 12 or GED	419	25.9

	College 1-3 yrs	527	32.6
	College 4 years	502	31.0
Income Level	Less than $10K	77	4.8
	Less than $15K	100	6.2
	Less than $20K	112	6.9
	Less than $25K	150	9.3
	Less than $35K	173	10.7
	Less than $50K	197	12.2
	Less than $75K	239	14.8
	$75K or more	378	23.3
	Don't know/not sure	193	11.9
Race/ethnicity	White non-Hispanic	1157	71.5
	Black non-Hispanic	64	4.0
	Asian non-Hispanic	45	2.8
	American Indian/Alaskan Native	32	2.0
	Hispanic	229	14.1
	Other race non-Hispanic	92	5.7
Age	18-24	99	6.1
	25-34	127	7.8
	35-44	125	7.7
	45-54	186	11.5
	55-64	281	17.4
	65 and older	801	49.5
Smoking	Current Smokers-everyday	185	11.4
	Current Smoker-some days	62	3.8
	Former Smoker	549	33.9
	Never Smoker	799	49.4
	Don't know	24	1.5
Health Care Coverage	Yes	1467	90.6
	No	148	9.1
	Don't know	4	0.3
Sex	Male	675	41.7
	Female	942	58.2
	Don't Know	2	0.1

Research Question 1

RQ1: What is the relationship between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Statistical Assumptions

Chi-square analysis was conducted using crosstabs and Pearson's chi-square for the independent variable income, against the dependent variable diagnosed with COPD. Table 4 focuses on the development of COPD and income. In the chi-square analysis, it is noted the Pearson Chi-square had a value of $X^2 = 57.14$, df of 8 and a significance of $p = .000$ ($p \leq .05$). The Hosmer-Lemeshow test (HL test) shows, $p = .685$ ($p < .05$) which means this is a good fit. The post hoc Cramer's *V* analysis displayed φc = .188, stating the strength of the association between the two variables income and COPD as having a moderate association.

Hypothesis Test Results

There is a statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance $p = .004$ ($p \leq .05$) therefore, we must reject the null hypothesis. Utilizing table 10, variable in the equation, income was displayed amongst several income levels. Less than $10K was utilized as the reference category for income. As noted in table 10, income less than $10K is $p = .004$ ($p \leq .05$). The participants making $15K, $20K, and $25K respectively are .210, .960, .and .674 times less likely to develop COPD than participants who make less than $10K. In

addition, the participants who made $35K, $50K, and $75K are .172, .825, and .255 times with a higher likelihood to not develop COPD.

Table 4
Chi-Square Tests Income

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	57.141[a]	8	.000
Likelihood Ratio	54.768	8	.000
Linear-by-Linear Association	.640	1	.424
N of Valid Cases	1619		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.75.

Research Question 2

RQ2: What is the relationship between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Statistical Assumptions

Chi-square analysis was conducted using crosstabs and Pearson's chi-square for the independent variable education, against the dependent variable diagnosed with COPD. In addition, table 5, shows the chi-square was used on COPD and education. In the chi-square analysis, it is noted the Pearson Chi-square had a value of $X^2 = 31.77$, df of 5 and a significance of $p = .000$ ($p \leq .05$). The Hosmer-Lemeshow test (HL test) shows, $p = .685$ ($p < .05$) which means this is a good fit.

The post hoc Cramer's *V* analysis displayed φc = .140, stating the strength of the association between the two-variable education and COPD as having a moderate association.

Hypothesis Test Results

There is a statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance $p = .026$ ($p \leq .05$) therefore, we must reject the null hypothesis. In table 10, variables in the equation, education is displayed in multiple levels. No school/kindergarten is used as the reference category for education. As noted in table 10, no school/kindergarten is $p = .026$ ($p \leq .05$). The participants who have completed Grades 1-8, Grades 9-11, and gGrade 12/GED are .028, .214, and .177 times with a higher likelihood of not developing COPD respectively. Furthermore, participants who have attended college 1-3 years or 4 years are .152, and .087 times respectively with a lower likelihood of developing COPD than participants who have no school/kindergarten education.

Table 5
Chi-Square Tests Education

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.770[a]	5	.000
Likelihood Ratio	34.074	5	.000
Linear-by-Linear Association	10.327	1	.001
N of Valid Cases	1619		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is .28.

Research Question 3

RQ3: What is the relationship between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 when smoking, age, sex, and lack of insurance are controlled for?

Statistical Assumptions

Chi-square analysis was conducted using crosstabs and Pearson's chi-square for the independent variable employment status, against the dependent variable diagnosed with COPD. Additionally, table 6 shows the chi-square analysis was used on COPD employments status. In the chi-square analysis, it is noted the Pearson Chi-square had a value of X^2= 103.87, df of 6 and a significance of $p = .000$ ($p \leq .05$). The Hosmer-Lemeshow test (HL test) shows, $p = .685$ ($p < .05$) which means this is a good fit. The post hoc Cramer's *V* analysis displayed φc = .253, stating the strength of the association between the two-variable employments status and COPD as having a high association.

Hypothesis Test Results

There is a statistically significant association between employment status and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance $p = .000$ ($p \leq .05$). Therefore, we must reject the null hypothesis. For this test result I had to remove "employed for wages" from the criteria because the data resulted in 0 Exp(B), 0 Lower

and no Upper 95% C.I.for EXP(B), which is something that cannot be displayed, as it is not calculated. There was a significant difference between Yes and No answers, 56 and 1275, respectively. In table 10, variables in the equation, employment is displayed in several categories. For this variable, unable to work is used as the reference category. As noted in table 10 unable to work is $p = .000$ ($p \leq .05$). The participants who are self-employed, have the same likelihood not to develop COPD as compared to participants who are unable to work. Out of work more than one year, and out of work less than one year are .089, and .024 times with a lower likelihood to not develop COPD as compared to participants who are unable to work. In addition, participants who are a homemaker, or a student, have the same likelihood of not developing COPD as compared to participants who are unable to work. In addition, retired are .008 time with a higher likelihood of not developing COPD as compared to participants who are unable to work.

Table 6

Chi-Square Tests Employment

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	103.870[a]	6	.000
Likelihood Ratio	111.347	6	.000
Linear-by-Linear Association	66.652	1	.000
N of Valid Cases	1619		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.42.

Research Question 4

RQ4: What is the association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for smoking, age, sex, and lack of insurance?

Statistical Assumptions

Chi-square analysis was conducted using the independent variable race/ethnicity, against the dependent variable diagnosed with COPD. Furthermore, table 7 shows the chi-square was used on COPD and race/ethnicity. In the chi-square analysis, it is noted the Pearson Chi-square had a value of X^2= 15.40, df of 5 and p =.009 ($p \leq .05$). The Hosmer-Lemeshow test (HL test) shows, p = .685 (p <.05) which means this is a good fit. The post hoc Cramer's V analysis displayed φc = .098, stating the strength of the association between the two-variable race/ethnicity and COPD as having a low association.

Hypothesis Test Result

There is not a statistically significant association between race/ethnicity and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance p = .199 ($p \leq .05$). Therefore, we fail to reject the null hypothesis. For this variable, White non-Hispanic is used as the reference category. As noted in table 10, White non-Hispanic is p = .199 ($p \leq .05$). In table 10, variables in the equation, race/ethnicity is detailed in several categories. Black non-Hispanics and Asian non-Hispanics are .202, and .515 time less likely to develop COPD in comparison to White non-Hispanics. Moreover, American

Indian/Alaskan Native, and Hispanics are .162, and .064 times with a higher likelihood to not develop COPD as compared to White non-Hispanics.

Table 7

Chi-Square Tests Race /Ethnicity

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.405[a]	5	.009
Likelihood Ratio	17.456	5	.004
Linear-by-Linear Association	3.939	1	.047
N of Valid Cases	1619		

a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 4.47.

Table 8

Bivariate Characteristics of diagnosed with COPD

	COPD			Chi-square test		
Independent Variable	Yes (n%)	No(n%)	Total	X^2	*p*	Cramer's V
Income Level				57.14	0.000	0.188
Less than $10K	18(19.4%)	75(80.6%)	93			
Less than $15K	34(30.1%)	79(69.9%)	113			
Less than $20K	24(15.3%)	133(84.7%)	157			
Less than $25K	30(12.7%)	207(87.3%)	237			
Less than $35K	25(8.5%)	270(91.5%)	295			
Less than $50K	38(10.4%)	328(89.6%)	366			
Less than $75K	35(7.9%)	408(92.1%)	433			
$75K or more	31(11.5%)	238(88.5%)	269			
Education Level				31.77	0.000	0.140
No school/Kindergarten	1(50%)	1(50%)	2			
Grades 1-8	1(2%)	48(98%)	49			
Grades 9-11	27(22.5%)	93(77.5%)	120			

Grades 12/GED	74(17.7%)	345(82.3%)	419			
College 1-3 years	79(15.0%)	448(85.0%)	527			
College 4 Years	44(8.8%)	458(91.2%)	502			
Employment Status				103.87	0.000	0.253
Self employed	7(2.5%)	272(97.5%)	279			
Out of work > 1 year	7(15.2%)	39(84.8%)	46			
Out of work < 1 year	6(11.3%)	47(88.7%)	53			
A homemaker	9(5.5%)	154(94.5%)	163			
A Student	3(3.5%)	83(96.5%)	86			
Retired	132(16.6%)	664(83.4%)	796			
Unable to work	62(31.6%)	134(68.4%)	196			
Race / Ethnicity				15.40	0.009	0.098
White non-Hispanic	176(15.2%)	981(84.8%)	1157			
Black non-Hispanic	9(14.1%)	55(85.9%)	64			
Asian non-Hispanic	4(8.9%)	41(91.1%)	45			
American Indian / Alaskan Native	4(12.5%)	28(87.5%)	32			
Hispanic	15(6.6%)	214(93.4%)	229			
Other race non-Hispanic	18(19.6%)	74(80.4%)	92			

Logistic Regression

All data were analyzed using SPSS Statistics Version 25. Binary logistic regression analyses were used to assess the associations between the independent variables of income, education, employment, and race/ethnicity with the dependent variable the development of COPD (emphysema or chronic bronchitis). The research questions were answered depending upon the results of these binary logistic regression results.

The below table, table 9 discusses the observed vs. predicted outcome for COPD. All cases must have fell into one of two categories, yes for diagnosis of COPD or no for diagnosis of COPD. In table 9, in the predicted category there are nine cases that fell in

the YES category for COPD and 217 that fell into the NO category, this means in the logistic regression model predicted that out of the 226 individuals who did have COPD the prediction was correct 9 times with a percentage correct of 4%. Furthermore, if we focus on the opposite prediction, in the predicted category there are 1,385 cases that fell into the NO category and eight that fell into the YES category meaning the logistic regression model predicted out of the 1,393 participants who did not have COPD, the prediction was correct 1,385 times with a percentage correct of 99.4%. The overall percentage correct reveals an 86.1%, which means the model is a good fit.

Table 9

Classification Table[a]

			Predicted		
			COPD		Percentage
	Observed		Yes	No	Correct
Step 1	COPD	Yes	9	217	4.0
		No	8	1385	99.4
	Overall Percentage				86.1

a. The cut value is .500

Table 10 is used to determine if we will reject the null hypothesis and accept the alternative hypothesis or fail to reject the null hypothesis. Table 10 displays all the independent variables compared to the dependent variable. I will be referencing White non-Hispanic for race, No School/Kindergarten for education, unable to work for employment, and less than 10K for income.

Table 10

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Lower
Step 1[a]	RACE White-non-Hispanic (ref)			7.299	5	.199			
	Black non-Hispanic	.492	.386	1.625	1	.202	1.636	.767	3.489
	Asian-non-Hispanic	.365	.561	.423	1	.515	1.440	.480	4.322
	American Indian/Alaskan Native	.794	.568	1.956	1	.162	2.212	.727	6.730
	Hispanic	.606	.327	3.440	1	.064	1.833	.966	3.477
	Other race non-Hispanic	-.152	.304	.252	1	.616	.859	.473	1.557
	EDUCATION No School/Kinder (ref).			12.734	5	.026			
	Grades 1-8	3.855	1.750	4.853	1	.028	47.237	1.530	1458.720
	Grades 9-11	1.828	1.470	1.546	1	.214	6.222	.349	111.044
	Grades 12/GED	1.975	1.464	1.819	1	.177	7.204	.409	126.989
	College 1-3 Years	2.096	1.464	2.050	1	.152	8.134	.461	143.387
	College 4 Years	2.512	1.466	2.937	1	.087	12.334	.697	218.230
	EMPLOYMENT Unable to work (ref)			50.521	6	.000			
	Self Employed	2.403	.428	31.512	1	.000	11.052	4.777	25.572
	Out of Work One year or More	.767	.451	2.893	1	.089	2.152	.890	5.206
	Out of Work Less than One Year	1.061	.470	5.095	1	.024	2.890	1.150	7.261
	A Homemaker	1.640	.394	17.357	1	.000	5.157	2.384	11.156

A Student	2.232	.618	13.027	1	.000	9.319	2.773	31.314
Retired	.544	.206	6.962	1	.008	1.722	1.150	2.579
INCOME Less than $10K (ref)			22.464	8	.004			
Less than $15K	-.469	.374	1.572	1	.210	.625	.300	1.303
Less than $20K	.020	.393	.003	1	.960	1.020	.472	2.203
Less than $25K	.162	.386	.176	1	.674	1.176	.552	2.503
Less than $35K	.539	.394	1.866	1	.172	1.714	.791	3.713
Less than $50K	.084	.378	.049	1	.825	1.087	.518	2.280
Less than $75K	.439	.386	1.296	1	.255	1.552	.728	3.306
$75K or More	.980	.397	6.083	1	.014	2.665	1.223	5.808
Do not know	.339	.379	.803	1	.370	1.404	.668	2.949
Constant	-1.537	1.492	1.061	1	.303	.215		

a. Variable(s) entered on step 1: Imputed Race / ethnicity value, education level, employment status, income level.

Summary

In section 3, I presented the results of the study. In this section, I present the data collection outcomes, results from descriptive statistics and logistic regression. This study examined the 2018 BRFSS data set between the dependent variable ever diagnosed with COPD and the independent variables income, education, employment status and race/ethnicity.

The statistics utilized for this study was a correct fit for the data that was utilized, and displayed the independent variable of income, education, and employment have a relationship with the development of COPD (chronic bronchitis and emphysema) while controlling for sex, age, smoking status and health insurance. Moreover, the independent variables of race/ethnicity were found to have no relationship with the development of COPD (chronic bronchitis and emphysema) while controlling for sex, age, smoking

status, and health insurance. Further details on the findings and results are discussed in section 4.

Section 4: Application to Professional Practice & Implications for Social Change

Introduction

The purpose of this quantitative study was to understand the impact of SES (income, education, and employment) and race/ethnicity on COPD patients. According the results in section 3, income, education, and employment status were statistically significant and thus had impact on COPD; the null hypothesis was rejected. However, race/ethnicity did not have statistical significance and thus the null hypothesis was not rejected.

Interpretation of the Findings

The findings from this study were in line with several other studies Grigsby et al. (2016) and Gershon et al. (2014) which also showed an association between SES and COPD. However, this study showed that race/ethnicity did not affect COPD. Interestingly in a study by Mamary et al. (2018) race/ethnicity did correlate with patients who have COPD due to an equal amount of participants of each race. I felt it was important to focus on whether the impact of SES and race/ethnicity affected COPD patients. It is worth mentioning for this study, there was not an equal amount race/ethnicity participant, which may skew the data. Approx. 71.5% of the participants were White non-Hispanic with Hispanic the next closest at 14.1%. In a study by Mamary et al. (2018) the prevalence of COPD increased among African American men.

Income

COPD tends to affect individuals with lower incomes more than it affects individuals with higher incomes. In Grigsby et al. (2016), income did affect the outcome

of COPD. Moreover, the Grigsby et al. (2016) study identified the persistently negative effects of low SES on COPD symptoms, morbidity, and mortality, especially since many individuals did not have insurance and were tested for COPD. In that meta-analysis, measures of SES included income, education, and occupation. The authors found that individuals from low SES were twice as likely to have worsening outcomes as the higher-income groups (Lowe et al., 2018). The reason more low-income individuals were diagnosed more with COPD is income, which is a factor in predicting pulmonary disease progression in smokers with COPD; those with lower income experience faster progression and worse symptoms (Lowe et al. 2018)**.**

For this study, the reference category for income was less than $10K; in Lowe et al. (2018), the low-income group was to earn less than the U. S. federal minimum wage at the time. A person-earning minimum wage working 40 hours per week, 52 weeks per year would earn approx. $15,080. This finding for this study were same as Grigsby et al. (2016) and Lowe et al. (2018): for the state of Nevada in 2018 income $p = .004$ ($p \leq .05$) did influence COPD. Individuals with an annual income at or below the United States minimum wage suffered the significantly greater impacts of smoking-related disease leading to COPD (Lowe et al. 2018)**.** Lowe et al. (2018) stated that many individuals with low income have little or no health insurance or funds to seek care when developing COPD.

Education

In the study, educational attainment was also a factor that influenced COPD. In addition, studies conducted by Gjerdevik et al. (2015) and Grigsby et al. (2016) added

lower educational attainment was associated with increased emphysema among adults with COPD. Interestingly, the state of Nevada, education, had a similar effect on patients with COPD as previous studies in which it was a significant with COPD. A multivariable logistic regression conducted by Cai et al. (2020) indicated that higher educational levels was associated with an overall lower risk of COPD and lower education levels are associated with a higher risk of COPD. Having low educational attainment can affect an individual's health literacy, or reduced capacity to understand, evaluate, and act on health information, is associated with worse self-management, more severe COPD (Stellefson et al., 2019a).

Employment

Persons with COPD are less likely to be employed and more likely to be limited in the type of work they can do compared with persons without COPD (CDC, 2015). In addition, CDC (2015) adds COPD is strongly associated with activity limitations and an inability to work. In Grigsby et al. (2016), employment was affected by individuals with COPD. Nevada, in 2018, employment was also a factor for COPD $p = .000$ ($p \leq .05$). For this test result I had to remove "employed for wages" from the criteria because the data resulted in 0 Exp(B), 0 Lower and no Upper 95% C.I.for EXP(B), which is something that cannot be displayed, as it is not calculated. There was a significant difference between yes and no answers, 56 and 1275, respectively. In addition, in a study conducted by the CDC, stated adults with COPD were more likely to report being unable to work compared with adults without COPD (CDC, n.d.).

There are significant factors of why individuals who have COPD have difficulty working as often they need accommodations such as: parking closer to the door, work station closer to the entrance, and allowing them to work at home while others cannot (Leader, 2019).

Race/ethnicity

COPD, once considered a disease of white men, is recognized as increasingly prevalent among women and African American men (Mamary et al., 2018). A study conducted by Gilkes et al. (2016) states in the only population study to assess COPD prevalence by ethnicity, there was a lower prevalence of COPD among Black non-Hispanic and Asian non-Hispanic compared to White non-Hispanic. Although, in Gilkes et al. (2016) study, there were relatively small numbers of Black non-Hispanics participants. For my study, White non-Hispanics made up 71.5% and Black non-Hispanics made up only 4%. In this study race/ethnicity did not affect COPD patients $p = .199$. One reason this might be the case is White non-Hispanic participants and accounted for three quarters of the participants. Race, which is strongly associated with SES, has been identified as risk factors for more severe chronic obstructive pulmonary disease (COPD) (Lowe et al., 2018).

Findings for SEM Theoretical Framework

For this study, I incorporated the five levels of the social ecological model to discuss the individual, interpersonal, organizational, community, and policy levels. The social ecological model further recognizes that circumstances beyond the level of the

person may affect that person's behavior. Levels in the model interact with one another, and each level has an independent effect. I will discuss each of the levels individually.

Individual

Income tends to affect those individuals with COPD which establishes the need for spirometry, chest computed tomography (CT) scans and symptoms to identify those at risk (Lowe et al., 2018). Stigma also affects the individual at several levels, many COPD patients report feeling not only a sense of blame from others, but they also blame themselves and feel guilty and shameful over their symptoms so they refuse to acknowledge the disease (McNamee, 2020).

Interpersonal

For this study, approx. 30% of the participants were married, while the remaining were either divorced, widowed, separated, or never married. Due to the low level of COPD participants who are married are in line with the CDC stating married individuals are less likely to report a COPD diagnosis. Being married corresponds with the interpersonal level, as respondents who were divorced, widowed, or separated were more likely to report COPD (9.4%) than married respondents (4.6%) (CDC, n.d.). The social support system used in the interpersonal level is shown as a formal and informal social network and social support systems, including the family, work group, and friendship networks and to act as a buffer to support individuals with COPD (Nakken et al., 2015).

Organizational

Institutional factors, such as organizations with formal or informal rules within a community, may have an influence on health status. Many low income, or under

educated individuals with COPD work in environments which can trigger COPD exacerbations (Lowe et al., 2018). There may be environmental chemical exposures other than urban air pollution and second-hand tobacco smoke which increase the risk of COPD exacerbation, however it is not often focused on as much as smoking (Sama, Kriebel, Gore, DeVries, & Rosiello, 2017).

Community

A study conducted by Pleasants et al. (2016) has shown that COPD incidence and mortality are higher in rural communities than urban communities due to higher prevalence of smoking in rural areas. Residential segregation, in this study race/ethnicity, has been shown to result in poorer lung disease outcomes for Blacks compared to Whites in specific low income communities (Pleasants et al., 2016). According to Rural Health Information, Nevada is made up of three main urban areas, however, 89.6% of the state is made up of rural territories (Rural Health Information Hub, n.d.). In addition, Rural Health Information Hub (n.d.) states 74.3% of the state is white, 29% Hispanic, and 10% is black.

Policy

Public policy factors for individuals with COPD may include local, state, or national laws and regulations that affect the health of populations (McDaniel, 2018). Studies of the introduction of statewide and national smoke-free laws have shown decreases in hospitalizations for symptoms of respiratory illnesses, such as COPD. In Nevada, state law, regardless of the area in which you live, enacted laws to decrease smoking in parks, public transportation, and public buildings. In many low-income areas,

Nevada increased the laws to prohibit smoking within 25 feet of any entrances or risk eviction.

A study conducted by COPD Action Plan (2017) suggest we empower people with COPD, their families, and caregivers to recognize and reduce the burden of COPD. Furthermore, COPD Action Plan (2017) states an increase public awareness and public policy of the risk factors and symptoms of COPD are needed to decrease the morality of COPD.

Summary of Key Findings and Interpretation

Low income, education, and employment status play a significant role in the diagnosis of COPD. However, race/ethnicity did not affect who or who did not have COPD. However, in this study, there were far more White non-Hispanics in the study than any other race. Findings in this study also suggest that more studies need to be conducted with an equal disbursement of individuals in each category.

Limitations of the Study

Whenever conducting any study, one must be aware of the limitations that might affect the study. This study has limitations based on the use of secondary data. The reason for this limitation is secondary data can have human error since it is researched and entered by someone else (Thompson, 2017). BRFSS is calling all 50 states including Guam and Puerto Rico and they are asking multiple standard scripted questions. This survey is not designed to specifically focus on COPD. There could be health illiteracy or recall bias as well as not feeling comfortable to answer the question honestly. The question “ever been diagnosed with COPD” can be misleading. This could be answered

based on years of smoking and breathing issues, however, never properly been tested, and diagnosed by a pulmonologist.

Looking at the results of the study by race and yes to ever been told you have COPD, 176 out of 226 participants are White non-Hispanic while the next closest race was Hispanic with 15 participants out of 226. This could put limitations on the data, as there is not an equal number of participants from each race identified. There are also limitations regarding patients who refuse to answer. Currently, the population of Nevada is approx. 3 million individuals, and only 3,222 (1%) participated in the survey.

Recommendations

Based on the results from the study, my recommendation regarding this study is to continue with further research on the impact of SES and race/ethnicity on COPD patients. There are numerous suggestions that could heighten improvement of SES and race/ethnicity against COPD. First, I believe one limitation to the study was the lack of diversity in the survey. As there were more White-non-Hispanics participants than any other race, the result might have not been truly indicative of the impact between race/ethnicity and COPD. If there was a more diverse group of participants, there is a chance that the result of this study could be different.

Second, this study was limited to one state, Nevada, if multiple states were used the impact of SES and race/ethnicity might play a bigger role in COPD as a bigger population sample size could be used. Third, smoking, which is a leading cause of COPD, was identified in 17.6% of adults in Nevada while the national rate was 17.1% (Truth Initiative, 2019). Besides, Truth Initiative (2019) stated 6.7% of high school

students in Nevada smoked cigarettes, while the national average is 8.8%. I would like to enhance further research focusing on male vs. female and smoking status against the diagnosis of COPD to determine if male or females are more susceptible to COPD. I recommend the need to continue studies on SES and race/ethnicity and the impact on COPD patients to involve more variables.

Implications for Professional Practice and Social Change

This section will provide recommendations regarding professional practices and social change on the impact of SES and race/ethnicity on COPD patients. Chronic obstructive pulmonary disease (COPD) is a progressive and debilitating respiratory condition that leads to a significant burden, both medically and financially and affects millions of people worldwide (May & Li, 2015). There are significant opportunities to for groups to work together to come up with procedures and protocols to combat COPD.

Professional Practice

There are several thoughts that have come out from this study that are requiring further research. Chronic obstructive pulmonary disease (COPD) is a progressive and debilitating respiratory condition that leads to significant burden, both medically and financially. It affects millions of people worldwide and causes significant morbidity and mortality (May & Li, 2015). COPD is an irreversible disease and will require continuous research to help build and design protocols and procedures to combat this disease. Recommendations include but are not limited to, education, smoking cessation classes, breathing test to determine severability and the understanding of the progression of COPD. As the research study showed, although White non-Hispanic participants were

the majority of this study, White non-Hispanic participants was $p = .864$ where Black non-Hispanic participants were $p = .077$ ($p \leq .05$) respectively, Black non-Hispanic may have been more susceptible to COPD.

Smoking is the main cause for COPD, this study may help community leaders' partner with hospitals and legislatures to design campaigns focusing on the dangers of COPD and how to live with it. Some strategies that might help deter smoking and decrease the risk of COPD is to collaborate with leaders in areas where high cigarette sales are. Place an increased sales tax on all cigarette sales, as well as increase the age for cigarette sales to deter younger individuals from buying cigarettes. These laws or campaigns need to be in all areas to help combat COPD and not just focused on low SES areas.

Methodological

Other methodological opportunities could account for the different outcomes on SES and race/ethnicity and COPD patients. The lack of a diverse group of participants is a possible explanation of the outcomes. Studies that happen in the future could use a different methodological approach from hospital records instead of the limitation of self-reported answers. In addition, having an equal, yet diverse group of participants could yield a change in the results.

Theoretical

Determining the effectiveness of complex interventions requires understanding of the components of an intervention and their interrelationships. The theoretically derived evaluation framework, which is based on social learning theories, links the disease

management components with the underlying mechanisms by which they influence outcomes, and proposes direct and indirect relationships among them (Lemmens et al., 2010)

RHIhub (n.d.) states SEM is a model that can assist in providing a complete perspective of the factors that affect specific health behaviors, including the social determinants of health. Because of this, ecological frameworks can be used to integrate components of other theories and models, thus ensuring the design of a comprehensive health promotion. SEM is important in this study by utilizing the five levels of influence.

Empirical

Screening for COPD is vital in individual's health and public health officials and other stakeholders need to collaborate for health improvement. There have been many empirical studies on SES and race/ethnicity and COPD, however, further investigation is needed for this study based on the results. This empirical study is based on the BRFSS where 3,222 participants from Nevada were questioned. While lower SES was found to be associated with greater COPD morbidity and mortality, few studies have examined the role of low SES in the prevalence of COPD (Grigsby et al., 2016).

Positive Social Change

The results that came from this research study were in line with Walden University implications for social change. The direction from this study is to use the results to create awareness and identify risks associated with SES, race/ethnicity, and the impact on COPD patients. The results from this study showed income, education, and occupation did affect COPD. However, race/ethnicity did not have an effect. Cigarette

smoking is known to be a significant factor for increased COPD diagnosis. Low-income people continue to smoke at disproportionately high rates compared with the general population. For Americans, whose incomes fall below the federal poverty threshold, rates of smoking still hold at more than one-quarter of the group (Haskins, 2017). Based on the results, processes can be used to guide new programs, including the correct stakeholders, and legislative groups to determine more rigorous laws to discourage the access to cigarettes. The tobacco industry has had a strong influence on low-income people and cultural norms surrounding smoking, targeting low-income communities with heavy marketing, and engaging in other deceptive tactics to keep people hooked on tobacco (Haskins, 2017). There are strategies from this study that can be utilized such as marketing campaigns in low-income areas, tax increase on cigarette sales, increases smoke free areas such as parks, and increased community awareness programs. Persons with COPD are less likely to be employed and more likely to be limited in the type of work they can do compared with persons without COPD (CDC, n.d.). This study can help create opportunities for individuals with COPD so they can live productive lives and be active in the community. This study-identified education influences COPD patients. Results from this study can aide in designing programs within the community where they can seek a partnership to help understand the disease and how to live with it. Many individuals with low education may have health illiteracy issues and need to seek help. When compared with patients with higher health literacy, those with lower health literacy scores were almost five times more likely to have issues from a COPD diagnosis (Stellefson et al., 2019b). Although race/ethnicity did not affect COPD patients, these

programs should focus on all areas of SES and race. Social support is of the utmost importance when focusing on positive social change for patients with COPD. Mental status is a severe issue when it comes to positive social change. A large proportion of subjects with COPD had neither a positive nor a negative view of their overall life (Franssen et al., 2018). We found in this study that several groups such as low income, employment status, and education would all need to be focused on to increase positive social change and awareness.

In addition, Franssen et al. (2018) states subject with COPD less frequently had a partner and, when having a partner, they were less likely to be 'very satisfied' with the daily support they received from their partner than non-COPD subjects. Individuals with COPD also perceived emotional support less often compared to non-COPD subjects. Corresponding to the current study, the HELP-COPD study suggested that physical, psychological, social support should be offered from mild disease, routinely providing a holistic approach throughout the life-long course of the disease (Franssen et al., 2018).

At the individual level, there are many issues in life that can disrupt the social change such as stigma, the fear of the symptoms, stress can cause increased isolation, and a burden on social networks and health care providers (Lenferink, van der Palen, & Effing, 2018).

At the family level, Lenferink, van der Palen, and Effing (2018) posit some studies indicate that in COPD patients positive social support is associated with reduced hospitalizations, fewer exacerbations, better health status, and improved disease management behaviors as well as mental health and self-efficacy have emerged as

possible areas of benefit from social support in COPD patients. Family members play the most important part of care when it comes to COPD, as they are an extra set of ears and eyes so the patient can carry out tasks in the home environment and ensure that the patient takes his or her medications as well as to recognize signs of exacerbation.

At the organization level, there is a need for increased hospital smoking cessation programs regardless of an individual's ability to pay. A disproportionate burden of COPD occurs in communities of SES (Pleasants et al., 2016). Communities need to focus on education since communities with low educational levels and unemployment associated with higher risk of COPD.

At the societal level it was shown that the diagnosis of COPD has social consequences, little is known about how they manifest in daily living (e.g., personal network size, the frequency of daily support or satisfaction with received help) (Franssen et al., 2018). People from all backgrounds live with COPD, addressing the stigma of COPD is of the utmost importance in a society because stigma is a mark of disgrace associated with a particular circumstance, quality, or person. Stigma occurs when society labels someone as tainted, less desirable, or handicapped (Cannizzaro, 2017). Nobody should be ashamed or discriminated against because of this disease.

Summary

There have been studies done on SES and race/ethnicity and COPD; however, there have not been any that focuses solely on the state of Nevada. This survey was the first to use BRFSS secondary data set from a survey that is population based. Albeit the research confirmed the relationship between SES independent variables (Income,

education, and employment) and the dependent variable the development of COPD. In addition, it did confirm that race/ethnicity was not significant with development of COPD. This study can be utilized as an addition to the other studies regarding SES and race along with COPD.

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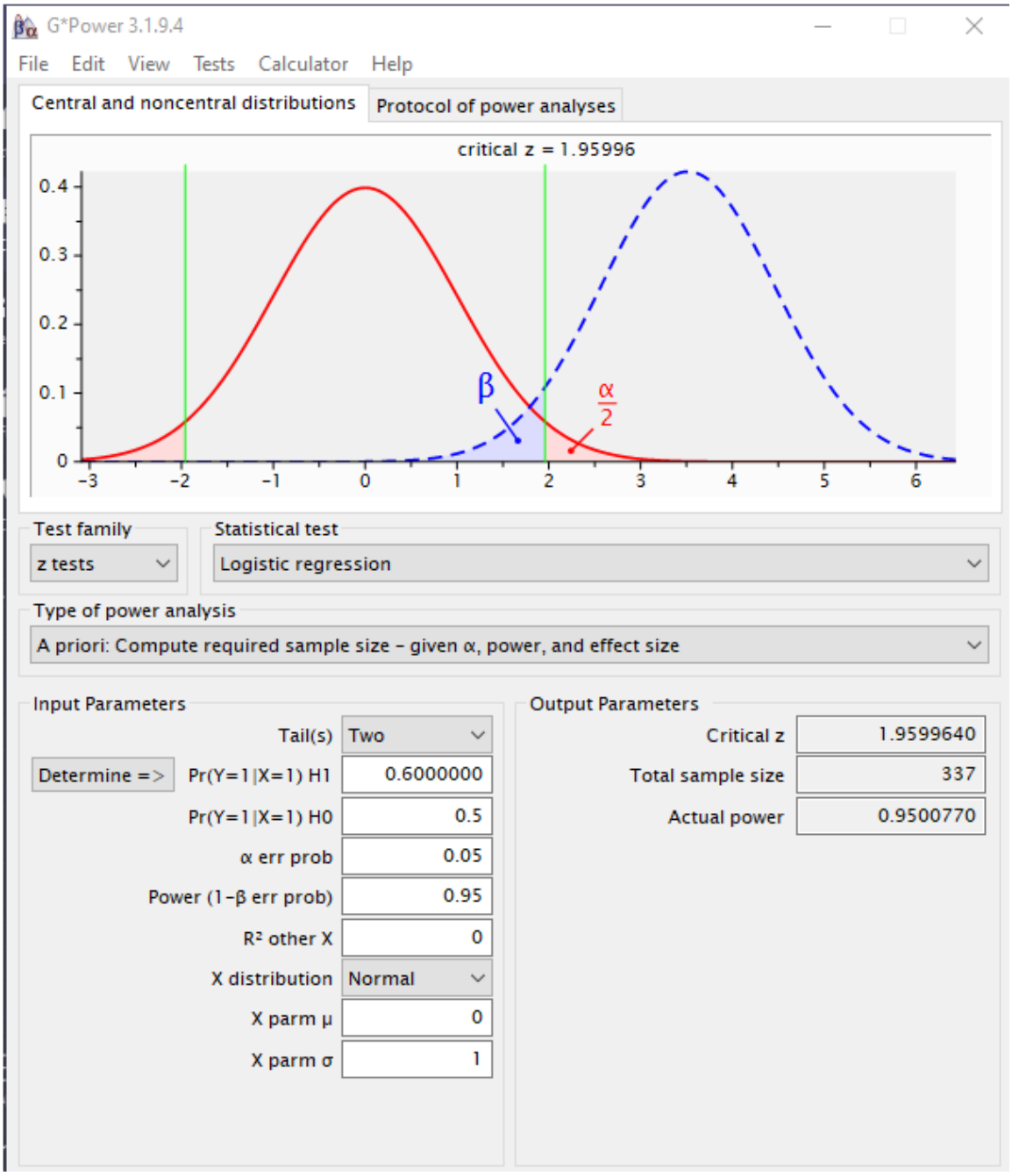
Appendix A: G*Power Analysis



Appendix B: Statistical Procedures per Research Question and Hypothesis

Research Question	Hypothesis (H_a)	Variables[A]	Statistical procedures/analysis
RQ1: What is the relationship between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for age, sex, and lack of insurance?	H_{01}- There is no statistically significant association between income and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance	IV: income DV: development of COPD (emphysema or chronic bronchitis)	Binomial Logistic Regression
RQ2: What is the relationship between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for age, sex, and lack of insurance?	H_a: There is no statistically significant association between education and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance.	IV: education DV: development of COPD (emphysema or chronic bronchitis)	Binomial Logistic Regression
RQ3: What is the relationship between occupation and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for age, sex, and lack of insurance?	H_a: There is no statistically significant association between occupation and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018, controlled for smoking, age, sex, and lack of insurance.	MV: occupation DV: development of COPD (emphysema or chronic bronchitis)	Binomial Logistic Regression

RQ4: What is the association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for age, sex and lack of insurance?	H_a: There is no statistically significant association between ethnicity (White, Black, Hispanic, and Asian) and the development of COPD (emphysema or chronic bronchitis) in adults residing in Nevada in 2018 controlled for smoking, age, sex and lack of insurance.	IV: ethnicity (White, Black, Hispanic, and Asian) DV: development of COPD (emphysema or chronic bronchitis)	Binomial Logistic Regression

[1]*variables with binary (e.g., yes/no) outcome will be managed as categorical variables, while variables with Likert scale outcome will be managed as continuous variables.*