2018

The Prevalence of Cigarette Smoking Among Registered Nurses and Certified Nursing Assistants

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THE PREVALENCE OF CIGARETTE SMOKING AMONG REGISTERED NURSES AND CERTIFIED NURSING ASSISTANTS.

A MASTER'S THESIS SUBMITTED TO THE GRADUATE FACULTY

GRADUATE SCHOOL BETHEL UNIVERSITY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE IN PHYSICIAN ASSISTANT

MAY 2018

ABSTRACT

Cigarette smoking is a dangerous addiction that affects over 45 million Americans. Smoking has been proven to cause a variety of diseases that result in about 480,000 U. S. deaths per year. Healthcare workers have the ability and responsibility to assist patients in smoking cessation; however, a significant number of healthcare workers also participate in cigarette smoking. Studies have shown that healthcare workers with higher levels of education are less likely to smoke; physicians are less likely to smoke than registered nurses, who are less likely to smoke than licensed practical nurses. There is a lack of research done on the incidence on certified nursing assistants' smoking rates. The purpose of this research study is to determine the incidence of smoking among RN and CNAs and identify variables that may influence smoking rates among these two groups. Researchers also aimed to assess RN and CNAs' knowledge and confidence in educating patients about smoking cessation. To fulfill this purpose, researchers distributed a paper survey to RNs and CNAs working in a birthing center of a suburban Minnesota hospital.

ACKNOWLEDGEMENTS

The authors of this study would like to thank the following people for their assistance, expertise, and encouragement throughout this project: Christy Hanson, PA-C, Sue Steen, BSN, M. S., Katelyn Tessier, M.S, Wallace Boeve, PA-C, Ed. D, and Lisa Naser, PA-C. We could not have completed this project without your support and help. Thank you!

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Chapter One Introduction

Introduction

Tobacco use in the form of cigarette smoking is a harmful activity that kills millions each year, yet Americans continue to engage in this dangerous habit. The smoking epidemic has impacted the general public and has found its way into the lives of healthcare workers. Chapter One will include a brief background about the health consequences of cigarette smoking, prevalence of smoking, and populations that are engaging in this high-risk activity. The prevalence of cigarette smoking among healthcare workers, specifically nursing professionals and certified nursing assistants (CNAs), and how smoking may impact nursing professionals and CNAs' patient care will also be addressed in Chapter One.

Background

According to the Centers for Disease Control and Prevention (CDC), one in 17 Americans smoke and one out of every five deaths are from cigarette smoking-related causes (Centers for Disease Control and Prevention, 2016b). According to the CDC (2015a), cigarette smoking is a known cause of multiple cancers, heart disease, stroke, pregnancy complications, chronic obstructive pulmonary disease (COPD), and other diseases. Smoking-related disease is considered the number one avoidable cause of death in the U. S., contributing to more than 480,000 deaths per year (Centers for Disease Control and Prevention, 2016b). There has been a general decline in cigarette smoking rates in the United States (U. S.); however, smoking is an issue that requires continued discussion (Centers for Disease Control and Prevention, 2016b).

According to Han, Trinkoff, and Gurses (2015), more than 40% of the 45 million U. S. smokers attempt to quit cigarette smoking each year. Tobacco contains the chemical nicotine, which has been found to be as addictive as heroin, cocaine, and alcohol (Centers for Disease

Control and Prevention, 2015b). The addictive nature of nicotine makes people attempting cigarette smoking cessation have uncomfortable withdrawal symptoms, such as irritability, difficulty thinking, feeling more hungry than normal, and weight gain, which often causes cessation attempts to be unsuccessful (Centers for Disease Control and Prevention, 2015b). A study performed by Chaiton et al., determined that on average, smokers attempt quitting 30 times before successfully quitting for at least one year (Chaiton et al., 2016). However, if an individual is successful in their cessation attempt, they reduce their risk of developing disease and premature death significantly (Centers for Disease Control and Prevention, 2015b).

Through federal taxes on cigarettes, media campaigns, and education from healthcare workers, most individuals have a general knowledge about the health consequences of cigarette smoking (U. S. Department of Health and Human Services, 2014a; Fiore et al., 2008). Despite this general knowledge, Americans continue to engage in this high-risk activity. According to Hu et al. (2016), the highest tobacco use is among males, non-Hispanic whites, non-Hispanic blacks, individuals under 45 years of age, people living in the Midwest or Southern U. S., people with a general education development (GED) degree rather than high school diploma, non-married individuals, people with a household income of less than $20,000, and people who are lesbian, gay, or bisexual. By identifying individuals at higher risk for tobacco use, healthcare providers may be able to decrease the incidence of smoking in the U. S. (Fiore et. al., 2008).

According to Fiore et al. (2016), tobacco dependence should be viewed as a chronic disease rather than a lifestyle choice, and the treatment should follow a similar model to treating chronic disease. This model recognizes tobacco dependence as a long-term disorder that requires clinical intervention in order to treat successfully (Fiore et al., 2008). Patient education by healthcare providers about the health consequences of smoking is crucial to the patient's well-

being, as these providers are able to encourage and give advice when the patient decides to quit (Fiore et al., 2008). A 2006 study found that 60% of the U. S. population viewed registered nurses (RNs) as the most trusted of all healthcare workers (Cowen & Moorhead, 2014). RNs administer treatments and medications, monitor patients regularly, and educate patients on treatment plans (Cowen & Moorhead, 2014). The majority of RNs work in hospital settings, and prolonged patient interactions during a patient's hospitalization allows RNs to be influential in patient smoking cessation (Cowen & Moorhead, 2014).

The demand and pressure on RNs has changed as healthcare has evolved over the years. As a result, RNs are taking on more responsibility in patient care, increased workloads, and extended work hours, especially in hospital settings (Cowen & Moorhead, 2014). Additionally, understaffing is a common problem in U. S. hospitals, which further increases RNs' workload (Cowen & Moorhead, 2014). According to Cowen and Moorhead (2014), as a result of inappropriate staffing levels, RNs cannot devote as much time to each patient, which threatens patient safety and increases the risk of negative patient outcomes.

The employment of CNAs has attempted to lower the workload of hospital RNs (Nursing Assistant Guides, 2016). After completing a short-term training class and competency exam, CNAs are qualified to provide basic, quality of life needs for patients under the supervision of a RN or licensed practicing nurse (LPN) (Nursing Assistant Guides, 2016). LPNs provide basic medical and nursing care under the supervision of a RN or doctor (All Nursing Schools, 2016). They are able to practice nursing after one year of nursing education and passing a national certifying exam (All Nursing Schools, 2016). RNs, LPNs, and CNAs all have substantial amounts of direct patient care, which allows them to develop relationships with patients.

Likewise, nursing professionals and CNAs can impact a patient's healthcare decisions and adherence to their treatment plans.

Healthcare workers, including nursing professionals and CNAs, witness the effects of cigarette smoking everyday through interactions with patients who use cigarettes. Despite healthcare workers' understanding of the health implications of cigarette smoking, many still smoke (Sarna, Bialous, Nandy, Antonio, & Yang, 2014). Along with the general population, the rates of smoking among healthcare workers have declined but it is still a significant problem within the medical field (Sarna et al., 2014). Healthcare workers as a whole have been found to have a smoking rate of 8.34%, with LPNs having the highest rate at 24.99% (Sarna et al., 2014). Sarna et al. (2009) suggests that among nursing professionals, high stress working environments and overnight shifts may contribute to higher smoking rates. Among nursing professionals who smoke, only 1/3 were trying to quit (Sarna et al., 2009). Healthcare workers can influence their patients' decisions on smoking habits, but healthcare workers who smoke may not be able to effectively counsel their patients on smoking cessation (Braun et al., 2004).

Problem Statement

Nursing professionals see the impact of smoking in their everyday workplace, yet the most recent data suggests that up to 10% of RNs and 17% of LPNs in Minnesota continue to smoke (Braun et. al, 2004). The difference in smoking rates between LPNs and RNs calls into question whether or not level of nursing education affects smoking rates. Currently, there is no data regarding smoking rates among CNAs. RNs, LPNs, CNAs all play a critical role in patient care and spend a lot of time with the patient, and their smoking habits could influence the way they discuss and educate their patients on smoking cessation. For the purpose of this study, the smoking habits of RNs and CNAs will be examined, excluding LPNs from the research.

Purpose

The purpose of this study was to examine current data regarding the percentage of RNs and CNAs who smoke cigarettes. In addition, researchers identified variables that may influence cigarette smoking rates among these two groups. If smoking among RNs and CNAs is found to be prevalent, education and intervention may assist in lowering the incidence. This would help RNs and CNAs, and possibly their patients, lead healthier lives.

Significance of the Study

Healthcare workers play a large role in the education and health maintenance of patients who smoke cigarettes (Chalmers, Seguire, & Brown, 2002). Of these healthcare workers, nursing professionals are thought to spend the most time face-to-face with patients in hospital settings and can see firsthand the negative impacts of cigarette smoking (Cowen & Moorhead, 2014). Chalmers et al. (2002) sampled opinions and beliefs of nursing students in Canada and found that 87% of respondents agreed that cigarette smoking has specific risk factors, that there is a degree of relatedness between stress and cigarette smoking, and that nursing professionals play an important role in a patient's cigarette smoking cessation. Of the nursing students surveyed, 83.5% agreed that nursing professionals should be expected to set a non-smoking example for their patients (Chalmers et. al., 2002). However, Braun et al. (2004) found that up to 10% of RNs smoke cigarettes. Chalmers et al. (2002) found that nursing students who smoked cigarettes admitted to having feelings of guilt and shame about their personal habits. Nursing students indicated that this guilt and shame impacts their likelihood and ability to discuss smoking cessation with their patients (Chalmers et. al., 2002).

Through extensive research on the current literature, it is evident that cigarette smoking rates among nursing professionals is a problem that needs to be addressed. We hope to add

information to the conversation about cigarette smoking cessation among nursing professionals and CNAs by further examining the problem of smoking among nursing professionals and CNAs and ways to address it. Through education, intervention, and support, the incidence of cigarette smoking among nursing professionals and CNAs may be lowered so nurses can lead healthier lives and set an example for other healthcare workers and patients for smoking cessation.

Research Questions

The following research questions were addressed are:

1. What percentage of RNs and CNAs smoke cigarettes at a suburban Minnesota hospital?
2. How does education level among RNs and CNAs correlate with higher or lower rates of cigarette smoking?
3. How confident are RNs and CNAs in their education and abilities to address smoking cessation with their patients?

Limitations of the Study

Throughout this study assumed that subjects would participate and respond to questionnaires or surveys and that they will answer truthfully. The assumption that we would have a large enough sample size is also included as a limitation. As researchers we will apply some delimitations to our study in order to keep it as bias-free as possible. We will survey CNAs and RNs who work in similar settings and see similar patient populations; the participants will all work in a hospital setting. Since we cannot control who replies, our sample size and population may be skewed. This may indicate a higher response rate among either CNAs or RNs. These delimitations have been explicitly stated in attempt to obtain data that is free from bias.

Definitions of Terms

The following terms are important to define for this study:

- Healthcare worker: Anyone who provides direct patient care in a medical setting. Including, but not limited to nursing professionals, certified nursing assistants, nursing assistants, healthcare providers, physical therapists, phlebotomists, etc.
- Healthcare providers: A healthcare worker who can diagnose and treat patients and has the ability to prescribe medications. Includes medical doctors (MDs), doctors of osteopathy (DOs), physician assistants (PAs), and nurse practitioners (NPs).
- Registered nurse (RN): "A licensed healthcare professional who practices independently or is supervised by a physician, surgeon, or dentist and who is skilled in promoting and maintaining health" (Cowen, & Moorhead, 2014, p. 5). RNs are able to practice after completing a four-year Bachelor of Science and Nursing degree, or a two year Associates Degree in Nursing, and pass a national board exam.
- Certified nursing assistant (CNA): "Serves as an assistant to registered nurses, licensed practical nurses and other nursing and healthcare professionals... CNAs, which are also known as nurse aides and nurses' assistants, provide basic, day-to-day care for patients in nursing homes, hospitals, assisted living centers and other health care facilities" (Certified Nursing Assistant License, 2016). CNAs are able to practice after completing a single course on basic nursing care and passing a national certification exam.
- Smoking: The use of tobacco in the form of cigarettes.

Conclusion

Smoking rates in the U. S. have declined, both within the general population and the population of healthcare workers, but smoking continues to be a major healthcare issue in the

21st century. Nursing professionals and CNAs play a large role in patient care, but research shows that nursing professionals still smoke, and their smoking habits may impede their ability to counsel patients about the importance of smoking cessation. In Chapter Two will discuss in detail the health effects of cigarette smoking and variables that may play a role in nursing professionals and CNAs' smoking.

Chapter Two: Literature Review

Introduction

More than 45 million Americans smoke and an even larger number of Americans suffer from the effects of secondhand smoke (Han et al., 2015). Healthcare workers play an important role in their patients' smoking cessation process, but the ability of the healthcare professional to provide counseling may be affected by the professional's own participation in smoking. This literature review will outline current research available on the health consequences of smoking, the prevalence of smoking, and how healthcare workers, specifically nursing professionals, can play a role in reducing smoking rates.

Health Consequences of Cigarette Smoking

According to the World Health Organization (2016), over one billion smokers currently exist worldwide, with tobacco products being responsible for up to six million deaths per year. While many of these deaths are attributed to direct tobacco use, a significant amount are a result of second-hand smoke inhalation (World Health Organization, 2016). One cigarette contains over 600 ingredients and produces more than 7000 chemicals when burned, many of which are toxic or known to cause cancer (American Lung Association, 2016). These chemicals cause damage to a variety of internal organs and structures. Half of all smokers will die from smoking-related illnesses, making smoking the number one cause of preventable death and disease in the U. S. (American Cancer Society, 2015). Smoking increases an individual's risk for developing macular degeneration, mouth cancer, impaired sense of smell and taste, throat cancer, heart disease, lung disease, colon cancer, pancreatic cancer, infertility, cervical cancer, and many other health complications (American Cancer Society, 2015). Almost every organ in the body can be affected by smoking. A study by Jha et al. (2013) followed a cohort of over 200,000 U. S. adults

between 1997 and 2004 and categorized each adult as a smoker, former smoker, or never smoker. They determined that a never smoker was twice as likely than a current smoker to reach age 80, primarily because the smoker was significantly more likely to develop cancer or other serious diseases (Jha et al., 2013).

Inhaled cigarette smoke first passes through the mouth and oropharynx, damaging the cells and mucosal membranes as smoke coats the teeth and tissues with hundreds of chemicals and tar (American Cancer Society, 2016b). Surrounding cells divide rapidly to replace the damaged cells, which increases the probability of DNA mutation in these cells (American Cancer Society, 2016b). This process, along with the ability of the chemicals found in tobacco to directly damage DNA, greatly increases the risk of cancer development (American Cancer Society, 2016b). As a result of these two processes, one of the strongest risk factors for mouth and pharyngeal cancers is tobacco use (American Cancer Society, 2016b). Toxins found in cigarette smoke are not confined to the oral cavity but are absorbed into the bloodstream and can travel throughout the body (Center for Disease Control, 2015a). The ability for the toxins to alter DNA demonstrates that cigarette smoking can cause cancer almost anywhere in the body, including the lungs, kidneys, liver, colorectal organs, and stomach (Center for Disease Control, 2015a).

Chronic absorption of toxins can lead to malignant and benign lung diseases (U. S. Department of Health and Human Service, 2014a). The chemicals found in tobacco smoke damages cells and distorts DNA in lung tissues in the same mechanism as it does in the oral cavity and oropharynx (U. S. Department of Health and Human Services, 2014b). Smoking is the direct cause of approximately 80% of lung cancers (American Cancer Society, 2016a). According to the American Cancer Society (2016a), lung cancer is currently the second most common form of cancer in men and women and is the leading cause of cancer-related death.

Secondhand smoke contributes to more than 7000 of these deaths per year (American Cancer Society, 2016a).

Cigarette smoking has an irrefutable connection to the development of lung disease. In 1964, the Surgeon General published the first report warning the public against cigarette smoking and explained the newly discovered negative health implications of the habit (U. S. Department of Health and Human Services, 2014b). The first report declared the link between cigarette smoking and the development of chronic bronchitis, and this claim has held true over the past 50 years (U. S. Department of Health and Human Services, 2014b). Chronic bronchitis is included with emphysema under the category of chronic obstructive pulmonary disease (COPD) (Kumar, Abbas, Fausto, & Aster, 2010). The risk of developing COPD increases as the quantity and duration of cigarettes smoked increases (U. S. Department of Health and Human Services, 2014b). Cigarette smoke exposure causes airway inflammation and excess mucus production (Kumar et al., 2010). Cigarette smoke also inhibits cilia, the small hair-like structures that remove dangerous material and excess mucus from the lungs (American Cancer Society, 2015). The impaired ability to expectorate the excess mucus leads to airway obstruction and the development of a chronic cough, which is the hallmark symptom of chronic bronchitis (Kumar et al., 2010).

An individual who smokes has an increased risk of developing emphysema as a stand alone disorder or in conjunction with chronic bronchitis (American Cancer Society, 2015). Emphysema develops as the inhalation of cigarette smoke causes inflammation of the alveoli and small bronchioles, which leads to a functional airflow obstruction and decreased gas exchange in the lungs (Kumar et al., 2010). In late stage emphysema, individuals will experience progressive dyspnea and, like chronic bronchitis, could eventually develop heart failure, pneumothorax, or

other serious lung conditions (Kumar et al., 2010). No cure has been found for either of these diseases, and COPD is the third leading cause of death in the U. S. (American Cancer Society, 2016a).

In the last 50 years, the list of smoking-related pulmonary diseases has grown to include more than COPD as more has been learned about the effects of cigarette smoke. When cigarette smoke is inhaled, the toxins and tar are absorbed by the lung tissue and can exacerbate underlying lung problems (U. S. Department of Health and Human Services, 2014a). Cigarette smoke travels through air affecting everyone in the vicinity of the smoker. Secondhand smoke irritates the lung tissue in the same way as direct inhalation of cigarette smoke and can cause similar health effects (U. S. Department of Health and Human Services, 2014a). Children exposed to significant amounts of secondhand smoke are at an increased risk for developing respiratory infections and asthma (U. S. Department of Health and Human Services, 2014a).

Lung disease may be the most obvious consequence of cigarette smoking, but the effects on the cardiovascular system are also significant. Cardiovascular disease exacerbated by smoking includes coronary artery disease (CAD), peripheral artery disease (PAD), hypertension, acute myocardial infarction, cerebrovascular accident (CVA), and angina (U. S. Department of Health and Human Services 2014a). More smokers die of cardiovascular-related disease than die of lung cancer (U. S. Department of Health and Human Services 2014a). People who smoke less than five cigarettes per day are at a higher risk of developing cardiovascular disease than non-smokers, and the cardiovascular risk grows with increased cigarette use (U. S. Department of Health and Human Services, 2014b). Chemicals in cigarette smoke cause blood to thicken, leading to the increased risk of clot formation (U. S. Department of Health and Human Services, 2014b). Cigarette smoking promotes the development of plaque deposits in arteries and

vasoconstriction of blood vessels, which reduces blood flow and increases pressure in the vessel (U. S. Department of Health and Human Services, 2014b). Several diseases stem from the combination of these pathophysiological processes.

Cigarette smoking greatly increases the risk for vascular disease, specifically PAD and CAD, both of which can cause decreased or blocked blood flow to vital organs (U. S. Department of Health and Human Services, 2014b). PAD occurs after arteries supplying extremities sclerose due to chronic vasoconstriction (U. S. Department of Health and Human Services, 2014b). The reduced blood flow to the extremities can cause cell death related to hypoxia (U. S. Department of Health and Human Services, 2014b). CAD occurs with a similar mechanism to PAD but has more severe effects as it directly affects arteries supplying the heart (U. S. Department of Health and Human Services, 2014b). Coronary atherosclerosis, along with increased clotting and plaque formation from cigarette smoking, can cause decreased oxygenation of the cardiac muscle, leading to acute myocardial infarction and possibly sudden cardiac death (U. S. Department of Health and Human Services, 2014b). Through this same mechanism, arteries to the brain can become occluded, leading to a CVA (U. S. Department of Health and Human Services, 2014a). Individuals with repeated exposure to secondhand smoke have an increased risk of developing arterial disease, including a 20-30% increased risk of a CVA (U. S. Department of Health and Human Services, 2014a).

In addition to cardiovascular and pulmonary disease, there are a number of smoking-related consequences that affect other organ systems. According to the Surgeon General's report, smokers have poorer overall health than non-smokers due to poor immune systems (U. S. Department of Health and Human Services, 2014a). Smokers are 30-40% more likely to develop diabetes (U. S. Department of Health and Human Services, 2014a). Women who smoke have a

higher incidence of ectopic pregnancy, which is fatal for the fetus and can be fatal for the mother (U. S. Department of Health and Human Services, 2014a). Recent evidence suggests a causal relationship between cigarette use and erectile dysfunction in men (U. S. Department of Health and Human Services, 2014a). Smokers are also at an increased risk of developing age-related macular degeneration and autoimmune diseases, such as systemic lupus erythematosus and inflammatory bowel disease (U. S. Department of Health and Human Services, 2014a).

Cigarettes have a highly addictive nature, and as a result, many cessation attempts are never initiated or are unsuccessful (Centers for Disease Control, 2015b). Nicotine is the primary addictive substance found in tobacco products (U. S. Department of Health and Human Services, 2014b). According to the Surgeon General's report, it takes 10 seconds for nicotine to reach the brain after one puff of a cigarette (U. S. Department of Health and Human Services, 2014b). Once in the central nervous system, nicotine increases the release of dopamine, which causes a heightened sense of alertness (U. S. Department of Health and Human Services, 2014b). Overtime, the brain adapts to the increased dopamine levels and depends on those enhanced concentrations for optimal function, causing addiction (U. S. Department of Health and Human Services, 2014b). When a smoker attempts to quit, the decreased dopamine levels cause mood changes and intense cravings for more nicotine (U. S. Department of Health and Human Services, 2014b). The 2014 Surgeon General's report also acknowledged that cigarettes may be more addictive than they were 50 years ago because tobacco companies have added chemicals to increase the potency and delivery method of nicotine (U. S. Department of Health and Human Services, 2014b).

Prevalence of Cigarette Smoking in the United States

The 1964 Surgeon General's Report outlined what was known about cigarette smoking at that time (U. S. Department of Health and Human Services, 2014a). The Surgeon General's Report has been continuously updated as more studies are conducted, and a recent report was published by the U. S. Department Health and Human Services (2014a) discussing the history of smoking over the past 50 years. According to the U. S. Department of Health and Human Services (2014a), smoking is an epidemic affecting the U. S. and is considered one of the greatest "health catastrophes of the century" (p.1). However, tobacco control and the declining rate of smoking in the U.S. is also one of the greatest successes over the past 50 years (U. S. Department of Health and Human Services, 2014a).

Unfortunately, cigarette smoking continues to be an epidemic, despite the government's effort to control and decrease tobacco use. Since the publication of the first report, more than 20 million Americans have died as a result of smoking, of which, 2.5 million were non-smokers exposed to secondhand smoke (U. S. Department of Health and Human Services, 2014a). Smoking is a harmful act, not only to the participants, but to those around them as well. According to the U. S. Department of Health and Human Services (2014a), "More than 10 times as many U. S. citizens have died prematurely from cigarette smoking than have died in all wars fought by the U. S. during its history" (p. 1). The American Lung Association (2011) reports one in every five deaths in the U. S. is caused by smoking-related diseases. Smoking-related disease is considered the number one avoidable cause of death in the U. S., contributing to more than 435,000 deaths per year (Center for Disease Control, 2016b). Despite these negative health consequences, more than 45 million Americans continue to smoke (Han et al., 2015).

The rate of smoking has significantly declined from the first report 50 years ago, possibly due to the increased information about the health consequences of smoking (U. S. Department of Health and Human Services, 2014a). A number of measures to control and decrease tobacco use have been enacted in the past 50 years, such as indoor smoking bans in public places, media campaigns, and tax increases for cigarettes (U. S. Department of Health and Human Services, 2014a). Although smoking rates have declined from 42% in 1964 to 18% in 2014, more than 5.6 million American children under 18 are still at risk to die prematurely due to their smoking habits (U. S. Department of Health and Human Services, 2014a).

Huge financial costs on the healthcare system are associated with smoking. According to the U. S. Department of Health and Human Services (2014a), more than $150 billion per year are lost in productivity due to premature deaths related to smoking, and secondhand smoke accounts for an additional $5.6 billion lost per year (U. S. Department of Health and Human Services, 2014a). Furthermore, $130 billion are spent on direct medical care of adults due to smoking-related illnesses (U. S. Department of Health and Human Services, 2014a). The financial burden of smoking dramatically impacts the U. S. economy.

When the first Surgeon General's report was published, smoking was believed to have a higher all-cause mortality rate, but the specific data on how it affected people's health were unknown (U. S. Department of Health and Human Services, 2014a). Therefore, attitudes and opinions of Americans concerning smoking were hard to change, as at this time over 50% of males and 33% of females regularly smoked (U. S. Department of Health and Human Services, 2014a). Smoking among women actually increased following the release of the first report, and it was not until 15 years later that smoking rates began to decline (U. S. Department of Health and Human Services, 2014a). In the U. S. in 1981, 640 billion cigarettes were consumed, and in

2007, 360 billion cigarettes were consumed (American Lung Association, 2011). Smoking consumption has declined substantially since its peak in 1981 and continues to decrease today (American Lung Association, 2011). Tobacco producers tried to defend their products with aggressive advertisement, at the same time, state and federal laws were enacted in an attempt to decrease the incidence of smoking (U. S. Department of Health and Human Services, 2014a). Some of these laws include the prohibition of smoking in public places, which was adopted by almost half the states by 2011, and an imposed excise tax on cigarettes, which is present in all 50 states (American Lung Association, 2011). Over time, the opinion about the normalcy of smoking changed, and nonsmoking advocates began to arise (U. S. Department of Health and Human Services, 2014a). Due to these changes, the number of smokers has declined from 42% in 1964 when the first Surgeon General's report was released, to 18% in the updated Surgeon General's Report in 2014 (U. S. Department of Health and Human Services, 2014a).

Despite extensive political and media campaigns to eliminate the prevalence of smoking, almost 42 million adults and over 3.5 million middle and high school students continue to smoke (U. S. Department of Health and Human Services, 2014a). With tobacco companies spending close to $9.5 billion on advertising in 2013, Americans, specifically adolescents, are at a high risk to begin smoking (Centers for Disease Control, 2016a). The prevalence of smoking among younger populations is increasing, and the fear of a rise in cigarette use is still present (U. S. Department of Health and Human Services, 2014a). The 2014 Surgeon General's report states:

> Significant disparities in tobacco use persist among certain racial/ethnic populations, and among groups defined by educational level, socioeconomic status, geographic region, sexual minorities (including individuals who are gay, lesbian, bisexual, and transgender, and individuals with same-sex relationships or attraction), and severe mental illness. The

> majority (88%) started smoking before 18 years of age, and nearly all first use of cigarettes occurs before 26 years of age. (U. S. Department of Health and Human Services, 2014a, p. 13)

Initiation of smoking among young adults and adolescents grew from 1.9 million per year to 2.3 million per year between 2002 and 2012 (U. S. Department of Health and Human Services, 2014a). Progress has been made to reduce smoking rates, but the upswing in initiation of smoking makes it clear that smoking is a topic that is not going to go away. Fortunately, significant advances in smoking cessation measures are being developed today that could control and eventually end the smoking epidemic.

Smoking Cessation Techniques

Cigarette smoking is an addictive behavior that often takes multiple attempts and treatment strategies in order to quit successfully (Centers for Disease Control, 2015b). The number of former smokers who have quit surpasses the number of current smokers, indicating success in decreasing the rate of smoking among Americans (U. S. Department of Health and Human Services, 2014a). People who quit smoking often relapse and start again due to stress, increased weight gain, and withdrawal symptoms including agitation, cravings, feelings of hunger, and difficulty concentrating (Fiore et al., 2008). Many people try to quit on their own and often prove unsuccessful (Fiore et al., 2008).

Tobacco use is considered a chronic disease, and as a result, treatment should be similar to that of other chronic disease, like heart failure or diabetes (Fiore et al., 2008). A failure to recognize the chronicity of tobacco use by clinicians can hinder their ability to consistently treat tobacco use (Fiore et al., 2008). Treatment of tobacco dependence usually requires multiple visits and treatment types, and clinicians are encouraged to provide patient education for a significant

period of time (Fiore et al., 2008). The initial attempt at quitting is only successful for a minority of smokers (Fiore et al., 2008). Currently, greater than 70% of the 45 million smokers in the U. S. admit they want to quit smoking and 44% attempt to quit each year (Centers for Disease Control, 2016b).

The success rate of quitting cigarette smoking has drastically improved with the development of new treatment strategies that have been shown to be more effective than strategies used in the past (Fiore et al., 2008). Not only are there more effective pharmacological agents present, but by treating tobacco use as a chronic disease, healthcare professionals are able to intervene and counsel patients during their cessation process (Fiore et al., 2008). According to Fiore et al. (2008), currently seven first line pharmacologic agents have been proven to help quit smoking and are accessible for clinicians to prescribe: bupropion SR, nicotine gum, nicotine inhaler, nicotine lozenge, nicotine nasal spray, nicotine patch, and varenicline. Second line therapy includes clonidine and nortriptyline (Fiore et al., 2008). Fiore et al. (2008) acknowledge that smoking cessation counseling is more relevant and better received by the patients when the clinician giving the intervention is the one who the patient sees most often. Since strict time limits exist for primary care visits, the smoking cessation intervention often includes the work of nurses and other medical staff (Fiore et al., 2008).

The increase in available treatment methods allows for patients to choose the method that works best for them, giving the patient control over his or her treatment, and promoting independence and commitment to quitting (Fiore et al., 2008). Fiore et al. (2008) also states the role counseling services play in quitting smoking is now more supported than ever, which gives patients options other than pharmacological agents. Both the patient's and healthcare system's perseverance and willingness to engage in the process of smoking cessation plays a large role in

the success of treatment (Fiore et al., 2008). Healthcare providers can play a positive role in their patients' lives by intervening and consistently following up with the patients' quitting processes in order to improve the likelihood of successful cessation (Fiore et al., 2008). Fiore et al. (2008) outlines some recommendations for the current treatment of tobacco smoking cessation, including:

1. All patients should be asked if they use tobacco and should have their tobacco use status documented on a regular basis. Evidence has shown that clinic screening systems, such as expanding the vital signs to include tobacco use status or the use of other reminder systems such as chart stickers or computer prompts, significantly increase rates of clinician intervention. (p. 77)
2. All physicians should strongly advise every patient who smokes to quit because evidence shows that physician advice to quit smoking increases abstinence rates. (p. 82)
3. Treatment delivered by a variety of clinician types increases abstinence rates. Therefore, all clinicians should provide smoking cessation interventions. (p. 83)
4. The combination of counseling and medication is more effective for smoking cessation than either medication or counseling alone. Therefore, whenever feasible and appropriate, both counseling and medication should be provided to patients trying to quit smoking. (p. 101)

If all healthcare providers followed these recommendations, the health consequences and expenses associated with smoking-related illnesses would likely decrease. In order to effectively assist cigarette users in their attempt to quit, healthcare providers must have appropriate training. A healthcare provider's training background may make the provider more or less prepared to

assist with patients' attempts at smoking cessation. As current costs associated with smoking-related illnesses rise, preventative services should be made available by healthcare providers and implemented to decrease the prevalence of smoking and the costs associated with the disease.

Prevalence of Cigarette Smoking Among Healthcare Workers

Healthcare providers and nursing professionals are well versed in the risks and health effects of cigarette use. Beyond the general public's knowledge about the danger of engaging in smoking, healthcare providers and nursing professionals are formally educated about the effects of smoking on the body and the increased risk for multiple disease states. Additionally, healthcare workers directly witness the impact of cigarette smoking as they care for patients who have a history of smoking. Despite these factors, research shows that many healthcare workers continue to use cigarettes (Sarna et al., 2014).

Through the 21st century, smoking rates among healthcare workers have declined to 8.34% (Sarna et al., 2014). A study performed between 2010 and 2011 surveyed healthcare workers and revealed that smoking rates among physicians, dentists, RNs, LPNs, pharmacists and respiratory therapists ranged from 1.95% among physicians to 24.99% among LPNs (Sarna et al., 2014). At the time of the survey, the smoking prevalence in the U. S. general population was 16.08%, and the smoking rates among each group of healthcare workers, with the exception of LPNs, was lower than that of the general public (Sarna et al., 2014). Among the healthcare workers surveyed, only RNs had a significant decline in the prevalence of smoking, from 11.14% to 7.09%, since the time of the last survey in 2006-2007 (Sarna et al., 2014). A separate study identified common factors among nursing professionals who smoked as less experience in the nursing field, youth, being a male, working in the psychiatric or emergency department, working the evening or night shift, and working full time (Sarna et al., 2009). LPNs and RNs

with associate degrees were significantly more likely to smoke than baccalaureate RNs (Sarna et al., 2009).

A study performed in Spain demonstrated surprising and alarming evidence that smoking rates among nursing and physiology students increased as the students got further into their programs (García et al., 2007). At the time the article was written, the smoking rate among the general population in Spain was 36.7%, and the general smoking rate among the students surveyed was 29.3% (García et al., 2007). The smoking rate among the first-year students surveyed was 19.4%, among second-year students it was 29.4%, and the smoking rate was highest among third-year students at 41.0% (García et al., 2007). When the students were asked if they knew strategies and methods to help patients quit smoking, 78.6% of first year nursing students responded "yes," while only 57.8% of third year students answered "yes" (García et al., 2007). The researchers acknowledged their results were not always reproducible with other groups of students; however, they concluded there needs to be a greater emphasis in nursing education concerning tobacco use, its risks, and ways to quit in order to protect students and prepare them for careers in healthcare (García et al., 2007).

In Australia, another survey evaluated current smoking prevalence among RNs and examined their attitudes toward their personal smoking habits (Berkelmans, Burton, Page & Worrall-Carter, 2011). Among those surveyed, 45.1% of the current smokers admitted they would like to quit smoking, and 49.1% of the RNs who smoked had attempted quitting two to five times (Berkelmans et al., 2011). Of those RNs who smoked, 46% said they would attend a class on smoking cessation if it was organized and run by their institution, prompting the researchers to call for greater smoking cessation support for healthcare workers (Berkelmans et al., 2011). The RNs identified stress, anxiety, and fear of weight gain as the three most prevalent

reasons for continuing to smoke (Berkelmans et al., 2011). From the data gathered, researchers concluded that stress in the workplace can play a large role in the smoking habits of RNs and that there needs to be greater support for smoking cessation within the nursing profession (Berkelmans et al., 2011).

A U. S. study demonstrated that nursing professionals who smoke are more likely to take their allotted breaks during a typical work shift to avoid nicotine withdrawal symptoms, while nonsmoking counterparts are more likely to miss their allotted breaks during a given shift (Sarna et al., 2009). Nursing professionals chosen for this study were from Magnet level hospitals, a special recognition given to only 4% of the hospitals in the U. S. with the highest standards of nursing care (Sarna et al., 2009). Within these facilities, nursing professionals who did not smoke were two times more likely to miss their allotted breaks as their co-workers, who did smoke (Sarna et al., 2009). The researchers suggested the discrepancy in breaks between smokers and nonsmokers could lead to dissension between the two groups over the perceived injustice (Sarna et al., 2009). Nursing professionals who smoke may be less inclined to quit smoking if they realize they would be less likely to receive their work breaks once they quit (Sarna et al., 2009). In conclusion, the researchers believe stronger smoking cessation support should be in place for nursing professionals who smoke (Sarna et al., 2009).

A study performed in Canada examined baccalaureate nursing students' habits and attitudes on smoking. Of the nursing students surveyed, 12.9% were current smokers and 91.4% of the current smokers admitted to wanting to quit (Chalmers et al., 2002). These same students acknowledge the stress of nursing school and the societal prevalence of smoking as reasons for continuing to smoke (Chalmers et al., 2002). The researchers discovered that of the students who had previously quit smoking or who admitted to wanting to quit, most acknowledged "cold

turkey," "tapering down" and "peer support" or "family support" as strategies for smoking cessation, but few students acknowledged nicotine replacement aids or support groups as helpful treatment for smoking cessation (Chalmers et al., 2002, p.20). Of all the students surveyed, "83.5% agreed that nurses should set a non-smoking example to others" (Chalmers et al., 2002, p. 21). While most of the nursing students acknowledged their responsibility as non-smoking role models for their patients, most of the students (smokers, former smokers, and non-smokers) were not aware of current and beneficial smoking cessation aids available (Chalmers et al., 2002). The researchers concluded that greater emphasis should be placed in nursing education on the current knowledge, resources, and techniques for smoking cessation in order to enable students to competently provide smoking counseling to their patients (Chalmers et al., 2002).

Smoking is still an issue among nursing professionals both within the U. S. and internationally. Nursing professionals and CNAs can play a large role in patient's smoking cessation process, but personal smoking habits may create a barrier for nursing professionals and CNAs to appropriately educate and support their patients through smoking cessation. Educating nursing professionals and CNAs about the health consequences associated with smoking and the therapies available for smoking cessation will prepare nursing professionals and CNAs to counsel and support patients' through smoking cessation attempts.

Nursing Professionals Impact on Smoking Cessation

Healthcare workers have been shown to play a positive role in their patient's attempts at smoking cessation. As stated by the American Academy of Nursing on Policy, "research demonstrates that nurses and professional nursing organizations can make a significant difference in minimizing this disease-burden caused by tobacco through nursing research, policy, practice, and education" (Sarna & Bialous, 2013, p. 1).

A study by Braun et al. (2004) surveyed primary care physicians, advanced practice nurses (nurse practitioners and midwives), RNs, LPNs, and medical assistants (MAs) in Minnesota to determine their smoking-related knowledge and clinical practices. Generally, as education level increased, the healthcare workers was more likely to view smoking cessation services as important to improving patient health (Braun et al., 2004). Physicians and advanced practice nurses were more likely to ask their patients if they smoked cigarettes and recommend smoking cessation than other medical personnel (Braun et al., 2004). Researchers found that working fewer hours, being a current smoker, and considering oneself as an unqualified counselor were associated with inconsistently facilitating smoking cessation (Braun et al., 2004). The results of this study indicate that nursing professionals need to receive more education on smoking cessation techniques.

According to Cowen and Moorhead (2014), nursing professionals are "educated to provide holistic care for people across the age spectrum and in all settings. Nursing professionals interpret information, teach patients, advise, and advocate" (p. 13). Nursing professionals are often the healthcare workers who spend the most time with patients, especially during hospital stays, and have the ability to make an impact on a patient's readiness to attempt smoking cessation (Cowen & Moorhead, 2014). The American Academy of Nursing on Policy confirms that nursing professionals should be involved in preventing the start of smoking, help with the cessation process, and inform patients about the dangers of secondhand smoke exposure (Sarna & Bialous, 2013). Understanding the impacts of smoking on health is something that should be addressed and treated at every nursing healthcare encounter (Sarna & Bialous, 2013). The American Academy of Nursing on Policy is working to add training on the methodology of smoking cessation in nursing school curriculum, implement testing on tobacco competency as

part of nursing licensure, and to invest financially in research and control programs associated with tobacco (Sarna & Bialous, 2013). Most importantly, the organization believes that "smoking among the profession is a barrier to interventions, and nurses worldwide should serve as tobacco-free role models. Employers of nurses and nursing educators should provide cessation resources and services for all nurses and student nurses who use tobacco" (Sarna & Bialous, 2013, p.2).

Conclusion

A vast amount of information about the impact of smoking on health is widely available to the general public. Regardless of the implications, a significant number of Americans continue to smoke, and tobacco addiction is a chronic disease that needs to be addressed by the healthcare profession. Treatment for cessation needs to be a joint effort by healthcare workers and the individual patient in order to increase success rates. Since healthcare workers can have a positive impact on quitting rates, the responsibility to assist with smoking cessation will continue to fall on healthcare workers. With appropriate knowledge and training, healthcare workers can provide information and assistance with patients' attempts at smoking cessation. Healthcare workers that spend more with the patient can have a greater impact on successful smoking cessation, such as nursing professionals and CNAs. Unfortunately, the literature shows smoking rates are still high in nursing professionals, which could lead to insufficient care in the smoking cessation process due to nursing professionals and CNAs' personal beliefs and choices on smoking. Through extensive search of the literature, no current data or information about the prevalence of smoking among CNAs was found. This study initiated research to examine the incidence of smoking among CNAs, the prevalence of smoking among RNs, and identify variables that may influence smoking rates between the two professions. Chapter Three will discuss the methodology of this

research in order to acquire data about the smoking rates among RNs and CNAs in a Minnesota hospital.

Chapter Three: Methodology

Introduction

The purpose of this study was to determine the percentage of CNAs and RNs who smoke cigarettes and to evaluate specific factors that may influence an individual's decision to smoke. To accomplish these goals, researchers distributed surveys that aimed to answer the following research questions:

1. What percentage of RNs and CNAs smoke cigarettes at a suburban Minnesota hospital?
2. How does education level among RNs and CNAs correlate with higher or lower rates of cigarette smoking?
3. How confident are RNs and CNAs in their education and abilities to address smoking cessation with their patients?

This chapter will include information about the study design, sample population, data collection tool, and the experimental procedure with statistical analysis.

Study Design

Researchers completed a quantitative, cross-sectional, retrospective study surveying RNs and CNAs from a suburban Minnesota hospital. This one-time survey allowed for confidential assessment of the smoking habits of multiple RNs and CNAs through a direct comparison between the two groups. The survey also addressed factors that may influence smoking habits among this population.

Population

As explained in the literature review, nursing professionals and CNAs can play a large role in patient smoking cessation. However, a significant percentage of nursing professionals in the United States smoke cigarettes. The literature also suggests that individuals with more

nursing education, like nurse practitioners, have a lower incidence of smoking compared to those with less nursing education, like LPNs. The population of interest for this study was RNs and CNAs working in a birthing center in a suburban Minnesota hospital. A committee member for this research study works for the selected hospital and gave permission to survey the selected RNs and CNAs (Appendix A). Due to a limited access to the hospital, only RNs and CNAs in the birthing center were surveyed. The researchers and authors of this study had no contact with any of the RNs or CNAs included in this study before surveys were distributed. The aim of the study was to have a sample size of 20-40 RNs and CNAs.

Due to the nature of this survey and the use of human subjects, Bethel University's Institutional Review Board (IRB) reviewed the study and research tool. IRB level three ethical approval was gained before distributing the surveys and research process.

Data Collection

This study utilized a seven-question survey, found in Appendix C, designed by the researchers with questions that consist of demographic information, closed-ended questions, and opinion-based questions using a Likert scale. The researchers distributed the cover letter, found in Appendix D, and survey in person in order to collect the following information:

1. Demographic Information: highest level of education and job title.
2. Data about current and past smoking status.
3. Likert scale assessment of participants' perceived qualification to discuss smoking cessation with their patients.

Each closed-ended question contained options for the participant to check the answer that best describes them. The survey included a question on whether the participant is a current

cigarette smoker, past cigarette smoker or a never cigarette smoker. The opinion-based questions used a Likert scale with the options of strongly agree, agree, disagree, and strongly disagree.

Researchers chose to use this survey as a research tool to accurately and efficiently provide answers to the research questions listed above. The simplicity of this survey allowed for efficient data collection and interpretation. The survey was intended to take less than five minutes to complete, thus taking minimal amount of time out of the RNs and CNAs' day.

Prior to completing the survey, the participant was given a cover letter explaining the research project, as seen in Appendix D. In this letter, the participant was informed that choosing to decline the survey will not affect their relationships with their employer or Bethel University and that the participants' identity will never be collected. The letter explained that completing the survey indicates the participants' informed consent, and that the participant was free to not answer questions or to stop the survey at any time without penalty.

The survey was a novel research tool and was not formally evaluated for validity and reliability. The questions assessing demographic and quantitative factors, which are factual in their response, may be inherently more accurate than the opinion-type questions, which may change depending on the situation. In attempt to create the most reliable and valid survey, researchers distributed test surveys to acquaintances who are RNs and CNAs, who provided sample responses and feedback on the survey. After receiving evaluations of the survey, researchers made necessary changes to ensure the accuracy and consistency of the survey.

Experimental Procedure

The research questionnaire was presented on paper and administered in-person at a birthing center in the selected Minnesota hospital. Each questionnaire contained a one-page consent letter and a one-page, seven-question survey, as seen in Appendix C-D. The researchers

asked RNs and CNAs if they would be willing to participate in the study. Participants who agreed were given the questionnaire and brief, scripted instructions on how to complete it, as seen in Appendix E. The researcher stepped away from the participant to allow for privacy while completing the survey, then returned several minutes later to collect the questionnaire. The survey took most participants less than 5 minutes to complete. Researchers immediately placed the questionnaire in a folder without viewing the responses. As an incentive and thank you for participating in the survey, researchers brought cookies for the CNAs and RNs and left them in the break rooms of the birthing center. This process was completed on two separate days during shift changes in attempt to survey as many RNs and CNAs as possible.

In order to ensure confidentiality, questionnaires were kept in a folder, which was always in the possession of a researcher. The consent letter was discarded. The survey results were transferred into a Microsoft Excel spreadsheet on a password protected computer owned by the researchers. At the completion of the study, the paper surveys were destroyed and the electronic data was moved onto an external flash drive. This external flash drive will be locked in the Bethel Physician Assistant program office for a minimum of five years, which is the requirement for Bethel University's Physician Assistant Program.

The data was statistically analyzed using two computer programs: Microsoft Excel and R-Studio. Pearson's Chi-Square test and Fisher's Exact test were used to determine statistically significant relationships between independent and dependent variables in this study. Independent variables included education level and job title. The dependent variable of the study was participants' smoking habits. Responses to the Forced Likert Scale questions were analyzed using a Wilcox Rank Sum Test.

Conclusion

The next chapter discusses the results of this study along with the statistical interpretations of these results. A discussion concerning the results, including research limitations and inferences from this research, is found in Chapter Five. Suggestions for future research is also discussed in Chapter Five.

Chapter Four: Results

Introduction

This chapter will examine the data collected from the researcher-designed survey. All information collected from the survey was utilized to answer the research questions. Throughout this chapter, the demographics of the research population will be stated and briefly discussed. In addition, the data collected will be analyzed and further discussed in Chapter Five. Microsoft Excel and R Studio were used to store and analyze results collected from the study. Tables and figures are used to display the analyzed data.

Demographics

Participants for this study were RNs and CNAs working in a suburban Minnesota hospital birth center. In total, 61 surveys were collected, but one survey was discarded due to incompletion. For purpose of statistical analysis, total participants of this study was 60.

Demographic questions included job title, level of education, and smoking status. In regard to job title, 11 (18.33%) CNAs and 49 (81.67%) RNs completed the survey. Of the 60 healthcare workers surveyed, six (10%) indicated their highest level of education was a high school diploma, 14 (23.33%) indicated an associate's degree as the highest level of education, 37 (61.67%) indicated a bachelor's degree as the highest level of education, and three (5.00%) participants indicated a master's degree as the highest level of education. None of the survey participants identified themselves as current smokers, but 12 (20.00%) identified themselves as "past smokers," and 48 (80.00%) identified as "never smokers." This information can be seen below in Table 1.

Demographics of Survey

Participants N=60		
Variable	**N**	**%**
Education Level		
High School	6	10
Associate's	14	23.33
Bachelor's	37	61.67
Master's	3	5
Job Title		
Certified Nursing Assistant	11	18.33
Registered Nurse	49	81.67
Smoking Status		
Current	0	0
Past	12	20
Never	48	80

Table 1. Demographics of Survey Participants. Participants were asked about their highest level of education, job title (CNA or RN), and smoking status (current, past, or never).

Data Analysis

The demographic data can be further stratified to address one of the research questions in this study of how education level among RNs and CNAs correlate with rates of cigarette smoking. Of the 11 CNAs surveyed, six identified a high school diploma as their highest level of education, four (36.36%) indicated an associate's degree as their highest level of education, one (9.09%) indicated a bachelor's degree as their highest degree of education, and none had a master's degree. Of the 49 RNs surveyed, 10 (20.41%) indicated an associate's degree as their highest level of education, 36 (73.47%) indicated a bachelor's degree as their highest level of

education, and 3 (6.12%) indicated a master's degree as their highest level of education. All of the RNs had completed some level of post-secondary education.

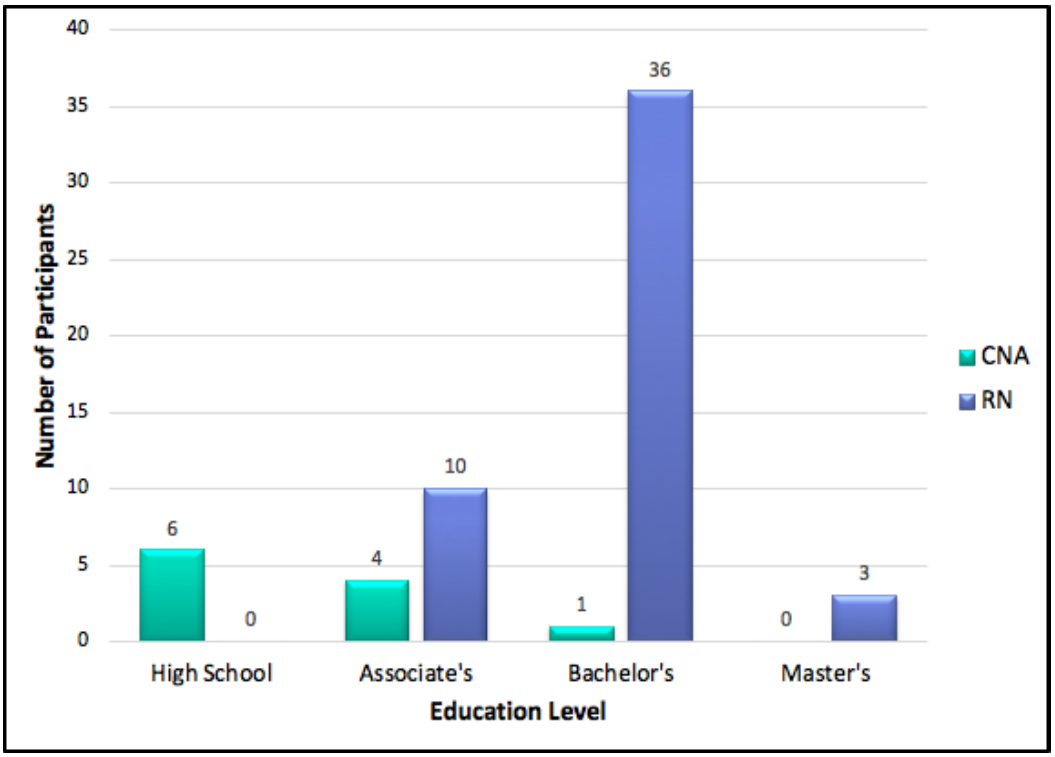

Figure 1. Education level of healthcare workers. Participants were asked for their highest level of education. Figure displays highest level of education compared between CNAs and RNs. Results are displayed according to the number of RNs and CNAs in each education category.

The survey included responses from 11 CNAs and 49 RNs. Of the 11 CNAs, three (27.27%) self-reported a "past" smoking status and eight (72.72%) reported never smoking, addressing the research question pertaining to the percentage of CNAs and RNs who smoke. Comparatively, nine (18.37%) RNs reported a past cigarette smoking status and 40 (81.63%) reported never smoking. None of the participants, either RN or CNA, were current smokers. See Table 2.

CNA Smoking Status (N=11)	N	%
Current	0	0
Past	3	27.27
Never	8	72.73
RN Smoking Status (N=49)	**N**	**%**
Current	0	0
Past	9	18.37
Never	40	81.63

Table 2. Smoking Status vs. Job Title. Smoking status stratified into categories "Current smoker," "Past smoker," and "Never smoker." Job title stratified into "CNA" and "RN."

In order to determine if there was a statistically significant relationship between job title and smoking status to answer the research question, both Pearson's Chi-square test and Fisher's Exact Test were considered. Due to the uneven sample size between RNs and CNAs, the Chi-square approximation may have been incorrect, so the Fisher's exact test was used through the statistical computer program R-studio and resulted in a p-value of 0.68. See Figure 2.

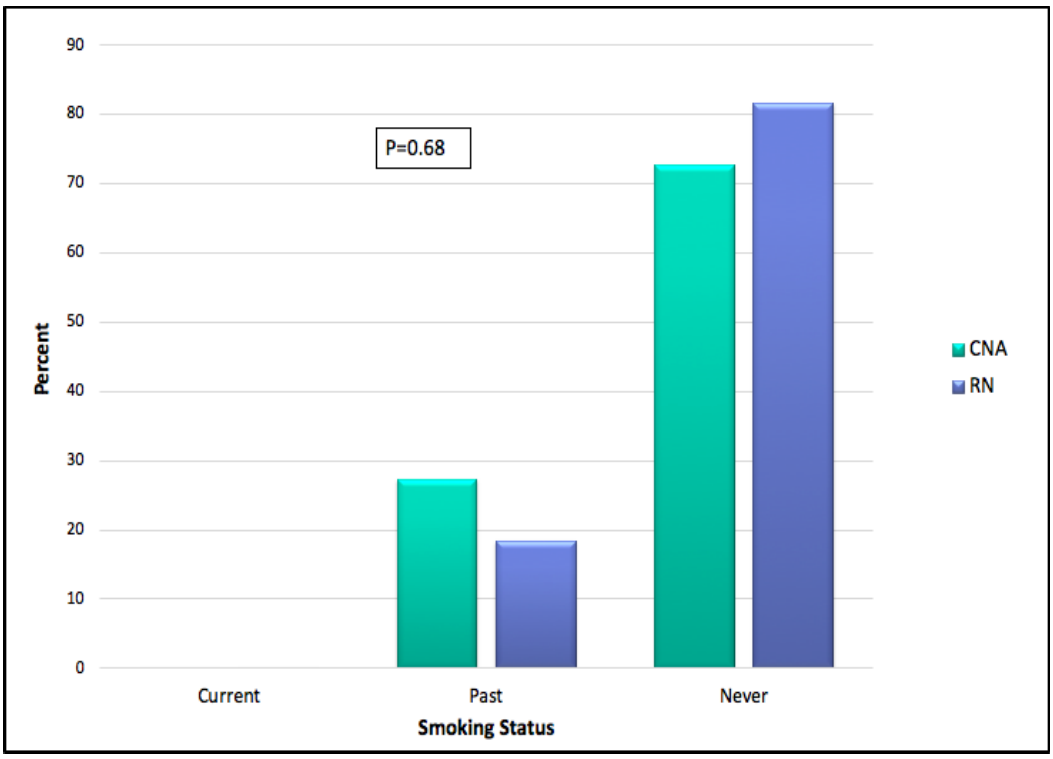

Figure 2. Smoking Status vs. Job Title. Bar graph shows differences in smoking status between CNAs and RNs. P-value (0.68) from Fisher's Exact Test is also included and shows no statistically significant relationship between the two variables.

One of the research questions addressed the relationship between level of education and prevalence of smoking. Of the six participants who listed a high school diploma as their highest education level, zero (0%) were current smokers, one (16.67%) was a past smoker, and five (83.33%) were never smokers. Of the 14 participants who listed an associate's degree as their highest education level, zero (0%) were current smokers, six (42.86%) were past smokers, and eight (57.14%) were never smokers. Of the 37 participants who listed a bachelor's degree as their highest level of education, zero (0%) were current smokers, five (13.51%) were past smokers, and 32 (86.49%) were never smokers. Of the three participants who listed a master's degree as their highest education level, all three (100%) were never smokers. A Pearson's Chi-squared test was run using R-studio to compare the results and determine if there was a statistically significant difference between highest level of education and smoking status. This

result was determined not to be the best approximation and a Fisher's Exact Test was run in order to determine the relationship. The Fisher's Exact Test revealed a p-value of 0.11.

High School (N=6)	**N**	**%**
Current	0	0
Past	1	16.67
Never	5	83.33
Associate's (N=14)		
Current	0	0
Past	6	42.86
Never	8	57.14
Bachelor's (N=37)		
Current	0	0
Past	5	13.51
Never	32	86.49
Master's (N=3)		
Current	0	0
Past	0	0
Never	3	100

Table 3. Smoking status vs. Highest Level of Education. Participants reported their highest level of education (high school diploma, associate's degree, bachelor's degree, and master's degree) and their lifetime smoking status (current, past and never).

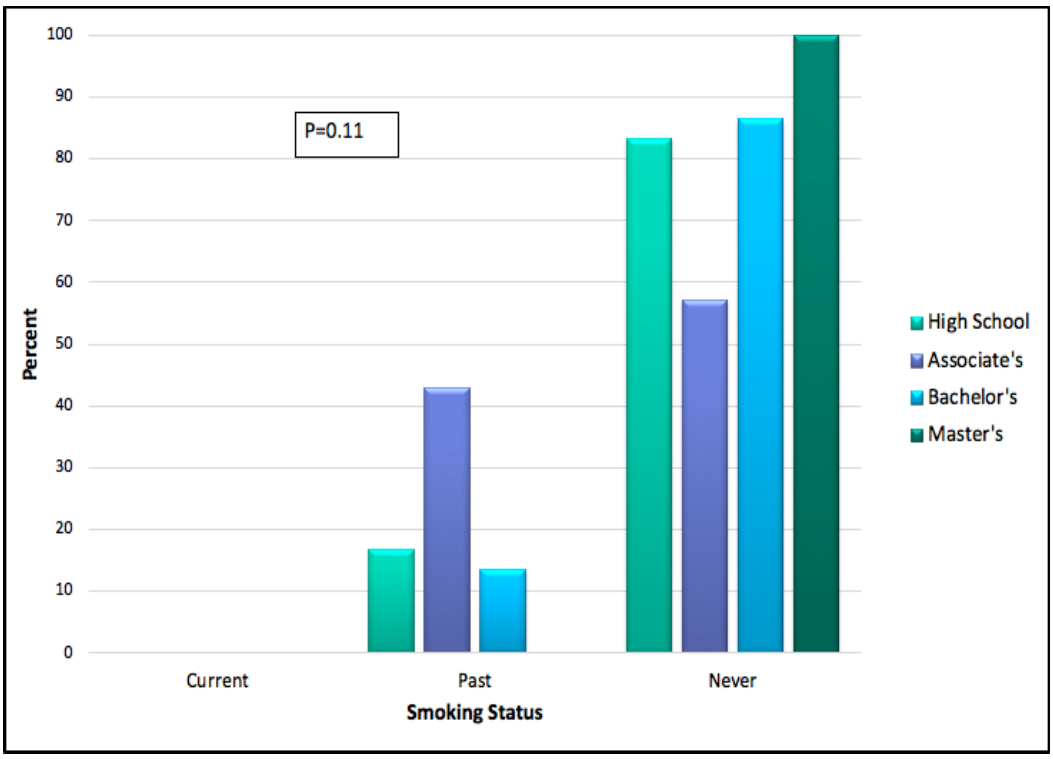

Figure 3. Smoking status vs. highest level of education. Bar graph shows differences in smoking status between associate, bachelor and master's degrees. P-value (0.11) from Fisher's Exact Test is also included and shows no statistically significant relationship between the two variables.

The third research question of this study was how confident are RNs and CNAs in their education and abilities to address smoking cessation with their patients? Using a Likert scale, statements were posed and participants responded with their level of agreement or disagreement with a given statement. There were a total of four statements for the participants to respond to. Statement one said "I understand tobacco and nicotine's immediate and long term effects on the body" and had 60 participant responses. Statement two said "My education enabled me to assist patients through smoking cessation" and had 59 participant responses. Statement three said "RNs play a large role in a patient's smoking cessation attempt" and had 59 responses. Statement four said "CNAs play a large role in a patient's smoking cessation attempt" and had 60 responses. The response of "strongly disagree" was correlated with a numerical value of one, response of "disagree" was correlated with a numerical value of two, response of "agree" was correlated with

a numerical value of three, and response of "strongly agree" was correlated with a numerical value of four. Responses to these four statements are displayed below in Table 4 and graphic representation of these responses is displayed in Figure 4.

Statement	**N**	**1 N (%)**	**2 N (%)**	**3 N (%)**	**4 N (%)**
S1	60	0 (0)	0 (0)	7 (12)	53 (88)
S2	59	0 (0)	8 (14)	29 (49)	22 (37)
S3	59	1 (2)	10 (17)	32 (54)	16 (27)
S4	60	7 (12)	25 (42)	21 (35)	7 (12)

Table 4. Responses to Likert Scale Statements. 1N indicates "strongly disagree", 2N indicates "disagree", 3N indicates "agree", and 4N indicates "strongly agree." Table reports both the number of responses in each category for each question, as well as the percentage of responses of each category for each question listed in parentheses.

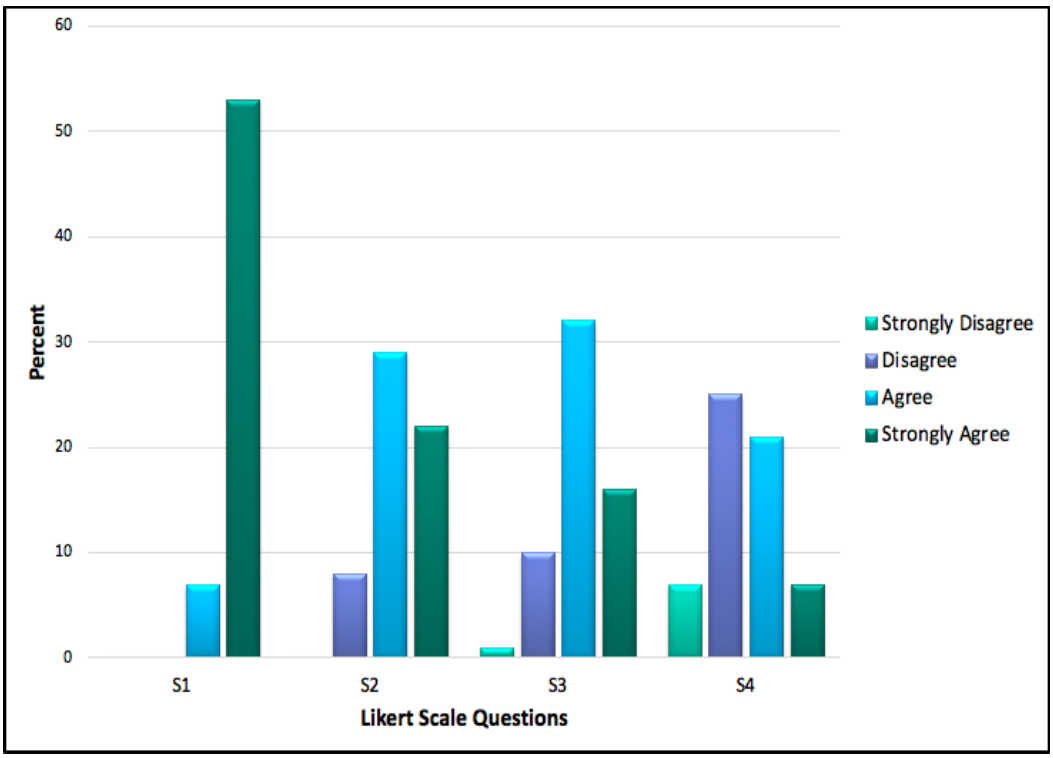

Figure 4. Responses to Likert Scale Statements. The figure indicates responses from both CNAs and RNs combined.

In Table 5 seen below, the participants' responses to the Likert statements are stratified further to compare responses between CNAs and RNs. In order to determine the statistical difference in Likert scale responses between CNAs and RNs, a Wilcox rank sum test was run. For statement one, the Wilcox rank sum revealed a P-value of 0.47. Statement two had a P-value of 0.30, Statement three's determined P-value was 0.11. Statement four had a P-value of 0.49. None of the P-values for statements one through four showed a statistical significance among the responses between CNAs and RNs.

Statement			1 N (%)	2 N (%)	3 N (%)	4 N (%)
S1	**CNA**		0 (0)	0 (0)	2 (18)	9 (82)
	RN		0 (0)	0 (0)	5 (10)	44 (90)
S2	**CNA**		0 (0)	4 (36)	3 (27)	4 (36)
	RN		0 (0)	4 (8)	26 (54)	18 (38)
S3	**CNA**		0 (0)	0 (0)	6 (60)	4 (40)
	RN		1 (2)	10 (20)	26 (54)	12 (24)
S4	**CNA**		1 (9)	4 (36)	4 (36)	2 (18)
	RN		6 (12)	21 (43)	17 (35)	5 (10)

Table 5. Likert scale responses divided by CNAs and RNs. 1N indicates "strongly disagree", 2N indicates "disagree", 3N indicates "agree", and 4N indicates "strongly agree." Table reports both the number of responses in each category for each question, as well as the percentage of responses of each category for each question listed in parentheses.

Conclusion

The results of this study stem from the responses of 60 CNAs and RNs who work in a birth center of a suburban Minnesota hospital. These study participants responded to demographic questions about job title, level of education, and smoking status. They also responded to four Likert scale statements that measured their perceived qualification to discuss smoking cessation with patients. From these survey results, two separate Fisher's Exact Tests revealed no statistically significant relationship between job title and smoking status or education level and smoking status. Similarly, there was no statistically significant difference between the responses of CNAs vs. RNs in their perceived qualification to discuss smoking cessation.

A discussion of these results and how they relate to this study's research questions will be found in Chapter Five.

Chapter Five: Discussion and Conclusion

Introduction

The main goal of this study was to analyze the smoking status CNAs and RNs who work in the birth center of a suburban Minnesota hospital. Researchers aimed to determine if there was a statistically significant relationship between smoking status and job title or smoking status and level of education. The final focus of the study was to assess CNA and RNs' confidence in educating patients on smoking cessation. This chapter includes a summary and discussion of these research questions and the study results, which were outlined in Chapter Four.

Summary of Results

Cigarette smoking is an addictive habit that carries dangerous health risks. Smoking has been shown to increase a person's likelihood for lung cancer, chronic obstructive pulmonary disease, cardiovascular disease, and other disease states (U.S. Department of Health and Human Services, 2014b). The negative health consequences of smoking are widely available, yet over 45 million Americans continue to smoke (Han et al., 2015). Healthcare workers are included in that 45 million and studies have shown that up to 8.34% of healthcare workers smoke, despite their knowledge of the harmful effects of cigarettes (Sarna et al., 2014). There is a significant amount of research that has examined the prevalence of smoking among healthcare professionals, which was described in detail in Chapter Two. Overall, the literature demonstrates that medical professionals with less education are more likely to smoke (Sarna et al., 2009). However, after extensive review, no current data or research was found regarding smoking rates among CNAs. The purpose of this study was to determine the smoking rate of CNAs, specifically those working at a birth center of a suburban Minnesota hospital, and compare the incidence of smoking to that of RNs working at the same location. This study further considered other

variables that could contribute to smoking habits and asked participants to evaluate their comfort in educating patients on smoking cessation.

The research questions of this study were designed to determine the percentage of RNs and CNAs who smoked in a suburban Minnesota hospital. Out of the 60 participants in this study, none of the CNAs or RNs identified themselves as current smokers. The population of this study had lower rates of smoking than was expected based on the review of current literature. A study from 2004 by Braun et. al found that 10% of RNs in Minnesota smoke. The difference in RN smoking rates may be explained by our study's small population size. A total of sixty were surveyed, 49 of whom were RNs, and all participants worked at one specific, suburban hospital on one specific unit. Based on these participant requirements, current smokers may have been excluded from the study. Little to no research exists on smoking rates among CNAs, so we are unable to determine if the 0% incidence of CNA smoking that was found in this study agrees with past studies. Our review of the literature found that 17% of LPNs in Minnesota smoke, and although we are unable to compare LPNs to CNAs directly, this can be used as a reference (Braun et. al, 2004).

This research contributed to the discussion of smoking rates among healthcare workers by looking at both current cigarette smokers as well as past and never smokers. Of the 11 CNAs surveyed, 27% were past smokers and 73% were never smokers. Of the 49 RNs surveyed, 18% were past smokers and 82% were never smokers. Using Fisher's exact statistical test to evaluate the relationship between job title (CNA and RN) vs smoking rate, the acquired p-value of 0.677 indicated that there was not a statistically significant relationship between these two variables. While there were no current smokers in the surveyed population, the rates of past smoking can

be compared between RNs and CNAs. Although not statistically significant, a higher percentage of CNAs identified themselves as past smokers than RNs.

The difference in education levels and training between CNAs and RNs was discussed in Chapter Two but given that RNs require a higher level of medical education for their position, RNs generally have higher levels of educations than their CNA counterparts. Survey participants' education level was outlined and displayed in Chapter Four as both the total participant population and further stratified into education level based on profession. Prior research has demonstrated that LPNs and RNs with associate degrees were significantly more likely to smoke than baccalaureate RNs (Sarna et al., 2009). This called into question whether education level among healthcare professionals impacts smoking rates, specifically if higher education level correlates to decreased smoking rates. Using a Fisher exact test to compare the relationship between education level and smoking rates, a p-value of 0.12 was obtained, which indicated that there was no statistically significant relationship between the two variables. Based on the review of the literature, it was surprising that this research did not demonstrate a statistically significant difference between smoking rates based on level of education.

The third research question addressed nurses' education and confidence in knowledge about smoking and smoking cessation. According to Sarna & Bialous, "research demonstrates that nurses and professional nursing organizations can make a significant difference in minimizing this disease-burden caused by tobacco through nursing research, policy, practice, and education" (2013, p. 1). To analyze this relationship, four statements were included in this study's survey, using a Likert scale to assess participants' perceived qualifications and confidence on educating patients on smoking cessation. All of the participants either agreed (12%) or strongly agreed (88%) that they understand tobacco and nicotine's immediate and long

term effects on the body. The majority of participants also agreed with the statement that their education enabled them to assist patients through smoking cessation. Only 14% of the total participants disagreed with this statement and did not feel like their education prepared them for this task. Participants generally believed that RNs play a more significant role in patient smoking cessation than CNAs. Despite the fact that both CNAs and RNs responded that they understood the long-term impacts of smoking on the body and that their education enabled them to assist patients through smoking cessation, 81% of total respondents believed that RNs play a large role in smoking cessation while only 47% believed CNAs played a large role in smoking cessation. To determine if these results were due to a difference of opinions between the CNAs and RNs, the statements were analyzed individually.

Results of each statement were stratified further to compare the responses of RNs to the responses of CNAs using a Wilcox Rank Sum test. The resulting P-values indicated that for statements one through four, there was no statistical significance between the responses of CNAs and RNs. For statement one, the resulting p-value of 0.47 meant that both RNs and CNAs believe that they understand the effects of nicotine and tobacco's effects on the body long-term. Statement two had a resulting p-value of 0.30, which also demonstrated no difference between the responses of RNs and CNAs indicating that both groups believe their education prepared them to assist patients through smoking cessation. A p-value of 0.11 for statement three also demonstrated no significant difference in the responses between RNs and CNAs, indicating that both groups believe that RNs play a role in assisting their patients in smoking cessation. Finally, statement four had a p-value of 0.49, demonstrating no significant difference in responses between RNs and CNAs, which indicated that both groups do not believe that CNAs play a role in assisting their patients in smoking cessation. For all four Likert scale statements, there was no

significant difference in responses between RNs and CNAs, showing that both groups agree about their understanding of smoking, education about smoking cessation techniques, and both groups' roles in assisting patients with smoking cessation.

In summary, the majority of respondents agreed that RNs play a large role in smoking cessation while CNAs do not. However, since RNs and CNAs responded similarly to statements three and four, as determined by the Wilcox Rank Sum test, researchers concluded that this result was not due to difference of opinions between the two groups. The majority of CNAs agreed that they are educated on assisting patients in smoking cessation, but they do not identify themselves as playing a large role in smoking cessation. Future research is warranted in order to determine what other variables may have contributed to this finding.

Limitations and Delimitations

One limitation of this study is that participants were expected to answer the survey truthfully. Participants may have not answered truthfully if they were embarrassed or felt guilty about their smoking habit. Researchers were able to obtain a sample size of 60; however, there was an unequal distribution of participants with RNs making up 81% of the sample size. The chosen statistical tests used to analyze the data corrected for this discrepancy, and it should not be counted as a limitation. The hospital from which the participants were selected is located in a higher socioeconomic area, so the results of the research cannot be extrapolated to populations from different socioeconomic levels and geographical locations.

Delimitations were applied to the research to control as many variables as possible. The participants included RNs and CNAs who work in similar settings with similar patient populations; the participants all work on the same labor and delivery floor of a suburban Minnesota hospital. All participants had to speak and understand English.

Further Research Opportunities

There has been a significant amount of research evaluating the relationship between smoking status and job title in the healthcare field, but very little research has evaluated the relationship between CNAs and smoking. This study specifically compared smoking status between CNAs and RNs. Although this research did add valuable information to the discussion, there were multiple limitations to the study as explained above, and there are ways that this research could be expanded. One way to further this research would be to include a broader geographic and demographic population as this specific study was limited to a single hospital in a Minnesota suburb. Adding another hospital or even another floor at the hospital would increase the sample size and could impact the results. Additional research including more urban and rural geographies could also have significantly different results. Variables such as race and age, both of which have been found to impact smoking status, could be further analyzed in order to get a clearer picture of what impacts a person to smoke. Another possibility for future research would be to analyze additional variables that impact a person to start smoking and observe past smokers to determine commonalities among those who successfully quit.

Conclusion

Cigarette smoking and smoking-related disease continues to be a prevalent problem in the United States. Prior research has demonstrated that healthcare workers are included in the percentage of Americans who smoke, despite medical knowledge about the effects of cigarette smoking and the daily interaction with patients whose health has been negatively impacted by smoking. A review of the literature reveals that level of education is inversely related with smoking rates among these healthcare professionals. Since CNAs have less medical education than other healthcare workers, specifically RNs, one could predict that smoking rates of CNAs

would be higher than those of RNs working in the same setting. Studies have shown that healthcare workers, including nurses, have a significant role in patient smoking cessation. There has been research done on the smoking habits of nurses, doctors, and respiratory therapists, but little to no research has been done looking at the smoking habits of CNAs.

The purpose of this study was to determine the smoking incidence of CNAs and RNs working in a birthing center at a suburban Minnesota hospital. It also aimed to determine the relationship between level of education and smoking status, and the participants' perceived qualification to educate on and assist patients with smoking cessation. Results of the study showed no statistically significant difference between smoking status (current, past, or never) between RNs and CNAs. Among the surveyed population, there was not a statistically significant difference between education level and smoking status. There was a general consensus that RNs play a larger role in a patient's smoking cessation than CNAs.

With time constraints and limited resources, this study was limited to RNs and CNAs that worked on a single floor in one suburban Minnesota hospital. This posed the possibility that the population was very homogenous and does not represent the RN and CNA population at large. Further research that included healthcare facilities in a variety of locations and settings could create a more accurate picture of smoking habits among RNs and CNAs.

Although none of the participants identified themselves as current smokers, several said they were past smokers. Additionally, this study also demonstrated that both RNs and CNAs recognize the role that they can play in assisting a patient in smoking cessation. Therefore, continued education and support for healthcare professionals is essential, both to assist healthcare workers in their own smoking cessation attempts and to provide them resources and tools to support patients in their smoking cessation attempts.

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APPENDIX A

Signed Agreement with Maple Grove Hospital

Signed Agreement

On behalf of Maple Grove Hospital, I give permission to Ana Brown, Taylor Paulson, and Katie Peterson to conduct their Master's Research at this hospital with permission to survey RNs and CNAs employed by Maple Grove Hospital.

Faith Zwirchitz (electronic signature)
Signature

Faith Zwirchitz
Name

01.25.17
Date

APPENDIX B

Bethel University IRB Approval

Wallace Boeve May 10

to Ana, Taylor, me, Christy, Lisa, Peter

May 10, 2017

Ana, Katie, & Taylor;

As granted by the Bethel University Human Subjects committee as the program director, I write this letter to you in approval of Level 3 Bethel IRB of your project entitled: "The Prevalence of Cigarette Smoking Among Registered Nurses and Certified Nursing Assistants." This approval is good for one year from today's date. You may proceed with data collection and analysis. Please let me know if you have any questions.

Sincerely;

Wallace Boeve, EdD, PA-C
Program Director
Physician Assistant Program
Bethel University
w-boeve@bethel.edu
651 308-1398 cell
651 635-1013 office
651 635-8039 fax
http://gs.bethel.edu/academics/masters/physician-assistant

CC: Bethel IRB Chair
Faculty Chair Advisor
PA Program Research Coordinator

APPENDIX C

Survey

Thank you for taking our survey. Participants are NOT required to answer any question(s) he/she chooses without repercussions.

Please check the box that best describes you.

1. Highest Level of Education Completed

- ❑ High school graduate
- ❑ Associate's degree
- ❑ Bachelor's degree
- ❑ Master's degree

2. Job Title

- ❑ CNA
- ❑ RN
- ❑ Other _____

3. What is your cigarette smoking status?

- ❑ Current cigarette smoker
- ❑ Past cigarette smoker
- ❑ Never a cigarette smoker

	Strongly Agree	Agree	Disagree	Strongly Disagree
I understand tobacco and nicotine's immediate and long term effects on the body.	❑	❑	❑	❑
My education enabled me to assist patients' through smoking cessation.	❑	❑	❑	❑
RNs play a large role in a patient's smoking cessation attempt.	❑	❑	❑	❑
CNAs play a large role in a patient's smoking cessation attempt.	❑	❑	❑	❑

APPENDIX D

Survey Cover Letter and Informed Consent

Dear Nursing Staff:

We are three physician assistant students from Bethel University, conducting research in partial fulfillment of the requirements for a Masters Degree in Physician Assistant Studies. Our study is investigating smoking habits among nursing professionals and assistants. RNs & CNAs that are currently practicing at your hospital of employment will receive this survey.

Attached is a survey to gather necessary information to complete the data collection of this research. The survey will take approximately 5 minutes to complete. Completion of this survey is voluntary and you have the option to stop taking the survey at any point. By completing this survey, you are indicating that you are over 18 years old and give informed consent to participate in this study.

Your identity will be kept strictly confidential as no names or identifiable information will be collected so your answers cannot be linked to you. Reports and subsequent data will not discuss individual responses. Your employer and Bethel University will not know your responses, and therefore no action can be taken against you based on your personal tobacco use habits.
We understand that you have an extremely busy work shift and your time is limited. We have talked to your supervisor and they've given you permission to complete this survey during your shift. Please realize that your participation is vital to the success of this research. The information that you provide is essential to the validity of this study. Thank you in advance for your prompt response to this study. Please complete and return the survey as soon as possible. You can keep this informed consent letter for your records. If you have any questions, please contact Ana Brown at 651-500-2967 or arz67996@bethel.edu, or our research chair Christy Hanson at 651-635-8042 or c-hanson@bethel.edu.

Thank you again for your help.
Sincerely,
Ana Brown, Taylor Paulson, & Katie Peterson

APPENDIX E

Survey Script

Introducing the survey:
"Hello, how are you? We are three PA students from Bethel University conducting research about smoking habits among RNs and CNAs. Would you be willing to participate in our survey? The survey is only 7 questions and should take about 5 minutes to complete. You shouldn't feel obligated to complete this survey and your answers will be completely confidential as we aren't collecting any identifying information."

If they decline the survey:
"Thank you. Have a good day."

If they agree to participate:
"We will leave you with this survey and return in approximately 15 minutes to collect it if it's completed. The first page of the survey is a cover letter that includes a few more instructions and information about your informed consent. Thank you in advance for your participation."

When collecting the completed survey:
"Thank you so much for your participation. We really appreciate your time and your responses."