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Analysis of the Effects of a Workplace Smoking Ban on Smoking Behavior of Employees

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ANALYSIS OF THE EFFECTS OF A WORKPLACE SMOKING BAN ON SMOKING BEHAVIOR OF EMPLOYEES

By

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I would like to dedicate this paper to my family: my husband, Clyde, who has been very patient and supportive of my desire to further my education and career, my children, Inaki and Amaya who are the constant inspiration in my life, and Joe and Alexis, for teaching me to be patient. May this undertaking and the effort required to complete it serve as motivation for their own future academic and life endeavors, whatever they may be. To my sisters and brother, they are examples of generosity, courage, dignity, simplicity, and honesty.

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ABSTRACT

This study explored the effects of a complete smoking ban, in a hospital in north Florida, on smoking behavior of employees. Data from the hospital’s employee smoking survey was used as pre-existing data for a convenience sample of smoking and non-smoking employees, 18 months after the implementation of a smoke-free policy. A response rate of 9% (n = 216) was achieved. The reported reduction in smoking consumption following the ban was statistically significant according to the Wilcoxon test. There was a 30% (n = 14) reduction in cigarette consumption reported, 5% (n = 2) quit rate, and 2% (n = 1) reported started smoking for a total 34% total change in smoking behavior. The respondents showed considerable agreement with the policy however there was a need for better compliance and enforcement of it. There was a 5% (n = 2) employee enrollment for the smoking cessation program among the respondents, with 50% (n = 1) success rate and 50% (n = 1) reduction in smoking. These results indicate that although the smoking cessation program was ineffective in reducing over all smoking among employees, the smoking policy has significantly decreased smoking consumption among employees resulting in a positive impact on smoking behavior. It is suggested that in the future, there should be more focus on the smoking cessation program, which should be an ongoing program even after the ban. More education is needed to inform employees about cessation aids available to them and support to motivate employees to give up smoking. Better enforcement of the policy by security personnel and employees was mentioned. This study concluded that smoke free workplaces not only protect non-smokers but also encouraged smokers to quit smoking or decrease cigarette consumption.
CHAPTER 1

INTRODUCTION

Much attention has been drawn to smoking and smoking bans in public places in the United States and around the world. There has been significant progress in the reduction of smoking in the past decade (United States Health and Human Services, 2006). However, according to the Center for Disease Control and Prevention (CDC) (2003), tobacco use is still the single most preventable cause of death and disease, causing approximately 440,000 deaths annually in the United States. In Canada, the Department of Industry, Tourism and Resources has banned smoking during work hours beginning in October 2004 for its 3,000 workers across the country. Since March 29, 2004, the Irish Government was the first country in the Northern Hemisphere to ban smoking in all enclosed spaces, such as bars, restaurants, hospitals, offices etc. Some public buildings have now built a ‘Smoking Gazebo’ outside entrances to cater for smokers. Five European countries have adopted smoking bans since Ireland first pioneered the move. Scotland became the latest to ban smoking following Italy, Malta, Norway and Sweden (Wikipedia, 2006). There have been policies drawn in boardrooms and government entities to meet this public outcry.

Healthcare workers, especially nurses, are the pillars of health promotion in the community, and as the largest group of healthcare providers, nurses continue to be involved in efforts to increase public awareness about the effects of smoking. But despite this, a large percentage of nurses continue to smoke. According to Longo, Johnson, Kruse, Brownson and Hewett (2001), the smoking rate among nurses is similar to the smoking rate among women in general. In 1990-1991, 18.3 % of Registered Nurses (RNs) were current smokers, compared to 21% of females in the general population. Licensed Practical Nurses (LPNs) continued to smoke at higher rates than Registered Nurses: 38% versus 21.7% respectively (Bialous, Sarna,
Wewers, Froelicher, & Danao, 2005). In 2003, the median prevalence of current cigarette smoking among adults was 22.1% in the United States (MMWR, 2004). Healthcare providers have a special responsibility to provide a healthy environment for those around them.

Second hand smoke, also known as Environmental Tobacco Smoke (ETS), is a mixture of the smoke given off by the burning end of tobacco products (side stream smoke) and the smoke exhaled by smokers (mainstream smoke). According to the CDC (2001), secondhand smoke is associated with an increased risk for lung cancer and coronary heart disease in nonsmoking adults. An estimated 3,000 lung cancer deaths and more than 35,000 coronary heart disease deaths occur annually among adult nonsmokers in the United States as a result of exposure to secondhand smoke. According to the American Lung Association Gallup poll (2004), 95% of Americans, smokers and non-smokers, now believe companies should either ban smoking totally in the workplace or restrict it to separately ventilated areas. There has been an increasing demand from patients and employees to address hospital smoking. According to the Surgeon General’s (2006) report on secondhand smoke exposure in the workplace, smoke-free workplace policies are the only effective way to eliminate secondhand smoke exposure in the workplace. Separating smokers from nonsmokers, cleaning the air, and ventilating buildings cannot eliminate exposure (United States Department of Health and Human Services, 2006).

**Statement of the Problem**

Usually, the reason given for banning smoking in the workplace is to benefit non-smokers, and this is a valid and important reason, but the bans also have health benefits for smokers themselves. Smoke-free policies not only protect people from the long-term dangers of secondhand smoke, but they also help to reduce the incidence of heart and lung disease in smokers themselves (CDC, 2005). According to the American Lung Association (2004), cigarette smoking has been identified as the most important source of preventable morbidity and premature mortality worldwide. Chronic lung disease accounts for 73% of smoking-related conditions among current smokers. Even among smokers who have quit, chronic lung disease accounts for 50% of
smoking-related conditions. Employers have the choice to restrict smoking in the workplace or to implement a totally smoke-free workplace policy to protect its employees from second hand smoke.

**Significance of the Problem**

Many people experience decreased quality of life due to the adverse health consequences of tobacco use, and society will ultimately bear substantial direct and indirect economic costs from these diseases. A national health objective for 2010 is for all 50 states and the District of Columbia to have laws that restrict or prohibit smoking in public places and worksites (CDC, 2005). Epidemiologic studies have shown that people living or working in an environment polluted with secondhand smoke have a 30% increased risk of acute myocardial infarction (Sargent, Sheppard & Glantz, 2004). Direct medical expenditures attributed to smoking have risen since the early 1990s. In addition to direct medical expenditures, smoking results in lost productivity and potential life lost. According to the CDC (2005), smoking costs the United States over $167 billion each year in health-care costs including $92 billion in mortality-related productivity losses and $75.5 billion in excess medical expenditures. A smoking employee costs the employer at least $1,000 per year in total excess direct and indirect health care costs, compared with a similar nonsmoking employee. Some employers have been forcing smoking employees to pay higher premiums for medical coverage.

Research has shown that the ability to dramatically reduce the health and economic burden of tobacco use can be achieved by implementing proven strategies for smoking cessation. The Center for Disease Controls’ (2006) goal of comprehensive tobacco control programs is to reduce disease, disability, and death related to tobacco use by: a) preventing the initiation of tobacco use among young people, b) promoting quitting among young people and adults, c) eliminating nonsmokers’ exposure to secondhand smoke, d) identifying and eliminating the disparities related to tobacco use and its effects among different population groups.
Statement of Purpose

The purpose of this study is to determine whether there is a reduction in employees’ smoking rates following the introduction of a workplace-smoking ban, and whether the workplace-smoking ban has brought about a change in the employees smoking behavior.

Research Questions

The two research questions addressed in this study are:

1. Was there a decrease in cigarette consumption among healthcare employees in a hospital in north Florida after a workplace-smoking ban was implemented?
2. Did employees take advantage of the smoking cessation program offered by the hospital since the implementation of a workplace-smoking ban?

Operational Definitions

Smoking bans are government prohibitions or voluntary bans decided by establishment management on tobacco smoking in public or quasi-public indoor areas such as offices, restaurants and hotels, or even outdoor public areas such as parks and sports stadiums. For the purpose of this study, a workplace smoking ban means that in addition to the prohibition of smoking, which was the existing policy at a hospital in north Florida, the use of tobacco products will not be permitted anywhere on the campus of the hospital, including grounds and parking lots. This workplace-smoking ban was implemented on November 18, 2004.

For this research, a hospital employee is any individual working for a hospital in north Florida, either in a full-time or part-time capacity. The individual can be employed in any area of the hospital or its affiliate satellite offices around north Florida. Currently, there are about 2500 individuals employed by the hospital where the survey was taken.

Research indicates that smokers are more successful at quitting if they have help from a combination of methods including nicotine replacement therapies, prescription drugs, counseling and/or a network of family and friends. The hospital in north Florida has implemented a Smoking Cessation program for its employees. As part of the program, the hospital has agreed to pay for smoking cessation classes and
smoking cessation aids for any of their employees who would like to use implementation of the tobacco-free policy as an opportunity to quit smoking. The hospital established the smoking cessation program to assist its employees who were interested in smoking cessation. The program provided smoking cessation classes on site, reimbursement for smoking cessation classes or smoking cessation aids, such as nicotine replacement patch and medications, up to $300 for part-time or full-time employees. The program was put in started six months before the hospital implemented a workplace smoking ban and was in operation until six months after the implementation of the workplace smoking policy.

Theoretical Framework

The theoretical basis for this study is the Transtheoretical Model of Change (TTM) by Prochaska, DiClemente and Norcross (Prochaska, DiClemente and Norcross, 1992). The relationship between this model and the stated problem of smoking behavior change is that they both focus on the decision making of the individual. To ensure the success of a workplace smoking ban, primary focus should be on assisting employees to change their smoking behavior. TTM is based on the understanding that there are 6 stages individuals go through to change their risky behavior: pre-contemplation, contemplation, preparation, action, maintenance, and termination. The TTM recognizes that different individuals will be in different stages of change and that appropriate interventions must be developed for everyone. No two individuals will be prepared to change their behavior at the same time therefore smoking cessation interventions should be an ongoing program at any establishment. In using the TTM, an underlying premise is that it may take an individual several quit attempts before finally succeeding in smoking cessation. Before the implementation of a workplace smoking ban, the hospital must deliver a firm, unequivocal anti-smoking message, accompanied by a discussion of the risks associated with smoking and the benefits of quitting, discussion of personal reasons for continued smoking and barriers to quitting, and provision of written motivational materials. This step is the precontemplation stage of the TTM. Smoking cessation programs should understand that the passage through these stages is usually dynamic, characterized by recycling
through, repetition of, and regression to earlier stages over repeated cessation attempts until permanent cessation is finally achieved. Relapse is almost inevitable and becomes part of the process of working toward life-long change. It can be considered as the sixth stage of the cessation process since it occurs so frequently. It usually takes smokers several quit attempts before finally succeeding in smoking cessation.

The TTM has also been used in several risk behavior programs like exercise behavior, contraceptive use, dietary behavior, and alcoholic and drug rehabilitation programs.

**Assumptions**

The researcher made several assumptions about the data collected during the course of this study:

1. That respondent is aware of the danger of smoking to their health.
2. Respondents answer honestly to the survey.
3. No major change in smoking policy is expected by the time the survey is conducted.

**Summary**

When the Joint Commission on Accreditation of Health Care Organizations (JCAHCO) mandated smoke-free hospitals in 1993, it provided the opportunity for change that helped shape public debate and policy. Some healthcare facilities have taken the mandate one step further to initiate a tobacco free campus. A tobacco-free campus means that in addition to the prohibition of smoking, the use of tobacco products are not permitted anywhere on the campus of the facility, including grounds and parking lots. The goal of this study is to evaluate the effect of the workplace-smoking ban on tobacco consumption of employees. The results of this study will provide a means of measuring the effectiveness of a smoking ban in the health promotion of employees, and aid employees who are interested in smoking cessation.
CHAPTER TWO

REVIEW OF LITERATURE

This chapter will provide a review of literature that addresses smoking and its effect on smokers and non-smokers, as well as the environment. Concerns about the impact of second-hand smoke and the comfort of non-smokers have prompted most states to enact laws that severely restrict smoking in the workplace. Health risks associated with second hand smoke are becoming increasingly more apparent and are gaining more public attention. As such, more and more institutions are extending the workplace smoking ban to include the properties surrounding the buildings, and parking garages.

*The Smoking Ban*

Since both the Surgeon General (2006) and the CDC (2006) have released reports identifying environmental tobacco smoke as a cause of disease in non-smokers, workplace-smoking restrictions have proliferated. The review of literature will examine several studies published about the effects of these restrictions on the smoking habits of employees.

Farrelly, Evans, and Sfekas (1999), conducted a study for the purpose of estimating the impact of workplace smoking restrictions on the prevalence and intensity of smoking among all indoor workers and various demographic and industry groups. Detailed cross sectional data on worker self reported characteristics, smoking histories, and workplace smoking policies were used in multivariate statistical models to examine whether workplace-smoking policies reduce cigarette consumption. The database included a nationally representative sample from the tobacco use supplements to the September 1992, January 1993, and May 1993 Current Population Surveys of 97,882
indoor workers who were not self employed. The results of the study showed that having a 100% smoke-free workplace reduced smoking prevalence by 6% and average daily consumption among smokers by 14% relative to workers subject to minimal or no restrictions. Allowing smoking in some common areas lessened the impact of work area ban.

In a similar study, Fichtenberg and Glantz (2002) looked to quantify the effects of smoke-free workplaces on employee smoking, and compare these effects to those achieved through tax increases. The authors performed a systematic review with a random effects meta-analysis through Medline, Science Citation Index, Social Sciences Citation Index, Current Contents and PsychInfo; from reviews and references in research papers. Final inclusion was 26 studies from 24 papers of workplaces in the United States, Canada, Australia and Germany. Participants were employees in unrestricted and totally smoke-free workplaces. The results of the study showed a reduction in prevalence of smoking by 3.8%, and 3.1 fewer cigarettes smoked per day by a continuing smoker associated with a totally smoke-free workplace. According to the authors, achieving the same result with a tax increase would require a 47% ($0.76 to $3.05 per pack of cigarettes) tax increase of cigarettes in the United States and a 24% (€5.32 to €10.20 per pack of cigarette) increase in the United Kingdom. This loss in revenues explains why the industry fights so hard against legislation to ensure that workplaces become smoke-free. Both studies (Farrelly, Evans, & Sfekas, 1999; Fichtenberg & Glantz, 2002) concluded that smoke-free workplaces not only protect non-smokers from passive smoking but also encouraged smokers to quit or reduce their consumption.

Smoking is the largest modifiable risk factor for coronary disease (MMWR, 2006). Smoke-free work places substantially reduce the exposure to second hand smoke and the associated cardiovascular risks for passive smoking. A study by Ong and Glantz (2004) projected the cardiovascular health and economic effects of making all U.S. workplaces smoke-free after 1 year at a steady rate. The number of indoor smokers was estimated using the 2000 Occupational Employment Statistics Survey. One-year and steady-rate results were calculated using an exponential decline model. A Monte Carlo simulation was performed for a sensitivity analysis. The results of the
study shows the first year effect of making all workplaces smoke-free would produce about 1.3 million new quitters and prevent over 950 million cigarette packs from being smoked annually, worth about $2.3 billion in pre-tax sales to the tobacco industry. In one year, making all places smoke-free would prevent about 1500 myocardial infarctions and 350 strokes, and result in nearly $49 million in savings in direct medical costs. At steady-rate, 6250 myocardial infarctions and 1270 strokes would be prevented, and $224 million would be saved in direct medical costs annually. Making all U.S. workplaces smoke-free would result in considerable health and economic benefits within 1 year. Reductions in passive smoking would account for a majority of these savings.

The literature suggests that restrictive smoking policies at work may actually reduce over all smoking because they create environments that can alter the perceived difficulty of quitting. Smoking bans may eliminate ETS and contribute to overall reduction in smoking levels, but they may have the unintended consequences of relocating the problem elsewhere. A study by Parry, Platt, and Thomson (2000) looked at workplace smoking bans and the relocation of smoking at work. Evaluation of a Scottish university relied on a combination of qualitative and quantitative methods, including analysis of policy documentation, a full staff postal questionnaire, qualitative interviews with staff representatives and key members of the implementation process, and participant observation of staff seminars on the implementation of the new smoking policy. Results of the study suggest, while there has been a reduction in levels of smoking at work (23%), and quitting (6.5%) smoking, there has also been a relocation of smoking behavior from inside to outside university buildings since the ban was introduced. Over three quarters (76.8%) of all respondents reported an increase of smoking on university property (outside buildings) and over four-fifths indicated a noticeable increase in smoking specifically on entrances and steps to university buildings. The increased visibility of smokers has brought home to non-smokers some of the problems which dependent smokers face. It is felt that smokers should not be punished for their behavior, but assisted and supported in their efforts attempts to quit. The authors concluded that the high visibility of smokers following the ban raised awareness among non-smoking staff members about the problems faced by smokers.
And long term, heightened visibility and the raised awareness that it evokes among the staff members may assist in changing organizational attitudes to the provision of health intervention programs. This would provide a more acceptable, less punitive and more effective approach to health related behavioral change at work.

In health care settings, another aim of smoking policies is the reduction of smoking prevalence among health care professionals, to ensure that they give a good example by not smoking. A study by Strobl and Latter (1998) sought to explore the effects of a complete smoking ban in a large British teaching hospital on nurses’ smoking behavior, their views on the current policy and compliance with it. Questionnaires were distributed to a convenience sample of smokers and ex-smokers 9 months after the introduction of the smoking ban. A response rate of 64% (n=33) was achieved. Only three (9.7%) respondents were identified as ex-smokers (quit smoking after the ban). A slight reduction in workplace cigarette consumption was reported, but it was not statistically significant. The rejection of the smoking ban may have been associated with a feeling of not receiving enough support with quitting or anger about the managerial approach used for the introduction of the smoking ban. Nurses felt that they were not consulted or given enough preparation before the implementation of the ban. The authors concluded that the introduction of the smoking ban had failed to significantly reduce nurses’ reported cigarette consumption due to resistance and limited support for the policy among smoking nurses. These results were consistent with a study by Bloor, Meeson, and Crome (2006), which audited the effectiveness of a non-smoking policy in a mental hospital in the midlands of the U.K.; and investigated the impact of the policy on nursing staff smoking behavior and attitudes. The study used an anonymous questionnaire survey of all nursing staff within the hospital. Of the 156 questionnaires, 92 (58%) were returned; smokers, former smokers and those who had never smoked were equally represented. Most (75%) smoked 1-3 cigarettes while at work, while only 6.2% of respondents stated that they smoked more at work than elsewhere. Overall, a non-smoking policy was perceived as necessary by the nursing staff, but nurses in this study also felt strongly that smokers should have the right to smoke if they choose. The staff nurses in this study felt that the policy was not effective in motivating nurses to quit smoking and that not enough support was given to these
nurses. The authors view is that the policy may have produced a “victim subculture” among the smoking population that was met by a protective and empathic response from the non-smoking population.

**Nurse Managed Smoking Cessation Programs**

Smoking has been a major public health problem and has been reported as a major risk factor for cardiovascular disease (CVD) (MMWR, 2002). Nurses are the health care providers who have the most contact with patients. Since the implementation of smoking bans in hospitals, more and more smoking cessation programs are started while the patient is in the hospital. Nurse-led smoking cessation programs for inpatients have become increasingly popular. A research study by Chouinard and Robichaud-Ekstrand (2005), examined the effectiveness of a nursing inpatient smoking cessation program in individuals with cardiovascular disease (CVD). The purpose of this study was to evaluate a nurse-delivered inpatient smoking cessation program using the Transtheoretical Model (TTM) with follow-up to levels of readiness to quit smoking. Participants had to meet the following criteria for inclusion in the study: a) adult (18 years and older); b) hospitalized for CVD; c) smoker (having smoked at least one cigarette in the past month); d) ability to communicate French; e) local resident; f) telephone available at home; g) plan of hospital discharge to home; h) no mental or physical disabilities that would impede participation. A convenience sample composed of 168 patients with CVD was recruited from a cardiology unit within a regional tertiary hospital in the province of Quebec (Canada). Participants were grouped into three groups. The first group received inpatient counseling with telephone follow-up, the second group received inpatient counseling only, and the third group, the usual care group, received general information about smoking cessation. The results showed that telephone follow-up was most beneficial, particularly for participants who had started to smoke after hospital discharge. Thus, telephone follow-up permitted a better progression to ulterior stages of change, which ultimately led to higher smoking cessation rates.
Although nurses can make an important contribution to national cessation efforts, continued smoking among nurses has been identified as a barrier to interventions with patients. According to a study by Bialous et al. (2005), nurses have the same misconception about smoking cessation as the general public. The purpose of this study was to develop a national program to assist nurses in smoking cessation through an in-depth understanding of issues related to nurses’ attitudes towards smoking and quitting, and to explore nurses’ preferences for smoking cessation interventions. Eight focus groups were conducted in four states with nurses who were current or former smokers. Two focus groups; one with current smokers and the other with former smokers were conducted in each state. Each focus group had seven or eight participants. A total of 60 nurses participated in the eight focus groups. The results of the study showed the initiation to smoking for both groups to be in the teenage years. Most nurses continued to smoke through nursing school and identified the lack of support available in the schools as an additional barrier to smoking cessation. The myths and misconceptions of smoking were also explored including concern about nicotine therapy being as addictive as smoking. The reasons for quitting ranged from pregnancy to their children’s welfare or for the welfare of family members. There was a lot of guilt and shame experienced by nurses from family and friends who “assumed that nurses know better than to smoke”. Barriers to starting and finishing a cessation program successfully were irregular schedules, working mothers’ schedule, and lack of availability of resources in the workplace. Nurses’ patterns of addiction and their struggles to quit smoking were similar to what the general population experienced. At the end of the study, former smokers were very eager and enthusiastic about becoming ambassadors for smoking cessation with their patients.

The value of pregnancy as an intervention point for smoking cessation is being destabilized by high relapse rates in the postpartum period. Pregnancy is a motivational tool that nurses should seize as a starting point for smoking cessation. According to a study by Johnson, Ratner, Bottorff, Hall, and Dahinten (2000), smoking cessation interventions focusing on the prenatal period have failed to achieve long-term abstinence. The purpose of the study was to test a program to prevent smoking relapse in the postpartum period by comparing the rates of continuous smoking abstinence,
daily smoking, and smoking cessation self-efficacy in treatment and control groups. In the study, nurses provided face-to-face, in-hospital counseling sessions at birth, followed by telephone counseling over a span of six months. The target population was women who quit smoking during pregnancy and who delivered at one of five hospitals. The 254 participating women were interviewed 6 months after discharge and tested biochemically to determine smoking status. The results of the study showed that most respondents cited health of the unborn baby as the primary reason they quit smoking. Almost all (90%) said they intended to remain non-smokers postpartum. Although the intervention did not prove effective in total smoking abstinence, there was a significant decrease in daily smoking by participants in the treatment group. These findings are encouraging since it suggests that nurses can successfully intervene and assist smoking women in their commitment to smoking cessation. The study concluded that smoking cessation interventions focusing on the prenatal period failed to achieve long-term abstinence. Interventions can be strengthened if they are extended into the postpartum period. Smoking cessation during pregnancy should be followed-up in the postpartum period to prevent a relapse.

Parental smoking increases the risk of developing respiratory and other illnesses in children. According to a pilot study by Chan et al. (2005), the hospitalization of a sick child is identified as an educational opportunity for a family. It provides nurses the opportunity to influence parental smoking behavior and advance parents’ motivation to quit smoking. This study evaluated the effectiveness of a nurse delivered individualized motivational intervention (IMI) for parents of sick children attending outpatient clinics or admitted to pediatric wards of a major hospital in Hong Kong. Included in the study were parents of sick children (mother or father), who had smoked daily for at least the previous 7 days, were able to communicate in Chinese, and who lived together with their sick children. Eighty eligible subjects were recruited and randomized into the intervention and control group. Smoking status of participants was assessed after a month and showed the quit rate in the intervention group at 7.5% versus 2.5% for the control group. A total of 15% of the intervention group versus 10% of the control group decreased smoking consumption by half, and 20% of the intervention group versus 7% of the control group reported quit attempts in the past 30 days. The authors concluded
that a nurse-delivered motivational intervention seemed to be effective in helping resistant parents of sick children stop smoking.

**Theoretical Framework**

The theoretical basis for this study is the Transtheoretical Model of Change (TTM) (Prochaska, DiClemente, & Norcross, 1992), which has been the basis for developing effective interventions to promote health behavior change. The Transtheoretical Model, (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997), describes how people modify a problem behavior or acquire a positive behavior. The relationship between this model and this study of smoking behavior change is that they both focus on the decision making of the individual. The Transtheoretical Model is a model of intentional change. The TTM has been widely accepted and endorsed by researchers and clinicians working in the area of health behavior change. Although the model was developed for use with any health behavior change, it has been used extensively with smoking cessation to predict and promote long-term quitting. The TTM has been challenged recently in terms of its theoretical and methodological soundness as well as its utility for the development of stage-based interventions. TTM is based on the understanding that there are 6 stages individuals go through to change their risk behavior:

- precontemplation, the individual has no intention to take action within the next six months;
- contemplation, intends to take action within the next six months;
- preparation, intends to take action within the next 30 days;
- action, has changed overt behavior for less than 6 months;
- maintenance, has changed overt behavior for more than 6 months; and
- termination, overt behavior will never return, and there is complete confidence that one can cope without fear of relapse.

The health model, therefore, focuses on health promotion as well as disease prevention. Lifestyle habits exert a major impact on the quality of human health. During the past decade, there has been an enormous amount of information about smoking and its health risks, not just to smokers but also to the other person inhaling the
cigarette smoke. Even the Surgeon General has issued numerous warnings about the risks posed by cigarette consumption and second-hand smoke. In the latest release (CDC, 2002), even cigars have to label their products with this warning: “SURGEON GENERAL’S WARNING: Tobacco Smoke Increases the Risk of Lung Cancer and Heart Disease, Even In Nonsmokers.” Most smokers are knowledgeable about the dangers of smoking and potential outcome of their actions. Knowledge creates the precondition for change. But additional self-influences are needed to overcome the impediments to adopting new lifestyle habits and maintaining them.

The Transtheoretical Model makes no assumption about how ready individuals are to change. It recognizes that different individuals will be in different stages and that appropriate interventions must be developed for everyone. Preparation is the stage when the individual is most ready for a change. It is the job of the health promotion professional to help manipulate the environment in order to make it conducive to the desired behavior change, thus promoting the change. This is where policy changes take place. In the application of this element to the research study, the environment is the main focus. The goal of a smoke-free policy is to provide a safe and healthful workplace for all employees. Unfortunately the simple message of smoke-free can sometimes be misinterpreted to mean smoker-free or anti-smoker. Communication is very important to allay any misconceptions. It is of utmost importance to stress to smokers that the workplace is not trying to stigmatize smoking employees but rather offer available resources to help them quit smoking if they desire. Changing the environment and making it smoke-free further facilitates the way for the next stage, action. Action is when the smoker’s perceived pros should outweigh the perceived cons, if making an attempt at a positive behavior change such as smoking cessation. The maintenance stage is one that starts six months after the action stage and can last for several years. The behavior being changed is the key factor in determining how long this stage will last. It is in this stage that the self-efficacy of the individual is at its highest, especially when compared to the four preceding stages. Self-efficacy is the belief in the ability to cope with stressors and the capability to organize and execute the orders needed for goal attainment. This is the confidence in one’s ability to take action. Since the Transtheoretical Model is cyclical, the individual may relapse back several
stages instead of just one. The individual needs to be prepared for relapse by knowing exactly what to do should it occur. In using the Transtheoretical Model, an underlying premise is that it may take an individual several quit attempts before finally succeeding in smoking cessation. When all of these steps in health promotion are in place, smoking cessation can be successful. Initial planning and circulation of information about when a workplace ban will be implemented will prepare an individual to make the decision to quit smoking. This places smokers in the first step towards smoking cessation. The research conducted for this thesis takes place in a health care facility that is offering its employees reimbursement for expenses incurred in smoking cessation such as smoking cessation classes and smoking cessation aids in the form of prescription, counseling, medications and nicotine replacement patch. Education on the long-term cost of medical care with continued smoking is also stressed. The TTM is designed to develop individual programs for specific needs of individuals, and when interventions are individualized, the dropout rate is less.

The Transtheoretical Model was used in several studies for smoking cessation. A study by DiClemente, et al. (1991) tested the transtheoretical model of change in a series of stages through which smokers move as they successfully change their smoking habit. Subjects from Texas and Rhode Island volunteered for a research project on minimal interventions for smoking cessation and were recruited to represent four groups: precontemplators, contemplators, subjects who were prepared or ready for action, and action subjects. Subjects were randomly assigned to interventions stratified by stage. Subjects were screened by telephone for initial stage data and all interventions were done by mail or phone contact or both. Several tools were used to measure smoking stages such as the Smoking Abstinence Self-Efficacy (SASE), Perceived Stress Scale (PSS), Fagerstrom Tolerance Questionnaire (FTQ), Smoking Decisional Balance scale (SDB), and Smoking Processes of Change scale (SPC). Smoking history data collected include age of acquisition, parent and peer smoking patterns, number of previous quit attempts, as well as current level of smoking, confidence to be able to quit or maintain nonsmoking, current concerns about smoking cessation, and the Fagerstrom assessment questions. Results strongly support the stages of change model. All groups were similar on smoking history but differed
dramatically on current cessation activity. Stage differences predicted attempts to quit smoking and cessation success at 1- and 6-mo follow-up. Precontemplators were not considering quitting in the next 6 months. Contemplators were, on the other hand. As demonstrated in this study, the distinction is clearly relevant and supports reinstating a preparation stage of change between contemplation and action stages. The study concluded that the stage of change model provides a valuable and intriguing view of the process of change for smoking cessation. The current research strongly supports the contention of the transtheoretical model that stages and processes of change are the basic building blocks of the process of change.

Another study by Pallonen (1998), discusses the applicability of the central concepts of the Transtheoretical Model of Change (TTM) to the adolescent smoking problem. This study compares adolescent data to previously published adult smoking data. Questionnaires were administered in a high school setting and consisted of non-smokers, smokers and ex-smokers. A substantial part of the questionnaire consisted of TTM measures. Results of the study showed that according to the stage of change distributions, adolescent smokers appeared to be somewhat less prepared to quit than adults. Both adults and adolescents utilized identical cognitive and behavioral activities to change their smoking although teens' process use appears to differ from that of adults at each stage of change. According to the decisional balance measure, the pros of smoking among adults and teens exceeded the cons in early stages of change and then reversed once smokers took action to quit. The levels of temptations to smoke among adults and adolescents were almost identical at each stage. The author concluded that both age groups turned out to be remarkably similar in the Transtheoretical measures, and, except for the processes of change, both groups exhibited similar behavior at different stages of the smoking cessation process.

The TTM can also be used as a health education instrument for other health promotions. In a study by Chang (2006), the TTM was used to explore the mechanisms of health behavioral change to design an effective health educational instrument. The study has been carried out since 2003 among 200 subjects from an electric company in southern Taiwan. The seven health promotions being studied included: healthy diet, weight control, physical activity, reducing alcohol, smoking and betel nut consumption,
and health exam. The purpose of the study was to apply pretest results and the TTM to design seven self-help brochures with a Question and Answer (Q & A) and desk calendar functions. Results of the study showed that after 6 months of intervention, the post test survey revealed that 30% of the subjects needed very strong help, 48% with partial help and 13% with minor help from the brochures. According to the study results, at the beginning of this study, 10-20% of subjects were in the precontemplation, meaning they will not change their behaviors in 6 months. The TTM approach was very useful and used a multi-function health education instrument. The study result provides a useful health educational tool and references for developing more effective health promotion program at worksites.

Summary

This chapter provided the review of literature to support the study. There are numerous studies about smoking and the hazards of Environmental Tobacco Smoke (ETS), as well as smoking bans in the public and private sector. Longo et al. (2001) has established through literature that employees in workplaces with smoking bans have higher rates of smoking cessation compared to employees where smoking is permitted, but relapse is similar between these two groups of employees. Although there is a chance of relapse in smoking abstinence, the literature has addressed this as an acceptable stage of the Transtheoretical Model of change, which can still lead to successful smoking cessation. Health care workers, especially nurses, witness first hand the negative effects of smoking and are in the position to educate the public and lead smoking cessation interventions successfully. However, before nurses can lead others to quit, they need to be motivated themselves to quit smoking, and smoking habits of nurses have hindered this objective. Studies have suggested that nurses feel that most hospital smoking policies are not effective in motivating nurses to quit smoking because of lack of support given to nurses who smoke (Bloor, Meeson & Crome, 2006)), and due to resistance and limited support for the policy among smoking nurses and their unwillingness to enforce it (Strobl & Latter, 1998)

In conclusion, the Transtheoretical Model of Change has been used very successfully in smoking cessation. Overall, this model explains the stages that people
go through in order to change behavior, and describes how a workplace-smoking ban
can decrease cigarette consumption of employees and enhance smoking cessation
among health care workers.
CHAPTER THREE

METHODOLOGY

This chapter will discuss the methodology used in collecting and analyzing data to study the effects of a workplace-smoking ban on cigarette consumption of employees. Description of the study design, setting, sampling plan, instruments, procedure, and data analysis will be outlined. Institutional Review Board (IRB) procedures and protection of privacy of respondents will also be addressed.

Design

This is a quantitative, descriptive study that aims to measure the change in smoking habits of employees after the implementation of a workplace-smoking ban. The study will be retrospective since it measures the change in smoking behavior of employees before and after the implementation of a workplace-smoking ban.

Setting

The setting for this study is a hospital in north Florida that imposed a total smoke-free policy around its property including garage and parking lots on November 28, 2004. The hospital currently employs approximately 2500 full-time and part-time personnel. The hospital is one of two hospitals in a city with a population of approximately 250,000.

Population and Sample

The subjects in this study are willing employees (full-time and part-time) of a hospital in north Florida. The participants are at least 18 years of age, male or female, with no regard to educational attainment, area of work, or race/ethnicity. Respondents’
demographics were collected and recorded for data analysis. The sample size was 216 hospital employees.

**Instruments**

A modified California Tobacco Survey (CTS) (2002) was used as an instrument to determine tobacco use prevalence, exposure to environmental tobacco smoke, knowledge and attitudes about smoking, and smoking cessation behavior. The California Tobacco Survey is conducted approximately every three years through contracts with the University of California, San Diego (UCSD) and Westat, Inc. to measure changes in attitudes and behaviors in the California population. The 2002 CTS was the sixth in a series of cross-sectional studies to collect information about tobacco use and behaviors among California adults and teenagers. Included in the survey is demographic information for the respondents such as age, gender, educational attainment, race/ethnicity, and job title/description. Questions addressed relate to smoking prevalence, knowledge about smoking cessation program availability, smoking behavior changes before and after the implementation of a smoke-free policy, and attitudes of employees about smoking restriction.

**Procedure**

In reaction to pressure from both patients and hospital staff, a hospital in north Florida stepped up to the smoking challenge. On November 18, 2004, the 28th Great American Smoke-Out Day, an event organized nationwide by the American Cancer Society, this hospital in north Florida implemented a smoking ban around its property. Although it is not the first hospital to ban smoking, it is one of the two largest local healthcare providers in the area that has chosen to become a tobacco-free campus. A tobacco-free campus means that in addition to the prohibition of smoking, the use of tobacco products will not be permitted anywhere on the campus including grounds and parking lots. As such, smokers have to face a longer distance to smoke than just going outside their building. The hospital established smoking cessation classes for its employees who were interested in quitting, and agreed to pay for the classes and for
smoking cessation aids for any of their employees who wanted to use the tobacco-free policy as an opportunity to quit smoking.

After obtaining approval for conducting the study from the Florida State University (FSU) Institutional Review Board (IRB), the study was initiated. A survey questionnaire prepared by the researcher was sent out by the Human Resources department of the participating hospital. The results were provided to the researcher, as pre-existing data, for this study. Full confidentiality of respondents was protected and secured by the hospital, and consent was implied by answering the questionnaire. The study was done to measure any changes in the smoking behavior of participants since the hospital implemented a smoking ban within its property. Data received was analyzed and results published only as aggregate data.

**Protection of Privacy**

Prior to collecting pre-existing data, the researcher obtained approval from the Florida State University (FSU) IRB. During data collection, the participating hospital assigned numbers to survey questionnaires and kept completed surveys secure to ensure privacy of respondents. Survey answers were shared by the hospital with the researcher as pre-existing data. Strict confidentiality was maintained at all times following privacy policies of FSU. No names were collected from respondents and completed questionnaires were kept in a locked room in a secure area until data analysis by the researcher and statistician. At the end of the study, all data was returned to the hospital and will remain secure in the Human Resource office.

**Data Analysis**

The study was analyzed using descriptive statistics to describe and synthesize the data. An analysis was developed to determine whether there is a significant relationship between the changes in the subjects’ smoking behavior before and after the workplace-smoking ban. Selected inferential tests were used to determine smoking behavior before and after the smoking ban such as Pearson’s Correlation Coefficient, Wilcoxon Rank Test using SPSS 14.0, and Excel software.
Summary

This chapter presented the methodology utilized in this study. Described in this chapter were the design, setting, sample, protection of human rights, instrument, procedure and data analysis. The study is a quantitative, descriptive study, as well as a retrospective study since it measured the change in smoking behavior of employees before and 18 months after the implementation of a workplace non-smoking policy. Sample of respondents was full time or part-time employees of a hospital in north Florida who were at least 18 years old. Survey questionnaire used was derived from the 2002 California Tobacco Survey, developed by the University of California at San Diego with the survey conducted by Westat Research and contracted by the State of California’s Department of Health Services, to plan and assess the effectiveness of smoking cessation strategies. Data gathered were used to determine the effects of a workplace smoking ban on smoking behavior of employees before and after the ban was imposed.

Survey questionnaire was made available to employees of participating hospital through email for 2 weeks and responses were faxed, emailed or dropped off at the Human Resource department. No identifying information of employee was collected in the study. Protection of respondent’s privacy was maintained at all times.

Data analysis was done through descriptive statistics using SPSS 14.0 and Excel software.
CHAPTER FOUR

RESULTS

This study addressed the increasing demand for public smoking bans in response to the Surgeon General’s Annual Report regarding the public health concerns of involuntary smoking (Department of Health and Human Services, 2006). Previous studies have been conducted on workplace smoking bans but few have addressed the recent workplace bans in the healthcare setting.

Results of an employee smoking survey from a hospital in north Florida were used as pre-existing data for this study. Respondents’ confidentiality was maintained through unidentifiable questionnaires by the hospital. The survey questionnaire was made accessible to hospital employees for 2 weeks, and the anonymous responses were forwarded to the Human Resource Department.

Description of Sample

A total of 216 smoking and non-smoking employees responded to the study. The following tables provide a description of the respondents.

Table 1 shows that of the 216 respondents in the survey, 81% (n=175) were non-smokers and 19% (n=41) were smokers before the total workplace ban was imposed. After the survey, there was a total reduction in smoking behavior by 34% : 6% (n=13) reduction in smoking while 0.5% (n=1) respondent increased in smoking (Table 1a). There were 40 smokers and 176 non-smokers after than ban for a total of 216 respondents.
Table 1 – Smoking History before the Ban

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>19%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>No</td>
<td>175</td>
<td>81%</td>
<td>81%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Table 1a – Smoking Behavior Change after the Ban

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>% of Total Population</th>
<th>Percent Change of Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in smoking</td>
<td>13</td>
<td>6.0%</td>
<td></td>
</tr>
<tr>
<td>New Smoker</td>
<td>1</td>
<td>0.5%</td>
<td></td>
</tr>
<tr>
<td>No change in Smokers</td>
<td>26</td>
<td>12.0%</td>
<td>-34%</td>
</tr>
<tr>
<td>Sub-total Smokers</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-smokers</td>
<td>176</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>Total Respondents</td>
<td>216</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>


Table 2 – Gender Classification

<table>
<thead>
<tr>
<th>Gender</th>
<th>No of Respondents</th>
<th>Non-Smokers</th>
<th>Smokers</th>
<th>% of Total</th>
<th>No Change After Ban</th>
<th>New Smoker</th>
<th>Quiting After Ban</th>
<th>Reducing After Ban</th>
<th>Smokers w/ No Change After Ban</th>
<th>% Total Smokers w/ No Behavior Change</th>
<th>% Smoker Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>160</td>
<td>138</td>
<td>22</td>
<td>54%</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>37%</td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>37</td>
<td>19</td>
<td>46%</td>
<td>12</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>12</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>175</td>
<td>41</td>
<td>100%</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>15</td>
<td>27</td>
<td>66%</td>
</tr>
</tbody>
</table>

Table 2 describes the gender classification of respondents and their smoking behavior before the total workplace smoking ban and 18 months after the smoking ban was implemented. The sample of 216 respondents was 74% (n=160) female and 26% (n=56) male. Of the total population, there were 10% female smokers and 9% male smokers. The percentage of the smoking population before the workplace ban was 54% (n=22) female versus 46% (n=19) male. The smoking population after the ban was 37% (n=15) female versus 29% (n=12) male, with 32% reduction/quit rate for females (1 started smoking after the ban was implemented), and 37% for males, for a total of 34% reduction in total smoking rate.

Figure 1 shows the smoking frequency of respondents. Of the 216 respondents, 81% (n=175) were non-smokers, 17% (n=37) smoked every day and 2% (n=4) smoked some days.

Figure 2 describes the smoking behavior of the smokers after the smoking ban. Of the 41 smokers, 30% (n=13) reduced their cigarette consumption, 5% (n=2) quit smoking, 63% (n=26) had no change in smoking behavior and 2% (n=1) increased smoking, for a 34% total change in smoking behavior after the ban.

Table 3 describes the educational level of respondents. The educational level was distributed as: 10% (n=21) no college education, 50% (n=107) some college, and 41% (n=88) baccalaureate degree or more. The change in smoking behavior before and after the ban was: no college 15% (n=6) before the ban versus 7% (n=3) after the ban with a reduction of 50%; some college 61% (n=25) before the ban versus 46% (n=19) after the ban and 1 increase in smoking for a total smoking reduction of 24%; and baccalaureate degree and beyond 24% (n=10) before the ban versus 12% (n=5) after the ban for a 50% reduction in smoking. Respondents with some college had the highest percentage of smokers and the lowest reduction in smoking in the classification. The total change in smoking behavior for the sample was 34%.
Figure 1 – Smoking Frequency Before the Ban

- Everyday 17%
- Some days 2%
- Not at all 81%

Figure 2 – Smoking Behavior Change After the Ban

- No Change in Smoking 63%
- Increased smoking 2%
- Reduced smoking 32%
- Quit Smoking 5%
Table 4 describes the age classification of respondents. Age was distributed as: 19–30 years old 14% (n=31), 31-40 years old 19% (n=42), 41-50 years old 35% (n=75), 51-60 years old 27% (n=58), and 61-70 years old 5% (n=10). The change in smoking behavior before and after the ban was: 19–30 years old 15% (n=6) smokers before the ban versus 5% (n=2) after the ban with a 67% reduction; 31-40 years old 22% (n=9) before the ban versus 20% (n=8) after the ban with 1 started smoking after the ban, for a reduction of 11%; 41-50 years old had the highest percentage of respondents at 41% (n=17) before the ban versus 27% (n=11) after the ban for a reduction of 35%; 51-60 years old 20% (n=8) before the ban versus 12% (n=5) after the ban for a reduction of 38%; 61-70 years old 2% (n=1) before the ban versus no reduction in smoking after the ban. Respondents aged 19 – 30 had the highest percentage of reduction in smoking after the ban. The total change in smoking behavior of the sample was 34%.

Table 3 – Educational Level

<table>
<thead>
<tr>
<th>Education</th>
<th>No of Respondents</th>
<th>Non-Smokers</th>
<th>Smokers Before Ban</th>
<th>% of Total Smokers Before Ban</th>
<th>No Smokers</th>
<th>Smokers Quiting After Ban</th>
<th>Smokers Reducing After Ban</th>
<th>Smokers w/ No Change After Ban</th>
<th>% Total Smokers w/ No Behavior Change</th>
<th>% Smoker Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>No College</td>
<td>21</td>
<td>15</td>
<td>6</td>
<td>15%</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>7%</td>
<td>-50%</td>
</tr>
<tr>
<td>Some College</td>
<td>107</td>
<td>82</td>
<td>25</td>
<td>61%</td>
<td>18</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>19</td>
<td>46%</td>
</tr>
<tr>
<td>Bacalaureate at and Beyond</td>
<td>88</td>
<td>78</td>
<td>10</td>
<td>24%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>175</td>
<td>41</td>
<td>100%</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>27</td>
<td>66%</td>
</tr>
</tbody>
</table>

Table 4 – Age Classification

<table>
<thead>
<tr>
<th>Age Class</th>
<th>No of Respondents</th>
<th>Non-Smokers</th>
<th>Smokers Before Ban</th>
<th>% of Total Smokers Before Ban</th>
<th>No Change After Ban</th>
<th>Smokers Quiting After Ban</th>
<th>Smokers Reducing After Ban</th>
<th>Smokers Quiting and Reducing After Ban</th>
<th>Smokers w/ No Change After Ban</th>
<th>% Total Smokers w/ No Behavior Change</th>
<th>% Smoker Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-30</td>
<td>31</td>
<td>25</td>
<td>6</td>
<td>15%</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>31-40</td>
<td>42</td>
<td>33</td>
<td>9</td>
<td>22%</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>41-50</td>
<td>75</td>
<td>58</td>
<td>17</td>
<td>41%</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>11</td>
<td>27%</td>
</tr>
<tr>
<td>51-60</td>
<td>58</td>
<td>50</td>
<td>8</td>
<td>20%</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>12%</td>
</tr>
<tr>
<td>61-70</td>
<td>10</td>
<td>9</td>
<td>1</td>
<td>2%</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>175</td>
<td>41</td>
<td>100%</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>15</td>
<td>27</td>
<td>66%</td>
</tr>
</tbody>
</table>


Table 5 describes smoking behavior of respondents according to job classification. Job classification was distributed as: administration 9% (n=20), clerical staff 9% (n=20), licensed practical nurses (LPN) 4% (n=9), nurse support technicians 15% (n=32), registered nurses (RN) had the highest percentage of respondents in the survey at 36% (n=78), and other respondents like pharmacists, physical therapists, maintenance, and financial analysts, 26% (n=57). The change of the smoking behavior before and after the ban was: administration 5% (n=2) smokers before the ban versus 2% (n=1) after the ban with a 50% reduction; clerical staff 12% (n=5) before the ban with no change or reduction after the ban since 1 started smoking after the ban; LPNs 5% (n=2) before the ban with no reduction in smoking; nurse support technicians, 17% (n=7) before the ban versus 7% (n=3) after the ban for a reduction of 57%; RNs 32% (n=13) before the ban versus 15% (n=6) after the ban for a 54% reduction; and others 29% (n=12) before the ban versus 24% (n=10) after the ban for a reduction of 17%. Nurse support techs had the highest percentage of smoking behavior reduction among
the respondents followed by the RNs and administration staff. The total change in smoking behavior was 34%.

**Table 5 – Job Classification**

<table>
<thead>
<tr>
<th>Position</th>
<th>No of Respondents</th>
<th>Non-Smokers Before Ban</th>
<th>Smokers Before Ban</th>
<th>% of Total Smokers Before Ban</th>
<th>No Change After Ban</th>
<th>New Smoker</th>
<th>Smokers Quiting After Ban</th>
<th>Reducing After Ban</th>
<th>Smokers w/ No Change After Ban</th>
<th>% Total Smokers with No Behavior Change</th>
<th>% Smoker Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin</td>
<td>20</td>
<td>18</td>
<td>2</td>
<td>5%</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Clerical Staff</td>
<td>20</td>
<td>15</td>
<td>5</td>
<td>12%</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>12%</td>
</tr>
<tr>
<td>LPN</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>5%</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Nurse Support Tech</td>
<td>32</td>
<td>25</td>
<td>7</td>
<td>17%</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>RN</td>
<td>78</td>
<td>65</td>
<td>13</td>
<td>32%</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>15%</td>
</tr>
<tr>
<td>Others</td>
<td>57</td>
<td>45</td>
<td>12</td>
<td>29%</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>175</td>
<td>41</td>
<td>100%</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>13</td>
<td>15</td>
<td>27</td>
<td>66%</td>
</tr>
</tbody>
</table>


Table 6 describes the respondent’s race/ethnicity and their smoking behavior before and after the smoking ban. Race/ethnicity was distributed as: Asian/Pacific Islander 4% (n=9), Black/African American 26% (n=56), Caucasian/White, with the highest percentage of respondents at 68% (n=146), Hispanic/Latino 1% (n=2), Native American/Alaskan Native 0.5% (n=1), and others 1% (n=2). The change of the smoking population before and after the ban was: Asian/Pacific Islander 2% (n=1) smoker before the ban versus no smokers after the ban with 100% reduction; Black/African Americans 24% (n=10) before the ban versus 17% (n=4) after the ban since 1 started smoking after the ban, for a reduction of 30%; Caucasian/White 71% (n=29) before the ban versus 49% (n=20) after the ban with a 31% reduction in smoking; Hispanic/Latino and Alaskan/Native American had no smokers (n=0); and others 2% (n=1) smokers
before the ban versus no smokers after the ban with 100% reduction. The total change in smoking behavior was 34%, with 5% (n=2) quit smoking after the ban.

Table 6 – Ethnicity

<table>
<thead>
<tr>
<th>Position</th>
<th>No of Respondents</th>
<th>Non-Smokers</th>
<th>% of Total Smokers Before Ban</th>
<th>% Total Smokers</th>
<th>Smokers Quitting After Ban</th>
<th>Smokers Reducing After Ban</th>
<th>Smokers w/ No Change After Ban</th>
<th>% Total Smokers with No Behavior Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian/ Pacific Islander</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Black/ African American</td>
<td>56</td>
<td>46</td>
<td>10</td>
<td>24%</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Caucasian/ White</td>
<td>146</td>
<td>117</td>
<td>29</td>
<td>71%</td>
<td>20</td>
<td>0</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Hispanic/ Latino</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Native American/ Alaskan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>175</td>
<td>41</td>
<td>100%</td>
<td>26</td>
<td>1</td>
<td>2</td>
<td>13</td>
</tr>
</tbody>
</table>


This section discusses the relationship between demographics and smoking behavior of employees before the ban, and answers the research questions asked in the study. Table 7 summarizes the relationship between demographics and smoking behaviors of employees before the ban. Demographic factors were tested using Pearson’s correlation to determine if there is a relationship between these factors and smoking behavior. The results showed that a weak correlation exists between smoking behavior to age and highest education attained therefore we are unable to reject the statement that there is no relation of these variables to smoking behavior before the ban. But since the relationship that exists is weak, we cannot conclude that it is a factor in smoking behavior. However, in the other factors like gender, ethnicity, and job
classification, the value of the variables did not show a relationship with smoking behavior so we can reject the statement that there is a relationship between these variables and smoking behavior and conclude that no relationship exists between them.

Table 7 - Study of Demographic Factors using Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th></th>
<th>Smoking Behavior Before ban</th>
<th>Smoking Behavior After Ban</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>sex of respondents</strong></td>
<td>Pearson Correlation 0.22**</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.00</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>N 216.00</td>
<td>41.00</td>
</tr>
<tr>
<td><strong>highest education attained</strong></td>
<td>Pearson Correlation 0.17*</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.02</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>N 216.00</td>
<td>41.00</td>
</tr>
<tr>
<td><strong>age in years</strong></td>
<td>Pearson Correlation 0.05</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.48</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>N 215.00</td>
<td>41.00</td>
</tr>
<tr>
<td><strong>Race or Ethnicity</strong></td>
<td>Pearson Correlation -0.04</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.57</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>N 216.00</td>
<td>43.00</td>
</tr>
<tr>
<td><strong>Position at TMH</strong></td>
<td>Pearson Correlation -0.01</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.83</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>N 216.00</td>
<td>41.00</td>
</tr>
<tr>
<td><strong>Smoking Behavior Before Ban</strong></td>
<td>Pearson Correlation 1.00</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.46</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>N 216.00</td>
<td>41.00</td>
</tr>
<tr>
<td><strong>Smoking Behavior After Ban</strong></td>
<td>Pearson Correlation 0.11</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 0.46</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>N 41.00</td>
<td>41.00</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Research Question 1

Research question 1 asked if there was a decrease in the smoking behavior of employees after a total workplace smoking ban was implemented. The survey was conducted 18 months after the implementation of a total workplace non-smoking policy.

Table 8 reflects this change in the smoking behavior of employees after the implementation of a workplace non-smoking policy. Before the implementation of this policy, 19% (n= 41) of the total respondents were classified as smokers and 81% (n= 175) were classified as non-smokers. Results of the study show that within the smoking population (n = 40) after the ban, there was a 32% (n=13) reduction in cigarette consumption, 2% (n=1) started smoking after the ban, and 66% (n=26) had no change in smoking behavior. Total reduction in cigarette consumption was 34%. A smoking behavior change is reflected as a cessation of smoking and a reduction in cigarette consumption. The 5% (n=2) that quit smoking will be reflected as a non-smokers after the ban, for a total of 176 non-smokers after the ban.

In order to test the significance between the mean of the respondents’ smoking behavior before the ban and their behavior after the ban, a nonparametric Wilcoxon z-test was performed. This nonparametric test was used since the variables are closely-related and that the sample size of smokers is quite small compared to the total respondents. The difference between before and after the ban was obtained and run through the test. The focus was on the 41 smokers and the 14 who responded that they have changed their smoking behavior as a result of the smoking ban. Based on the results (Table 9), it shows that the Wilcoxon z statistics (-1.543) is statistically significant at 95% confidence interval since it is higher in absolute value than the critical value (0.123). Thus, the null statement that the means before and after are equal is rejected. Therefore, we can conclude from the results that the impact of the ban has significantly changed the smoking behavior of smokers by 34%. Of the 41 smokers, 34% said that they have reduced their smoking, with 5% quitting smoking. Results of the Wilcoxon test are shown on Table 9.
Table 8 – Change in Smoking Behavior of Employees Before and After the Ban

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>No</td>
<td>175</td>
<td>81%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in smoking</td>
<td>13</td>
<td>33%</td>
<td>35%</td>
</tr>
<tr>
<td>New Smoker</td>
<td>1</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>No change in Smoking</td>
<td>26</td>
<td>65%</td>
<td>68%</td>
</tr>
<tr>
<td>Sub-total (Smokers After Ban)</td>
<td>40</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Sub-total (Non-smokers)</td>
<td>174</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit smoking</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Participating Hospital Employee Smoking Survey, 2006
Table 9 - Smoking Behavior Before and After the Ban using Wilcoxon z-test

<table>
<thead>
<tr>
<th>Smoking behavior after ban - Smoking history before ban</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Ranks</td>
<td>25*</td>
<td>19.5</td>
<td>487.5</td>
</tr>
<tr>
<td>Positive Ranks</td>
<td>14**</td>
<td>20.89</td>
<td>292.5</td>
</tr>
<tr>
<td>Ties</td>
<td>2***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Smoking behavior change after ban < Smoking history before ban
** Smoking behavior change after ban > Smoking history before ban
*** Smoking behavior change after ban = Smoking history before ban

Test Statistics (b)

<table>
<thead>
<tr>
<th>Smoking behavior after ban - Smoking behavior before ban</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.543*</td>
<td>0.123</td>
</tr>
</tbody>
</table>

* Based on positive ranks.
** Wilcoxon Signed Ranks Test

Research Question 2

Research question 2 asked if the employees took advantage of the smoking cessation program offered by the hospital 6 months before and 6 months after the smoking policy was implemented. The study showed that only 5% (n=2) of the respondents took advantage of the smoking cessation program offered by the hospital, with 50% (n=1) successfully stopped smoking and the other 50% (n=1) reduced cigarette consumption. Although only 2 of the respondents took advantage of this program, the results showed a positive change in smoking behavior. The smoking cessation program was managed by the Human Resources Department and offered smoking cessation classes in conjunction with the American Lung Association, and
offered employees reimbursement for expenses incurred for smoking cessation aids like Nicotine Replacement Patch (NRT), medications (i.e. Wellbutrin, Chantix) and other prescribed aids. When asked about why they did not take advantage of the smoking cessation program, respondents mentioned reasons like unavailability during hours of classes, cancellation of classes, the need for more classes and their readiness to quit smoking. The data shows that the positive change in smoking behavior was not a result of the cessation programs but was likely the result of the employee’s inaccessibility to smoke on campus.

**Summary**

This chapter analyzed the results of a survey of smoking behavior of employees before and 18 months after a workplace smoking policy was implemented in a hospital in north Florida. The first research question addressed in this chapter was whether the workplace smoking ban had brought about a change in the smoking behavior of employees. The significance between the respondents’ smoking behavior before and after the smoking ban was tested using the Wilcoxon rank test. Results of the test showed that the smoking change before and after the ban was statistically significant at 95% confidence interval. We can therefore conclude that the smoking ban has significantly changed the smoking behavior of some employees. Demographic data was analyzed using Pearson’s Correlation to test the relationship of demographics to smoking behavior before and after the ban. Results showed a weak relationship between smoking behaviors to age and highest education attained, and no relationship between gender, ethnicity and job classification to smoking behavior.

The other research question addressed in this chapter was whether the employees availed of the smoking cessation program offered by the hospital. Results of the survey showed that the positive change in smoking behavior was not a result of the cessation programs since only 5% (n = 2) of respondents enrolled in the program. The positive smoking change was likely the result of the employee’s inaccessibility to smoke on campus. Reasons cited for not enrolling in the cessation program were unavailability during hours of classes, cancellation of classes, the need for more classes, and their readiness to quit smoking. The total change in smoking
behavior was 34%, with 5% (n=2) of the respondents able to quit smoking after the ban. Sixty-six percent of the total respondents had no change in smoking behavior.
CHAPTER FIVE

DISCUSSION

The purpose of this study was to determine whether there was a reduction in employees’ smoking rates following the introduction of a workplace-smoking ban, and whether the workplace-smoking ban brought about a change in the smoking behavior of employees. Smoking survey questionnaires were released to employees of a hospital in north Florida to evaluate the effectiveness of the workplace smoking policy that was implemented 18 months prior. A response rate of almost 9% (n=216) of smoking and non-smoking employees was received within the 2 week period that the survey was available to hospital employees on the hospital website. Of the total respondents, 81% (n = 175) were smokers and 19% (n = 41) were non-smokers. This chapter will discuss the study findings, limitations and recommendations for future studies.

Discussion of Results

The results of the study show that there was a 34% reduction in smoking among employee smokers after the implementation of a workplace smoking policy. This is a positive change in smoking behavior since smoking and secondhand smoke have been linked to cardiovascular and respiratory diseases, as well as allergies like asthma. The findings of this study show a change in smoking behavior of employees before and after a workplace smoking ban was implemented. This is a very important finding since there is an increasing demand for smoking restrictions in the workplace and it is important to have a smoking cessation program in place before policies are implemented to steer smoking employees in a positive and non-judgmental approach to smoking cessation.
In a hospital setting, employees are thought to be more knowledgeable about the health risks posed by smoking but interestingly, results of this study showed a distinct similarity in the reduction rates of smoking prevalence and cigarette consumption after a workplace smoking ban was implemented when compared to previous studies done in non-healthcare settings.

**Research Question 1**

1. Was there a decrease in cigarette consumption among healthcare employees in a hospital in north Florida after a workplace-smoking ban was implemented?

Results of the study showed that there was a reduction in cigarette consumption of employees reported after a workplace smoking ban was implemented. This finding was statistically significant according to the Wilcoxon z-test. Similar findings of this decrease have been consistently reported (Farrelly et al 1999, Fichtenberg et al 2002, Parry et al 2000, Longo et al 2001) but there have not been studies on healthcare settings in Florida in the past five years. This finding is relevant for this study. Although only 5% of the smokers quit, there was a 32% reduction in smoking consumption, while only 1 respondent (5%) reported an increase in cigarette consumption after the ban. However, there was no mention of the ban contributing to increased consumption. Overall, this represents a positive change in smoking behavior. The relationship of smokers to demographic factors was also tested using Pearson’s Correlation coefficient and results showed a weak relationship in age (at 0.05 level of significance, 2- tailed) and education (at 0.01 level of significance, 2- tailed). However, demographic factors like gender, job classification, and ethnicity are not determinants of smoking behavior.

**Research Question 2**

2. Did employees take advantage of the smoking cessation program offered by the hospital since the implementation of a workplace-smoking ban?

Although the smoking cessation program was put in place by the hospital 6 months before the implementation of a workplace smoking policy, and kept 6 months
after the ban, only 5% of the smokers said that they enrolled in the program. Consistent with previous findings, reasons cited for not enrolling in this program were time constraints imposed by schedules (Bialous et al 2004), unavailability of classes at convenient times, cancellation of classes due to low enrollment as well as the readiness of an individual to quit smoking. Although only a minimal number of smokers enrolled in the program, the rate of progress toward successful cessation was higher if a smoker reported multiple related factors like the availability of smoking cessation support and cessation aids (Pierce, Gilpin and Farkas, 1997).

This low rate of enrollment in the smoking cessation program is consistent with previous studies that addressed this baffling public health issue. According to Hennrikus et al (2002), although reasonably effective programs are available to help smokers quit, relatively few participate in them. Approaches to improving participation in these programs were incentives for participation and cessation. The rate of enrollment in programs offering financial incentives was twice as much as the rate in worksites with no incentives. Interestingly, participation in cessation programs through financial incentives did not improve cessation outcomes (Hennrikus et al., 2002). Behavior modification and employee motivation to quit appear to be the most effective method of smoking cessation.

**Implications for Nursing**

As primary health care providers, nurse practitioners are in a prime position to intervene with tobacco dependence of patients and their families. Asking about smoking at every opportunity, and placing visual reminders and a permanent progress card are means of identifying smokers. Inquiring at every visit conveys the message that smoking status is as significant as the vital signs that are checked at each visit. The TTM proposes that an individual progresses through stages of behavioral change in the process of developing a health promotion behavior. Asking about their smoking status is a means of determining readiness to quit. Health care providers are uniquely positioned to help smokers in the difficult challenge of smoking cessation.

According to the TTM, the environment plays a major role in an individual’s readiness to quit smoking. Workplace smoking should be addressed in smoking
cessation since most people spend about 8 – 12 of their waking hours at work every day. In order to successfully implement a smoking cessation policy at work, there should be a smoking cessation program in place. Although the study did not show a large participation in the smoking cessation program, other studies did show this to be a positive force in smoking cessation (Hennrikus et al., 2002).

Although smoking restrictions in the workplace are popular, it is important to ensure good communication with everyone who will be affected since there are many anxieties associated with the introduction of the policy. Help should be available to employees who would like to quit through behavioral and pharmacological intervention and support must be given to the individual who must abstain from smoking on the premises during work or hospital stay. Nurses have traditionally been educators and this skill can be tapped to full advantage by placing the smoking cessation program under the supervision of the employee health nurse, preferably a nurse practitioner who is trained in smoking cessation counseling and can dispense medications to candidates for smoking cessation. Smoking cessation services needs to include access to individual counseling, behavior modification and pharmacotherapy. Because of the chronic nature of smoking and the potential for relapse, it is imperative that classes be offered regularly throughout the year with support and follow-up through emails or telephone counseling. Although most employees visiting employee health services are not seeking smoking cessation assistance, the first step in treating tobacco use and dependence is to identify tobacco users. Smoking cessation programs at the worksite can be both convenient and a source of support.

The Transtheoretical model can be used as a framework for the smoking cessation program of the hospital since it has been used extensively in behavior modification and, therefore, is appropriate for smoking cessation. The TTM maintains that there are 6 stages of change that an individual goes through to overcome an undesirable behavior. Precontemplation describes the stage where an individual has a problem, whether he acknowledges it or not, but has no intention to change it. In smoking cessation, this person would be smoking and not considering quitting any time in the foreseeable future. An individual enters the stage of Contemplation when he or she becomes aware of a desire to change a particular behavior. This stage describes a
number of smokers, who think about quitting but lack sufficient commitment to change their behavior. The Preparation stage of the Model indicates not only a desire to change, but also evidence of commitment to make that change in the near future, traditionally within the next 30 days. Someone in the Preparation Stage of Change for smoking cessation researches and seeks information about smoking cessation programs, makes a few phone calls inquiring about schedule for classes, or rallies verbal support from friends and colleagues for group support. The Action stage is where the change in the criterion behavior actually occurs. Progressing through this stage may include intense effort to modify behavior itself as well as the environment in which the behavior occurs, and is expected to endure for about six months. When considering smoking cessation, Action may mean changing routines, reallocating time, and developing strategies to cope with the many environmental barriers to smoking like a smoke free working environment. The fifth Stage, Maintenance, consists of ongoing change of the target behavior; however, individuals are often faced with the challenge of relapsing back to an earlier stage. The lack of smoking environment changes provides a good example of how relapse may be difficult to prevent during Maintenance. For many people, the maintenance stage lasts forever. Some smokers, for example, will always fight at least an occasional craving for a cigarette. The TTM Stages of Change model accepts this situation as normal. But for some people and some behaviors, the behavior change is so complete that they reach a stage of Termination or self-efficacy. This means they have complete confidence that they can maintain the behavior change forever, in any situation. This is ideal but it is not necessary for success and is rare for many behaviors. For this reason, many descriptions of Stages of Change include only the first five stages. In adopting this framework for a smoking cessation program, it is imperative to understand that individuals can go through these stages at different times; therefore the smoking cessation program should be an ongoing program in an institution trying to implement a workplace non-smoking policy. Classes should be offered at regular intervals throughout the year to ensure continued support for employees interested in smoking cessation.
Limitations

The researcher recognizes a number of study limitations including the use of only one worksite and limited sample size. Sample size was a limitation since only a small number of employees responded to the smoking survey despite a large employee population in the participating hospital. Although the study yielded a small participation rate (9%) for the survey, the percentage of employees who smoke among the respondents (19%) is similar to previous studies by Longo, et al (2001) and national health data survey of smoking population in the United States (CDC, 2006). Another limitation is the design. The study is a sample of convenience based on a hospital in north Florida versus random sampling of employees from other hospitals, and relies on “before and after” historical controls, not on randomized control trials.

The potential for biased response of individuals can also be a limitation because of the negativism associated with smoking and the actuality that the employee survey was conducted by the employing hospital. Because this study is from pre-existing data, it limits the ability of the researcher to explore the perception of smokers about the smoking cessation program in place at the site, as well as the perceived benefit of the program to enrollees.

Another potential shortcoming is the use of self-reported smoking behavior. There was no biochemical testing performed to validate responses. However studies have shown that self-reported smoking in adults is reliable when validated with urine cotinine levels except during pregnancy (Caraballo, Giovino, Pechacek, Mowery, 2001).

Relationship of Findings to Literature

Overall, the results of the study confirmed previous studies that having a 100% smoke-free workplace reduced smoking prevalence by 4% - 6% (Farrely et al 1999, Fichtenberg et al 2002, Parry et al 2000, Chan et al 2005), and cut back cigarette consumption by 34% (Fichtenberg et al 2002), compared to workers subject to minimal or no restrictions.

Similar to previous data, 19% of respondents in the study are smokers compared to the median prevalence of current cigarette smoking among adults which was 22.1%
in the United States (MMWR, 2004). Interestingly, more RNs (32%) smoke compared to LPNs (5%). This is dissimilar to a study by Bialous et al (2005) which states that LPNs smoke at a higher rate than RNs: 38% versus 21.7%.

Smoking cessation programs have been in place in most institutions before the implementation of a no smoking policy. Although employers have shouldered the expenses for this program, only a low percentage of individuals (5%) take advantage of it. Historically only a minimum number of smokers attempting to stop smoking use smoking cessation aids or attend smoking cessation services (West, 2004). This may reflect a lack of confidence among smokers that these treatments will help. Consistent with previous findings, reasons cited for not enrolling in this program were time constraints imposed by schedules (Bialous et al 2004), unavailability of classes at convenient times, cancellation of classes due to low enrollment as well as the readiness of an individual to quit smoking. Non-compliance of the smoking policy by smokers was also mentioned by respondents as a setback to successful implementation of the policy. Similar to a previous study by Strobl (1998), a lack of enforcing mechanism in support of the ban was reported and criticized by respondents. Respondents felt that enforcement should be the responsibility of every employee and be practiced by everyone, especially security personnel. According to Strobl (1998), the increased visibility of smokers outside the hospital perimeter has made non-smokers more aware of the smoking problem. This awareness may increase sensitivity that smokers should not be punished for their behavior but assisted and supported in their attempts to quit.

Recommendations for Future Study

The influence of restrictions on smoking behavior change needs to be explored further with an in depth qualitative research study addressing the issue of total workplace smoking bans including garage and parking lot versus a workplace smoking ban with designated smoking areas outside buildings. According to Longo et al (1997), the more restrictive the smoking policy is, the higher the rate of employee smoking cessation.
The effects of the smoking policy on patients and their families as well as their opinions and ways of coping with the policy and its effect on their consumption during and after hospitalization need to be explored further as well.

A larger sample size with random sampling from other hospitals in Florida would validate this finding. Florida hospitals would be a favorable choice for a study since few studies on smoking in hospitals in the state exist and public smoking ordinances exist (My Florida, 2006).

Evaluations of smoking policies should be done continuously or on a regular basis. These could also focus on comparing restrictive policies (designated smoking areas outside buildings) with total smoking bans. Evaluation of the institutions smoking cessation program should also be done continuously. There should also be an ongoing smoking cessation program in place in institutions since different individuals contemplate quitting at different stages in their life.

Summary
The introduction of a workplace smoking ban has significantly reduced cigarette consumption among employees in a hospital in north Florida. This study looked at the changes in smoking behavior of employees before and 18 months after a workplace smoking ban was implemented. The likely reason for the decrease in cigarette consumption is the inaccessibility to smoke within the hospital property. This decrease in cigarette consumption cannot be attributed to the smoking cessation program of the hospital since only a minimal number of smokers enrolled in the program, resulting in half quitting smoking and the other half reducing their cigarette consumption. More education and individualized support is needed to assist smokers to view the smoking policy as a benefit to them more than a benefit to the institution, and to emphasize behavior change rather than smoking restriction as an objective of the program. Non-smoking employees perceived a high degree of non-compliance by policy enforcers and mentioned the need for stricter policy enforcement. Because of the chronic nature of smoking, ongoing smoking cessation support and classes should be available to employees to bring about a consistent change in smoking behavior.
This study concluded that smoke free workplaces not only protect non-smokers but also encouraged smokers to quit smoking or decrease cigarette consumption.
APPENDIX A

Employee Smoking Survey Questionnaire
July 17, 2006

Dear Colleagues:

Participating HealthCare, Inc. implemented policies in November, 2004 creating a “tobacco free” organization. If you answer the following questions for us, it will assist us in understanding the impact of this policy change and how it may have improved the health of our staff. Please take a few minutes and complete this survey and return it hard copy or via email not later than Monday, August 1, 2006 to Leslie Youngman, Administrative Assistant, Human Resources. Thank you.

1) Your gender and age?
   a) Male Age ___________
   b) Female Age ____________

2) Highest Education attained:
   a) No College
   b) Some College
   c) Baccalaureate degree and beyond

3) Please describe your Race or Ethnicity:
   a) Asian / Pacific Islander
   b) Black / African American
   c) Hispanic / Latino
   d) Caucasian / White
   e) Native American / Alaskan Native
   f) Other, ________________

4) What is your position at PARTICIPATING HOSPITAL?
   a) RN
   b) LPN
   c) Nurse Support Tech (MA/Surgical Tech/)
   d) Clerical staff
   e) Administration
   f) Housekeeping
   g) Other: __________________________________________
   h) Do you smoke cigarettes every day, some day or not at all?
   i) Every day, (Number cigarettes__________________)
   j) Some days, (Number cigarettes _______________)
   k) Not at all, if No proceed to #9
5) How many cigarettes on average do you smoke? __
   a) Every day - Number cigarettes ________________
   b) Some days - Number cigarettes ________________
   c) None ____________________.

6) Since PARTICIPATING HOSPITAL went smoke-free last Nov 2004, do you continue to smoke during breaks?
   a) Yes
   b) No

7) Were you smoking at all before PARTICIPATING HOSPITAL went smoke-free (in 2004)?
   a) Yes,
   b) No,

8) What best describes the number of cigarettes you smoked before PARTICIPATING HOSPITAL became smoke-free?
   a) The same number as you are now smoking
   b) More than you are now smoking, or
   c) Less than you are now smoking?

9) Was the PARTICIPATING HOSPITAL smoking cessation program successful for you – did you quit via the program?
   a) Yes
   b) No
   c) N/A did not participate in the smoking cessation program –
      because _____________________________________________________
      __________________________________________________________
      __________________________________________________________
      __________________________________________________________

10) Did the smoking cessation program help you quit smoking?
    a) Yes
    b) No

11) Since PARTICIPATING HOSPITAL went smoke free (November 2004), was there a change in your smoking behavior?
    a) Quit smoking
       b) Reduction in smoking
       c) Increased smoking
       d) No change

Additional comments regarding the PARTICIPATING HOSPITAL tobacco use policy:

Source: Participating Hospital Smoking Survey, 2006
APPENDIX B

Letter of Approval from Florida State University IRB
APPROVAL MEMORANDUM

Date: 9/21/2006

To: Carmen Gabor
1307 Walden Road
Tallahassee, FL 32317

Dept.: NURSING

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research Analysis of the Effects of Smoking Behavior of Employees after a Workplace Smoking Ban

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Human Subjects Committee at its meeting on 9/13/2006. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If the project has not been completed by 9/12/2007 you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. The principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

cc: Larulie Grubbs
HSC No. 2006.0667
REFERENCES


BIOGRAPHICAL SKETCH

Carmen L. Gabor

Education

- Master of Science, Nursing
  Graduated December 2006
  Florida State University
  Tallahassee, Florida
- Bachelor of Science, Nursing
  Graduated October 1990
  Liceo de Cagayan University
  Cagayan de Oro City, Philippines

Licensure: Registered Nurse, State of Florida

Clinical Education/ Experience – Nurse Practitioner Program, FSU

- Tallahassee Memorial Family Residency Program – Tallahassee, Florida
- Dr. Wendy Thompson Family Clinic – Tallahassee, Florida
- North Florida Women’s Care – Tallahassee, Florida
- Family Health Center – Madison, Florida

PROFESSIONAL EXPERIENCE

- TALLAHASSEE MEMORIAL HEALTHCARE - Tallahassee, Florida
  Clinical Specialty Coordinator - GYN (2000 to Present)
    - Coordinates inservice for staff on gynecology procedures and instruments, supervises the ordering of supplies for gynecological specialty, orientation of new employees to gynecological specialty
Staff OR Nurse (1997 to 2000)
  ➢ Circulating nurse in different surgical specialties, managed the care of patients pre-operatively and peri-operatively

- SANTA ROSA HEALTHCARE – San Antonio, Texas
  Staff / Charge ER Nurse (1996 to 1997)
  ➢ Charge nurse in 25 bed Adult Emergency Room, Triage Nurse,

- GONZALES MEMORIAL HOSPITAL – Gonzales, Texas
  Staff / Charge Nurse (1993 to 1996)
  ➢ Direct care to Neonates, Pediatrics, Adults, Geriatrics in the Emergency Room, Surgery, ICU, Labor and Delivery, Postpartum, Medical-Surgical Specialties

- WARM SPRINGS REHABILITATION HOSPITAL – Gonzales, Texas
  Staff / Charge Nurse (1995 to 1996, Part-time)
  ➢ Charge nurse in rehabilitation hospital
  ➢ Managed the care of acute and chronic patients in rehabilitation

- MISAMIS ORIENTAL PROVINCIAL HOSPITAL – Cagayan de Oro City, Philippines
  Staff Nurse (1991 to 1992)
  ➢ Staff nurse in Labor and Delivery and High- Risk Neonatal unit

- LICEO DE CAGAYAN UNIVERSITY – Cagayan de Oro City
  Clinical Instructor (1991)
  ➢ Supervised students in their initial clinical rotation in hospital, and Instructor in nursing procedures in the clinical setting