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Characteristics of Adult Tobacco Smokers and Their Smoking Cessation Outcomes After an Intervention Program

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CHARACTERISTICS OF ADULT TOBACCO SMOKERS AND THEIR
SMOKING CESSATION OUTCOMES AFTER AN INTERVENTION PROGRAM

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DEDICATION

In loving memory of:

my biological parents:

my mother, Eddie Lee Mites

my father, Arthur Will Mites

and

my God-given father, Wakefield Smith

May these words express my token of love and appreciation for your contributions to my life. It was your shoulders I stood on to reach this achievement. Your spiritual insight, moral enforcement, and ethical encampment served as the foundation of who I am and who I represent.

In this effort, Arthur, I gleaned from your sixth-grade education; Wakefield, your third-grade education; and Eddie, your college education as I journeyed toward the educational legacy this African American family could uphold.

It has been and will continue to be my determination to honor your lives as you had sacrificed yours for me in so many ways before.

May your hearts beat strongly with acceptance and love as mine beats for you. When this time on earth has ended and I join you in heaven, may our arms embrace and celebrate this place, our combined spiritual and educational legacy.

Love always, Your Daughter.

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ABSTRACT

Approximately 46 million people in the United States smoke tobacco. Although smoking has declined over the past 10 years, it remains a major contributor to lung and other cancers, heart disease, and stroke. Minority low-income smokers are at special risk.

This retrospective, longitudinal study involved 223 randomly selected ethnic minority (African American and Hispanic), low-income participants in an established smoking cessation program from 2001 through 2005. The program was located in a large southeastern U.S. metropolitan area, and at preintervention all participants had a baseline CT scan for lung cancer. Despite much research on smoking cessation programs, no studies have focused on this population in an early lung cancer and smoking cessation program.

This study described the sample characteristics and examined selected factors (level of activity, physical health, emotional health, and stages of change) predictive of smoking cessation 12 months postintervention. Two research questions were formulated: (a) Was there a significant change in participants' self-reports on the five variables preintervention and at 12-month postintervention? (b) If there was a significant change in these variables, what were the relative contributions of postintervention scores in predicting smoking status at 12-month follow-up?

Two instruments were administered at baseline preintervention and postintervention: the Early Lung Cancer Action Program (ELCAP) Intake and Follow-Up Surveys. Results of *t* tests and logistic regression indicated that for Research Question 1, general health and physical health significantly improved, and emotional health

significantly declined. Further, 57% of the participants reported not smoking at all in the month following postintervention. For Research Question 2, none of the five variables predicted smoking cessation at postintervention. Therefore, the program was partially effective in contributing to participants' decreased smoking and increased general and physical health.

A major limitation was the instruments, constructed from the ELCAP program surveys, which are used exclusively for diagnosis. Further instrument validity and reliability testing is warranted.

The ELCAP program has been primarily a medical model, and this study may provide a first step toward a nursing model. Further research is suggested with similar populations in other geographic areas, especially with minority, low-income participants at high risk for lung cancer.

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CHAPTER 1

THE PROBLEM

Introduction

Approximately 46 million people in the United States (U.S.) smoke tobacco, and a third to one-half of all smokers die prematurely (Schroeder, 2005). Smoking contributes to over 440,000 deaths annually in the U.S. alone (Centers for Disease Control [CDC], 2005a). In 2004, approximately 21% of adults, 44.5 million individuals (23% men, 18.5% women), were smokers (Andrews, Heath, & Graham-Garcia, 2004; CDC, 2005a). The highest level of prevalence was among those between the ages of 18 to 24 (23.6%) and 25 to 44 (23.8%). The lowest prevalence was among those ages 65 and older (8.8%) (Centers for Disease Control [CDC], 2005b).

Smoking decreases the life span by approximately 13 to 15 years (CDC, 2005b; “Overview: Smoking Cessation,” 1996). Further, projections for the next 50 years indicate that tobacco will contribute significantly to or cause almost 450 million deaths throughout the world (Centers for Disease Control [CDC], 2005c). A national health objective for 2010 is to reduce the percentage of adult smokers to 12% or less (CDC, 2005c).

Efforts at increasing public awareness of the dangers of smoking have had a degree of effectiveness. Although overall smoking has declined in the U.S. over the last 10 years, closer consideration shows that it is the proportion of heavy smokers that has declined. The percentage of those who smoked 1 to 4 cigarettes and 5 to 14 cigarettes daily increased (CDC, 2005b).

Smoking continues to be a major but preventable contributor to death and to a wide range of smoking-related illnesses. Lung cancer is the most widely known disease associated with smoking, but less obvious may be the extensive range of illnesses for which smoking is also a contributing factor, such as cancer of other organs, heart disease, emphysema, and stroke (Andrews et al., 2004; Youdan & Queally, 2005).

Background

Smoking-Related Diseases

Smoking is a primary contributor to lung cancer, the second most frequently diagnosed cancer in men and women (American Cancer Society [ACS], 2003; Andrews et al., 2004). Of individuals with lung cancer, 85% to 90% report having been directly exposed to tobacco. The risk of lung cancer increases with the age at which smoking began, number of cigarettes smoked daily, and depth of inhalation (Mazzone, 2004; Yamaguchi, Mochizuki-Kobayashi, & Utsunomiya, 2000). Further, it has been estimated that each year 3,000 nonsmokers die from lung cancer because of exposure to secondhand smoke (CDC, 2005b).

Smoking has been strongly correlated as a contributing factor to more than 50 other illnesses, including coronary heart disease, emphysema, stroke, and cancers of major digestive organs (Andrews et al., 2004; Hays, Dale, Hurt, & Groghan, 1998; “Overview: Smoking Cessation,” 1996; Pederson, Ahluwalle, Harris, & McGrady, 2000; Youdan & Queally, 2005). Elimination or even curtailment of tobacco use would greatly decrease individuals’ risk of cancer, cardiovascular diseases, and other respiratory diseases (Florida Department of Health, 2002).

National Demographic Risk Factors

Despite the overall national decline in smoking, higher smoking prevalence occurs in certain populations with particular sociodemographic characteristics (Haiman et al., 2006). The highest prevalence is among individuals ages 18 to 44, with more men smokers than women. Nevertheless, smoking has been labeled “a full-blown epidemic” for women in the U.S., and women account for approximately 40% of all deaths from smoking (“Smoking a ‘Full-Blown’ Epidemic,” 2001).

A recent popular magazine article reported that smoking is responsible for approximately 90% of lung cancer deaths in women and harms women’s reproductive health as well. Not only can smoking increase the risk of heart attack, stroke, or blood clots, but smoking can also lead to fertility problems, pregnancy-related complications, incontinence, earlier menopause, and cervical cancer (“The Damage from Smoking,” 2006). Further, although the higher smoking rates nationwide are for males (CDC, 2005b), Andrews (2004) pointed out the high prevalence of smoking, difficulties of stopping smoking, and need for effective cessation intervention among low-income African American female smokers.

Demographic Risk Factors in Miami-Dade County, Florida

Miami-Dade County Florida has a higher concentration of both Hispanic (16.8%) and African American (14.6%) residents than found nationwide (12.5% and 12.3%, respectively) (Florida QuickFacts, 2000; Miami-Dade County, Florida, 2000). According to the Miami-Dade County Health Department (2003), the leading causes of death among the population at large were heart diseases (32%). The second highest cause of death was cancer (22%).

In 2003, for the first time in over 70 years, the national number of deaths from cancer overall decreased. However, in Florida, the number of cancer deaths increased, as it has every year. Nationally, the death rate attributable to lung cancer for men has dropped about 2% per year; this drop has been credited to a reduction in smoking among men. Unfortunately, the rate for women has not dropped and has been correlated to the increased incidence of smoking among women (Stobbe, 2006).

According to the Florida Department of Health (2002), 22% of all adult Floridians smoked. This figure can further be distinguished by ethnicity: Hispanics 19.3% and African Americans 17.5%. According to Zhang (2005), a senior epidemiologist in the Miami-Dade Health Department's Office of Epidemiology and Disease Control, for the period from 2002 through 2004, low-income Hispanics and non-Hispanics accounted for 3,000 smoking-related deaths. From 2003 to 2004, the number of deaths from cancer of the lungs and related organs rose 51%, with increases of 63% for Caucasians, 51% for African Americans, and 46% for Hispanics.

Ethnicity and Socioeconomic Status

Asians and Hispanics have the lowest smoking prevalence (15%) and American Indians/Alaska Native have the highest (33.4%), followed by non-Hispanic Caucasians (22.2%) and non-Hispanic African Americans (20.2%) (CDC, 2005b). Studies (Hays et al., 1998; Macnee & McCabe, 2004; Mazzone, 2004; Yamaguchi et al., 2000) have also found that certain ethnic groups are at higher risk than others for lung cancer and other smoking-related illnesses. For example, Haiman et al. (2006) found that African American and Native Hawaiian groups, at a maximum of 30 cigarettes a day, and Asians and Hispanics, at between 11 and 20 cigarettes a day, are at highest risk.

Higher smoking levels also occur among adults of low socioeconomic status (Ruggiero, Tsoh, Everett, Fava, & Guise, 2000) and lower educational levels (CDC, 2005b). Dell, Whitman, Shah, Silva, and Ansell (2005) studied 1,699 residents of six racially and ethnically diverse Chicago communities which had approximately equal percentages of Caucasians, African Americans, and Hispanics. Dell et al. found that the smoking rates were higher in the lowest socioeconomic communities (39%), which were predominantly African American, and lowest (18%) in the highest socioeconomic communities, which were predominantly Caucasian. It was found that the most likely individuals to smoke were men, occupants of poorer households, and those with less education.

Moreover, members of the African American community are at disproportionately high risk for lung cancer. The disease accounts for 25% of all cancers in African American men at a frequency almost double the rate of the U.S. population as a whole. Similarly, the mortality rate for African American women is 20% higher than that for Caucasian women. Although no comparable statistics are available for Hispanic populations, the American Lung Association observed that smoking and cancer rates differ among various segments of the Hispanic population and that more research is certainly needed (American Lung Association [ALA] of Washington, 2006; Early Lung Cancer Action Project [ELCAP], 2005).

Although it is clear that Hispanic populations are at risk for smoking and the associated adverse effects, they are possibly the least likely to receive cessation education, encouragement, or support from their health care providers. A study of U.S. Hispanic physicians showed that less than half routinely performed basic interventions,

such as asking patients about smoking status, advising patients to quit smoking, informing patients about the health risks inherent with smoking, and providing educational materials or referrals to smoking cessation programs (Soto-Mas et al., 2005). Another study of 5,652 respondents in the 2000 National Health Interview Survey reported that Caucasians, African Americans, and other non-Hispanic groups were significantly more likely to receive smoking cessation advice from their physicians than were Hispanics (Lopez-Quintero, Crum, & Neumark, 2006).

Smoking Cessation Programs

Although the majority of those who smoke stop without structured interventions, fewer than 20% do so without help of some kind, and many people need the incentives and motivations provided by smoking cessation programs (Thompson, 2006). The CDC recommends that comprehensive cessation programs be implemented at state and territory levels to reduce smoking among U.S. adults and to prevent the associated diseases (CDC, 2005b; Westermaas & Langsam, 2005). A wide range of programs and interventions have been developed to help smokers stop smoking. All programs have two primary goals: (a) to help individuals stop smoking, and (b) to help them maintain abstinence (CDC, 2005b).

General Strategies

Many strategies may be incorporated into smoking cessation programs to help smokers quit and maintain abstinence from smoking. These include pharmaceutical therapy and psychological and social support modalities.

Pharmaceutical Therapy

A major strategy is pharmacological therapy, primarily nicotine replacement therapy. This is prescribed medication that replaces inhaled nicotine, the addictive substance in cigarettes, with a nicotine patch, nicotine gum, nicotine spray, or nicotine inhaler. The types and dosages are based on an individual's duration and amount of smoking and contain progressively less nicotine than is available from smoking. These lesser amounts are intended to wean the individual from nicotine dependency (Jonsdottir & Jonsdottir, 2001; "Overview: Smoking Cessation," 1996).

Reports of success rates in these programs show effectiveness. In some of the programs, there was a 20% success rate with nicotine replacement therapy versus 9% without it. In some hospitals, cancer institutes, and healthcare corporations, the success rate was 17% with nicotine replacement therapy versus 11.7% without nicotine replacement therapy ("Overview: Smoking Cessation," 1996; Pederson et al., 2000).

Another pharmacological intervention, Varenicline, marketed by Pfizer as Chantix, was recently granted federal approval by the Food and Drug Administration. Several European studies of approximately 2,000 smokers showed that a year after initial treatment, abstinence rates were 22% compared to 16% with another anti-smoking drug, Zyban, and 8% with a placebo (Thompson, 2006). In addition, a vaccine is in the testing stage that immunizes patients against nicotine craving (LeSage, Keyler, & Pentel, 2006).

Psychological and Social Support Modalities

Many types of psychological modalities have been used to help individuals stop smoking, such as individual and group counseling and behavior modification therapy. In Denmark, researchers combined pharmacological and behavioral modalities in two

groups of patients with Chronic Obstructive Pulmonary Disease (COPD) who smoked. In one group, nicotine sublingual tablets were used. In another, a placebo was used. Both groups received supportive visits and phone calls with nurses. The group taking the actual pharmacological therapy showed statistically significant superior smoking cessation rates to the placebo group (Tonnesen, Mikkelsen, & Bremann, 2006).

Additional strategies in many programs include health education emphasizing smoking addiction, withdrawal symptoms, and smoking-induced diseases; physical exercise programs, such as aerobic training, stretching, and weight lifting; and meditative techniques. Social cognitive models include modeling, self-efficacy techniques, recognition of dangerous social and emotional situations, problem solving, and skills training (Andrews, Felton, Wewers, Waller, & Humbles, 2005).

Social support methods, such as “buddy” systems, telephone support, group reports, enlistment of family members, and nicotine/smokers anonymous programs are also available (Arcari, 1996; Jonsdottir & Jonsdottir, 2001; Sidorov, Christianson, Girolami, & Wydra, 1997).

Further modalities include aversion therapy, hypnosis, acupuncture, and live-in retreats (ALA of Washington, 2006). Such multicomponent interventions are widely used and recommended by health care researchers (Jonsdottir & Jonsdottir, 2001).

Types of Smoking Cessation Programs

Programs are available at local, state, and national levels. The United States Department of Health and Human Services (2005) provides a range of resources to help individuals stop smoking, with an extensive website and links to extensive additional

resources. State offices supply listings of smoking cessation programs in various counties and cities.

Many programs are sponsored by nonprofit organizations, such as state cancer societies, the ACS, the American Heart Association (AHA), and the ALA (“Overview: Smoking Cessation,” 1996). In addition, healthcare facilities sponsor programs through clinics and outreach programs. Hospitals, cancer institutes, and healthcare corporations may offer programs through affiliated institutions (Pederson et al., 2000).

Community organizations may offer programs through community centers, adult education centers, and civic groups. Private programs are available through churches, private organizations dedicated to smoking cessation, physicians’ groups, and Internet resources (e.g., PuffOut.com, QuitNet.com). Many worksites have instituted in-house smoking cessation programs (Center for Tobacco Cessation, 2005).

The Early Lung Cancer Action Program (ELCAP)

The Early Lung Cancer Action Program (ELCAP) utilizes many of the strategies of other programs. ELCAP was initiated in 1992 as a joint project of the Weill Medical College of Cornell University and New York University Medical Center as a vehicle to utilize the enhanced potential of computed tomography (CT) in screening for lung cancer in high-risk individuals, especially heavy smokers. With CT screening, early-stage lung cancer may be diagnosed and patients advised on initiation of treatment. Medical staff recognized that the CT scan provided an opportunity to initiate smoking cessation programs as part of treatment (ELCAP, 2005).

The program began as a means to screen individuals for signs of early lung cancer for immediate treatment. Further, “an unexpected result of ELCAP was that screening

provided a ‘teachable moment’ or viable opportunity for smoking cessation advice and assistance” (ELCAP, 2005, p. 3). It has been found that approximately three-fourths of participants in the program increased their desire to quit smoking as a result of participation. From these results, the development of smoking cessation interventions combined with CT scanning was recommended, since it had been observed that patients’ attention could be gotten as to the seriousness of their smoking habit (Ostroff, Buckshee, Mancuso, Yankelevitz, & Henschke, 2001).

ELCAP is an international consortium of experts in many medical fields with member institutions in hospital and medical centers in the U.S. in California, Connecticut, Delaware, Florida, Georgia, Illinois, Michigan, New York, and Washington. Internationally, member institutions are located in Canada, China, France, Italy, Israel, Japan, the Philippines, Spain, and Switzerland (“I-ELCAP Member Institutions,” 2004).

Statement of the Problem

Smokers in minority groups comprise more than two-thirds of all smokers (Pederson et al., 2000; Woodruff, Talavera, & Elder, 2002), and low-income minority smokers are at especially high risk for contracting lung cancer and associated diseases (Dell et al., 2005; Haiman et al., 2006). Women are at especially high risk for smoking (“Smoking a ‘Full-Blown’ Epidemic,” 2001; Stobbe, 2006). Smoking is highly correlated with the incidence of morbidity and mortality among these ethnic populations. However, minorities and gender differences have been neglected in smoking cessation research; few studies have been conducted on the effectiveness of smoking cessation programs for minorities and for gender differences (Audrain et al., 1997; Lawrence,

Graber, Mills, Meissner, & Warnecke, 2003; Pederson et al., 2000; Woodruff et al., 2002).

According to researchers at the Center for Tobacco Research and Intervention at the University of Wisconsin Medical School, little or no research exists on the success “of formal tobacco-dependence treatment specific to gender or racial/ethnic status” (Piper, Fox, Welsch, Fiore, & Baker, 2001, p. 291; see also Andrews & Heath, 2003). These researchers recommended further studies focusing on gender and ethnicity and observed that these groups may require different types of treatment.

Further, because of the specific interest of nurses in patient health, several health-related variables of smoking were considered, specifically general health, physical health, emotional health, and level of activity. In addition, particularly relevant to smoking cessation, stage of change (level of readiness to quit smoking) was investigated. Studies have been conducted with relation to smoking on all variables except general health individually or with additional variables, as reviewed in Chapter 2 (e.g., for physical health, Croghan et al., 2005; Ventegodt & Merrick, 2003; for emotional health, Duncan & Rees, 2005; Zvolensky, Schmidt, & McCreary, 2003; for level of activity, Audrain-McGovern, Rodriguez, & Moss, 2003; Haveman-Nies, de Groot, & van Staveren, 2003; for stage of change, Carlson, Taenzer, Koopmans, & Casebeer, 2003; Keller & McGowan, 2001; Macnee & McCabe, 2004). However, with application to a minority, low-income group of smokers at risk for early lung cancer, the variables of general health, physical health, emotional health, level of activity, and stage of change have not been examined together before and after a smoking cessation intervention or with regard to their predictive qualities for smokers’ continued cessation.

Purpose of the Study

This retrospective, longitudinal, descriptive study had a twofold purpose. The first was to describe the characteristics of the participants enrolled in a smoking cessation program directed toward ethnic minority residents of Miami-Dade, Florida. The second purpose was to examine specific factors (e.g., general health, physical health, emotional health, level of activity, and stage of change) regarding their predictive relationship to smoking cessation after completion of the smoking cessation intervention program.

Research Questions

Selected variables were measured at two points in time: on initial enrollment into the smoking cessation program and again at the 12-month follow-up visit. The variables measured at the time of enrollment included four demographic items (participant age, gender, ethnicity, and educational level). Smoking history was addressed through the report of the number of packs of cigarettes per day the participant currently consumed, the number of years the participant smoked, and the number of attempts the participant made to stop smoking. The participants' stage of change at the start of the intervention was measured. Participants were asked to provide a self-evaluation of their perception of their general health, physical health, emotional health, and level of activity.

At the 12-month follow-up visit, participants were asked to reveal their current smoking status if they had continued to smoke, or if they had refrained from smoking over the 12 months following completion of the smoking cessation intervention. They were again asked to indicate their stage of change and to provide a self-evaluation of their general health, physical health, emotional health, and level of activity.

Research Question 1

Was there a significant change in the participants' self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change immediately preintervention and at 12 months postintervention?

Research Question 2

If there was a significant change in the participants' self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change, what were the relative contributions of these postintervention scores in the prediction of smoking status at 12-month follow-up?

Research Assumptions

This study accepted several principles as being true without proof or validation. These assumptions included the following:

1. Participants are at high risk for lung cancer but not diagnosed with lung cancer.
2. Participants have been consistent in attending the ELCAP program and in complying with the requirements.
3. Participants have been honest and thoughtful when completing the survey instruments.

Definition of Terms

The following terms were operationally defined for use in this study.

Stage of Change

Smoking Stage of Change for intent to stop smoking has been conceptualized and extensively tested to support the Transtheoretical Model of Behavior Change

(DiClemente & Prochaska, 1985; Fava, Rossi, Velicer, & Prochaska, 1991; Prochaska & DiClemente, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988; Velicer, Prochaska, Fava, Norman, & Redding, 1998). Five stages are described: precontemplation, contemplation, preparation, action, and maintenance, but only the first three applied to participants in the smoking cessation program of this study. In Chapter 2, the Transtheoretical Model of Behavior Change and Stage of Change for smoking cessation are discussed in greater detail with regard to several studies. Stage of Change in the present study was used as a measure but not as a theoretical framework because the study was descriptive. Stage of change was indicated by participants' responses to item 8 of the ELCAP Intake Survey (see Appendix A), and item 3 of the ELCAP Follow-Up Survey (see Appendix B).

Precontemplation

Theoretical definition. Precontemplation is the first stage proposed by the Transtheoretical Model of Behavior Change. Individuals admittedly have no intentions of taking action to change behavior. They may be underinformed about the consequences of their behavior or may have tried to change and may feel demoralized about their ability to do so. They avoid thinking about the consequences of their negative behavior (Prochaska & DiClemente, 1983).

Operational definition. Precontemplation refers to participants' statements that they have no intention of quitting smoking within the next 6 months.

Contemplation

Theoretical definition. Contemplation is the second stage. Individuals state they intend to change undesirable behavior. They are aware of the pros and cons of changing

behavior and may be ambivalent about doing so. This stage has also been called chronic contemplation or behavioral procrastination (Prochaska & DiClemente, 1983).

Operational definition. Contemplation refers to participants' statements that they intend to take measures to stop smoking within the next 6 months.

Preparation

Theoretical definition. Preparation is the third stage. Individuals begin to explore options for changing their behavior. At this stage, they may "try out" the new behaviors in small ways, but they have not wholly committed to changing (Prochaska & DiClemente, 1983).

Operational definition. Preparation refers to participants' statements that they have made some attempts to stop smoking or are seriously thinking about it in the next 30 days.

General Health

Theoretical definition. General health is an individual's overall health, encompassing all physical systems in the body, as well as mental and social well-being. General health can range from excellent to poor and can affect all of an individual's activities (*American Heritage Stedman's Medical Dictionary*, 2004).

Operational definition. General health was measured by item 9 of the ELCAP Intake Survey (see Appendix A) and item 4 of the ELCAP Follow-Up Survey (see Appendix B).

Physical Health

Theoretical definition. Physical health is the state of the physical body in which an individual is free from chronic or acute illness that impedes activities or enjoyment of

activities of life. The individual feels a sense of well-being and does not feel well-being is constrained by illness (World Health Organization [WHO], 1999). Physical health is the state of the organism when it functions optimally without evidence of disease. This is a state characterized by anatomic and physiologic reliability and consistency, resulting in the ability to perform family, work, and community roles (*American Heritage Stedman's Medical Dictionary*, 2004; *KLME Medical Dictionary*, 2007).

Operational definition. Physical health was measured by items 12, 13, 14, and 15 of the ELCAP Intake Survey (see Appendix A) and items 7, 8, 9, and 10 of the ELCAP Follow-Up Survey (see Appendix B). Scoring of both instruments is described in Chapter 3 in the section on scoring.

Emotional Health

Theoretical definition. Emotional health is the state of mind or feeling state with psychic, somatic, and behavioral components in which an individual feels a range of positive or negative emotions. These can range from calmness and peacefulness to depression and agitation. The individual's degree of emotional health may enhance or constrain activities and interactions with others (Kaplan & Sadock, 1996). Emotional health is also a state of emotional and psychological well-being in which individuals are able to use their cognitive and emotional capabilities, function in society, and meet the ordinary demands of everyday life (*American Heritage Stedman's Medical Dictionary*, 2004).

Operational definition. Emotional health was measured by items 16, 17, 18, 19, 20 and 21 of the ELCAP Intake Survey (see Appendix A) and items 11, 12, 13, 14, 15,

and 16 of the ELCAP Follow-Up Survey (see Appendix B). Scoring is described in Chapter 3 in the section on scoring.

Level of Activity

Theoretical definition. Level of activity is the physical actions an individual undertakes and completes successfully. Levels of activity may be comprised of actions which induce breathing only a little harder than usual, slightly faster heartbeat, and little or no sweating (light or moderate), or actions which induce heavy breathing, markedly faster heartbeat, and profuse sweating (strenuous) (Audrain-McGovern et al., 2003; Pate, Heath, Dowda, & Trost, 1996).

Operational definition. Level of activity was rated as moderate, such as cleaning or engaging in sports such as bowling and golf, or strenuous, such as climbing flights of stairs. Level of Activity was measured by items 10 and 11 of the ELCAP Intake Survey (see Appendix A) and items 5 and 6 of the ELCAP Follow-Up Survey (see Appendix B). Scoring is described in Chapter 3 in the section on scoring.

Smoking Years

Theoretical definition. Smoking years refers to the number of packs per day multiplied by the number of years participants smoked on entry into the smoking cessation program. This definition was constructed for this study to indicate the effect that the combined packs and years could ultimately have on an individual's body.

Operational definition. Smoking years was measured by items 5 (number of packs smoked per day) and 6 (how many years smoked this amount) of the ELCAP Intake Survey (see Appendix A).

Smoking Cessation

Theoretical definition. Smoking cessation refers to participants' reports that they stopped smoking as of a certain date. Complete abstinence from smoking is considered as cessation (Croghan et al., 2005). Reduced smoking is not considered as smoking cessation (Ostroff et al., 2001).

Operational definition. Smoking cessation was measured by participants' responses to item 1, whether or not they smoked at all over the past 30 days, on the ELCAP Follow-Up Survey (see Appendix B). Thirty days was designated the minimal amount of time by the ELCAP program designers for testing the new habit of smoking cessation (ELCAP, 2005; Ostroff et al., 2001).

Scope and Limitations of the Study

The study population was comprised of a convenience sample of participants enrolled in an established smoking cessation program located in a large metropolitan area of the southeastern U.S. The multiethnic participants were overly represented by low-income individuals. The sample may have been additionally limited because it represented only the population of the specified metropolitan area. Finally, the instruments used were constructed from a primarily diagnostic and patient tracking survey and had no prior validity or reliability testing. Thus, the findings herein were limited due to concerns regarding the exclusive use of these members, maturation, the use of self-report methods, and the instruments.

Threats to External Validity

The use of this population introduced bias, which threatened external validity. However, it was anticipated that, as the established program incorporates many

components common to other smoking cessation programs, the results may be generalized, although with caution, to individuals enrolled in other similar programs.

Threats to Internal Validity

The research instruments were self-report measures and asked for participants' responses at two points in time, on entry into a smoking cessation program (baseline) and again 12 months after completion of the program. Internal validity was therefore threatened by two factors, maturation and the use of self-reports. Maturation may have affected responses such as a stronger or weaker resolve to stop smoking or more or less accuracy in recall regarding frequency of smoking. Since participants were asked to self-report regarding their perceptions on a number of factors, it is possible that they may have responded with answers they felt were socially desirable rather than wholly accurate (Holtgraves, 2004).

Significance of the Study

The risks associated with smoking are well-publicized and, for some individuals, the message has taken hold. According to the United States Department of Health and Human Services (2005), an estimated 70% of all smokers, at some time, have the desire to stop smoking, and 50.6% are able to stop smoking. Each year a large proportion of smokers attempt to stop smoking but few are successful (Andrews et al., 2004; CDC, 2005b). Postintervention, national estimates indicate that 42.5% maintain cessation (Centers for Disease Control [CDC], 2007). A number of intervention strategies have been found to be effective in promotion and maintaining smoking cessation; however, high-risk ethnic groups have been underrepresented in the studies examining the programs. This study examined the descriptive characteristics of individuals who

participated in a multifaceted intervention to determine which, if any, characteristics predicted longterm smoking cessation in a predominantly minority population.

Education

The more nurses know about factors that help people stop smoking, the more they can, in turn, educate and support patients in breaking the smoking habit. With reference to specific characteristics of minority, low-income individuals, as both nurses and nursing students recognize the difficulties of these individuals through study results, the more nurses can educate them specifically in their efforts to stop smoking. This study should also help nurses recognize and accentuate factors that assist people to stop smoking and maintain smoking abstinence. The more nurses know about the factors that help people stop smoking, the more they can educate, guide, and support patients in quitting and maintaining abstinence.

Research

This study will contribute to the growing body of knowledge related to factors associated with smoking cessation in general and to ethnic minorities in particular. The study findings may add greater empirical support to the existing knowledge and serve as a model for replication with other minority, low-income populations participating in smoking cessation programs.

Further, to date the ELCAP program has been primarily a medical model. This study may offer a first step in extending this model to a nursing model and encourage more nurses not only to replicate this study but also to investigate means for wider smoking cessation among populations at high risk for lung cancer but not diagnosed with the disease.

Practice

Nurses play key roles in healthcare education, prevention, and early detection of lung cancer. In the ELCAP program, patients receive smoking cessation interventions in all three areas prior to and at 12 months following CT scans. These nursing interventions aid in patient support after diagnosis of lung cancer and with smoking cessation interventions. Studies show that if lung cancer is caught early enough, the cure rate can be as high as 70% (Ostroff et al., 2001). Since many smokers desire to stop as a result of a health problem, nurses are in a strategic position to assist and encourage them to stop (Youdon & Queally, 2005).

The findings of this study will contribute to the growing body of evidence-based interventions that may bring positive change to clinical practice (Melnik & Fineout-Overholt, 2002), especially because only one previous study was conducted on the effectiveness of a combined diagnostic tool and smoking cessation intervention (DeJong & Veltman, 2004). Specific to low-income minority populations who may have cultural pressures and traditions to continue smoking (Dell et al., 2005; Fisher et al., 1998; Nevid & Janvier, 1997), nurses can provide additional strong support and role modeling for these patients' cessation and continued abstinence from smoking.

The study results may also present evidence from which nurses can design and deliver more effective interventions for smoking cessation among minority groups. These interventions are delivered in hospitals, clinics, health maintenance organizations, and communities. For example, primary care nurses successfully delivered a smoking cessation program in 20 primary care clinics in Pennsylvania (Sidorov et al., 1997). Interventions could emphasize the components of good self-care and improved activity

levels and increase patients' awareness of their habits and motivation toward smoking cessation. With the present study results as evidence, nurses can become vocal professionals governed by a nursing model of education, prevention, and intervention rather by a medical framework of treatment after contraction of a disease.

Public Policy

In a wider context, nurses informed with study results can lobby in Congress for smoking-related laws to be changed. Nurses' voices can support public health policies for tobacco control and help counter the rising rates of smokers in tobacco-growing states (Levy, Bauer, & Lee, 2006; Spurlock, 2005). Nurses can also take political positions that change healthcare insurance companies' reimbursement for education, prevention, and early detection for screening high-risk smokers prone to lung cancer or smoking-related illnesses.

With proactive steps through education, research, design of better smoking cessation programs, and advocacy, nurses should be able to help smokers quit sooner and reduce their risk for smoking-related illnesses and death. Lobbying for positive changes in the laws relating to smoking could especially help low-income minority individuals to reach smoking abstinence and dramatically reduce their risk of lung cancer and associated diseases.

Summary

Although nationally smoking has declined over the past 10 years, it is still a major contributor to many illnesses, especially lung and other cancers, heart disease, and stroke. Certain demographic factors place various groups at risk. Minority low-income smokers

are at special risk because of the amount of cigarettes smoked and their low socioeconomic status.

Smoking cessation programs are offered by private, community, local, and national organizations. These programs may incorporate such strategies as pharmacological aids, psychological approaches, and social support. An international program, ELCAP, utilizes many of these strategies plus computed tomography screening for lung cancer in high-risk heavy smokers.

This study described the characteristics of the participants enrolled in the ELCAP smoking cessation program in South Florida, and examined factors (e.g., level of activity, physical health, emotional health, and stages of change) predictive of longterm continued smoking cessation after completion of the program. Although much research has been carried out on smoking cessation programs, little has been conducted with minority, low-income smokers who are at high risk for lung cancer and enrolled in an early lung cancer and smoking cessation program.

CHAPTER 2

REVIEW OF THE LITERATURE

An exhaustive literature search was carried out, and the following databases were searched for relevant information: CINAHL, ERIC, MEDLINE, PSYCHLIT, PUBMED, and Sociological Abstracts. Although all sources were considered, priority was given to studies that investigated the following areas: theoretical model of behavior change for smoking cessation, smoking cessation programs, descriptions of smoking cessation populations, and evaluations of smoking cessation programs. To assure the literature reviewed was current, no study before 1980 was included.

Organization of the Chapter

This chapter first presents a review of studies which have used the Stages of Change, a derivative of the Transtheoretical Model of Behavior Change, for smoking cessation. Next reviewed are studies evaluating smoking cessation programs for illness-related and minority populations. Then descriptive studies of smoking populations are reviewed, followed by studies on the relationship of smoking cessation to level of activity and physical and emotional health.

Studies Using the Stages of Change Associated With the Transtheoretical Model of Behavior Change

The Stages of Change of Transtheoretical Model of Behavior Change has been utilized for both diagnosis and treatment of a variety of problem behaviors, such as weight control, alcohol and drug abuse, medical noncompliance, stress, psychological problems, lack of condom use for HIV protection, needed organizational change, and smoking cessation (Andersen & Keller, 2002; Andrews et al., 2004; DiClemente &

Hughes, 1990; DiClemente & Prochaska, 1985; Elder, Ayala, & Harris, 1999; Prochaska et al., 1988). The model has also been used by the CDC, National Cancer Institute, National Institute of Alcohol Abuse/Alcoholism, and the ALA. The model has been tested empirically as a model for readiness for smoking cessation and has been found an excellent model for prediction of readiness. It is the most widely used model in smoking cessation interventions and is used in the ELCAP program as well (Andersen, Keller, & McGowan, 1999; Andrews, 2004; ELCAP, 2005; Macnee & McCabe, 2004).

Keller and McGowan (2001) tested the major aspects of the Transtheoretical Model of Behavior Change using 50 English-speaking Mexican American women, mean age 24, 75% of whom had begun smoking between the ages of 14 and 18. The subjects were recruited from two community health clinics, which served indigent and working class populations. Four instruments developed by Prochaska and colleagues were administered: the Stage of Change questionnaire, the Process of Change Questionnaire, the Decisional Balance questionnaire (pros and cons of smoking), and the Self-Efficacy/Temptation Scale.

Results of descriptive statistics and logistic regression showed that 31.7% of the subjects were in precontemplation stage, 28.0% in the contemplation stage, and 34% in the preparation stage. The researchers acknowledged that the model had been applied generally to populations who were White and employed without consideration of culture-specific constructs; the Mexican American women used different processes of change than White subjects in previous studies. Thus, the researchers suggested sensitivity in future studies to cultural differences in populations studied.

Stage of Change associated with the Transtheoretical Model of Behavior Change was tested for predictive value on smoking cessation by Carlson et al. (2003) with 2,069 participants in smoking cessation clinics in an outpatient cancer center in Canada. The clinics were held between 1992 and 1999, and the 4-month intervention consisted of eight 90-minute sessions. Among the strategies used were education, self-monitoring, behavior modification techniques and training, and an agreed-on quit date for each group.

Measurements included several variables. These were the rate of smoking cessation at 3 months after the agreed-on quit date and the differences between participants who were successful and unsuccessful in terms of four aspects of the Transtheoretical Model of Behavior Change: stages of change, processes of change, decisional balance, and temptation situations. Research instruments were those developed by Prochaska and colleagues (DiClemente & Prochaska, 1985; Fava et al., 1991; Prochaska & DiClemente, 1983; Prochaska et al., 1988), as well as smoking history and smoking-related demographic variables.

The results indicated that, at 3 months postcessation, those who had stopped smoking used only reinforcement management, one of the processes of change, compared to smokers prior to the start of the program. The nonsmokers also were more cognizant of the negatives of smoking, and this awareness showed in their negative decisional balance scores. With logistic regression, these variables continued to predict success in smoking cessation, but none of the other variables were found significant. The researchers suggested that future studies reassess the model's variables at both quit date and 3-month follow-up to ascertain if and how a given program would affect the variables

Ruggiero et al. (2000) studied pregnant and nonpregnant smokers. Their study was essential because smoking affects not only the mother but also the unborn child. The researchers cited prior studies indicating that even if women stop smoking during pregnancy, 70% return to smoking within a year after delivery.

The research of Ruggiero et al. (2000) utilized the Transtheoretical Model of Behavior Change stages of change in two groups of women smokers, 103 in a pregnant and 103 in a nonpregnant group. Both groups were ethnically mixed (50% White, 25% Hispanic, 25% African American). All participants were low-income women, but there were significant differences in demographic characteristics. The pregnant group had a mean age of 24 years, compared to 26.8 for the nonpregnant group, and the pregnant group was less educated, with a mean of 10.5 years of school, compared to 11.8 years for the non-pregnant group. Further, the pregnant group was lower in income levels (74% with incomes under \$20,000 compared to 52% with incomes under \$20,000 in the nonpregnant sample).

Four instruments were administered, all measuring aspects of the Transtheoretical Model of Behavior Change. These were Stages of Change Inventory (Prochaska et al., 1988), Decisional Balance Inventory—ratings of the pros and cons of smoking (Fava et al., 1991), Situational Temptation Inventory—temptation in habitual or addictive situations (Velicer, DiClemente, Rossi, & Prochaska, 1990), and Processes of Change Inventory—behavioral and experiential strategies used in the process of quitting (Fava et al., 1991).

Results found both groups to be similar in distribution on the Stages of Change inventory. In the pregnant group, 38.8% were in the precontemplation stage, 36.9% in the

contemplation stage, and 24.3% in the preparation stage. In the nonpregnant group, 44.7% were in the precontemplation stage, 37.9% in the contemplation stage, and 17.5% in the preparation stage. Despite these differences, the pregnant and nonpregnant smokers did not differ significantly in their readiness for quitting. More than 75% of the pregnant smokers were at the precontemplation stage, with no intention of quitting in the foreseeable future, or at the contemplation stage, considering quitting in the following 6 months or sometime during pregnancy. These results, as Ruggiero et al. (2000) pointed out, show that special interventions should be designed for pregnant smokers to impress on them the debilitating effects of smoking not only for themselves but also for their unborn children.

Macnee and McCabe (2004) studied the stages of change in a sample of 357 smokers in the southern Appalachian region of Tennessee, a region with an exceedingly high smoking prevalence. The sample consisted of a nearly equal number of females (53%) and males (47%). However, the sample was predominately White (96%). The mean age was 51 years; 33% rated their health as fair or poor, higher than the percentage nationally of 17%. The researchers administered a written questionnaire comprised of six measures related to smoking and smoking cessation: stage of change, nicotine dependence, decisional balance, barriers to cessation, temptation to smoke, and processes of change.

With regard to stages of change, Macnee and McCabe's (2004) results of descriptive statistics and ANOVA showed that this sample of smokers differed from national samples in the first three stages of change. Using three national samples, Velicer, et al. (1995) found 40% to be in the precontemplation stage, 40% in the contemplation

stage, and 20% in the preparation stage. In contrast, in Macnee and McCabe's sample, 56% were in precontemplation, 30% in contemplation, and 14% in preparation. None were in the action or maintenance stages. The researchers pointed out that these different percentages, especially in precontemplation, may indicate that Appalachian smokers are different from national samples. These results may indicate further that a larger number of current smokers are in the precontemplation stage than national samples indicate, and thus a need exists to tailor interventions toward directing smokers toward contemplation and preparation for action.

Limitations and Significance of Studies Using the Stages of Change,

A Component of the Transtheoretical Model of Behavior Change

Several limitations were present in these studies, including a small sample (Keller & McGowan, 2001), homogeneous subjects (Keller & McGowan; Macnee & McCabe, 2004; Ruggiero et al., 2000), and a single geographic location (Carlson et al., 2003; Keller & McGowan; Macnee & McCabe). These factors indicate that generalization to other populations should be made with caution. Further, in Keller and McGowan, the subjects' level of acculturation was not taken into account, which could have affected how the Mexican American women used the processes of change. In addition, Carlson et al. (2003) did not specify the training methods used, so that uneven training and delivery of the intervention may have biased study results. Finally, Ruggiero et al. (2000) used a cross-sectional design. A longitudinal design might have provided a more accurate representation of pregnant women's changes in smoking perspectives and habits throughout their pregnancies

However, aspects of these studies are relevant to the present research. Keller and McGowan's (2001) and Ruggiero et al.'s (2000) subjects were low-income minority members, like those of the present study. The stages of change found in Keller and McGowan and Ruggiero et al. were similar to those measured in the present study. In addition, the finding of Carlson et al. (2003) that stage of change did not predict smoking cessation supports the present study's examination of whether stage of change predicts smoking cessation.

With additional relevance to the present study, Keller and McGowan (2001) pointed out that the Transtheoretical Model of Behavior Change has been used primarily with White, employed samples to ascertain stages of change in smoking cessation. The studies with diverse populations reviewed above are exceptions to this finding. Thus, a study such as the present one using this model with minority, low-income participants was warranted and should contribute to the literature on the relationship of stage of change to smoking cessation.

Evaluations of Smoking Cessation Programs

Many smoking cessation programs exist, and evaluations have been conducted on the effectiveness of programs in hospitals, schools, and worksites, as well as community samples. Appropriate to the present review, two groups of evaluations are reviewed: illness-related populations and minority populations.

Smoking Cessation Programs Directed Toward Illness-Related Populations

Using the Transtheoretical Model of Behavioral Change, Chouinard and Robichaud-Ekstrand (2005) studied the effectiveness of a smoking cessation program with people at high risk for cardiovascular disease. The intervention was conducted by

nurses for inpatients by means of counseling and telephone follow-ups during the first 2 months after discharge. Patients were counseled based on their stage of change as described in the model. The sample consisted of 168 White inpatients, with a mean age of 44.9 years. The majority of the participants, 73.8%, were males ($n = 123$), with 26.8% females ($n = 45$). Participants were assigned to one of three groups: counseling with phone follow-up, counseling alone, and usual care without counseling.

After 6 months, in the first group smoking abstinence was 41.5% ($n = 22$), compared with 30.2% ($n=16$), and 20.0% ($n = 11$) in the other two groups. These results showed the effectiveness of a smoking cessation intervention in this population ($p < .05$, $X_2 = 5.90$).

Smoking adversely affects the cardiovascular system and has detrimental effects on surgical outcomes. Ratner et al. (2004) evaluated a smoking cessation intervention which employed nicotine replacement therapy with counseling for 237 patients (mean age 55, 48.1% males, 51.9% females) electing surgery at a hospital in western Canada. The patients were randomly divided into treatment and control groups, approximately equivalent in demographic characteristics. Participants completed several research instruments, including those on smoking status, smoking cessation self-efficacy (Prochaska et al., 1988), smoking stage of change, the Transtheoretical Model of Behavioral Change (Velicer et al., 1990), smoking history and nicotine dependence, psychological state, and demographic and personal characteristics.

For the treatment group, registered nurses (RN) were trained to collect all data and deliver counseling in person in the hospital and by telephone 24 hours before surgery and 1 week after surgery. The phone calls provided support and encouragement to

maintain abstinence and continued weekly for the 1st month after discharge and once every 2nd week for the 2nd and 3rd months. At 6 (55.8% return) and 12 (53.1% return) months, patients returned questionnaires which asked whether they had stopped smoking and supplied a biochemical strip testing urine for the presence of nicotine (Ratner et al., 2004).

Results indicated that the percentage of participants in the treatment group who abstained before surgery was significantly higher (73.0%) than control participants (53.0%). At 6 months, the percentage of treatment group participants who abstained was significantly higher (31.2%) than control participants (20.2%). Variables significantly predictive of abstinence included self-efficacy in relation to craving and negative affect, and smoking stage of change at intake. However, at 12 months, there were no significant differences between the treatment (27.2%) and control participants (26.1%) in smoking abstinence (Ratner et al., 2004). Significant predictors of abstinence included smoking stage of change at intake (contemplation *OR* 3.95, 95% *CI* 1.15-13.56; preparation *OR* 2.94, 95% *CI* .90-9.63).

Anthonisen et al. (2005) conducted a longitudinal study under the auspices of the National Heart, Lung, and Blood Institute of the National Institutes of Health at 10 clinical centers in the U.S. and Canada. The sample consisted of 5,887 (63% men, 37% women) middle-aged (mean age 48) heavy smokers with mild to moderately abnormal lung function. Participants were divided into control and experimental groups. Participants in the control group received no intervention, but those in the experimental group participated in a 10-week intensive smoking cessation program, which included

behavior modification, use of nicotine gum, and a continuing 5-year maintenance program.

After 5 years, 21.7% of the intervention group had maintained smoking abstinence, and 90% had continued nonsmoking success after 11 years. In contrast, only 5.4% of those who received no intervention maintained abstinence. Further, for those in the intervention group, after 14½ years, the death rate was 15% lower than for those who had received no intervention (Anthonisen et al., 2005). These results showed the profound longterm positive effects of intensive smoking intervention programs.

Jonsdottir, Jonsdottir, Geirsdottir, Sveinsdottir, and Sigurdardottir (2004) carried out a study of 69 individuals (26 men, 37.2%; 43 women, 62.8%) with a mean age of 63.8 years. The participants were heavy smokers with lung disease (chronic obstructive pulmonary disease [COPD] or asthma) who participated in an individualized smoking cessation intervention program. Due to the severity of the participants' health conditions, no control group was utilized. The intervention was grounded in the Transtheoretical Model of Behavioral Change and employed nicotine replacement therapy, individual and group counseling, and nurse-patient support. The intervention took place in person during hospitalization at a university hospital in Iceland and by telephone at 1 week and 1, 3, 6, and 12 months postdischarge.

Patients were assessed for readiness to quit based on the five stages of the Transtheoretical Model of Behavioral Change and nicotine dependence. Results of *t* tests and chi-square tests showed that no relationships were found between readiness to quit at baseline and abstinence at any stage, between level of nicotine dependency during hospitalization and at 12 months abstinence, or between the genders at abstinence.

Results showed that at 1 month, 48.5% ($n = 68$) had maintained complete abstinence from smoking, at 3 months 35.9% ($n = 64$) had continued abstinence, at 6 months 35.1% ($n = 57$) had continued, and at 12 months 39.2% ($n = 51$) had continued abstinence. The researchers concluded that individualized supportive counseling from RNs may be an effective method of initiating and continuing smoking cessation.

A similar study was conducted by DeJong and Veltman (2004) in Michigan using a sample of 243 participants (51% female, 49% male) whose ages ranged from 21 to 86 ($M = 55$). Forty-nine percent of the participants reported to be currently smoking, 37% reported they had been smokers, and 15% reported they had never smoked. All participants were considered to be at risk for COPD, a disease in which symptoms do not manifest until the disease is advanced. An interventional program, provided by a clinical nurse specialist, included screening for COPD and a follow-up telephone survey at 8 to 12 weeks after the screening. The premise was that when people become aware of the risk factors related to the disease, they are more likely to change their behavior to alleviate the risk factors.

The outcomes found 85% of the participants to be at risk for developing COPD, as evidenced by their smoking history and spirometry assessment. In 23% of the participants, mild to moderate COPD was found. Prior to screening, 85% of those participants with pulmonary obstruction or a history of smoking indicated they were not ready to quit smoking. Following screening, 47% of those who were contacted indicated they were at further stages in the Transtheoretical Model of Behavioral Change toward quitting. They had either already quit; they were seriously considering quitting that week; or they were in the process of quitting. DeJong and Veltman (2004) observed that the

combination of screening and counseling can be an effective method for early diagnosis of smoking-related disease and helping people quit smoking.

*Limitations and Significance of Studies on Smoking Cessation Programs Directed
Toward Illness-Related Populations*

These studies had several limitations that affect generalizability to other populations suffering from various illnesses. Chouinard and Robichaud-Ekstrand (2005), Ratner et al. (2004), Anthonisen et al. (2005), and Jonsdottir et al. (2004) studied populations each with a single disease. In addition, in Anthonisen, it was not known whether clinics were representative of the U.S. and Canada or whether ethnicity of subjects was representative. In Jonsdottir et al., the intervention and control groups were not randomized, and slightly over one-fourth of the subjects dropped out during the study. Moreover, in this study, two-thirds of the subjects were women, limiting generalizability to men.

In Chouinard and Robichaud-Ekstrand and Anthonisen et al., no descriptions were provided regarding the training of healthcare professionals who provided the interventions. In Ratner et al., the fact that no significant differences in abstinence were found at 12 months raises questions as to the nature of the intervention or presence of intervening variables from 6 to 12 months. DeJong and Veltman (2004) used a convenience sample and follow-up at only 12 weeks, which may not have been enough time to indicate longterm desire to change smoking behavior or smoking cessation

However, these studies are nevertheless relevant to the present research. Chouinard and Robichaud-Ekstrand (2005), Ratner et al. (2005), and Anthonisen et al. (2005) conducted longitudinal studies tracking smoking cessation, similar to the design of

the present study. Results of Ratner et al., Anthonisen et al., and Jonsdottir et al. (2004) all showed that both the intervention and follow-up efforts seem to have made a difference in maintenance of smoking cessation. Moreover, Ratner et al. supported the present study in the finding that stage of change was a significant predictor of abstinence; the present study examined stage of change for predictive ability. In addition, regarding the telephone follow-up method of Anthonisen et al., the present study did not employ telephone follow-up but included follow-up with CT scan and interview.

With regard to DeJong and Veltman (2004), this study is closest of all those reviewed to the present study in its use of a medical diagnostic screening instrument and a counseling intervention. Screening for lung disease, parallel to the present study's CT scan, appeared to make a positive difference in subjects' stage of change, indicating readiness to quit smoking. Thus, DeJong and Veltman's research supported the present study in stage of change, intervention, and use of a screening instrument.

Smoking Cessation Studies Directed Toward CT Scan

Only one study (Ostroff et al., 2001) was located which assessed the impact of the CT screening on the smoking habits of participants in a smoking cessation program. A sample of 134 enrollees from the New York City Presbyterian Hospital ELCAP program participated in a follow-up telephone survey. The 10-minute telephone survey included close-ended questions about changes in smoking behavior following ELCAP enrollment, smoking-related health beliefs, and aspects of the ELCAP that influenced their motivation to quit and actual cessation. Results indicated that 23.1% ($n = 31$) quit smoking, 47.8% ($n = 64$) reported no change in smoking status or rate, and 2.9% ($n = 4$)

reported their smoking had increased. The median time between ELCAP enrollment and participants' quitting was 6 months.

This study is reported herein because it was the precursor of the smoking cessation program at the medical center that was the present study site; moreover, Ostroff et al. (2001) was the first study on smoking-related follow-up to an ELCAP CT program. Because of the high rates of cessation following CT screening, the authors pointed out that "providing quitting advice and evidence-based cessation interventions in conjunction with a CT screening program may accelerate quitting among a group of smokers who are . . . receptive to smoking cessation advice" (p. 617). The present ELCAP smoking cessation program is such a program and, for many participants, provides a "teachable moment" which motivates individuals at risk for illnesses to ascribe to methods to reduce negative health-related behaviors (McBride, Emmons, & Lipkus, 2003, p. 157).

The first longitudinal study on patients in the ELCAP CT program was published by the International Early Lung Cancer Action Program Investigators (2006). This study was conducted through I-ELCAP from 1993 through 2005 with participants who smoked and were at risk for lung cancer from programs in the U.S. (including the present medical center program), Europe, Israel, and China, and the Azumi Health Care Program in Japan. At baseline, 37,567 individuals at risk for lung cancer were screened with the CT scan. Participants' median age was 61 (range 40-85), and median number of years of smoking packs was 30 (range 0-141). Between 1994 and 2005, 17,456 screenings took place from 7 to 18 months after the first screening. As a result of the screenings, 484 individuals were diagnosed with lung cancer.

Among those diagnosed, 85% ($n = 412$) had clinical stage I lung cancer, with the estimated survival rate 88% (95% *CI*, 84-91). Of these, 73% ($n = 302$) underwent surgical resection within a month after diagnosis. The actual survival rate was 92% (95% *CI*, 88-95) for the 11-year period. This rate is in marked contrast to the 70% who typically survive (Mazzone, 2004). Although this extensive study was limited by lack of a control group, it supports the finding that CT scans in at-risk smokers without symptoms can detect early-stage lung cancer that, if treated appropriately, can measurably increase survival rates. This study focused on the medical perspective of smoking cessation with the effects of the CT scan; the present study focused on the nursing perspective with the effects of the multifaceted smoking cessation intervention.

Smoking Cessation Programs Directed Toward Minority Groups: Overview

Smokers in minority groups comprise more than two-thirds of all smokers (CDC, 2005a; Pederson et al., 2000). Some research has been conducted on smoking cessation programs with ethnic minority groups (Andrews, 2004; Woodruff et al., 2002). However, most research into smoking cessation programs or evaluations has not focused on African Americans or Hispanics (Pederson et al., 2000; Woodruff et al.).

Lawrence et al. (2003) conducted a meta-analysis on outcomes of smoking cessation interventions with minority populations. A total of 35 studies from 1985 to 2001 were analyzed. Of these, 23 were on African Americans, 10 were on Hispanics, 4 were on Asian/Pacific Islanders, and 3 were on Native Americans. The authors pointed out that the majority of studies are on African Americans and stated that more studies are needed for the other minority populations. In addition, abstinence rates varied greatly,

depending on the intervention design and methods, and most of the interventions did not reflect the most current thinking or strategies.

Ethnicity has not been found to have a relationship to the success of smoking cessation in various studies. In a diverse population of 722 White (70.9%), African American (22.5%), Hispanic (2.7%), and Native American and other (3.7%) women, Turner et al. (2001) found that ethnicity did not affect progress in the stages of change to quit. Using two national surveys of 3,758 African American and White smokers, McGrady and Pederson (2002) concluded that success in stopping cigarettes was independent of both ethnicity and gender.

However, these findings were partially contradicted for Hispanic and White smokers, as noted by Bock, Niara, Neighbors, Carmona-Barrows, and Azam (2005). They found no significant differences for women in quitting between the groups but significant differences between ethnic groups on smoking-related variables, such as smoking rate, nicotine dependence, motivation to quit, risk perception of smoking, and depression. These findings suggest the need for culturally-sensitive interventions in smoking cessation programs with ethnic minorities.

Smoking Cessation Programs Directed Toward Hispanic Populations

Culturally-focused studies on smoking interventions with Hispanics are sparse (Woodruff et al., 2002). Fewer studies have been conducted with Hispanic populations than African American populations on smoking cessation programs, and more studies are needed (ELCAP, 2005, Lawrence et al., 2003). Keller and McGowan (2001) pointed out that among Hispanic subgroups, the smoking rate of Mexican American women is 23.8%, higher than the national rate of Hispanics, 15% (CDC, 2005b). Smoking among

younger Hispanic women has steadily increased, consistent with the “epidemic” proportions of smoking for women (“Smoking a ‘Full-Blown Epidemic,’” 2001). The few studies of culturally-based smoking intervention programs that have been conducted have shown mixed effectiveness.

Marin, Perez-Stable, Marin, and Hauck (1994) evaluated the effects of a community-based smoking cessation program in San Francisco, California, which was specifically designed for Spanish-speaking Hispanics. The program’s intervention consisted of distribution of a self-help guide to quitting, use of media campaigns, conducting of raffles for smokers who stopped smoking, and engagement in community service activities. Telephone surveys were conducted of Hispanic adults, ages 18 to 65, at two points in time starting before the program ($n = 7,667$) and 4 years later ($n = 3,551$). Exposure to the intervention was measured by asking individuals if they had heard of the program, if they possessed the self-help guide, had seen media messages, or knew about the raffle. Results showed that smoking prevalence decreased over the period, but smoking cessation in the 12 months before the survey was found to be unrelated to exposure to the community program (Marin et al., 1994).

A more targeted intervention was studied by Nevid and Javier (1997) in predominantly Hispanic communities in Queens, New York. A total of 93 participants (52% men, 48% women) were randomly assigned to either a multicomponent, Hispanic culturally-specific smoking cessation program with behavioral emphasis or to a low-intensity self-help control group that included supportive telephone calls. Participants’ smoking status was assessed at three points posttreatment: at the conclusion of the

intervention and at 6 months and 12 months postintervention. Measures included sociodemographic variables, smoking history, nicotine dependence, and self-efficacy.

Nevid and Javier (1997) found that, in the short term, significant differences occurred between the groups. At postintervention, 21% of the participants in the treatment group biochemically validated smoking abstinence as compared to 6% of those in the control group. At 6 months postintervention, the abstinence percentages were 13% for the treatment group and 9% for the control group. However, at 12 months, 8% of the treatment group participants showed abstinence compared to 7% of the control group. These findings indicated that this program was effective in the short term but not over time in helping Hispanics achieve complete abstinence from smoking.

Another culturally-specific invention for Hispanics was assessed by Woodruff et al. (2002) with Hispanic smokers ($n = 313$) in San Diego, California. Slightly more than half of the participants were female ($n = 160$), the mean age was 42.4 ($SD 12.6$), and approximately half were married (56%). Income and education were low (\$1100-\$1400 per month), with almost half the participants reporting less than a high school education (grades 9 to 11). Participants were randomly assigned to an intervention or comparison group.

The intervention took place over 3 months and was delivered in smokers' homes by trained health advisors. Each advisor was assigned an average of 10 participants, and four visits were made over the time period. Intervention curricula addressed traditional Hispanic values of family, empathy, and respect, and focused on social cognitive principles, such as positive reinforcement, modeling, social support, problem solving, and

social and family concerns. The members of the control group were given telephone contact information for the California Smoker's Helpline in Spanish.

In addition to sociodemographic data, Woodruff et al. (2002) collected information regarding smoking status and history, attempts at quitting, knowledge about smoking, and sociodemographic variables. Data analyses showed the groups were very similar in sociodemographic and baseline smoking-related variables. Sociodemographic variables were not related to biochemically validated abstinence, but smoking-related variables, amount smoked daily and number of recent attempts to stop, were related to biochemically validated abstinence.

At 1 week postintervention, 20.5% of the intervention group showed smoking abstinence, compared to 8.7% of the control group. Woodruff et al. (2002) recognized the short-term nature of these findings and cited Nevid and Janvier's (1997) similar short-term effects that disappeared after 12 months. Thus, Woodruff et al. pointed out that further study should examine longer-term effects of smoking cessation interventions for Hispanic populations.

Limitations and Significance of Studies on Smoking Cessation Programs Directed Toward Hispanic Populations

Like the previous studies, those in this section had several limitations: a single geographic area (Marin et al., 1994; Nevid & Janvier, 1997); a small sample size (Nevid & Janvier); and few details on the intervention (Nevid & Janvier). In addition, in Marin et al. there was possibility of confounding variables over the study term, such as additional smoking information to which the participants may have been exposed and the lack of follow-up earlier than 4 years. In Nevid and Janvier, the lower abstinence rates at 12

months compared to 6 months for both groups may have been the result of the small sample or flaws in the programs. Assessment at a premature point was pointed out by Woodruff et al. (2002) in their study. They assessed smoking status at only 1 week postintervention. Such a short time period does not adequately assess longterm abstinence. In addition, because the interventions were delivered individually in smokers' homes by lay health advisors, inconsistency in delivery modes and content may have taken place.

Nevertheless, these studies were significant for the present research. For all three, the study of a Hispanic population's smoking behavior had relevance, since Hispanics represented a large portion of the sample. Marin et al. (1994) found that smoking prevalence decreased over the period, but smoking cessation in the 12 months before the survey was found to be unrelated to exposure to the community program. These findings supported the present inquiry of determinants of smoking cessation pre- and postintervention.

Nevid and Janvier (1997) examined a similar timeframe of follow-up, as well as use of a multicomponent smoking cessation program. Although the elements of the present study's program were different, the multicomponent aspect indicates a basis for comparison. The results of Woodruff et al. (2002) showing that the intervention group had higher cessation rates than the control group, despite the short assessment period, suggest that an intervention can support smoking cessation, as was explored in the present study.

Smoking Cessation Programs Directed Toward African American Populations

African Americans' smoking cessation rate is higher than that of Whites, although not the highest nationally (Voorhees, Stillman, & Swank, 1996). Cultural-specific cessation programs may be necessary to raise the possibility of quitting for African Americans. Pederson et al. (2000) reviewed 32 studies published from 1988 to 1998 on smoking cessation interventions and quitting strategies employed by African Americans. It was concluded that the programs evaluated were not uniformly effective, especially among clinic programs. For the community-based interventions, no differences were evident in the success for African Americans or Whites. Pederson et al. noted that additional research is called for with regard to the culture-based beliefs of African Americans concerning smoking and investigation into if and how ethnicity may be a factor in their smoking.

Fisher et al. (1998) conducted a quasi-experimental study in three low-income African American communities in St. Louis and Kansas City, Missouri. Participants were assigned to either a treatment group or a control group. The intervention, a community-based program, took place over 24 months with meetings and pre-post telephone surveys. After the intervention, the smoking prevalence of the treatment group declined from 34% to 27%; in the control group, the prevalence declined from 34% to 33%. Demographic characteristics had no effects on smoking status.

Although the smoking prevalence of the intervention group decreased, this study was limited by few details on the intervention and lack of longterm follow-up. However, the study is relevant to the present one in its focus on a minority group that is highly

represented, the measurement of smoking cessation percentage after intervention, and exploration of the relationship of demographic characteristics to cessation.

At a large urban public hospital, Allen, Pederson, and Leonard (1998) studied 1,086 patients, equally divided among treatment and control groups. The mean age of patients was 44, and the mean number of years smoking was 25. The 92 physicians administering the intervention had been exposed to 2-hour training sessions, and each physician counseled from one to 18 patients.

The intervention group received counseling from the physicians, and the control group received the usual care. Both groups were monitored at 3- and 12-month follow-ups. At 12 months, no significant differences between the control group (2.2%) and the treatment group (2.8%) were found for biochemical validation. No significant differences were found in cessation rates for the intervention group (2.2% to 3.7%) and the control group (2.8% to 4.6%). Follow-up attrition was high at 3 (38%) and 12 months (40%). However, the patients in the intervention group smoked fewer cigarettes at 3 and 12 months and reported more attempts at quitting.

African Americans participated in three interventions designed to improve smoking cessation at a community health center in Durham, North Carolina. Lipkus, Lyna, and Rimer (1999) studied 160 low-income smokers (males, $n = 77$, 48%; females, $n = 83$, 52%) at baseline and at a 16-month follow-up. Participants ranged in age, with 51% ($n = 81$) of the sample between the ages of 18 and 49, and 49% ($n = 79$) age 50 and over. Participants were generally poorly educated, with 72% ($n = 115$) reporting between 0 to 11 years of education and 28% ($n = 45$) with 12 or more years of education.

Participants were randomized into three intervention groups. The first intervention provided a computerized physician prompting system of behavioral messages developed by the National Cancer Institute to promote smoking cessation delivered to the participants during clinic visits. The second intervention consisted of printed communications and newsletters, delivered at the time of participants' birthdays. The newsletters contained messages tailored to African Americans with specific recommendations and messages to help participants quit smoking, including barriers to smoking cessation, the pros and cons of smoking, and handling life stresses. The third intervention was comprised of telephone counseling tailored to the individual smokers and their characteristics, delivered by counselors trained in a structured telephone protocol. One phone call per year was made to males and two to females if they were due for cancer screening. These three groups were cumulative; each successive group received the previous interventions.

Data collection instruments included questions from the 1990 Disease Prevention and Health Promotion Supplement to the National Health Interview Survey, one question on stage of change at baseline (contemplator: whether subject was thinking of quitting in the next 6 months), and questions on the desire to quit, pros and cons of smoking ($\alpha = 0.59, 0.42$), and barriers to quitting ($\alpha = 0.71$).

At follow-up, 21.8% ($n = 35$) had quit smoking. Bivariate analysis revealed that the most effective intervention was a combination of provider prompting and tailored print materials (32.7%, $n = 10$), compared to provider prompting alone (13.2%, $n = 7$) or all three interventions (19.2%, $n = 10$) ($\chi^2 [2, N = 10], = 6.3, p < .05$). Education was found to be the only significant predictor of smoking cessation: less educated participants

were more likely to have quit smoking at follow-up ($\chi^2 = 4.78, p < .05$). Stage-of-change contemplators ($\chi^2 = 7.59, p < .01$) who smoked 10 cigarettes per day or less at baseline ($\chi^2 = 6.78, p < .01$) and had a strong desire to quit smoking ($\chi^2 = 6.24, p < .05$) were most likely to have quit at follow-up. This study showed that, among low-income African American participants, predictors of smoking cessation included thinking about quitting in the next 6 months, lighter smoking, less education, and a strong desire to quit.

In African American communities, churches play an important role in delivering and evaluating health-related information and interventions, including smoking cessation interventions (Pederson et al., 2000). Voohees et al. (1996) evaluated multicomponent interventions sponsored by 22 Baltimore churches for randomly assigned urban African Americans. Two types of interventions were assessed, a culturally-specific and a minimal self-help intervention. Progress was measured according to the Transtheoretical Model of Behavioral Change stages of change.

A total of 199 (31.3% males, 68.9% females) participants (mean age 46) took part in the intensive intervention and 93 in the minimal intervention. The intensive culturally-specific methods included pastoral sermons on smoking, testimonies during church services from members who were in the process of quitting, counseling either individually or in groups, spiritual audiotapes of gospel music, daily spiritual readings emphasizing smoking cessation, and health fairs which included education about risks of smoking and free examinations to evaluate cardiovascular risks of smoking. The minimal intervention group attended the health fair and received supportive booklets on smoking cessation.

Telephone surveys were conducted at baseline and 1-year follow-up for both groups for change in stages of change toward smoking cessation and differences in the quit rates. At baseline, the multicomponent group showed 18.9% of the participants were at precontemplation, 40.5% were at contemplation, and 38.5% were at preparation; the minimal intervention group had 24.2% at precontemplation, 38.5% at contemplation, and 30.89% at preparation. Results showed no significant differences between the two intervention groups, although based on stage of change, the multicomponent cultural intervention group was more likely to progress positively toward quitting than the self-help group ($OR = 1.68$, $p = .04$). This was especially true of Baptists in the multicomponent intervention (Voorhees et al., 1996).

Another church-based study was conducted by Schorling et al. (1997) in two rural counties in Virginia in conjunction with a coalition of African American churches. Participants in one county were designated as the treatment group and participants in the other county designated as the control group. Counselors were trained in participating churches for one-to-one counseling and provision of self-help materials, supplemented by community activities. Stage of change, smoking cessation, and exposure to the 18-month intervention were measured in 652 African American individuals at baseline and 452 after the intervention at 18-month follow-up.

Participants were described (mean age 40, 55% males, 45% females). The majority (88%) said they belonged to a particular church, and 86% attended church in the county in which they lived. Smokers in the control county were found to be less likely to attend church at least once per month than were those in the treatment county. Results showed that only two demographic variables were significantly related to smoking

cessation: smoking fewer cigarettes at baseline and being married. At baseline, the overall smoking prevalence was 25.8%, but at follow-up in the intervention county smoking prevalence was 9.6% and in the control county 5.4%.

Among church attendees, the quit rates in the intervention group was 10.5% versus 5.9% ($p = 0.20$) in the control group, although the difference was not statistically significant. Significantly more ($p = 0.03$) progress was found in the stages of change continuum after intervention for intervention versus control group members (precontemplation, 40.2%, contemplation, 32.1%, preparation, 17.3%, action, 2.9%, maintenance, 6.6%). These results indicate that church-sponsored smoking cessation programs can be effective for rural African American populations.

Andrews (2004) and Andrews et al. (2005) evaluated a community-based multicomponent smoking cessation program. This program, "Sister Intervention," was specifically targeted at low-income African American women in subsidized housing communities (Andrews et al.). A collaborative community partnership with a nurse and community health workers supplied weekly individual and group counseling; Transtheoretical Model of Behavioral Change stage-based education on smoking; behavioral strategies, including social support and self-efficacy promotion; and nicotine replacement therapy. The control group (Andrews) received general health education delivered at intervals of several weeks. Instruments included smoking status, stages of change, self-efficacy to quit smoking, and social support.

In follow-up at weeks 6, 12, and 24, Andrews (2004) found that the participants in the intervention group had a higher likelihood of quitting than did the participants in the

control group. The intervention group also had higher levels of social support, spiritual well-being, and self-efficacy for smoking cessation.

From the original study, Andrews et al. (2005) studied a community sample of 15 low-income, low-education African American women (mean age 49.8). On the average, the participants had smoked for 25 years, with an average number of 12.1 cigarettes per day (range 1-40). The researchers used self-report questionnaires to measure smoking status, stage of change, self-efficacy, and degree of social support. The stage of change and smoking efficacy/temptation scales were those created by Prochaska and colleagues (DiClemente, Prochaska, Fairhurst, & Velicer, 1991; Velicer et al., 1995).

The intervention consisted of individual and group sessions delivered by trained community health workers once a week for 6 weeks and a final session at the 12th week. Each week focused on a stage of change, from precontemplation to maintenance at the 6th week and thereafter maintenance, with themes appropriate to each stage. Culture-appropriate audiovisual materials, refreshments, and spiritual materials were used for the African American participants. The health workers also made phone calls following up on each weekly session, and participants were given nicotine patches of different strengths, depending on the amount they smoked.

Andrews et al. (2005) found that at weeks 6 and 12, the 24-hour abstinence rates were 80% and 73%, and the 2-month abstinence rate was 60%. Additionally, for 13 of the participants, significant differences were shown in the progress of stages of change, social support, and self-efficacy to stop smoking.

Because of their similar ethnicity, culture, values, and personal experiences, the participants bonded. The spiritual influence was shown to be important to these women;

as one said, “God could deliver me from tobacco” (p. 18). This study shows the possible positive outcomes of community-based, culturally-sensitive interventions with social support and spiritual components as aids to self-efficacy for African American women. However, the relapse rate increased at the 12th week, the time period in which the social support and group interaction had diminished.

Limitations and Significance of Studies on Smoking Cessation Programs Directed Toward African American Populations

Similar to previous studies, the studies reviewed in this section were limited by convenience samples from single settings (Allen et al., 1998; Andrews et al., 2005; Fisher et al., 1998; Lipkus et al., 1999, Schorling et al., 1997; Voorhees et al., 1996) and a small number of participants (Andrews et al., 2005), which limit generalization to other African American populations. High attrition at follow-up was a problem in several of the studies (Allen et al., Schorling et al., Voorhees et al.). Attrition may have resulted in the church-related studies (Schorling et al., Voorhees et al.) because the church-related intervention methods may not have produced sustained interest or motivation with some participants.

Individual studies had particular limitations. In Fisher et al. (1998), the physicians were residents in training who may not have had sufficient experience dealing with patients. In view of the results of little differences in cessation between the intervention and control groups, their 2-hour training for the intervention may not have been sufficient. As the authors pointed out, a brief smoking cessation intervention administered by physicians did not seem to be effective for this population. In Lipkus et al. (1999), the educational measurement grouped all educational levels (0 through 11 years), which may not have yielded an accurate analysis of educational levels, especially

since this variable was found significantly related to smoking cessation. In addition, the study design of successive interventions may have obscured the individual effects of the interventions. In Andrews et al. (2005), no control group was used and follow-up did not take place after 12 weeks. Recognizing this limitation, the authors suggested larger longitudinal studies on smoking cessation with African American women.

However, these studies are pertinent to the present work because most used low-income African American samples (Andrews et al., 2005; Fisher et al., 1998, Lipkus et al., 1999; Schorling et al., 1997), longitudinal design, and predominantly 12-month follow-ups (Fisher et al., 1998; Lipkus et al., 1999; Voorhees et al., 1996), as in the present study. In addition, stages of change in relation to smoking cessation were measured in Lipkus et al., Schorling et al., Voorhees et al., and Andrews et al., supporting the examination of these variables in the present work.

Moreover, several studies showed positive change after intervention. Although the results of Allen et al. (1998) showed no differences in cessation rates between the intervention and control groups, subjects in the intervention group smoked fewer cigarettes and more reported quitting. The results of Voorhees et al. (1996) showed no significant differences between the two intervention groups but indicated that, based on stage of change, subjects in the multicomponent intervention group were more likely to quit than those in the control group. Participants in Schorling et al. (1997) showed significant changes in stages of change after intervention as well as reduction of smoking postintervention, and Andrews et al. (2005) indicated reduced smoking among participants after the intervention. These results support the exploration of stage of

change in relation to intervention and follow-up with low-income African American participants in the present study.

Descriptive Studies of Smoking Populations

A number of studies have described smokers' demographic characteristics, smoking habits, and quit attempts in an effort to identify factors that contribute to smoking cessation. Although these studies did not report on interventions, they are important as background and context for the descriptive component of the present study. The authors of all of the studies herein reviewed recommended that their conclusions should be taken into account in the design of interventions.

Herrick (2001) reported findings from 3,613 smokers (1,727 males, 1,886 females), age 18 and older, who participated in the 1990-1998 North Carolina Behavioral Risk Factor Surveillance System. Smokers were defined as those who acknowledged having smoked 100 cigarettes in their lives and smoked daily. Quit attempts were defined as having stopped smoking for one day or longer during the previous 12 months. Heavy smokers were defined as those smoking 20 or more cigarettes per day; light smokers were defined as those smoking less than 20 cigarettes per day.

Yearly declines occurred in smoking rates for females. Young adults were more likely to smoke daily in 1998 (24%) than they were in 1990 (21%), a 14% increase. The percentage of change did not differ between African Americans and Whites. But in 1998, 16% of African Americans were daily smokers, compared to 21% of Whites. Yearly declines were evident for those with 12 or more years of education.

African Americans were more likely to report a quit attempt (57.8%) than White smokers (46.8%). Light smokers (64.5%) were significantly more likely than heavy

smokers (38.9%) to report a quit attempt. For males, logistic regression showed that the odds of a quit attempt was 1.3 times greater for those with a recent health care visit (*OR* 1.26, 95%, *CI* 1.00-1.60), although no significance was found for health status, education, or ethnicity. But for females, health status significantly predicted quit attempts; those who reported being in poor health reported a quit attempt 1.9 more times than those reporting being in better health (*OR* 1.93, 95% *CI* 1.23-3.03). Education was not found to be a significant predictor of quit attempts for either gender, although better-educated females were slightly more likely to attempt to quit.

Over a 12-month period, West, McEwen, Bolling, and Owen (2001) interviewed smokers (1,478 at baseline, 1,012 at follow-up) in the United Kingdom to explore the demographic, social, behavioral, and psychological predictors of quit attempts and smoking cessation success. The mean number of cigarettes smoked was 16.1 per day, indicating that the subjects were close to heavy smokers (20 per day). At the 12-month follow-up, the results showed that none of the variables (gender, age, educational level) were related to quit attempts. Approximately one-third (31%) reported at least one quit attempt, with 17% having made an attempt within the first 9 months. Of these, 29% were still not smoking at the 12-month follow-up.

Although stages of change were not specifically identified, a question on whether the subject intended to stop smoking within the next 12 months, similar to the contemplation stage of change of intention in the next 6 months, was significantly related to prediction of quitting (*OR* 2.26, $p < .001$). With regard to smoking habits and history, time of first cigarette of the day (*OR* 1.36, $p < .005$) and age smoking started (*OR* 1.07, $p < .02$) were independently and positively related to the success of quit attempts.

With the Stage of Change Model, Yang et al. (2001) used data from participants (41,659) in a 1996 national prevalence survey in China. Participants were found to be at various stages of change. Approximately 72% were in the precontemplation stage (not intending to quit); 16.4% were in contemplation (intending to quit but having taken no action), and 11.6% had once quit but relapsed by the time the survey was administered. The percentages were similar in males and females although, in general, older males had a higher proportion of quitters and a lower proportion of those in precontemplation stage. Higher educational level was associated with quit intention, from 64.1% to 46.3% in college-educated respondents.

Yang et al. (2001) pointed out that their findings contrasted sharply with findings of smokers in the U.S. and other developed countries. In these countries, high proportions of smokers had made at least one quit attempt. In contrast, in China, a small proportion of smokers successfully quit and the relapse rate was high. Further, the majority of Chinese smokers were in precontemplation; this is in contrast to comparable U.S. data showing the majority of smokers to be in either contemplation (40%) or preparation (20%) (Velicer et al., 1995).

Another study conducted on smokers in the U.S., with 1992-1999 data showed results closer to those of Yang et al. (2001) than of Velicer et al. (1995). Wewers, Stillman, Hartman, and Shopland (2003) reported on the National Current Population Survey describing the proportion of adult daily smokers by stage of change. Using telephone or in-person interviews of 104,724 participants, the researchers collected data collected for three 1-year periods: 1992-1993, 1995-1996, and 1998-1999. Demographic data were collected on gender, age, ethnicity, education, income, and residence and

reported on for the 1992-1993 cohort, although the researchers noted that distributions were similar for the subsequent periods. There were approximately equal numbers of males (18,823) and females (20,883); the majority of participants (20,687) were between the ages of 25 and 44 years of age, followed by those 45 to 64 (11,416). Ethnicity of the participants was reported, with Whites representing the largest ethnic group (33,649), followed by African Americans (3,316). The participants reported their highest level of education; 17,940 were found to have completed at least 12 years of education, followed by those with 13-15 years of education (9,698).

Results on stage of change showed that, for each time period, the percentages of subjects at the precontemplation stage were the highest (59.1%, 63.7%, and 58.5%, respectively). The percentages of those in contemplation were next (33.2%, 28.7%, and 32.2%, respectively). The percentages of those in preparation were the lowest (7.7%, 7.6%, and 9.3%, respectively). Although the percentages of those in contemplation and preparation rose among the 1998-1999 cohort, the authors observed that, in general, the findings showed “a relative lack of change in smoking behavior pattern . . . throughout the decade” (Wewers et al., 2003, p. 715).

Regarding the relationship of demographic characteristics to stages of change, no gender differences were found. Whites were more likely to be in precontemplation, and African Americans had the largest percentage in contemplation. Those with lower educational levels and income were more likely to be in precontemplation, and those with higher educational levels were more likely to be in preparation.

A longitudinal study of composed of both current and former smokers was conducted by Hyland et al.(2004) in 20 U.S. communities as part of the National Cancer

Institute's Community Intervention Trial for Smoking Cessation. The cohort of 6,603 smokers was followed for 13 years, with telephone surveys completed in 1988, 1993, and 2001. The study assessed the percentage of quitters, smoking habits (number of cigarettes smoked daily, age when smoking commenced, length of time to first cigarette upon arising, number of serious quit attempts), reasons for quitting, and demographic variables. Individuals were classified as former smokers if, at the time of follow-up, they had not smoked for at least 6 months before the interviews.

For the smokers first interviewed in 1988, 24% had stopped smoking by 1993, and 42% were not smoking by 2001. A total of 72% had made at least one serious attempt to quit smoking between 1993 and 2001. Of those who made quit attempts, 30.2% had stopped smoking by 2001. Logistic regression analysis was used to relate smokers' characteristics and smoking cessation. Results showed that statistically significant predictors of smoking cessation were male gender (*OR* .84, 95% *CI* .75-.94), older age (55-64) (*OR* 2.41, 95% *CI* 2.01-2.90), higher income (> \$40,000; *OR* 1.43, 95% *CI* 1.12-1.83), fewer cigarettes smoked per day (< 5) (*OR* .197, 95% *CI* 1.48-2.64), and longer time to first cigarette on arising (> 1 hour) (*OR* 1.77, 95% *CI* 1.47-2.13).

West and Sohal (2006) conducted a study of 916 smokers, age 16 and over, who reported having made at least one attempt to quit smoking, and 996 former smokers in the United Kingdom. Questionnaires were administered by in-person interviews and included demographic data on gender, age, and socioeconomic group, as well as smoking information, such as number of cigarettes smoked per day or week. Most questions focused on quit attempts and how far in advance they were planned (same day, next day, few days ahead, few weeks ahead, few months ahead).

The results showed that almost half the quit attempts were made without previous planning (50.0% for males, 47.3% for females). The next largest group consisted of those who planned to quit smoking a few weeks ahead of their actual quit date (14.2% for males, 14.3% for females). Those over 55 years of age were more likely to make unplanned attempts, and those in lower socioeconomic brackets were less likely to do so. Of the unplanned attempts of former smokers who had made quit attempts between 6 months and 5 years previous to the study, 65.4% lasted for 6 months, compared with 42.3% of planned attempts (*OR* 2.6, 95% *CI* 1.9-3.6). For current smokers, the results were similar; unplanned quit attempts were more likely to be successful than planned ones (*OR* 2.0, 95% *CI* 1.2-3.2). Adjusting for demographic variables did not change these results.

From the results, the authors hypothesized an alternative model based on “catastrophe theory,” in which smokers can be motivated to quit by large or even small “triggers” (West & Sohal, 2006, p. 460). The authors suggested that a smoker’s state of mind triggered the immediate decision to quit.

In an effort to identify characteristics that predicted smoking cessation, Whitson, Heflin, and Burchett (2006) carried out a longitudinal study with 4,162 individuals, 65 years of age and older, in five counties in North Carolina. The study was part of the North Carolina Established Populations for Epidemiologic Studies for the Elderly of the National Institute on Aging. Baseline data were collected in 1986 and 1987; 714 individuals were eligible for the Whitson et al. study if they responded “yes” to one question: “Do you smoke cigarettes regularly now?” (p. 467). Follow-up interviews were conducted with these subjects in 1989/1990, 1992/1993, and 1996/1997.

The variables studied included the demographic characteristics of age, gender, ethnicity, educational level, and health status (recent diagnosis of cancer or heart attack), and the smoking characteristic of number of cigarettes smoked per day. At the 1989/1990 follow-up, 573 subjects had survived; 100 (17.5%) were classified as quitters and remained so to the end of the study. The majority of the nonquitters (71.4%) continued to smoke to the end of the study (or their death). Of these, 5.1% quit for a time but resumed. In 1996/1997, by the end of the study, 473 subjects had survived, 44% of the 100 quitters and 51.6% of the 473 nonquitters. These percentages indicate that smoking cessation was not a statistically significant predictor of mortality for these subjects. Results of logistic regression showed that smoking cessation was associated only with female gender (*OR* 1.70, 95% *CI* 1.04-2.77). Age, ethnicity, educational level, health status, or number of cigarettes smoker per day were not found to be predictive of smoking cessation.

Limitations and Significance of Descriptive Studies of Smoking Populations

These studies, like others in previous sections, had a number of drawbacks, such as limitation to a single geographic area (Whitson et al., 2006) and sample (Yang et al., 2001), and lack of data on the number of different ethnicities participating (Herrick, 2001). These deficiencies limit generalizability to other studies and populations. In addition, many studies did not report salient factors, such as ethnicity (West et al., 2001), demographic characteristics, and stage of change (Hyland et al., 2004), questions on quitting and smoking history data (West & Sohal, 2006), and smoking patterns between interviews (Whitson et al.). Further drawbacks were lack of definition of amount of cigarettes smoked (Wewers et al., 2003) and overrepresentation of a single ethnicity, age group, and educational level (Wewers et al.). Addition of these data would have provided

more comprehensive reports of the studies and participants' smoking cessation patterns, thus increasing credibility of the studies.

However, these studies are relevant to the present work in several ways. Herrick (2001) studied individuals with similar demographic variables, especially gender, ethnicity, and education. Both Herrick and West et al. (2001) studied similar smoking history variables in relation to quit attempts and self-reported health status, and Hyland et al. (2004) examined demographic and smoking characteristics as predictors of cessation, supporting the present inquiry. The Yang et al. (2001) study findings indicated a sharp contrast with U.S. smokers, suggesting higher prevalence of smoking in China and little movement of subjects toward quitting. Wewers et al. (2003) measured stages of change, as did the present study.

West and Sohal (2006) utilized a provocative alternative application of smoking cessation to the stages of change, a "catastrophe" model (p. 460). If these researchers had also assessed the stage of change precipitating quitting, a comparison with planned and unplanned attempts would have provided additional understanding on how smokers arrive at cessation and could have been compared with present study results.

The Whitson et al. (2006) study is pertinent especially because of the elderly sample, which is similar to the present study sample. In addition, the finding that female gender was significantly associated with cessation has relevance because the subject base in the present study had a larger proportion of females than males. Moreover, other studies have found that male gender is a predictor of cessation (Hyland et al., 2004; Yang et al., 2001), and women are at higher risk of smoking than men (Stobbe, 2006).

Studies on Smoking Cessation, Physical Health, Emotional Health,
and Level of Physical Activity

An extensive literature search revealed that little research has been carried out using the variables of level of activity, physical health, and emotional health in relation to smoking cessation. Studies have been conducted on these variables but in combination with others.

Physical Health

Studies on physical health and smoking cessation may encompass quality of life assessments. Ventegodt and Merrick (2003) studied the relationships between lifestyle, quality of life, and health status with 6,127 individuals, ages 18 through 88, in Denmark. Quality of life questions included feelings of well-being, life satisfaction, happiness, and needs fulfillment. Lifestyle questions included eating habits, amount of exercise, alcohol consumption, smoking status, and if smoked, the number of cigarettes consumed daily. Health questions included self-rating of general physical health and specific symptoms.

Results of correlation analysis showed that health was more strongly correlated to quality of life ($r = .05, p < .0001$) than to lifestyle ($r = .2, p < .0001$). The lifestyle factor of smoking was very weakly related to health, and the researchers concluded that preventative efforts for illness should focus on quality of life factors rather than specific lifestyle factors.

Prokhorov et al. (2003) studied 1,283 college students' health-related factors in relation to smoking status and stages of change as predictors to smoking cessation in Houston, Texas. Logistic regression analysis showed that smokers had the most frequent respiratory symptoms, and nonsmokers had the least frequent, with more frequent

respiratory symptoms in later stages of readiness to change. Regarding health, over half the current smokers believed their health was better than average for same-age nonsmokers, and 19% believed their health was better than same-age nonsmokers. In addition, 45% believed that continuing to smoke would have little impact on their health. Regarding stages of change, those in precontemplation reported the lowest perceptions of health vulnerability related to smoking, and those in preparation reported the highest perceptions of vulnerability.

Croghan et al. (2005) evaluated the change in health status in relation to smoking status with 206 patients (mean age 56.4, 43.6% males, 56.4% females, 55.4% White) treated for nicotine dependence at the Mayo Clinic Nicotine Dependence Center. After treatment, the patients completed a quality-of-life questionnaire. At 1 year postintervention, they completed surveys comprised of the baseline instrument and a smoking history survey. Items included whether or not they had resumed smoking, and if so, for how many days or months, as well as how many cigarettes per day. It was found that 60 participants reported they had continued to smoke and 146 reported continuous abstinence during the follow-up period.

The results of analysis of covariance showed significant differences between groups. Those who maintained smoking cessation for the entire year had more improvement in overall perceived general health status ($p = .013$) than did those who continued to smoke. The sustained quitters also had more improvement on the subscales for emotional role limitations ($p < .001$) and physical role limitations ($p < .017$).

Emotional Health

The relationship between emotional health and smoking has been studied primarily with a focus on specific emotional factors. Zvolensky et al. (2003) investigated the relationship of smoking to panic disorder. The researchers conducted a cross-sectional analysis of smoking and nonsmoking patients ($N = 122$, mean age 37.6, 67.2% female, 32.8% male, 86.9% White) with panic disorder. Smokers ($n = 16$) were defined as those individuals who smoked 10 or more cigarettes per day; nonsmokers ($n = 106$) were defined as those individuals who smoked no cigarettes. Research instruments included a panic disorder severity scale, two anxiety scales, a depression inventory, and a physical health rating form.

Comparisons with t tests showed that smokers were found to have higher levels of anxiety ($t = 2.87, p < .01$; $t = 2.56, p < .05$) and panic ($t = 2.01, p < .05$) than did nonsmokers, although smokers did not measure higher on the depression scales. On physical health, smokers reported more days of infection ($t = 1.81$, higher number reflecting poorer health) than did non-smokers and perceived themselves as having poorer overall physical health ($t = 1.79, p = < .10$, approached significance).

Zvolensky et al. (2004) assessed the associations among anxiety sensitivity and smoking outcome expectancies among 90 female White regular smokers (mean age 23.4, mean number of cigarettes per day 11.7). The research instruments included an anxiety sensitivity index and a smoking consequences questionnaire (expected consequences concerning appetite, weight, and decreased health or respiratory problems). Results indicated significant associations between anxiety sensitivity and the smoking outcome expectancies of reduction in negative emotions and increase in negative personal

consequences. Thus, these female smokers felt that the anxiety-reducing effects of smoking outweighed expectations of the negative consequences of smoking.

Duncan and Rees (2005) assessed the effects of smoking on depressive symptoms among adolescents ages 11 through 21 in grades 7 through 12, participants in the Adolescent Health Study, a nationally representative sample of students. Data were analyzed at wave I of 18,924 respondents and at wave II of 13,569 respondents 1 year later. Depressive symptoms were assessed by the Center for Epidemiologic Studies Depression (CES-D) Scale, and smoking by two questions regarding how many days of the past 30 the subject had smoked, and how many cigarettes were smoked on those days.

The results showed that, at baseline, 25.3% of males and 25.8% of females smoked; at follow-up, 33.4% of males and 33.9% of females smoked. Linear regression analysis showed that 15.41% of male smokers (95% *CI*, 13.61, 17.2) scored high depressive symptoms compared with 5.98% of male nonsmokers (95% *CI*, 5.31, 6.66). Male smokers had an average of 3.11 points higher on the CES-D than nonsmokers. Of the female smokers, 17.64% (95% *CI*, 15.76, 19.51) scored high depressive symptoms, compared with 9.35% of female nonsmokers (95% *CI*, 8.56, 10.15). Female smokers had an average of 3.31 points higher on the CES-D than did the nonsmokers.

Level of Physical Activity

Some studies on physical activity related to a specific illnesses, such as prostate cancer (Cerhan et al., 2004), diabetes (Mokdad et al., 2003), and atherosclerosis (Wiggers et al., 2006). Other studies focused on specific populations, such as adolescents (Kelder, Perry, Klepp, & Lytle, 1994; Nelson & Gordon-Larsen, 2006; Pate et al., 1996).

Haveman-Nies et al. (2003) studied dietary quality, physical activity, and smoking habits of 480 individuals (216 males, 264 females), ages 70 to 75, from seven European countries over a 10-year period. The data were based on the European SENECA (Survey in Europe on Nutrition and the Elderly, a Concerted Action) study, which collected longitudinal data on diet, lifestyle, and health. Interviews were conducted to determine self-rated health status and lifestyle habits (diet, exercise, alcohol consumption, smoking) at baseline in 1988/1989, and again in 1993 and 1999. The results showed that type of diet had no effect on health status deterioration but that subjects who smoked and were inactive had an increased risk for declining health status compared with nonsmoking, active subjects.

Audrain-McGovern et al. (2003) examined the relationship between changes in smoking and physical activity in 978 high school students (48% male, 58% female) in northern Virginia. A total of 63% were White, 12% Hispanic, 11% Asian, and 8% African American. Physical activity was assessed by questions regarding the number of times in the past week subjects participated in strenuous or less strenuous physical activity or strengthening exercises. Smoking progression was assessed by questions such as: ever having smoked or experimented with tobacco, having smoked more or less than 100 cigarettes in their lifetime, and status as a current smoker or as a frequent smoker. Students were assessed in four waves in the fall and spring of their 10th and 11th grades.

The results showed that, across the four waves, the percentage of those who had never smoked decreased, and those who had experimented or had become frequent smokers increased from grades 10 to 11. Simultaneously, physical activity decreased in relation to the smoking status. Higher levels of physical activity reduced the odds of

progression to smoking or to a higher level of smoking ($OR\ 1.44, p < .05$). Ethnic differences were not found, but being male increased the odds of smoking progression to higher levels ($OR\ 1.32, p < .05$).

*Limitations and Significance of Studies on Smoking Cessation, Physical Health,
Emotional Health, and Level of Physical Activity*

With regard to studies on physical health, limitations apply in primarily White cohorts (Croghan et al., 2005; Ventegodt & Merrick, 2003), as well as samples from single geographic (Prokhorov et al., 2003; Ventegodt & Merrick) and clinic (Croghan et al.) settings. In addition, Ventegodt and Merrick asked only two questions on smoking status, which may not have been enough for an accurate indication of this behavior.

The studies have relevance to the present one, however, in several respects. Ventegodt and Merrick's (2003) result that smoking was not a high significant factor in self-perceived health was compared with the present study results. In Prokhorov et al. (2003), the smoking subjects' self-rated health status was surprising in relation to their smoking and is relevant to the self-reported changes in health status to smoking of the present participants. The results of Croghan et al. (2005) are highly relevant to the present study in the role of smoking cessation to improved physical and emotional health.

With regard to emotional health, small, primarily White samples and single emotional illnesses (Duncan & Rees, 2005; Zvolensky et al., 2003; Zvolensky et al., 2004) limited the studies' generalizability to other populations with various emotional problems. In addition, Zvolensky et al. (2004) studied only females, further limiting applicability. Duncan and Rees lacked measurement of other factors that may have contributed to depression in adolescents, such as academic problems and relationship

problems with parents and peers, and the lack of follow-up on smoking status past 30 days.

Nevertheless, these studies are relevant to the present one. Zvolensky et al. (2003) found significant relationships between emotional illness and smoking and lower perceived health status of smokers compared to nonsmokers, which were compared to present study results of participants who had quit as of 12-month follow-up. Similarly, the findings of Zvolensky et al. (2004) on the relationship of smoking to anxiety reduction were relevant to the present subjects' reports of changes in emotional health, including anxiety reduction, with regard to quitting at follow-up. Duncan and Rees (2005) found a relationship between depression and increased smoking. In a related exploration, the present study compared self-reports of smoking and emotional health, including depression, at baseline and follow-up.

With regard to the studies on physical activity, similar limitations apply. Haveman-Nies et al. (2003) and Audrain-McGovern et al. (2003) were restricted by predominantly White subjects and a single geographic location, limiting application to other populations. However, Haveman-Nies et al. is pertinent to the present study because of the older age group utilized and the longitudinal nature of the study. Audrain-McGovern et al. is also relevant because of the longitudinal design, and especially the relationship found between physical activity and smoking status.

Summary

Many studies have investigated the relationship of stage of change and smoking history to smoking cessation in various populations (e.g., Dell et al., 2005; DiClemente et al., 1991; Dijkstra & Ten Wolde, 2005; Westmaas & Langsam, 2005), but few have done

so for minorities (Pederson et al., 2000; Piper et al., 2001; Woodruff et al., 2002). As this review has shown, only a few studies have been conducted with Hispanics and African Americans (Bock et al., 2005; Lawrence et al., 2003; Voorhees et al., 1996). Since smokers in minority groups comprise more than two-thirds of all smokers, more research should be conducted to determine which interventions are effective for smoking cessation in these groups (Pederson et al., 2000; Woodruff et al., 2002).

The present study specifically considered a predominantly minority, low-income population in an existing lung cancer and smoking cessation program. This study investigated the relationships between selected demographic and smoking variables, stages of change, physical and emotional health, level of activity, and smoking cessation for these groups. The relationships of level of activity and physical and emotional health to smoking cessation has been examined either individually or in relation to other variables (e.g., Audrain-McGovern et al., 2003; Croghan et al., 2005; Haveman-Nies et al., 2003; Ventedogt & Merrick, 2003; Zvolensky et al., 2004). The present study may be the first to explore these variables together in relation to a smoking cessation program. Results of this study should contribute to the understanding of the relationships among these variables; identify predictors of smoking cessation, and aid in the design of more effective interventions for smoking cessation among minority, low-income populations.

CHAPTER 3

METHODS

The twofold purpose of this study was first to describe the characteristics of the participants enrolled in a smoking cessation program directed toward ethnic minorities residing in Miami-Dade, Florida. The second purpose was to examine relationships of factors (e.g., level of activity, physical health, emotional health, and stage of change) predictive of smoking cessation after completion of the smoking cessation intervention program.

Research Design

This was a retrospective, longitudinal, cross-sectional study. Secondary data were used from two survey instruments routinely administered to participants, the first at baseline preintervention and the second at the 12-month follow-up.

Setting

The study was set in an existing medical-center-based smoking cessation program modeled after the international ELCAP that was begun in 1993. The program was begun in 2001 to serve residents of Miami-Dade County. Smokers were referred by physicians, faith-based organizations, and community health centers affiliated with the medical center.

The Intervention

The ELCAP voluntary smoking intervention program took place over 8 weeks, with eight weekly sessions of 1 hour each, and combined several recommended smoking cessation modalities. These modalities included individual and group counseling, behavior modification, nutritional and smoking aversion education, pertinent brochures

and booklets from the ACS and ALA, a method of tracking smoking behavior, and a “buddy” system of social support. In addition, participants received an initial screening for lung cancer by means of CT imaging. Participants received counseling by a clinical pharmacist for nicotine replacement therapy, which, if recommended, was prescribed by the primary physician. Further, because of ELCAP’s partnership with faith-based community organizations which provide referrals, these organizations provided additional social and community support to participants (ELCAP, 2005).

The smoking cessation program was offered five to six times each year, with a maximum of 15 participants in each group. The total number of individuals served in a given year varied from approximately 75 to 90. When individuals had completed the smoking cessation program, they were monitored with follow-up evaluations and additional CT scans at 12-month intervals.

ELCAP Program Inclusion and Exclusion Criteria

Prospective participants were screened by trained community-based nurses and social workers for possible inclusion. Initial inclusion criteria included heavy smokers who were residents of Miami-Dade County and had at least a fifth-grade reading level in English.

Participants were then divided into two sections based on age, since incidence and mortality from lung cancer rise with age and the detectable phase of cancer changes with age (Heflin & Cohen, 2001). Individuals in the first group were ages 45 to 49, had to have a history of smoking at least one pack of cigarettes a day for the last 10 years, and had to have an immediate family history of lung cancer (mother, father, sibling). Individuals in the second group were age 50 and over with a history of smoking at least

one pack of cigarettes a day for the last 10 years (Mites-Campbell, Hubbard, & Bendell, 2004).

Sample

Description of the Sample

The sample was randomly selected from the population of participants who completed the ELCAP smoking cessation program from inception of the program in 2001 to 2005. This population was largely low-income and of mixed racial and ethnic backgrounds. The total number of participants in the program from 2001 through the first half of 2006 was 487. Of this group, the total population for the study period of 2001 through 2005 was 446.

Inclusion/Exclusion Criteria

All participants enrolled in the ELCAP smoking cessation program from 2001-2005 were eligible for inclusion. If they met the smoking cessation program inclusion criteria, as summarized above, they met the study inclusion criteria. Depending on when participants completed the program, which began in 2001, they may have had from one to five follow-up evaluations. At the time of this study, participants who entered the program in 2006 had not yet reached the first 12-month anniversary and therefore had not had the first CT/Evaluation. For participants who had had more than one follow-up evaluation, the most recent evaluations were used.

Determination of Sample Size

Establishment of an adequate sample size for the number of variables and the statistical techniques used to analyze the data was necessary. To accomplish this, a priori estimation of sample size was made based on a power analysis.

Power Analysis

Power is the probability that a statistical test will distinguish a significant difference if it exists, as well as the likelihood of avoiding a Type I error, the probability of rejecting a true null hypothesis, and a Type II error, the probability of accepting a false null hypothesis (Burns & Grove, 2002; Munro, 2005). Power analysis is used to calculate sample size for *t* tests, correlations, multiple and logistic regression, and other statistical tests. Effect size, power, and significance level all contribute to determination of an adequate sample size. Following Cohen (1988), the power level must be .80 or greater for an adequate sample size.

Calculation of Power Analysis

For logistic regression, four predictor variables (e.g., physical health, emotional health, level of activity, and stages of change) and one criterion variable (e.g., smoking cessation), the significance level was set at the conventional level of $p = .05$ (Type I error), and the β level (Type II error) was set at the conventional level of $\beta = .20$ (Cohen, 1988). The medium effect size of .15 was chosen, which is conventional for psychosocial interventions (Munro, 2005). With these values, power analysis for logistic regression analysis was determined at .95, and a desired sample size of 129 was calculated, a critical $F(4,124) = 2.4448$, and $\lambda = 19.3500$. However, to obtain more reliable results, the random sample used was half of the total population of 446, or 223 participants.

Instrumentation

Patients enrolled in the program were routinely asked to complete an intake survey at the time of enrollment and a follow-up survey at their 12-month anniversary in the program. Portions of these existing two instruments were isolated and used for this

study, the ELCAP Intake Survey (see Appendix A) and the ELCAP Follow-Up Survey (see Appendix B).

ELCAP Intake Survey

The ELCAP Intake Survey used herein was comprised of seven sections, with a total of 21 items (see Appendix A). Items 1-4 asked for information that was used to describe the sample. Items 5-7 provided information on the smoking history and efforts at smoking cessation. Item 8 measured individuals' Stage of Change regarding smoking. Item 9 measured individuals' perceptions of their general state of health. Items 10 and 11 measured individuals' perceptions of their level of activity and whether their health limited them in their ability to carry out activities. Items 12-15 asked the participants to provide an indication of their perception of their physical health and the impact that it imposed on their ability to carry out activities over the previous 4 weeks. Items 16-21 asked about participants' perceptions of their emotional health and the impact that it imposed on their ability to carry out activities and mental outlook.

ELCAP Follow-Up Survey

The ELCAP Follow-Up Survey (see Appendix B), administered at the 12-month follow-up visit, was comprised of five sections, with a total of 16 items which readdress many of the constructs from the ELCAP Intake Survey. Additionally, patients were asked to reveal their smoking status for the previous month.

Scoring

Survey items which provided descriptive data (age, gender, ethnicity, level of education, smoking history, smoking status) or wherein a construct was measured by a single item (Stage of Change, General Health) were scored individually. In sections

wherein a construct was measured by more than one item (Physical Health, Emotional Health, Level of Activity), the items were summed and the resultant score was used as the measure of that construct.

Smoking status postintervention was measured by two items (Follow-Up Survey items 1, 2). Smoking status was measured as a dichotomous variable with possible responses either “No” or “Yes.” Item 1 indicated that in the past month the participant smoked, even a puff (Yes [1]) or did not smoke at all (No [0]). Item 2 indicated whether the participant had ever tried to quit smoking since the baseline CT scan. Again, participants could respond Yes (1) or No (0).

General Health was measured by one item (Intake Survey item 4; Follow-Up Survey item 9) on a 5-point Likert scale, with 1 indicating poor general health status and 5 indicating excellent general health status. The range of scores possible for General Health was from 1 to 5.

Physical Health was measured by three items (Intake Survey items 12-15; Follow-Up Survey items 7-10). Two items were measured on a 3-point Likert scale and two items were measured on a 5-point Likert scale, with 1 indicating that physical health limited participation in typical activities of daily living, including work and socialization. The range of scores possible for Physical Health was from 4 to 16.

Emotional Health was measured by six items (Intake Survey items 16-21; Follow-Up Survey items 11-16). All items were measured on a 5-point Likert scale, with 1 indicating that emotional health limited typical activities of daily living, socialization, or impacts on participants’ mood or outlook. The range of scores possible for Emotional Health was from 6 to 30.

Level of Activity was measured by two items (Intake Survey items 10, 11; Follow-Up Survey items 5, 6), each measured on a 3-point Likert scale, with 1 indicating that level of activity was limited a lot and 3 indicating that level of activity was not limited at all. The range of scores possible for Level of Activity was from 2 to 6.

Validity and Reliability

No estimates of validity or reliability have been reported for the ELCAP surveys because their purpose has been exclusively for diagnostic and patient tracking purposes. However, at the hospital-based center, the instruments have been used since the smoking cessation program's inception in 2001.

Since the instruments used were unique, comparisons could not be made with comparable instruments for criterion-related or concurrent validity. However, face, content, and construct validity were established by a panel of experts from the research site comprised of a physician treating patients with smoking-related illnesses, the senior nutritionist, a senior physical therapist, the senior staff psychologist, and a clinical instructor who delivered the smoking cessation intervention. This panel reviewed the theoretical and operational definitions in combination with the instruments to determine if the instruments tested what they appeared to test (face validity), whether the instruments actually measured the content expected and has no irrelevant factors (content validity), and whether the instruments measured the constructs (physical health, emotional health, level of activity, smoking cessation) they were designed to measure (construct validity) (Burns & Grove, 2002). The results of the reviews indicated that the instruments had good face validity, content validity, and construct validity. In addition,

for the present study, scales having more than two items were evaluated for internal consistency by means of Cronbach's alpha (α).

Protection of Human Subjects

Institutional Permissions

Participants were protected by several means. Although secondary data were used, approval of the study was sought and given by the Barry University Institutional Review Board (IRB) (see Appendix C). Permission to conduct the study with the smoking cessation program population was given by the sponsoring institution (see Appendix D).

Protecting Participants

All information obtained was held in confidence, and study results were reported in group form only. Data were drawn from an archival databank in which patients could not be identified. Patients' names and other personal information were not used; only identification numbers were used for study purposes. Because the study used secondary data, the dataset was considered patient records at the medical center. Patient records may not be obtained from the hospital or clinic by persons other than research personnel, who follow confidentiality policies established for this research. Participants in the program signed and dated a Health Insurance Portability and Accountability Act (HIPAA) release form according to the institution's IRB, indicating that their data could be used for research purposes. When the study was complete, the data were returned to the existing medical center files. Thereafter, the data were maintained and destroyed per agency policy.

Procedure

The existing medical records for the participants were accessed and the sample of 223 was randomly selected from the total of 446 enrolled. The data were identified by participants' code numbers only, and pertinent information from both the intake and follow-up surveys were transferred to the study research instruments. Data were then entered into a computer file, using the SPSS 14.0 (Statistical Package for the Social Sciences, 2005) software program.

Statistical Analysis

Statistical Techniques

Descriptive statistics were used to describe the sample, their smoking history, and number of months since baseline and follow-up surveys. Paired *t*-test and logistic regression statistical techniques were used to answer the research questions.

Statistical Assumptions

Parametric statistics were used for data analyses. As such, the data were expected to meet specific characteristics: the population should be normally distributed, the data should be measured as continuous with interval or ratio scales, and the variance in the outcome variable should be equal, not skewed, for the same values of the predictor variables in the population being sampled and compared in regression analysis (homoscedasticity).

The .05 level of significance was set at $p = .05$, the most widely accepted level used in psychosocial and healthcare research (Burns & Grove, 2002). It was also assumed that the sample size was adequate to yield statistically meaningful results.

Random Sampling

Because randomization increases the reliability and validity of results, a random sample was drawn from the patient population, increasing generalizability of the findings (Urbaniak & Plous, 2006). In random sampling, each member of the population has the same probability of being selected, and based on this principle a random sample has a high likelihood of representing the entire population. Thus, random samples are considered “unbiased,” since the random sampling process produces a sample that theoretically represents the population. In a population in which every participant can be listed, a table of random numbers can be used for selection of the random sample (Munro, 2005, pp. 73-74). For this study, a computer-generated random sample was used, with use of the *Research Randomizer* (Urbaniak & Plous). Appendix E shows the random sample results by participant number.

Research Questions

Research Question 1

Was there a significant change in the participants’ self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change immediately preintervention and at 12 months postintervention?

To answer Research Question 1, the same variables for the same participant were measured on two different occasions, prior to and following exposure to a clinical intervention, in a pre-posttest design. The statistical technique employed was paired *t* tests.

Research Question 2

If there was a significant change in the participants' self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change, what were the relative contributions of these postintervention scores in the prediction of smoking status at 12-month follow-up?

This research question contains five variables that were examined as possible predictors to the one outcome criterion of smoking status. The statistical technique applied was logistic regression analysis. The dependent variable, smoking cessation, is a dichotomous variable and not a continuous variable. Therefore, logistic regression rather than multiple regression was used (Mertler & Vannatta, 2002).

Data Management and Quality Control

Data Management

All coding, scoring, data entry and statistical analyses were performed by the researcher. Data were managed and statistical analyses were performed using the SPSS 14.0 software program.

Missing Data

Missing data can occur when one or more items on a questionnaire are not completed by participants. To handle missing data, generally all cases with complete data are counted and compared with those with missing data. In addition, a cutoff of 5% or 10% of cases with missing data is used (Munro, 2005). However, to assess whether the missing data are random or systematic (that is, values missing in a methodical nonrandom way throughout the data), a test for patterns is performed: 1 = cases with missing data on each variable measured and 0 = cases without missing data. A *t* test is then performed on

the differences between the two levels on each variable (Munro, 2005; Tabachnick & Fidell, 2001).

If no meaningful differences result, the missing data cases are deleted. If meaningful differences are shown, missing data are handled by pairwise deletion of cases with missing data, available in the SSPS statistical package used, the SPSS 14.0 (Statistical Package for the Social Sciences, 2005) software program. This method is often used for correlations and linear regression. Cases are deleted only if the variables being used have missing data (Allison, 2001). Alternatively, missing data are coded 99, and all instances noted. For each variable, complete cases are analyzed and results noted for cases of missing data (Munro, 2005). In addition, missing data by case and variable are reported. Chapter 4 reports the results of missing data for the present study.

File Storage

All instruments collected, spreadsheets, and statistical analyses printouts were stored in a locked file in the researcher's office. Backup copies were made of all files, as suggested by Burns and Grove (2002). These were in the form of hard copy and CDs stored as described. These files will be maintained for 5 years as required by the agency and then destroyed. The paper files will be shredded and the CDs will be cut up and discarded.

CHAPTER 4

RESULTS

The purpose of this study was to describe the characteristics of a sample of the primarily ethnic minority participants enrolled in a tobacco smoking cessation program, the Early Lung Cancer Action Project (ELCAP), and to determine if their self-evaluations of their general health, level of activity, physical health, emotional health, and stage of change, measured at enrollment into the program, was significantly different from their scores on the same measures at the time of their 12-month postintervention follow-up assessment. Further, the postintervention data were used to examine the predictive effect of those variables which had significantly changed on the prediction of smoking status post- intervention.

Data were collected by means of two survey instruments that measured participants' responses to the variables at two points in time, at enrollment the ELCAP Intake Survey (see Appendix A), and at 12 months following the intervention the ELCAP Follow-Up Survey (see Appendix B). Selected items were extracted by the researcher from archival records. As noted in Chapter 3, scales with more than two items were evaluated for internal consistency by means of Cronbach's alpha (α).

Description of the Sample

Data were collected from the archived records of 223 randomly selected participants of the 446 individuals who completed the ELCAP smoking cessation program from its inception in 2001 to 2005. No surveys had missing data; therefore, all surveys were included in the analyses. Table 1 provides a detailed description of the characteristics of the sample.

Table 1

Demographic Characteristics of the Sample (N = 223)

| Variable | <i>n</i> | % |
|---|----------|------|
| Age^a | | |
| 40 to 45 | 1 | .5 |
| 46 to 50 | 5 | 2.2 |
| 51 to 55 | 43 | 19.3 |
| 56 to 60 | 54 | 24.2 |
| 61 to 65 | 74 | 33.2 |
| 66+ | 46 | 20.6 |
| Gender | | |
| Male | 111 | 49.8 |
| Female | 112 | 50.2 |
| Ethnicity | | |
| Caucasian | 42 | 18.8 |
| Spanish/Hispanic/Latino | 91 | 40.8 |
| African American/West Indian/Caribbean | 81 | 36.3 |
| American Indian/Alaska Native | 1 | .4 |
| Other | 8 | 3.6 |
| Level of Education | | |
| Did not complete high school | 58 | 26.0 |
| Completed high school | 64 | 28.7 |
| Started college | 24 | 10.8 |
| Completed trade school | 62 | 27.8 |
| Completed 2-year college Degree | 15 | 6.7 |

^a Age was interpolated from date of birth, requested on the item, to 2005, the last year of the program, and groupings assigned as shown.

Data were collected regarding preintervention smoking status. As a whole, the participants smoked between less than one pack to seven packs of cigarettes per day ($M = 1.12$, $SD = .62$). The variable for smoking years was calculated based on the number of years that a person had smoked multiplied by the number of packs smoked per day. This value ranged from 8 to 138 smoking years ($M = 44.79$, $SD = 20.18$).

A very large number of participants ($n = 196$, 87.9%) indicated that they had previously tried to quit smoking at least once; 54 (24.2%) had tried between two and five times. An overwhelming majority ($n = 221$, 99.1%) reported that, over the preceding 12 months, they had tried to quit smoking for at least 24 hours on several occasions.

Responses to Measurement Scales

Prior to intervention, participants ($N = 223$) provided information regarding their general health, level of activity, physical health, emotional health, and stage of change. Prior to the intervention, 40 (17.9%) considered their general health to be very good, 121 (54.3%) considered their general health good, and 44 (19.7%) considered themselves to have fair general health. At the 12-month postintervention measure, a larger number of participants, ($n = 68$, 30.2%) rated their health as very good, 91 (40.4%) perceived their general health as good, and fewer ($n = 37$, 16.4%) perceived their general health as fair.

Prior to intervention, 127 (57%) of the participants reported that they were seriously thinking of quitting smoking within 30 days, 80 (35.9%) were thinking of quitting within the next 6 months, and 16 (7.2%) were not thinking of quitting. This same question was again measured at 12 months postintervention; at this time, 132 (59.2%) were seriously thinking of quitting within 30 days, 75 (33.6%) thought they would quit within the next 6 months, and 16 (7.2%) were not thinking of quitting at all.

Postintervention smoking status was measured by asking the participants if, over the preceding month, they had smoked cigarettes at all, even a puff. One hundred twenty-seven (57%) answered “No,” indicating smoking cessation, and 96 (43%) reported “Yes,” indicating they had not stopped smoking. Although a large number of the participants had smoked over the preceding month, 204 (91.5%) reported having tried to quit smoking at some time following their baseline CT scan.

Estimation of Instrument Reliability

Responses to those scales consisting of more than two items, i.e., the measure of physical health and the measure of emotional health, were used to provide psychometric estimations of internal consistency. Cronbach’s alpha (α) analysis found the scale measuring emotional health ($\alpha = .72$) had an acceptable level of reliability, and the scale measuring physical health ($\alpha = .43$) had a low level.

Response to Research Question 1

Research Question 1 asked: Was there a significant change in the participants’ self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change immediately preintervention and at 12 months postintervention? Data used to answer this question were collected on two different occasions for the same participant, in a before-and-after intervention design. The statistical test employed was a paired-samples t test. Table 2 displays a summary of the results.

Table 2

Paired-Samples t Tests for Differences in Pre- and Postintervention General Health, Physical Health, Emotional Health, Level of Activity, and Stage of Change (N = 223)

| | Pre- Intervention | | Post- Intervention | | <i>t</i> | <i>df</i> | <i>p</i> |
|-------------------|----------------------|-----------|-----------------------|-----------|----------|-----------|----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | | | |
| General Health | 2.96 | .84 | 3.20 | .96 | -2.88 | 222 | .00** |
| Physical Health | 13.57 | 2.21 | 14.12 | 3.14 | -2.08 | 222 | .04* |
| Emotional Health | 26.33 | 4.29 | 25.47 | 2.54 | 2.63 | 222 | .01** |
| Level of Activity | 5.06 | 1.26 | 5.26 | 1.20 | -1.75 | 222 | .08 |
| Stage of Change | 1.50 | .63 | 1.48 | .63 | .40 | 222 | .69 |

* $p < .05$. ** $p < .01$.

There was no significant difference between the pre- and postintervention scores for level of activity and stage of change, but significant differences were found in the scores for general, physical, and emotional health. The scores for general health and physical health increased and the score for emotional health decreased.

Response to Research Question 2

Research Question 2 asked: If there was a significant change in the participants' self-evaluation of their general health, physical health, emotional health, level of activity, or the stage of change, what were the relative contributions of these postintervention scores in the prediction of smoking status at 12-month follow-up?

According to the results for Research Question 1, the only significant postintervention changes occurred in the scores for general health, physical health, and emotional health. Therefore, for Research Question 2, the postintervention scores for these three variables were examined as possible predictors of the outcome criterion of smoking status. This question contains multiple predictor variables that were regressed with one outcome variable. The outcome variable was dichotomous and dummy scored, i.e., the occurrence of the event of having smoked (score = 1) or the absence of the occurrence of having smoked (score = 0); therefore, logistic regression analysis was used to test the relationships.

Results of this test showed that the odds ratio for each of the predictor variables were close to 1.0, indicating that unit changes in that independent variable did not affect the outcome variable. Therefore, none of the scores for the predictor variables, which were significantly changed following the smoking cessation intervention, were predictive of postintervention smoking status. Table 3 presents the intercorrelations for postintervention smoking status and the predictor variables. Table 4 summarizes the logistic regression.

Table 3

Intercorrelations for Postintervention Smoking Status and Predictor Variables

| Measure | 1 | 2 | 3 | 4 |
|---------------------|------|------|-----|----|
| 1. Smoking Status | -- | | | |
| 2. General Health | -.03 | -- | | |
| 3. Physical Health | -.31 | -.70 | -- | |
| 4. Emotional Health | -.91 | .02 | .04 | -- |

Table 4

Summary of Logistic Regression Analysis Predicting Postintervention Smoking Status

| Predictor | β | SE | Odds Ratio | Wald |
|------------------|---------|-----|------------|------|
| General Health | -.22 | .21 | .80 | 1.09 |
| Physical Health | -.09 | .07 | .91 | 1.93 |
| Emotional Health | -.08 | .06 | .93 | 1.98 |

Summary of Results

This research was conducted using a sample of 223 ethnic minority individuals participating in a smoking cessation intervention program of a major hospital organization in South Florida. Two research questions were posed. Archived data were accessed and used to provide information for analyses of psychometric estimation of internal consistency of two of the research scales and to answer the two research questions.

Estimation of internal consistency found that the scale for emotional health was an acceptable measure; however, the scale for physical health fell short of acceptable reliability. Therefore, results for which this measure was used must be viewed with reservation.

Analysis of the descriptive data for the sample found that, as whole, participants were longterm, heavy smokers who had previously tried but been unsuccessful in stopping smoking. Indeed, at the time of enrollment into the smoking cessation intervention, approximately 93% of the participants indicated they were seriously thinking of quitting smoking within 30 days to 6 months. However, 12 months following intervention, this number was essentially unchanged.

The majority claimed to have attempted to quit since their enrollment in the program. At postintervention evaluation, participants were asked if they had smoked at all over the previous month. More than half (57%) claimed they had not, and 43% admitted to having smoked within that time period.

The first research question asked if, as the participants progressed through the smoking cessation intervention, they experienced a change in their perceptions of their

general health, physical health, emotional health, level of activity, or stage of change as related to a plan to stop smoking. Measures for level of activity and stage of change were not significantly different at the postintervention measure. Measures for general health and physical health indicated the participants had improved. However, the scores measuring emotional health declined.

The second research question asked if these significantly different postintervention scores—general health, physical health, or emotional health—were predictive of postintervention smoking status. Logistic multiple regression found that none of these variables were significantly related to postintervention smoking status and so were not predictive of the outcome of smoking cessation.

CHAPTER 5

DISCUSSION

Summary and Interpretation of Results

The purpose of this study was to describe the characteristics of the participants enrolled in a smoking cessation program directed toward ethnic minorities residing in Miami-Dade, Florida, as well as to examine the relationships of five factors predictive of smoking cessation 12 months after completion of the program. These factors were general health, physical health, emotional health, level of activity, and stage of change.

This chapter first summarizes the study results of both descriptive statistics and research questions and then compares them with pertinent findings of previous literature reviewed. Next, implications of the findings for nursing research, practice, and education are discussed, followed by recommendations for future research. Then the study strengths and limitations are noted, and finally conclusions and the final summary are presented.

Interpretation of Results

The present study is different from most previous studies in smoking and smoking cessation. First, in comparison to other intervention studies (e.g., Carlson et al., 2003; Croghan et al., 2005; Ratner et al., 2004), the present study was a diagnostic study with a medical focus. In addition, all participants had a baseline CT scan before entering the intervention program. The study finding of their virtually unchanged smoking status pre- and postintervention may have been a consequence of noncompliance with smoking cessation following negative CT scan results. Further, no previous studies located or reviewed examined precisely the variables examined herein in the same manner. Given

these differences, nevertheless, for two of the variables found significant from pre- to postintervention, comparison with previous literature may be made.

Research Question 1

In the present study, level of activity and stage of change preintervention to postintervention were found nonsignificant, but general health, physical health, and emotional health from pre- to postintervention were found significant.

No previous studies reported on general health, but with regard to general and physical health, in the present study a significant difference was found pre- and postintervention, with physical health increasing between these periods. In contrast to these results, Ventegodt and Merrick (2003) found that smoking was not a significant factor in self-perceived health. Prokhorov et al. (2003) found that smokers rated their health better than nonsmokers. In support of the present results, Croghan et al. (2005) found with patients in the Mayo Clinic Nicotine Dependence Center (approximately equal numbers of males and females, mean age 56) that at 12 months postintervention, those who maintained smoking cessation for the period reported greater improvement in general health status than did patients who continued smoking.

With regard to emotional health, in the present study a significant decrease was found from pre- and postintervention. Zvolensky et al. (2003) found significant relationships between emotional illness and smoking, corroborating the present results. In the intervention study of Croghan et al. (2005) with patients at the Mayo Clinic Nicotine Dependence Center, at 12 months postintervention, those who maintained smoking abstinence showed significant improvement in emotional role limitations. These results contradict the present findings, possibly because almost half of the present participants

hardly changed their smoking status and had continued to smoke 12 months postintervention. It is also possible that the decrease in emotional health of the present participants was due to other variables, such as pre-existing emotional or physical chronic conditions.

Research Question 2

In the present study, none of the three significant pre- to postintervention variables predicted smoking status postintervention. Further, 12 months after intervention, virtually the same number of subjects as at preintervention said they were seriously thinking of quitting; that is, smoking status was unchanged. In contrast, with a population of low-income African American smokers similar to those in the present study, and approximately equal males and females, Lipkus et al. (1999) found that at 16-month follow-up, smoking cessation predictors included lighter smoking, less education, a strong desire to quit, and being at the contemplation stage of change (thinking of quitting in the next 6 months).

Implications of Findings for Nursing

The study findings have implications for nursing in several areas. These are particularly education, research, practice, and public policy.

Education

The findings of this study have important educational implications for nursing instructors and students and practicing nurses as they interact with patients. With regard to quit attempts, almost all present participants (99.1%) reported that they had tried to quit smoking over the preceding 12 months for at least 24 hours on several occasions. Since the percentages pre- and postintervention of those seriously thinking of quitting did

not differ substantially, education is needed that will provide patients with the knowledge and increased conviction that enables them to actually quit smoking and maintain abstinence.

The results of data analysis for Research Question 1 indicated a significant increase in general and physical health. These results imply several benefits of smoking cessation, which can be utilized by nurse instructors to educate students and nurses and nurses in turn to educate patients to the mental and physical health benefits of quitting and encouraging them to maintain cessation.

The results of Research Question 1 also found a decrease in emotional health. These findings imply that, in nursing education programs, candidates should be taught the extreme difficulties of smoking cessation patients experience and attendant anxieties in their attempts to maintain abstinence, as indicated by the present participants' results postintervention. In addition, nurses should educate patients about the ramifications of emotional health changes as they begin an intervention program such as ELCAP.

Further, nurses should be advised to take inservice courses and workshops in patient responses as they attempt to quit smoking, as well as training in counseling patients from specific and holistic standpoints as they struggle with quitting and abstinence. Such counseling could include specific steps, such as additional periodic CT scans and pharmacological aids (nicotine patch or pills), as well as lifestyle changes, such as increased exercise, healthier diets, and exploration of new interests.

Research

The major implication of this study for research is its contribution as a study of factors associated with smoking cessation, especially with regard to the relatively few

outcome studies of smoking cessation programs with low-income ethnic minorities. Hopefully also this study will spur additional research with other minority groups and in other geographical areas. An important implication is replication of this study with culturally-sensitive materials, since results of prior studies with both Hispanic and African American populations using such materials have been mixed (Andrews, 2004; Andrews et al., 2005; Bock et al., 2005; McGrady & Pederson, 2002; Turner et al., 2001).

With regard to the factors examined that are associated with smoking cessation, the ELCAP program has been primarily a medical model, developed with identification of patients at high risk for lung cancer. Thus, research implications of this study include additional studies that may predict cessation, especially with this population and other individuals diagnosed with lung cancer. For example, studies on additional factors that may predict cessation could include dietary and fitness practices and social support.

Finally, this study is the first to assess intervention outcomes in an ELCAP program. As the ELCAP program becomes developed and implemented in other regions (C. I. Henschke, personal communication, June 5, 2007), this study may serve as a model for replication in these programs.

However, it must also be noted that a major limitation of the study was the instruments, which were constructed from portions of the full ELCAP program surveys. Because the ELCAP program surveys have been used exclusively for diagnostic purposes, there was no need for validity and reliability testing until the present study. When the test for reliability was performed on scales with two or more items, the Cronbach's alpha at .72 for the scale measuring emotional health was acceptable, above the generally accepted level of .70 (Santos, 1999). The scale measuring physical health

fell below the accepted level, with a Cronbach's alpha of .43. Thus, for purposes of both replication and interpretation of results, this limitation should be kept in mind in future research.

Practice

Nursing practice strives for continuous improvement and meeting patients at their points of need (Andrews & Heath, 2003). The present study findings provide an evidence-based empirical foundation from which nurses may advise patients who smoke of the beneficial results of smoking cessation programs. Although close to half (43%) of present participants reported at postintervention that they had smoked during the past month, nevertheless, more than the majority (57%) reported that they had not smoked at all during the past month. This percentage is higher by 15% than the national average of 42.5% of individuals who had not smoked postintervention after participating in a smoking cessation program (Centers for Disease Control [CDC], 2007). The present findings can be cited by nurses to support the benefits of smoking cessation programs.

In addition, the results following from Research Question 1 indicate some salutary effects of a smoking cessation program, that is, increases in general and physical health from preintervention to postintervention, for minority populations. Nurses may use this evidence to recommend and refer patients to such programs.

Findings from Research Question 2, as noted above, showed that none of the significant variables were predictors of smoking cessation. In addition, 12-month postintervention results showed that close to half (43%) had smoked in the preceding month. These findings underscore the difficulties of continued abstinence after multiple quit attempts. Thus, results should provide nurses with a foundation for designing

individualized and culture-specific programs for smokers that will help them maintain cessation immediately following interventions and for longer periods of 12 months or more.

The results also indicate that during the first 12 months postintervention participants need increased support to maintain cessation. DeJong and Veltman (2004) instituted an 8- to 12-week follow-up. Additional types of support, provided by the institution delivering the interventions, could include a “buddy” system, similar to that in Alcoholics Anonymous, scheduled counseling sessions either in person or by telephone or email, and refreshment group sessions at intervals of 2, 3, or 6 months. Such individual contact has been shown to be highly effective (CDC, 2007).

In addition, community outreach to promote awareness of smoking risks and to encourage cessation could include well-publicized, free CT screenings at churches and synagogues and in clinics, hospitals, and malls, with referrals available to intervention programs. Further, literature could be disseminated and public service announcements made through local media to increase public awareness and promote residents’ actions toward smoking cessation, as was implemented in the Marin et al. (1994) study. Finally, parallel programs to the ELCAP program, with preliminary and follow-up CT scans, could be developed and delivered in other communities.

Public Policy

Although smoking has been increasingly banned in public places and many hospitals in the U.S. and other countries (Burton, 2006; McKee, Hogan, & Gilmore, 2004), many people continue to smoke. Nurses can help support current and additional bans through speaking out to individuals, on committees, and at community and hospital

forums. Nurses can also lobby for insurance coverage of smoking cessation programs and other medically-based treatments for smokers at risk for lung cancer and other smoking-related illnesses. In addition, nurses can voice suggestions and support for more smoking cessation interventions and initiatives at local, state, and federal levels, with special attention to elderly, minority, and low-income community residents (Leung et al., 2007; Peters et al., 2006).

Recommendations for Future Research

The findings of this study are important for nursing not only as discussed above but also as the basis for future research. Additional quantitative research on the effects of smoking cessation interventions and similar factors predictive of smoking cessation can be conducted with larger, more heterogeneous populations, ethnically and socioeconomically, as well as in other than urban geographical areas, such as rural and semirural locations. Because none of the postintervention significant variables predicted smoking cessation, future studies could replicate the present study with larger and more diverse populations. In addition, studies could be conducted at different longitudinal periods, including 3, 6, 9, 24, and 36 months postintervention.

Future studies could also be conducted with control groups and added support components at such time periods, including a “buddy” system, follow-up visits, and phone calls from nursing personnel, as well as refresher workshops to reinforce smoking cessation. An examination of possible relationships of demographic variables, such as gender, ethnicity, educational level, and occupation with regard to a smoking cessation program, could also be explored. Such exploration would help remedy the relative neglect of smoking cessation studies involving ethnic minorities and gender differences

(Audrain et al., 1997; Lawrence et al., 2003; Pederson et al., 2000; Woodruff et al., 2002).

Further, stages of change in relation to cessation could be explored especially with other low-income minority populations, an aspect of research ignored in the literature (Keller & McGowan, 2001). In addition, other psychosocial variables could be examined in relation to a smoking cessation program, such as social support, stress, and locus of control. Given the decrease in emotional health for present participants, other variables could also be considered, such as pre-existing chronic physical and emotional conditions, and their relationship to smoking cessation. Repeated-measure studies with smoking cessation intervention and control groups of matched samples could be conducted with the present instruments, especially to enhance their validity and reliability.

Future qualitative studies could elicit participants' observations of changes in their quality of life from inception to completion of a smoking cessation program and at various times postintervention. Qualitative explorations of the experiences and observations of participants' family members and significant others could shed additional light on smoking cessation for participants.

Finally, the present study could be used as a model for evaluating the outcomes of other smoking cessation programs. Although details of administration would necessarily be tailored to individual programs, the study could be replicated with various populations participating in cessation programs.

Study Strengths and Limitations

This study had several strengths. It was the first outcome study of the ELCAP smoking cessation program at this research site. The study's longitudinal nature over 4 years provided more comprehensive data than a cross-sectional survey would have, and therefore results may be more accurate regarding the study population. Further, the sample size was randomized as well as larger than that required by power analysis, increasing representativeness and adding to the generalizability of the findings.

A number of weaknesses were present as well. The study was confined to a single program in a large metropolitan area in the southeastern U.S., and the convenience sample was comprised primarily of multiethnic, low-income individuals who completed self-reports. The self-report data could have been biased because of issues of social desirability. In addition, the survey instruments had several weaknesses: the measure for physical health had a very low internal consistency value; health was measured by only one item; and the follow-up survey asked for possible smoking relapse only for the previous month. In addition, variables other than the five studied could have affected the outcomes, such as gender, ethnicity, age, and educational level. These factors may limit generalizability of the study findings.

Conclusions and Summary

From this longitudinal study of the effects of a smoking cessation program on a minority, low-income population, three conclusions can be reached. First, the ELCAP program was partially effective in decreasing the level of smoking activity for this group from preintervention to 12 months postintervention. Second, the program was effective in precipitating a statistically significant improvement of general and physical health for

these patients from preintervention to 12 months postintervention. Third, none of the five variables, general health, physical health, emotional health, level of activity, or stage of change predicted smoking cessation for this population at 12 months postintervention. Therefore, the ELCAP program could be said to partially contribute to the decrease of smoking activity and the increase of participants' general and physical health from preintervention to 12 months postintervention.

Nevertheless, the results of this study indicating a partial decrease in smoking and maintenance of cessation at 12 months show that a program such as the ELCAP intervention can help minority, low-income individuals at risk of smoking-related diseases. It is hoped and recommended that additional programs of this type are implemented through hospitals, community clinics, and private organizations to serve minority, low-income patients. Such programs could be more culture-specific, help lower the risk of smoking-related illnesses, and encourage minority participants' maintenance of smoking cessation.

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Appendix A

Early Lung Cancer Action Project (ELCAP) Intake Survey

DEMOGRAPHIC INFORMATION

1. Age _____
2. Gender:
 1. M _____
 2. F _____
3. Ethnicity
 1. Caucasian
 2. Spanish/Hispanic/Latino
 3. African American/West Indian/Caribbean
 4. American Indian/Alaska Native
 5. Asian
 6. Pacific Islander
 7. Other
4. Level of Education
 1. Did not complete high school
 2. Completed high school
 3. Started college
 4. Completed trade school
 5. Completed 2-year college degree
 6. Completed 4-year college degree
 7. Advanced degree (e.g., Master's, J.D., M.D., Ph.D.)

SMOKING HISTORY (Pack per year calculation refers only to cigarettes)

5. On average, how many packs of cigarettes do you currently smoke per day?

6. For approximately how many years have you smoked this amount? _____
7. Have you ever tried to quit smoking?
 1. No _____
 2. Yes _____

If yes how many times?

 1. One
 2. Two to five
 3. Five or greater

In the last 12 months, how many times have you quit smoking for at least 24 hours?
One

Two to five
Five or greater

STAGE OF CHANGE

8. Are you seriously thinking of quitting smoking?
1. Yes, within the next 30 days
 2. Yes, within the next 6 months
 3. No, not thinking of quitting

GENERAL HEALTH STATUS

9. In general, would you say your health is
1. Poor
 2. Fair
 3. Good
 4. Very good
 5. Excellent

LEVEL OF ACTIVITY

The following questions are about activities you might do during a typical day.
Does your health now limit you in these activities and, if so, how much?

10. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all
11. Strenuous activities, such as climbing several flights of stairs
1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

PHYSICAL HEALTH

The following questions are about the impact your physical health has on your ability to accomplish your work or other regular daily activities.

During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

12. Accomplish less than you would like?
 1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

13. Were limited in the kind of work or other activities?
 1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

14. How much did pain interfere with your normal work (including both work outside the house and housework)?
 1. Extremely
 2. Quite a bit
 3. Moderately
 4. A little bit
 5. Not at all

15. During the past 4 weeks, how much of the time have your physical health problems interfered with your social activities (like visiting friends, relatives, etc.)?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

EMOTIONAL HEALTH

During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems, such as feeling depressed or anxious?

16. Accomplished less than you would like?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

17. Did work or other activities less carefully than usual?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

The next four questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks:

18. Have you felt calm and peaceful?
 1. None of the time
 2. A little of the time
 3. Some of the time
 4. Most of the time
 5. All of the time

19. Did you have a lot of energy?
 1. None of the time
 2. A little of the time
 3. Some of the time
 4. Most of the time
 5. All of the time

20. Have you felt downhearted and depressed?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

21. During the past 4 weeks, how much of the time have your emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?
1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

Appendix B

Early Lung Cancer Action Project (ELCAP) Follow-up Survey

SMOKING HISTORY

1. Over the past month, have you smoked cigarettes at all, even a puff?

1. No_____

2. Yes_____

2. Since your baseline CT scan, have you ever tried to quit smoking?

1. No_____

2. Yes_____

STAGE OF CHANGE

3. Are you seriously thinking of quitting smoking?

1. Yes, within the next 30 days

2. Yes, within the next 6 months

3. No, not thinking of quitting

GENERAL HEALTH STATUS

4. In general, would you say your health is?

Poor

Fair

Good

Very good

Excellent

LEVEL OF ACTIVITY

The following questions are about activities you might do during a typical day.

Does your health now limit you in these activities and, if so, how much?

5. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

1. Yes, limited a lot

2. Yes, limited a little

3. No, not limited at all

6. Strenuous activities, such as climbing several flights of stairs

1. Yes, limited a lot

2. Yes, limited a little

3. No, not limited at all

PHYSICAL HEALTH

The following questions are about the impact your physical health has on your ability to accomplish your work or other regular daily activities.

During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

7. Accomplish less than you would like?
 1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

8. Were limited in the kind of work or other activities?
 1. Yes, limited a lot
 2. Yes, limited a little
 3. No, not limited at all

9. How much did pain interfere with your normal work (including both work outside the house and housework)?
 1. Extremely
 2. Quite a bit
 3. Moderately
 4. A little bit
 5. Not at all

10. During the past 4 weeks, how much of the time have your physical health problems interfered with your social activities (like visiting friends, relatives, etc.)?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

EMOTIONAL HEALTH

During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems, such as feeling depressed or anxious?

11. Accomplished less than you would like?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

12. Did work or other activities less carefully than usual?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

The next four questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks:

13. Have you felt calm and peaceful?
 1. None of the time
 2. A little of the time
 3. Some of the time
 4. Most of the time
 5. All of the time

14. Did you have a lot of energy?
 1. None of the time
 2. A little of the time
 3. Some of the time
 4. Most of the time
 5. All of the time

15. Have you felt downhearted and depressed?
 1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

16. During the past 4 weeks, how much of the time have your emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?
1. All of the time
 2. Most of the time
 3. Some of the time
 4. A little of the time
 5. None of the time

Appendix C

Barry University Institutional Review Board Approval

to Conduct Study



Barry University
 Institutional Review Board
 Office of the Provost and Senior Vice President
 for Academic Affairs

11300 NORTHEAST SECOND AVENUE
 MIAMI SHORES, FLORIDA 33161-6885
 Direct (305) 899-3020
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Research with Human Subjects
 Protocol Review

Date: April 10, 2007
 Protocol Number: 07-03-13
 Title: Characteristics of Adult Tobacco Smokers and Their Smoking
 Cessation Outcomes After an Intervention Program
 Faculty Sponsor: Dr. Jo Ann Kleiter
 Meeting Date: March 21, 2007
 Name: Mary Campbell
 Address: 5207 Grant Street
 Hollywood, FL 33021

Dear Ms. Campbell:

Your protocol has been reviewed and accepted as exempt from further review. You may proceed with data collection.

As principal investigator of this protocol, it is your responsibility to make sure that this study is conducted as approved by the IRB. Any modifications to the protocol or consent form, initiated by you or by the sponsor, will require prior approval, which you may request by completing a protocol modification form.

It is a condition of this approval that you report promptly to the IRB any serious, unanticipated adverse events experienced by participants in the course of this research, whether or not they are directly related to the study protocol. These adverse events include, but may not be limited to, any experience that is fatal or immediately life-threatening, is permanently disabling, requires (or prolongs) inpatient hospitalization, or is a congenital anomaly cancer or overdose.

The approval granted expires on June 30, 2008. Should you wish to maintain this protocol in an active status beyond that date, you will need to provide the IRB with and IRB Application for Continuing Review (Progress Report) summarizing study results to date.

If you have questions about these procedures, or need any additional assistance from the IRB, please call the IRB point of contact, Mrs. Nildy Polanco at (305) 899-3020 or send an e-mail to dparkhurst@mail.barry.edu. Finally, please review your professional liability insurance to make sure your coverage includes the activities in this study.

Sincerely,

Doreen C. Parkhurst, M.D., FACEP

Doreen C. Parkhurst, M.D., FACEP
 Chair Institutional Review Board
 Assistant Dean, SGMS &
 Program Director, PA Program
 Barry University
 Box SGMS
 11300 NE 2 Avenue
 Miami Shores, FL 33161

cc: Faculty Sponsor

Appendix D

Jackson Health System Permission to Conduct Study



1611 N.W. 12th Avenue
Miami, Florida 33136-1096

July 14, 2006

Barry University
School of Nursing
11300 NE 2 Avenue
Miami Shores, FL 33161

To Whom it May Concern:

Please allow this letter to serve as my availability and willingness to service as a consultant on the research study entitled "Characteristics of Adult Smokers and Their Smoking Cessation Outcomes After An Intervention Program" submitted by Mary Mites Campbell.

As the Principle Investigator of the Jackson Memorial Hospital Early Lung Cancer Action Program, I have given Ms. Mites Campbell permission to use this population for data analysis. In my role as consultant, I will assist her in the study's population availability and help her with data entry. Since she is a beginning researcher, both she and I feel that she could benefit from my experience with research methodology, grant writing, and publication.

Please feel free to contact me if you desire additional information.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard J. Thurer".

Richard J. Thurer, M.D.
Jackson Memorial Hospital
University of Miami
B. and Donald Carlin Professor of Thoracic Surgical Oncology
Senior Associate Dean for Faculty Affairs
305-243-6551-office
305-243-5574-fax

Copy: Academic file of Mary Mites Campbell

Appendix E
Random Sampling Results

Research Randomizer Results

<http://www.randomizer.org/index.htm>

1 Set of 223 Unique Numbers Per Set

Range: From 50 to 446 -- Unsorted

Job Status:

Set #1:

340, 352, 89, 320, 387, 351, 119, 411, 294, 178, 235, 378, 70, 68, 72, 394, 170, 109, 386, 303, 310, 97, 253, 419, 270, 259, 341, 92, 198, 353, 312, 236, 384, 172, 234, 358, 186, 295, 397, 163, 117, 375, 91, 76, 107, 446, 118, 251, 202, 348, 334, 137, 314, 407, 222, 328, 442, 268, 342, 216, 205, 267, 193, 418, 182, 333, 144, 94, 197, 279, 365, 237, 350, 428, 426, 275, 106, 381, 326, 88, 223, 349, 183, 316, 421, 430, 389, 167, 111, 355, 53, 215, 361, 90, 61, 285, 304, 301, 168, 83, 154, 258, 396, 265, 417, 388, 64, 152, 306, 424, 57, 104, 180, 321, 191, 377, 96, 404, 308, 335, 55, 185, 354, 132, 290, 323, 317, 164, 50, 224, 124, 136, 95, 243, 433, 108, 179, 176, 439, 77, 392, 372, 110, 199, 139, 79, 371, 269, 359, 277, 360, 379, 105, 445, 271, 330, 60, 162, 122, 123, 327, 121, 347, 401, 133, 245, 429, 376, 413, 56, 189, 385, 157, 67, 383, 127, 112, 177, 307, 261, 58, 203, 240, 339, 395, 229, 329, 248, 232, 300, 233, 409, 219, 156, 420, 134, 400, 81, 391, 102, 432, 260, 141, 274, 264, 135, 196, 423, 252, 159, 153, 188, 131, 190, 173, 356, 75, 201, 390, 346, 221, 399, 286

Urbaniak & Plous (2006).

VITA

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|--------------|--|
| | Born – Miami, FL |
| 1990 | B.S., Florida International University, Miami, FL |
| 1994 | M.S., Barry University Miami Shores, FL |
| 1990-1993 | Clinical Nurse, Medical Division, Jackson Memorial Hospital, Miami, FL |
| 1993-1998 | Clinical Nurse Educator, Medical Division, Jackson Memorial Hospital, Miami, FL |
| 1998-2001 | Community-Based Nurse Case Manager, Jackson Health System, Miami, FL |
| 2000-Present | Adjunct Nursing Professor, Medical Campus, Miami-Dade Community College, Miami, FL |
| 2001-Present | Coordinator, Research Study, Early Lung Cancer Action Program, Smoking Cessation Program, Jackson Health System, Miami, FL |

PUBLICATIONS

- Mites-Campbell, M. D., & Nembhard, J. J. (2000). How educators see redesign. *Nursing Spectrum, 10*(7), 5.
- Mites-Campbell, M. D., & Hubbard, J. (2001). Lung Cancer and you—Know the risks. *Vital Signs, 11*(22), 11-12.

AWARDS

- 1996 Jackson Memorial Hospital Professional Excellence Achievement.
- 1998 Black Nurses Association Professional Service Award
- 2000 Jackson Memorial Hospital Professional Excellence Achievement
- 2001 Jackson Health System Nursing Professional Excellence Award
- 2004 Jessie Trice Cancer Prevention Project Heroes Award