ASSESSMENT OF HEALTH-PROMOTING FACTORS IN COLLEGE STUDENTS' LIFESTYLES

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ASSESSMENT OF HEALTH-PROMOTING FACTORS

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Except where reference is made to the work of others, the work described in this dissertation is my own or was done in collaboration with my advisory committee. This dissertation does not include proprietary or classified information.

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VITA

Eva Jean Dubois, daughter of Mrs. Frances Tweedy and the late Mr. Evan Dean Tweedy, was born September 10, 1953 in Iola, Kansas. She graduated from Iola High School in 1971. Jean attended Allen County Community College, Iola, Kansas, and in 1973 completed an Associates Degree in pre-nursing. After completing her pre-nursing degree she transferred to Pittsburg State University, Pittsburg, Kansas and completed the professional Baccalaureate in Nursing Science degree in 1976. Jean practiced as a nurse in a variety of settings in Kansas, Arizona, Missouri, and Arkansas before she returned to school to pursue a Master's of Science degree in nursing. She completed her first master's degree at the University of Mississippi Medical Center, Jackson, Mississippi in 1989 with a clinical focus in cardiovascular critical care and a functional tract in nursing education. Jean returned to school for her second master's education as a family nurse practitioner and completed this program in 1993. Since 1987 she has served as nursing faculty in associate, baccalaureate, and master's degree nursing programs in Arkansas, Mississippi, and most recently in Alabama. She has also practiced as a staff nurse in cardiovascular critical care, family nurse practitioner in private clinics, and clinical liaison with a local hospital. Jean has been pursuing her degree in Adult Education since 2002. She has been married to Mark R. Dubois for the last twenty-nine years and has three sons, Justin Taylor, Christopher Miles, and Benjamin Hayes Dubois.

DISSERTATION ABSTRACT

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Eva Jean Dubois

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The purposes of this study were designed to determine the degree to which college students engage in health-promoting lifestyles, identify differences in health-promoting lifestyles between undergraduate and graduate students, and determine if there were any differences in demographic findings that influenced participation in a health-promoting lifestyle. A total of 1,752 students from a large southeastern university participated in this study. The incidence and prevalence of chronic disease has continually risen in the southern states and a study of students from this region was designed to identify areas of greatest concern related to health promotion.

Participants completed a demographic data form and the Health-Promoting Lifestyle Profile II (HPLP II). The mean score for the entire sample was 2.68

(*SD* = .413) which is above the midpoint of 2.5 for the HPLP II. Students reported practicing more health-promoting behaviors in spiritual growth and interpersonal relationship and less health-promoting behaviors in health responsibility. The subscale scores for nutrition, physical activity, and stress management were all in the 2.5 range. Graduate students represented the largest participating class and scored highest on the total and health responsibility, nutrition, and spiritual growth subscales. Gender, BMI, smoking status, ethnicity, and major area of college study were significant predictors in six of the seven regression models. Smoking status and higher BMI had a negative impact on health behaviors. Older students, African-Americans, and students in health related fields had higher scores.

Numerous research studies have been conducted to assess the level of health or incidence of risk taking behaviors among college students and reveal that college students still do not consistently participate in health-promoting behaviors. Educational and interventional programs need to be implemented on college campuses and designed to promote student participation. Peer education and modeling by faculty could also be used to promote healthy behaviors in college students.

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CHAPTER I

INTRODUCTION

The majority of health problems in the United States (U.S.) today are the result of personal behaviors and/or environmental factors. In 2002, the top five leading causes of death (mortality) in the U.S. were heart disease, cancer, stroke, chronic respiratory disease, and accidents (National Vital Statistics Reports, 2005). Most of these disorders can be prevented or disease progression managed through the demonstration of behaviors that promote or protect the health of the individual. The use of health-promoting behaviors would also decrease the impact of genetic and environmental disease risks that can impact the individual. Health-promoting behaviors have been described in a variety of ways but most agree that health-promoting behaviors are displayed behaviors that are motivated by an individuals desire to increase personal well-being and seek the highest level of health potential.

The health of an individual is influenced by genetic predisposing factors and healthiness of the home environment. The health of the individual is also influenced by the community in which they live, surrounding environment, and society as a whole. Estimates reveal that 55% of the mortality in the U.S. is directly related to unhealthy lifestyle choices by the individual, 20% by genetic influences, and 25% from the environment (Pender, Murdaugh, & Parsons, 2002). Therefore, it is not possible to focus

on the individual alone when assessing health-promoting behaviors but family, environmental, and societal impacts must also be taken into consideration. Pender, Barkauskas, Hayman, Rice, and Anderson (1992) observed that improvement of health will require "(1) developing self-care and health promotion potential for individuals, families, and communities, (2) creating healthier environments for all citizens, and (3) restructuring the present health care delivery system to include health promotion and prevention as reimbursable services" (p. 106).

Health care providers have been encouraging health-promoting behaviors since the late 17th and early 18th centuries but the concept of health promotion did not became prominent in the United States until the 1940's (Rush, 1997). Rising mortality (death) and morbidity (disease) rates have forced governmental agencies to study the problem and set forth a variety of documents that outline health goals for the individual and the nation. The first U. S. Department of Health and Human Services (USDHHS) report, completed in 1979, was entitled *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* and outlined broad national goals for improving health of Americans by the year 1990 (Pender, Murdaugh, & Parsons, 2002; USDHHS, 2000). This report was followed in 1980 by *Health Promotion-Disease Prevention: Objectives for the Nation*; in 1990 with *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*; and finally in 2000 with *Healthy People 2010: Understanding and Improving Health* (USDHHS, 2000; Pender, Murdaugh, & Parsons, 2002).

The latest of these documents, *Healthy People 2010*, includes 467 objectives in 28 focus areas reflecting what has been learned over the last 20 years in the areas of

preventive medicine, surveillance of disease, and development of therapeutic treatments. It also takes into account the changing demographics of the U.S. and the influence of information technology on health care (USDHHS, 2000). *Healthy People 2010* identified several critical health indicators that will be tracked as measures of health promotion. These critical health indicators include; physical activity, overweight and obesity, tobacco use, substance abuse, responsible sexual behavior, mental health, injury and violence, environmental quality, immunizations, and access to health care (Pender, Murdaugh, & Parsons, 2002). Just as these critical health indicators are vital for the health of our nation, identification of similar health indicators are essential to creating healthy environments on the nation's campus settings.

In 2002, The American College Health Association created a companion document to *Healthy People 2010* entitled *Healthy Campus 2010: Making it Happen* which included over 200 health objectives and planning guidelines for colleges and universities across the nation (American College Health Association, 2002). Leading health indicators noted in the *Healthy Campus 2010* document mirror those found in the nation as a whole and include; physical activity, overweight and obesity, tobacco use, substance abuse, responsible sexual behavior, mental health, injury and violence, environmental quality, immunizations, and access to health care (American College Health Association, 2002).

According to the U.S. Department of Education there are approximately 15.9 million students enrolled in more that 4,000 colleges and universities for which the American College Health Association (ACHA) conducts annual health assessment surveys. Data compiled from these surveys are used to generate guidelines for

intervention programs that can be used by campus leaders (The American College Health Association, 2005). Data were retrieved from the 1998 ACHA-National College Health Assessment (NCHA) which is a 300 item questionnaire using information from several other campus based assessment tools and health indicators identified in *Healthy Campus 2010.* The latest results were obtained from the Spring 2003 assessment conducted on 33 postsecondary institutions involving 19,497 students (The American College Health Association, 2005).

When the sample of this survey (19,497) is compared to the current 15.9 million students it represents a very small percentage of the total postsecondary student population. For that reason, "Standard five of ACHA's *Standards of Practice for Health Promotion in Higher Education* suggests that health care providers in higher education conduct population-based assessments of students' health status, needs, and assets as a critical indicator of evidence-based practice" (The American College Health Association, 2005, p. 200). Assessment of health-promoting behaviors in college students will provide valuable information that would provide direction for the development of individualized campus programs and will help create a healthier student body.

Statement of the Problem

The health of young adults is critically linked to the health status they will have as older adults. Regardless of the fact that health promotion standards have been established and advocated for all ages, many individuals have not adopted a health-promoting lifestyle. Even with this common knowledge about the benefits of a health-promoting lifestyle, it is disturbing that college students continue to participate in harmful health habits such as a sedentary lifestyles, unhealthy food choices, tobacco intake, substance

abuse, unsafe sexual practices, and other risk taking behaviors (The American College Health Association, 2005; Pender, Murdaugh, & Parson, 2002). The majority of college students are between the ages of 18 and 24 years of age, placing them in the young adult stage of development (The American College Health Association, 2005). Studies that concentrate on this age group are important because young adulthood is considered a time when an unhealthy lifestyle may be alterable (Brener & Gowda, 2001). Health-promoting behaviors adopted as a young adult have a greater probability of leading into a higher level of health as the individual ages. An individual's overall state of health is directly related to the health-promoting behaviors they incorporate in their lifestyles no matter what age. Thus, the health-promoting behavior of college students needs considerable research attention.

Health is also influenced by risk taking behaviors. The following risk taking behaviors were identified in the 1995 *National College Health Risk Behavior Survey (NCHRBS)*; tobacco use, unhealthy diet, sedentary lifestyle, alcohol and/or drug use, risky sexual activities, and behavior that result from violence or unintentional injury (Youth Risk Behavior Surveillance System, 1997). NCHRBS questionnaires were completed by 4,609 eligible undergraduate students from two and four year colleges and universities between January and June 1995. Data from this survey reflected behaviors that put the students at health risk for current and future health problems. Twenty-nine percent of the NCHRBS sample were current cigarette smokers. Students reported that within 30 days prior to survey 27% drove after drinking alcohol and 34.5% indicated episodic heavy drinking (five or more drinks at one setting at least once in the 30 days preceding the survey). Sexual risk taking behaviors were evident with 34.5% reported six

or more sexual partners in their lifetime and only 29.6% had used a condom during intercourse occurring within the three months preceding the survey. Unhealthy dietary habits were reflected in that 20.5% reported being overweight, 73.7% indicated that they had failed to eat five or more serving of fruits and vegetables on the day preceding the survey, and 21.8% had eaten three or more high fat foods on the day preceding the survey. Exercise was also below the recommended levels with 37.6% reporting vigorous and 19.5% indicating moderate exercise within the week prior to the survey (Youth Risk Behavior Surveillance System, 1997).

The NCHRBS data is now ten years old and therefore a current study to assess college student behaviors that result in a health-promoting lifestyle and/or risk behavior identification is needed to provide current data. University settings foster the development, implementation, and maintenance of health education/promotion programs because the students have common health issues, students tend to be receptive to educational programs, universities support health programs that will lead to a healthier campus and higher academic achievement, and most universities include cost of programs in student fees making them readily accessible (Brener & Gowda, 2001). Individual university campus assessment of health-promoting and risk-taking behaviors will better meet the needs of the individual college student, university administration, and campus community by providing direction to education and intervention programs. These programs would be based on individual campus data reflecting the needs of the specific college student population.

Purpose of the Study

The purpose of this study was threefold: 1) to determine the degree to which college students engage in health-promoting lifestyles; 2) to identify differences in health-promoting lifestyles between college freshman, sophomore, junior, senior, and graduate students; and 3) to determine if there are any differences in demographic findings that contribute to or prevent participation in a health-promoting lifestyle. Information gained from this study will be used to develop assessment, educational, and intervention programs to promote health-promoting behaviors among college students. Demographic findings may elicit target groups where assessment, education, and intervention are a priority to prevent future health problems.

Research Questions

The following research questions were used in this study:

1) What is the overall health-promoting lifestyle (as assessed by the Health-Promoting Lifestyle Profile II) among a sample of college students (undergraduate and graduate) attending a large southeastern university?
2) What are the health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management in college students?
3) Is there a difference between freshmen, sophomore, junior, senior, and graduate students in overall health-promoting lifestyle or in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management?

4) Are there differences in overall health-promoting lifestyle score and subscale scores that can be explained by demographic survey findings?

Significance of the Study

Chronic diseases such as heart disease, cancer, stroke, chronic respiratory disease, and diabetes have been steadily increasing in incidence and prevalence in the United States and appearing in younger individuals than in the past (Kickbusch, 2003). Obesity has become an epidemic problem in the U.S. today and is present in pre-school and school-aged children (Bodenheimer, Lorig, Holman, & Grumbach, 2002). Research has established genetic links for disease and discovered relationships between behaviors and disease. Environmental influences are also known to contribute to the onset and progression of diseases (Kickbusch, 2003). In society today, the individual is held responsible for their own personal health promotion and disease prevention. Individuals are no longer just concerned with avoidance of illness but are also interested in behaviors that can positively influence health promotion and prevent disease and/or disability (Pender, Murdaugh, & Parsons, 2002). Studies that concentrate on young people are important because young adulthood is considered a time when an unhealthy lifestyle may be alterable.

Limitations to the Study

The sample consisted of 1,752 undergraduate and graduate students enrolled in a large southeastern university. Several limitations prevented generalization of the findings beyond this sample. These include:

1) Students that participated in this study were volunteers from one university. Therefore, findings from this study may not be representative of all graduate and undergraduate college students across the country.
2) Students who participated in the study may differ from those students that chose not to participate.
3) The sample for this study was one of convenience which may influence the results.
4) Participants had similar educational levels and were of similar age. Therefore, results can not be generalized to other individuals of different educational levels and age.
5) Health-promoting and/or risk taking behaviors may be influenced by family medical history, home environment, culture, personal health problems, peer influence, or other factors. Therefore, results cannot be generalized to other individuals with different external influences.
6) Data were collected using self-report method. Self-report method information can not be guaranteed which therefore limits generalizability.

Assumptions of the Study

There were several assumptions made for this study. They are as follows:

1) The respondents understood the nature of the questions on the demographic data form and the Health-Promoting Lifestyle Profile II (HPLP II).
2) The researcher assumed that the respondents answered the questions on the demographic data form and the HPLP II accurately and honestly.

3) It was assumed that the HPLP II reliably measures health-promoting behaviors in the areas of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.

Definitions of Terms

Community "is a social group determined by geographic boundaries and/or common values and interests. Its members know and interact with one another. It functions within a particular social structure and exhibits and creates norms, values and social institutions" (Stanhope & Lancaster, 2004, p. 342).

Community health "fundamental of community health are peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice, and equity" (Pender, Murdaugh, & Parsons, 2002, p. 27).

Disease preventing behavior is behavior which serves to detect and prevent specific diseases (Pender, Barkauskas, Hayman, Rice, & Anderson, 1992).

Family health is a "dynamic changing state of well-being, including biologic, psychological, sociological, spiritual, and cultural factors of the family system" (Pender, Murdaugh, & Parsons, 2002, p. 26).

Genetic predisposition refers to an individual's genetic make-up, those factors with which he/she is born with that may suggest a risk of disease (U.S. Department of Health and Human Services, 2000; Walker, Volkan, Sechrist, & Pender, 1988).

Geographic community "is based on legal or geopolitical areas such as cities, town, or census tracts" (Pender, Murdaugh, & Parsons, 2002, p. 27).

Health is a "multidimensional phenomenon with biopsychosocial, spiritual, environmental, and cultural dimensions…in a positive model of health, emphasis is

placed on strengths, resiliencies, resources, potentials, and capabilities rather than on existing pathology" (Pender, Murdaugh, & Parsons, 2002, p. 16).

Health promotion "is the science and art of helping people change his/her lifestyle to move toward a state of optimal health" (American Journal of Health Promotion, 1989).

Health-promoting behavior " is behavior motivated by the desire to increase well-being and actualize human health potential" (Pender, Murdaugh, & Parsons, 2002, p. 7).

Health protection behavior "is behavior motivated by a desire to actively avoid illness, detect it early, or maintain functioning within the constraints of illness" (Pender, Murdaugh, & Parsons, 2002, p. 7).

Morbidity relative disease rate, usually expressed as incidence or prevalence of a disease (Stanhope & Lancaster, 2004).

Mortality relative death rate; the proportion of deaths at a particular time and place (Stanhope & Lancaster, 2004).

Optimal health "is a balance of physical, emotional, social, spiritual, and intellectual health" (American Journal of Health Promotion, 1989).

Relational communities "are based on how people interact to achieve common goals" (Pender, Murdaugh, & Parsons, 2002, p. 27).

Organization of the Study

Chapter I provides an introduction to the study, provides a problem statement which identifies support for the need to study health-promoting behaviors, describes the purpose of the study, delineates specific research questions, identifies significance, addresses limitations, lists assumptions, provides definitions of key terms, and describes

the organization of the study. Chapter II includes a review of related research starting with an historical overview of health promotion and followed by a description of Pender's Health Promotion Model. Chapter II will also include a review of research related to health behaviors of American college students including health interest and concerns, health beliefs, alcohol use, tobacco use, sexual behaviors, exercise, nutrition, psychosocial impacts on health, stress management, and current health education, promotion, and prevention programs. Chapter III reports the methods used in the study, including the population and subsequent sample, description of instruments used, data collection procedures, and statistical analysis. An objective presentation of the findings from this study will be presented in Chapter IV. Summarizations from the study, conclusions, limitations, implications, and recommendations for future study and practice will complete this document in Chapter V.

CHAPTER II

REVIEW OF LITERATURE

The purpose of the study was to investigate the degree to which college students engage in health-promoting lifestyles, to identify differences in health-promoting behaviors between freshman, sophomore, junior, senior, and graduate students, and lastly to determine if any demographic findings contributed to or prevented participation in health-promoting lifestyles. Before new knowledge can be generated, there needs to be an examination of previous literature and research regarding health-promoting and risk-taking behaviors of college students. This chapter starts with a review of related research starting with a historical overview of health promotion and followed by a summary of Pender's Health Promotion Model, which serves as the theoretical framework for this study. Following the historical overview and summary of the theoretical framework a review of research related to health behaviors of American college students will ensue including; health interest and concerns, health beliefs, exercise, nutrition, psychosocial impacts on health, and stress management. Also included in this review of research will be factors that negatively impact the health of college students including alcohol use, tobacco use, and high risk sexual behaviors. At the end of this chapter current college health education, promotion, and prevention programs will be reviewed.

Historical Overview of Health Promotion

The First International Conference on Health Promotion was held in Ottawa, Canada in November 1986. This conference was attended by health care and governmental representatives from around the world and was a gathering primarily in response to a new public health movement of health promotion that was surfacing (Catford, 1997; World Health Organization [WHO], 2005). Participants in this conference pledged to advocate a commitment to health through their political influence on public health policy and individual health to achieve Health for All by the year 2000 and beyond (Catford, 1997; WHO, 2005). There was some doubt during these deliberations whether it would be possible for the concept of health promotion to survive in the political arena. However, the reality has been that the concept of health promotion has not only survived but thrived since this first health promotion conference, known as The Ottawa Charter (Catford, 1997). The Ottawa Charter was co-sponsored by the Canadian Public Health Association, Health and Welfare Canada, and the World Health Organization (WHO, 2005).

The concept of health promotion that evolved out of The Ottawa Charter and supported by the WHO was identified and promoted through the public health systems in a variety of nations. Health promotion was identified as a process of "enabling people to increase control over, and to improve, their health" (WHO, 2005, p. 1). Promotion of health was identified as a collaborative effort between the individual and his/her environment. The Ottawa Charter identified several prerequisites for health. These prerequisites include: "peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice, and equity" (WHO, 2005, p.1). Therefore,

improvement requires efforts made by the individual as well as governmental influence on policies to improve the environment and facilitate health and health care resources.

Health promotion policies and programs have been put in effect by governmental strategies, consumer interest groups, and medical and nursing professional organizations. Since 1986 millions of federal, state, local, and interested individual dollars have been invested in health promotion programs with remarkable results (Catford, 1997; Rafael, 1999). The Ottawa Charter proposed the development of healthy public policy that would lead to environmental changes to support health for the community, environment, as well as the individuals. University degrees are now offered in health promotion and the concept of health promotion has become an underlying theme to nursing, medical, dental, pharmacy, and other health professional curriculums.

Programs that support health promotion can also be seen at the national and international level. The United States Department of Health and Human Services (USDHHS) proposes to lead America to better health, safety, and well-being (United States Department of Health & Human Services [USDHHS], 2005). The USDHHS is the principal agency for protecting the health of all Americans by providing essential human services, especially to those groups who are least able to provide for themselves. USDHHS represents more than 300 health related programs and includes immunization services, food and drug safety, Medicare, Medicaid, disease control and prevention, Indian health, health services for migrant workers, programs for children, families and aging, as well research and educational branches related to disease states, safety and wellness (USDHHS, 2005). The USDHHS was initiated in the 1790's with the passage of an act to create a federal network of hospitals to care for merchant seamen; this

legislation was the forerunner of today's U.S. Public Health Service (USPHS). A sampling of the health promotion programs that have been implemented following The Ottawa Charter in 1986 include: the Agency for Healthcare Research and Quality (1989); Nutrition Labeling and Education Act (1990); Vaccines for Children Program (1993), which provides free immunizations to all children in low-income families; State Children's Health Insurance Program (1997), which enables states to extend health care coverage to uninsured children; The Ticket to Work and Work Incentives Improvement Act (1999), that makes it possible for American with disabilities to rejoin the workforce; and lastly the Medicare Prescription Drug Improvement and Modernization Act (2003) that improves Medicare benefits and including a prescription drug benefit (USDHHS, 2005).

The USDHHS was also responsible for the series of reports on health, health promotion, and disease prevention. The first USDHHS report, completed in 1979, was entitled *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* and outlined broad national goals for improving health of Americans by the year 1990 (Pender et al., 2002). This report was followed in 1980 by *Health Promotion-Disease Prevention: Objectives for the Nation*; in 1990 with *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*; and finally in 2000 with *Healthy People 2010: Understanding and Improving Health* (Pender, et al., 2002).

The latest of these documents, *Healthy People 2010*, includes 467 objectives in 28 focus areas reflecting what has been learned over the last 20 years in the areas of preventive medicine, surveillance of disease, and development of therapeutic treatments.

It also takes into account the changing demographics of the U.S. and the influence of information technology on health care (USDHHS, 2005).

It is evident that the government, medical, nursing, and other health care professions value the concept of health promotion. Empowerment of the individual to attain their highest level of health and the governmental agencies commitment to providing a health environment will help the U.S. and the world achieve the vast number of objectives set forth in *Healthy People 2010*.

Pender's Health Promotion Model

The theoretical framework for this study comes from the assumptions and propositions of the Health Promotion Model (HPM) developed by a nurse, Nora J. Pender, and her colleagues. Pender's HPM synthesized research findings from nursing, psychology, behavioral influences, biological science, and public health into an explanatory model of health behavior that originally appeared in the nursing literature in the early 1980's (Pender, et al., 2002). The HPM is grounded in concepts found in Health Belief Theory, Expectancy-Value Theory, and Social Cognitive Theory (Pender, et al., 2002).

The original HPM model was a proposed framework to examine the complex biopsychosocial behaviors that motivate an individual to engage in activities that promote health. This original model included seven cognitive-perceptual factors (importance of health, perceived control of health, perceived self-efficacy, definition of health, perceived health status, and perceived benefits of and barriers to health-promoting behaviors) and five modifying factors (demographic and biological characteristics, situational and behavioral factors, and interpersonal influences) (Pender et al., 2002). The HPM model

was revised in 1996 to reflect the interrelationship of behavioral and cognitive variables and the addition of three new variables: "activity-related affect, commitment to a plan of action, and immediate competing demands and preferences" (Pender, et al., 2002, p. 68).

Pender's HPM recognizes the multidimensional nature of health promotion and individual interactions with their interpersonal and physical environments in pursuit of optimal health. Pender hypothesizes that each person exhibits unique personal characteristics and experiences that will influence and predict future health related behaviors. These influences can be either direct or indirect. Direct influences are synonymous with the development of healthy habits in which the health promoting activity is automatic over time. Indirect influences are those anticipated and/or experienced benefits to an individual's health-promoting behaviors. Relevant personal factors that can be predictive of health-promoting behaviors can be categorized as biological (age, height, weight, pubertal and/or menstrual status, and exercise capacity), psychological (self-esteem, self-motivation, and perceived health status), and sociocultural (ethnicity, education, and socioeconomic status) (Pender, et al., 2002).

The major motivational variables within the HPM are included in the behavior-specific cognitions and affect section. Perceived benefits and barriers, perceived self-efficacy, activity-related affect, and interpersonal and situational influences constitute these health-promoting motivational variables. An individual is more likely to engage in a health-promoting behavior if they perceive benefits (increased alertness, decreased fatigue, or social interactions) from the activity and are less likely to engage if they perceive barriers (expense, time, or difficulty) to the health-promoting behavior. Perceived self-efficacy to perform a certain health-promoting activity will increase an

individual's participation in said activity. Health-promoting activities that are perceived as fun, delightful, or enjoyable will be more likely to have a positive activity-related affect on an individual than those activities that are perceived as disgusting or unpleasant. Interpersonal influences include the expectation of significant others (family, peers, or health care providers), social support (instrumental and emotional encouragement), or modeling (learning through watching others). Individuals have been shown to participate in more health-promoting activities when situational influences make them feel competent and compatible as opposed to incompatible, unsafe, or threatening environments (Pender et al., 2002).

Commitment to a plan and immediate competing demands and preferences are other factors in Pender's HPM that influence an individual's participation in health-promoting behaviors. Commitment to a plan of action implies an underlying cognitive process by the individual to participate in health behaviors at a given time, place, and to eliminate any completing demands. This commitment also includes cognitive strategies for eliciting, carrying out, and reinforcing the health-promoting behavior (Pender, et al., 2002). Immediate competing demands and preferences can also influence an individual's participation in health-promoting behaviors. Family, work, or other situation in which the individual has very little control have been identified as competing demands where as choosing alternate activities or situations where the individual has a high level of control are competing preferences. The key to control over competing demands and preferences is the individual's ability to self-regulate and not give in to these competing influences (Pender, et al., 2002).

Through the discussion of the HPM it is evident that the expected outcome of the model is the individual's participation in health-promoting behaviors. Pender, et al. (2002) noted that "health-promoting behaviors, particularly when integrated into a healthy lifestyle that pervades all aspects of living, should result in improved health, enhanced functional ability, and better quality of life at all stages of development" (p. 74).

Even though Pender's HPM was constructed with the individual in mind it was also constructed in response to the global health agenda outlined in The Ottawa Charter, the WHO, and the works of the USDHHS. Pender, et al. (2002) identified several strategies that they felt would help achieve health for all on a global scale and include the following: "(1) empowering people by providing the latest health information and decision-making opportunities; (2) strengthening local systems of primary health care; (3) improving education and training programs in health promotion and prevention for health professionals; (4) applying science and technology to critical health problems; (5) using new approaches to problems such as violence that have resisted solution; (6) providing culturally appropriate assistance to the least developed countries; and (7) establishing a process for examination of the world challenges that must be addressed to make good health a reality for the masses" (p. 4).

The HPM challenged the medical model of health care in that it represents a proactive instead of a reactive model. The traditional medical model of healthcare reflects intervention only after an individual develops an acute or chronic disease representing treatment after the fact (Pender, et al., 2002). This reactive model does not reflect health promoting and/or disease preventing interventions that are incorporated in Pender's

HPM. Pender's model also strives to close the gap between the vast amount of knowledge on health-promotion and disease-prevention and its application in the health care practice setting.

Health Beliefs of College Students

There have been multiple studies conducted measuring the health beliefs of college students. Transition to college life is known to be an exciting as well as stressful time for adolescents and young adults. The traditional college student is one that enters college immediately following completion of high school (18 to 19 years or age) and is forced to adapt to significant changes. These changes include adapting to academic workloads, new support networks, and a new environment (Von Ah, Ebert, Ngamvitroj, Park & Kang, 2004). Coupled with these changes and new responsibilities the college student has greater freedom and control over their lifestyles. Therefore, this transitional period should be an opportune time to establish health behaviors when in reality it becomes a time when some college students engage in behaviors that place their health at risk (Von Ah, et al., 2004). These behaviors include, but are not limited to, smoking, drinking, risky sexual behavior, sedentary lifestyle, poor dietary intake, and ignoring safety habits such as wearing seat belts, bike helmets, and unprotected sun or tanning booth exposure. Multiple studies have been conducted that cite the Health Belief Model (HBM) as an explanatory model to determine the likelihood of performing preventive health practices among college students.

The HBM contends that people who are knowledgeable about their risk of disease or injury will modify their behavior to decrease the risk (Glanz, Lewis, & Rimer, 1997). This model is a psychological model first developed in the 1950's by social psychologists

Hochbaum, Rosenstock, and Kegels during their work with the Public Health Department. The HBM attempts to explain and predict health behaviors. The model focuses on health attitudes and beliefs of the individual and is based on three core assumptions. These assumptions are founded on the understanding that an individual will take health-related actions if: (1) they feel that a negative health outcome can be avoided, (2) taking a recommended health promotion action will prevents a negative outcome, and (3) the individual can successfully initiate the recommended health promoting activity (Glanz, et al., 2002). The HBM was developed with four constructs (susceptibility, severity, benefits, and barriers) representing perceived threats and/or net benefits. These constructs were used to describe the individual's readiness to act as cues to action and addressed the concept of self-efficacy (one's confidence in their ability to successfully perform the action) (Glanz et al., 1997).

Von Ah, et al. (2004) conducted a 2001 study that included 161 college students enrolled in an introductory psychology course at a southeastern university. The average age of the participant was 19.7 years of age, 74% female, 26 % male, 44% white, and 56% non-white. These students completed a self-report questionnaire regarding stress (Perceived Stress Scale), social support (Social Support Questionnaire), self-efficacy survey, and perceived threat, benefits, barriers, questionnaire following concepts outlined in the HBM. Measures of self-efficacy were measured using a 41-item questionnaire developed specifically for this study and based on Bandura's Theory of Self-Efficacy. A 46-item Health Behavior Questionnaire was also developed specifically for this study to help measure the constructs of HBM: perceived susceptibility, severity, benefits, and barriers to health promoting behaviors (Von Ah et al.,, 2004). Following multiple

regression analysis findings neither perceived stress nor availability or satisfaction with social support had a significant impact on health behavior. The most noted finding was that a high level of self-efficacy was a significant predictor of positive health behaviors related to drinking, physical activity, proper nutrition, general safety and protection from the sun. Smoking was the only risk taking behavior that was not significantly changed by a high level of self-efficacy. Many individuals continued to smoke even though they knew it was harmful to their health. The researchers hypothesized that smoking continued in these individuals even with known risk because they felt that they had the self-efficacy to quit at any given time (Von Ah et al., 2004). Von Ah, et al. (2004) concluded that health behavior established during the college years may have a significant impact on future health behaviors and therefore decrease the occurrence of acute or chronic diseases in later life. They also proposed the development and implementation of a variety of disease prevention and health promotion programs on college campuses.

Birkimer, Johnston, and Berry (1993) conducted research comparing the predictive power of the theory of reasoned action, the theory of planned behavior, and the theory of trying. These theories relate a variety of internal constructs that influence the performance of health-related behaviors. Participants in the study consisted of 185 American college students enrolled at a major midwestern university during the 1990-1991 academic year. Data were collected from self-report questionnaires and the Rosenbaum Self-Control Schedule. Two of the self-report questionnaires were used to determine health behaviors and predictors. The health behavior questionnaire asked participated to what degree do they currently participate in a variety of health-related activities (smoking status, dietary intake, and exercise). Two questionnaires attempted to

measure predictors of health behaviors by asking the student's opinion on their perceived degree of health risk with participation in certain risk-taking behaviors. Another questionnaire that also attempted to measure predictors of healthy behaviors asked participants how much they agreed that participation in certain behaviors increased their risk of chronic health problems such as heart disease, lung disease, and other acute or chronic health conditions. Rosenbaum's Self-Control Schedule was also assessed with these participants to identify predictors of health behavior (Birkimer, et al., 1993).

Descriptive statistics and stepwise multiple regression analysis was used to analyze the findings from the multiple questionnaires used in this study. Results of this study reflected that the average participant reported generally healthy behavior, did not participate in tobacco use, consumed moderate saturated fat and cholesterol in their diet, and participated in moderate exercise (Birkimer, et al., 1993). Most participants reported that they had received health education informing them of health risks associated with certain risk taking behaviors. Findings revealed that the participants strongly or moderately believed that these risk taking behaviors had an impact on their health and that avoidance of risk taking behaviors would lead to an improved level of health. However, potential feelings of guilt, support from friends, and the self-control schedule were three variables that were revealed in the data measuring predictors of health behavior that proved to be superior to the informed, belief, or rules measures. The authors concluded that because guilt and help from friends proved to be the most significant variables related to health behaviors of college students, further research should be conducted measuring these concepts (Birkimer, et al., 1993).

Another study of health practices and medical regimen adherence in college students was conducted by Christensen, Moran, and Wiebe (1999) through assessment of irrational health beliefs. Christensen et al. (1999) recognized that the role of cognitive factors and their influence on health-related behavior has held a prominent place in health promoting behavior and research since the 1950's. Even though these authors recognized that the basic construct of the HBM (perceived health benefits outweigh any barriers) will lead an individual to engage in health promoting behaviors, they also recognize some limitations to the HBM. It is argued that a major limitation of the HBM involves the assumption that health-relevant information is appraised and acted on in a rational manner (Christensen et al., 1999). From this perspective if an individual appraises a health-related situation in a distorted manner, then this individual can not predicatively act in a health promoting manner. Christensen et al. (1999) report that past descriptive reports are consistent with the view that some subjects hold irrational beliefs that can undermine health practices and/or adherence to an established medical regime.

The purpose of the study conducted by Christensen et al. (1999) was to provide initial validation (internal consistency and construct validity) of a 20-item Irrational Health Belief Scale (IHBS). The IHBS was a tool designed to assess individual differences in the tendency to engage in health-related cognitive distortions. Study groups were divided into 392 undergraduate psychology students (nonclinical sample) without chronic illness and a group of 107 individuals (clinical sample) with Type 1 diabetes mellitus. The study group of 392 college students revealed an average age of 19.1 years of age, 40% male, and 60% female. Participants in this study group completed the IHBS survey, Personal Lifestyle Questionnaire, Big Five Inventory, Positive and Negative

Affect Scale, and the Multidimensional Health Locus of Control scales. Hierarchical regression analysis was conducted to determine if there was a unique contribution of the IHBS to health practices. Results reveal greater health-related cognitive distortion (higher IHBS scores) was related with lower positive affectivity, greater negative affectivity, weaker internal health locus of control, and stronger change health locus of control (Christensen et al., 1999).

The clinical sample in this study consisted of 107 Type 1 diabetics. Mean age for this group was 41.7 years with 49% males and 51% females. These subjects were recruited from two endocrinology clinics. Compliance diagnostic studies (HbA1C – objective measure of average blood sugar level over 8-weeks and indirectly reflecting compliance with diabetes treatment regime – lower score reflects greater compliance), self-reported adherence to treatment regime, IHBS score, neuroticism, conscientiousness, and medical comorbidity were measured. Hierarchical regression analysis was used to determine the unique contribution of the IHBS to the compliance measure HbA1C. Results from this group reflected a negative correlation between IHBS and HbA1C scores indicating a higher level of cognitive distortion with higher HbA1C resulting in a lower level of compliance with the medical regime (Christensen et al., 1999).

Findings from this study suggest that our current use of health prevention and promotion programs need to add a component to determine if program participants come with a maladaptive, distorted way of thinking about health. If irrational health beliefs are present in participants of an educational class, interventions to remove these distorted thoughts need to be addressed before it can be assumed that the provision of health information will be effective. This study also introduces another concept that is present in

the health belief literature, optimistic bias. Optimistic bias is described as a conviction that "individuals generally tend to believe that they are less susceptible to risk than those around them" (Christensen et al., 1999, p. 169). Several studies involving college students have been conducting looking at the impact of optimistic bias on health beliefs, health promoting behaviors, and risk-taking activities.

Impact of Optimistic Bias on Health Beliefs

Smoking is a common risk-taking behavior that college students participate in even with an understanding of the risks involved with long term tobacco use. Prokhorov et al. (2003) conducted a study involving 1,283 community college students in the Houston area. Health-related factors, prevalence of respiratory symptoms, and perceived health status, were compared to smoking status and stage of change for quitting. These variables were evaluated to determine the effectiveness of their potential use as motivators for smoking cessation.

This study was part of the Project Look at Your Health, funded by the National Cancer Institute, to determine the effectiveness of smoking cessation programs designed to address personal health issues and readiness to change smoking behaviors (Prokhorov et al., 2003). A 122-item survey instrument was administered to assess variables that had been hypothesized as related to smoking behaviors among college students. Sociodemographics, smoking behavior, stages of change, respiratory symptoms and chronic respiratory diseases, perceived health status, and perceived smoking-related vulnerability were subscales within this survey (Prokhorov et al., 2003). The sample consisted of students between the age of 18 and 35 with 76% female and 24% male.

Statistical analyses were performed using analysis of variance and logistic regression. Findings revealed an optimist bias among the current smokers in the sample (n = 201) regarding smoking and their related health. Even though respiratory symptoms were reported more frequently in current smokers than those that had never smoked, 19% of the smokers felt their health was better than the same-age nonsmoker. "Furthermore, virtually all of the smokers perceived that their health was either not at all or only slightly affected by smoking, and almost half of smokers thought that quitting would bring either no benefit or only minor benefit to their health" (Prokhorov et al., 2003, p. 545). Further analysis reveals that 45% of the current smokers believed that their continued smoking would have minor or no impact on their health. Significance of this study would be for smoking cessation educators to consider measuring and demonstrating the health-related respiratory symptoms and associated smoking health problems as possible enhancing motivators to quit (Prokhorov et al., 2003).

Green, Grant, Hill, Brizzolara, and Belmont (2003), conducted a study to measure the risk perception of heart disease among college men and women. Participants included two groups of students, one group included 341 undergraduate students enrolled in physical activity classes at a large 4-year university and the other group consisted of 129 undergraduates in general business class at a midsized 4-year university (total n = 470). The mean age of the sample was 22.2 years with 45.7% male and 54.3% female as the gender breakdown. Data were collected from a 40-item questionnaire to assess the perception of causality between coronary heart disease (CHD) risk factors. This instrument measured condition or behaviors thought to comprise the risk factors associated with CHD as noted in the current cardiovascular literature and defined by the

American Health Association. Participants used a 10-point scale (10 being the strongest causality) to note associated strength of behavior as a cause or potential cause of CHD.

Findings revealed no significant differences in the 2 groups on any of the dependent variables measured so further analyses were conducted on total number and not by student groups. Descriptive statistics and chi-square analysis was used to provide statistical findings for this study. Overall findings revealed that the older the students the greater their ability to identify health behavior and/or risk-taking behaviors that were perceived to increase the risk of CHD. However, it was noted that all "participants lacked an understanding of some of the basic relationships necessary to perceive the risk of heart disease accurately" (Green et al., 2003, p. 210). Green et al. (2003) reported that one of the most important findings of their analysis was that the total group not only underestimated their risk for heart disease but that 68% of the respondents viewed their risk as lower or much lower than their peers, indicating a clear optimistic bias.

As noted in the studies above, optimistic bias is another factor that needs to be considered with assessing health-promoting behaviors of college students. It also needs to be considered when constructing and implementing health education programs on college campuses.

Exercise

The health benefits of physical activity and exercise have been supported in the research literature for many decades. It is a well established fact that regularly active individuals have lower rates of morbidity (disability) and mortality (death). Active individuals also have improved psychological, cardiovascular, and respiratory health.

Evidence indicates that regular physical activity patterns established in childhood will have a positive influence on the quality of one's life in later years (Pender, et al, 2002).

Exercise as a health-promoting behavior is undisputed and findings of exercise based studies provide compelling reasons to adopt and maintain an active lifestyle. "Unfortunately, the level of physical activity declines during adolescence so that about 70% of American adults are sedentary or inactive and are below the recommended level for health benefits. According to the 2000 National College Health Assessment, 57% of male and 61% of female students report that they performed no vigorous or moderate exercise on at least 3 of the previous 7 days" (Buckworth & Nigg 2004, p. 28).

Buckworth and Nigg (2004) conducted their study at a large midwestern university during the fall and spring semesters. Total participants included 493 undergraduate students enrolled in elective conditioning activity courses. The sample reflecting 58.3% female, 41.7 male, 73.8% white and 26.2% non-white. These students were fairly evenly distributed between the freshmen (28.4%), sophomore (24.3%), junior (24.1%), and senior (21.0%) classes. Questionnaires were administered to the participants and included items on age, gender, racial/ethnic group, academic class, exercise behavior, physical activity history, and sedentary behaviors. Statistical analyses included descriptive statistics, analysis of variance (ANOVA), multiple regression, and Pearson correlation.

Results revealed that participants reported spending almost 30 hours a week engaged in sedentary behaviors. However, they also reported being engaged in moderate ($\geq$ 5 of the previous 7 days) to vigorous activities ($\geq$ 3 of the previous 7 days) during the past week. These findings were higher than the students sampled in the 1995 National

College Health Risk Behavior Survey (NCHRBS) and 2000 National College Health Assessment (NCHA) (Buckworth & Nigg, 2004). Buckworth and Nigg (2004) also reported significant differences between men and women in relation to sedentary activities with men reporting more time watching television (TV), videos, and at the computer. However, the male participants also reported higher levels of activity. Reports of the older student spending more time in sedentary activities (computer activity) was also a significant finding of this study but was hypothesized as related to the increased demands of the upperclassman. The researcher felt that the measures of sedentary activities (watching TV, videos, studying, and time at the computer) for this study could not be discriminated from responsibilities for academic demands. It was suggested that in future studies that sedentary activities be separated into recreational versus obligatory to differentiate levels of perceived choice of activities.

Buckworth and Nigg (2004) suggest that college health promotion educators construct a program that makes physical activities more accessible and rewarding than the recreational sedentary activities. Making physical activities more accessible will have an immediate long-term health benefit for college students of all ages.

Another exercise study investigated the potential for enhancing exercise on college campuses. Merrill, Chatterley and Shields (2005) investigated selected statistical measures as a means to motivate college students to exercise. It was noted that the reporting of health statistics (incidence and prevalence of disease as related to lack of exercise) to participants in health educations classes has been a long standing teaching method for college health educators to attempt to motivate students to engage in exercise. However, many behavior change models reflect that knowledge itself is not a motivating

factor for behavior change. On the other hand, health behavior change theory is based on the fact that behavior change requires a rational decision-making process that considers the risk of illness and the benefits of the health promoting activity of exercise. Therefore, the purpose of this study was to identify different statistical measures most likely to motivate an adequate level of physical activity among undergraduate college students.

Data were collected through the distribution of a focused questionnaire measuring demographics, stages of change, motivation statements and statistical reporting related to exercise (Merrill et al., 2005). Five hundred and forty six students participated in this study with the mean age of 22.3 years. Women (79%) and white non-Hispanic (93%) were the majority of respondents.

Descriptive statistics, *t* tests, multivariate analysis of variance and mean differences were statistical tests used in this study. Mean differences were specifically used to measure the influence of statistical reporting as a motivator to increase the participant's level of exercise. It was noted that the reporting of risk ratios (adults are four times as likely to be obese than those who exercise regularly) had greater motivating influence to increase exercise that the reporting of percentages (15% of adults who do not exercise regularly suffer from depression) (Merrill et al., 2005). However, it was noted that the statistical message given to an audience regarding health and the benefits of health-promoting behaviors, like exercise, actually depends on the needs of the recipients. Therefore, the results of this study implicate the use of social marketing. Merrell, et al. (2005) define social marketing as a program-planning process that attempts to understand the needs of the consumer (specific target audience). This approach advocates a survey of the target audience to determine learning needs that would guide instruction. Through the

survey of the target audience it would help guide the health educator as to which (if any) statistical measures to include in the health message to facilitate (motivate) the expected change in behavior.

Brown (2005) used the Exercise Benefits/Barriers Scale (EBBS) to help understand variables that may influence levels of physical activity among college students. Demographics, cognition, behaviors, social and physical environments have been identified as promising variables to influence the level of exercise among individuals. In particular, two cognitive variables (perceived benefits and perceived barriers) have consistently been cited in the literature in reference to activity levels. Therefore, the EBBS was one of the tools used in this study by Brown (2005) measuring benefits and barriers to physical activity.

Participants included 398 undergraduate students attending a midwestern state university. Age of participants ranged from 18 to 35 years of age (mean 19.5). Female participants represented 57% of the sample, 69.6% were freshman, and 93.5% were Caucasian. Subjects completed the EBBS, Physical Exercise Self-Efficacy Scale (PESES), and a Physical Activity Recall (PAR). The findings of this study may not be representative of the population because a large proportion of the sample (81.8%) met the current U.S. recommended guidelines for physical activity which is not representative of the college population. However, in regard to the benefits and barriers scale, only the benefits scale was statistically significant in regard to the proportion of variance in physical activity. This can be interpreted positively in that increased levels of perceived benefits will be associated with higher levels of physical activity. On the other hand, perceived barriers were not found to be statistically significant, associated to decreased

levels of activity. Again, this could be related to the unrepresentative sample in this study (Brown, 2005). Even though the results of this study can not be generalized to other college populations, the validity of the EBBS, PESES, and PAR were validated and could be used in future studies with other college student groups.

Studies that investigate physical characteristics of college students are also important when reviewing literature related to exercise in college students. Tremblay and Chiasson (2002) designed a study to investigate fitness characteristics of college men and women and compared their findings to the Canadian Fitness Study that was conducted in 1981. Participants in this study were enrolled in a Canadian University in 1999 and consisted of 423 males (49.8%) and 427 females (50.2%) between the ages of 17 and 20. Students included in this study passed the Physical Activity Readiness Questionnaire (Par-Q) to determine the safety to participate in the fitness evaluation measurements used in this study (Tremblay & Chiasson, 2002).

The following fitness related variables were measured: estimated maximal oxygen uptake using a step test, upper body muscular fitness measured by maximal number of push-ups without effort, skinfold caliper measures of adipose (fat) tissue, waist circumference as an index of central body fat accumulation, and completion of a questionnaire examining variables that correlate with fitness (Tremblay & Chiasson, 2002). Descriptive statistics and one-way ANOVA were used during statistical analyses. The overall results revealed that the college students in 1999 were not as physically fit as those studied in 1981. The main findings in the present study revealed that the student of today demonstrated "lower muscular fitness and greater body weight and subcutaneous adiposity (fat)" (Tremblay & Chiasson, 2002, p. 572). The results of this study were

somewhat predictable because of the increased documentation of a more sedentary lifestyle for current college students. These findings can also be supported by other studies that document a lower level of participation in vigorous activities that would logically lead to in lower level of physical fitness.

Changes in physical activity level between high school and college was the focus of two studies looking at barriers to exercise and implications for health and psychological well-being. Gyurcsik, Bray and Brittain (2004) investigated ways to cope with barriers that appear during the transition from high school to college in regard to vigorous physical activity. "Epidemiological evidence shows that approximately 75% of North Americans do not engage in sufficient amounts of vigorous physical activity and that the population becomes increasingly less active with age, with the most dramatic decline occurring between adolescence and young adulthood" (Gyurcsik, et al., 2004, p. 130).

Participants in this study included 132 freshman students at a midwestern university between the age of 17 and 19. Females comprised 70.4% of the sample with males 29.6%. Caucasians comprised the majority of the sample (85.6%) and 96.2% were single. Gender, ethnicity, age, program of study, height, and weight were demographic variables collected. Barriers to vigorous physical activity were measured using a semi-structured, open-ended questionnaire, a multi-item questionnaire was used to measure coping self-efficacy to overcome barriers to physical activity, task self-efficacy was measured by a 3-item questionnaire assessing ability to engage in 20 minutes of continuous exercise, and Godin's Leisure Time Activity Questionnaire was used to assess vigorous physical activity (Gyurcsik, et al., 2004).

Data were analyzed using descriptive statistics and regression analysis. Five types of barriers were identified by this sample: intrapersonal, interpersonal, institutional, community, and physical/environmental. The most frequently barriers for each type include: intrapersonal – lack of motivation; interpersonal – social invitation during work-out time; institutional – high school workload; community – lack of transportation; and physical/environmental – weather. In 47% of the participants levels of vigorous activity (2.82 weekly sessions of at least 20 minutes) fell below the recommended level for weekly activity (3 – 20 minute weekly sessions). Regression analysis for coping and task self-efficacy revealed that coping self-efficacy was a significant predictor of task self-efficacy. Secondly, vigorous physical activity was regressed on task self-efficacy revealing that task self-efficacy was a significant predictor of vigorous physical activity. In the third multiple hierarchical regression analysis, vigorous physical activity was regressed on task self-efficacy and the coping self-efficacy with the overall model reaching significance (Gyurcsik, et al., 2004).

Results from this study indicated that transitioning students were not sufficiently vigorously active in relation to perceived barriers, levels of task and coping self-efficacy. This is important from a health promotion perspective for college based health educators to help transitioning students decrease perceived barriers and increase levels of task and coping self-efficacy.

Bray and Born (2004) also investigated changes in vigorous activity during the transition to the university. Instead of looking at barriers to vigorous activity and self-efficacy, this study measured vigorous physical activity and psychological well-being. Participants were 145 first-year (18 or 19 years of age) Canadian university students.

Data were collected using a self-report questionnaire measuring levels of physical activity based on the 1995 National College Health Risk Behavior Survey (NCHRBS). For the purpose of this study vigorous physical activity was defined as "activities requiring moderate to strenuous effort that are sustained long enough to cause one to break a sweat or to breathe heavily" (Bray & Born, 2004, p. 183). Two questionnaires were used to assess psychological well-being as represented by mood and psychological distress. Mood was assess using the Profile of Mood States – Adolescent (POMS-A) and included measures of vigor, tension, confusion, anger, fatigue, and depression. The General Health Questionnare-28 (GHQ-28) was used to assess psychological distress (somatic symptoms, social dysfunction, anxiety, insomnia, and severe depression) (Bray & Born, 2004).

Results revealed a decrease in vigorous physical activity from high school (3.32 sessions/week) to freshman year of college (2.68 sessions/week). Multivariate analysis of variance (MANOVA) revealed significant difference (Wilk's $\lambda = .869$, $F(10, 128) = 1.93$, $p < .05$) in psychological well-being between those active during high school and those students who had become insufficiently active during the first two months at the university (Bray & Born, 2004). This study also has implications for college based health educators in that a decrease in regular vigorous activity will lead to physical symptoms such as fatigue, tension, and possibly depression. Therefore, health education programs that focus on barriers as well as benefits of exercise could help the incoming freshman student realize the importance of finding time for at least the recommended vigorous exercise regime of three 20 minutes sessions/week.

As revealed in the previously cited studies it is evident that exercise is a significant health-promoting behavior for college students. However, there are several studies that combined diet with exercise in their investigation as well as the associated risk factor of obesity. These will be reviewed together in the following section.

Exercise, Nutrition, and Obesity

In the U.S. obesity has reached epidemic proportions in all age groups and poses as a major risk factor for premature death and disability (Huang et al., 2003). Currently, two thirds of U.S. adults are overweight (body mass index [BMI] is $\geq$ 25 kg/m^2) and more than 15% of U.S. adolescents are obese (BMI $\geq$ 95th percentile). "Between 1991 and 1997, the greatest increase in obesity (BMI $\geq$ 30 kg/m^2) was found among 18 to 29 year olds (7.1% to 12.1%) and those with some college education (10.6% to 17.8%). By 2001, the prevalence of obesity among 18 to 29 year olds further increased to 14% and 21% among those with some college education" (Huang et al., 2003, p. 83).

Huang et al. (2003) used a convenience sample of 736 college students aged 18-27 years to complete surveys related to weight status (BMI), dietary habits (fruit, vegetable, and fiber intake), and physical activity (aerobic exercise, strength training, and physical education). The sample consisted of 51.9% male, 47.9% female, and 90.7% Caucasian. Results were presented for the total sample and then by gender. Self-reported height and weight were used to calculate BMI percentiles. The Berkeley fruit, vegetable and fiber screener was used to assess servings of fruit, vegetable, and fiber intake. Three questions from the Youth Risk Behavior Survey were used to measure physical activity. Descriptive statistics, chi-square and *t* tests were used in the analysis of this study (Huang et al., 2003).

Overall prevalence of overweight and obesity, using BMI directly, resulted in 21.6% overweight and 4.9% obese in this sample. Men had a greater tendency to be overweight but not obese. Approximately 69% of the sample consumed less that the five servings of fruits and vegetables recommended per day and 67.1% consumed fewer than the recommended 20g of fiber per day (Huang et al., 2003). Huang et al. (2003) reported that women consumed less fiber than men per day. Students in this study engaged in aerobic activity an average of 2.8 days, 2.2 days strength training (three days is recommended), and 0.9 in physical education during a seven day period.

Nutrition and exercise educational implications are obvious following this study but with the addition of overweight and obesity, partnering with the student health center for weight management would be beneficial. These authors noted that colleges and universities are the ideal setting for intervention programs to target poor health practices because college students are still forming lifestyle patterns that will impact future health.

In a similar study, Racette, Deusinger, Strube, Highstein, and Deusinger (2005) assessed weight, dietary patterns, and exercise in college freshman and sophomores. Participants entered the study as freshmen and were studied over the next two years. Two hundred and seventy-four freshmen were included in the study in 1999 and an additional 490 were added with the 2000 incoming freshman class (total $n = 764$). Ages ranged from 18-20 with 53% female and 47% male in the sample. Participants completed a demographic form and a health history. Other data collection included obtaining their height/weight (used to calculate a BMI). BMI was calculated by dividing body weight in kilograms by height in meters squared (kg/m^2). A normal weight was classified as $< 85^{th}$ percentile, at risk for overweight 85^{th} to 95^{th} percentile, and overweight as $> 95^{th}$

percentile. A stages-of-change questionnaire (based on the transtheoretical model of behavior change) was used to assess self-reported participation in aerobics, strengthening, and stretching exercise. A dietary inventory was also completed. This dietary questionnaire assessed whether students were "(1) meeting the guidelines established by the 5-a-Day campaign to eat at least five fruits and vegetables daily; (2) limiting fried food intake to less than three times during the previous week; (3) limiting intake of high-fat fast foods to less than three times during the previous week; and (4) consuming 64 ounces of noncaffeinated, nonalcoholic beverages daily" (Racette et al., 2005, p. 246).

Statistical analyses included descriptive statistics for comparison of demographic findings. Continuous data (BMI) were analyzed using *t* test and categorical measures of exercise status were analyzed using chi-square to determine the difference between male and females. Paired sample *t* tests were used to examine changes between the freshman and sophomore year (Racette et al., 2005).

Overall, the findings in this study reflected a potentially significant weight gain of approximately 9 pounds in 70% of the students during the first two years of college. Other findings included the inactivity and unhealthy dietary behaviors that are consistent with students during their early college years. Only about half of the participants engaged in regular aerobic exercise (20-60 minutes/day for 3-5 days/week) and 30% did not engage in any exercise on a regular basis. Dietary intake in this sample was also below the recommended five servings of fruits and vegetables/day. There were minimal changes in dietary habits and physical activity noted from the freshman to the sophomore year. For example, the Five-a-Day fruit and vegetables consumption was 30% as freshmen and increased to 32% in the sophomore year. Individuals that did not participate in any form

of exercise were 30% as freshmen and decreased to 29% at the sophomore year (Racette et al., 2005).

Because nearly two thirds of the adult population is classified as overweight, it is critical that appropriate and effective health promoting programs be implemented on college campuses. Authors concluded that "promotion of healthy lifestyle behaviors early in college may have long-term benefits throughout adulthood that would serve to reduce the rising incidence of physical inactivity, overweight, and obesity in our society" (Racette et al., 2005, p. 250).

Nutrition

It is well established in the literature that college students have poor eating habits that fall far below the nutritional guidelines set forth by the experts. It is recommended that college students consume five or more fruits/vegetables/day, eat three or less servings of fried foods/week, and three or less high-fat fast foods/week (Racette et al., 2005). Cason and Wenrich (2002) conducted a needs assessment of undergraduate college students in regard to health and nutrition beliefs, attitudes, practices and perceived educational needs. Data were collected using quantitative and qualitative measures from students at a southern land-grant university. A total of 94 students completed the web survey which provided the quantitative data for this study and an additional 36 students participated in focus group interviews.

The quantitative survey for this study was a researcher developed questionnaire containing sections on healthy lifestyles and food habits, student participation in activities and organizations, and demographic characteristics. Face and content validity for this instrument was established by a panel of experts. Descriptive statistics, independent *t*

tests, Pearson product-moment correlation, chi-square, and one-way ANOVA were used to report the findings from this survey (Cason & Wenrich, 2002).

Cason and Wenrich (2002) also conducted and audiotaped six evening focus group interviews with freshman, sophomore, junior and senior students. A semi-structured questioning format was used by an experienced moderator and co-moderator during these one hour sessions. Eleven questions on nutrition and physical health were used during the focus group interviews and were reviewed prior to use for content and readability by a faculty member with adolescent growth and development expertise. Questions were also piloted with students in an undergraduate nutrition class.

The average age of student that participated in this study was 20 years of age with 92% in the 18 to 21 year range. Females (69%), Caucasian (86%), freshmen (31%), and juniors (32%) represented the majority of subjects that participated. Gender differences were evident in the findings from the questionnaire. Males consumed more fast food, meats, poultry, fish, milk, dairy products, and read more Nutrition Facts Food labels than females. Female respondents were more likely to try to lose (62%) or maintain current weight and were more likely to use the food pyramid to make food choices. Freshmen and seniors were more likely to eat snack food and seniors also reported less use of the food pyramid to guide food choices than any of the other classes (Cason & Wenrich, 2002).

Themes that emerged from the focus groups supported other research in the area of nutrition in the college student and confirmed that the majority of college students do not make healthy food choices. High fat food, frequent fast food meals, meal skipping, lower than recommended intake of fruits, vegetables, and dairy products, as well as a

lower than recommended level of physical activity were the most prominent themes that emerged from the focus groups. Time and location were noted as reasons why dietary habits and exercise patterns were not as healthy as recommended. Class, work, and homework schedules provided conflict with time to cook and exercise. Location (environment) was noted as having an impact because of all the fast food restaurants on and in close proximity to the campus. Lack of gym facilities, walking trails, and bike friendly streets were noted as barriers to increasing exercise levels (Cason & Wenrich, 2002).

Suggestions for improving college based educational programs on nutrition and exercise were revealed in the focus sessions. Having a well-known college-aged speaker (such as a student athlete), providing healthy food tasting with preparation tips at the educational session, and conducting interactive sessions with hands-on activities were several of the suggestions that emerged in regard to perceived nutritional/exercise informational needs (Cason & Wenrich, 2002). Overall, the students were knowledgeable about the need for proper nutrition and adequate levels of physical activities but recognized multiple barriers to compliance. This study, as well as other studies, noted that habits learned and/or demonstrated in the college student can lead to lifelong issues with health related to poor nutrition and a sedentary lifestyle.

Georgiou et al. (1997) conducted a study that compared health-related characteristics, health habits, and food choices between college students, nonstudent college graduates, and nonstudent noncollege graduates. Since the majority of nutrition studies on college-aged students has been conducted on college students these researchers felt it important to investigate if education had an influence on health food intake. Data

for this study were collected from a cross section of 18 to 24 year olds from nine states. Potential subjects were contacted via telephone and if agreed to participate were mailed a questionnaire. Usable questionnaires were received by 1,338 young adults reflecting 56.6% female, 43.3% male, and 94.3% Caucasian. The sample was represented by 55.3% current students, 13.8% college graduates, and 30.9% nonstudents.

The instrument used in this study was described as lengthy and included demographic data (age, gender, marital status, weight, eating habits, ability to read nutrition labels, alcohol intake, smoking status, and median income), attitude and behavior items related to diet, and a food frequency questionnaire that specified weekly intake of grains, vegetables, fruits, dairy, and meat products (Georgiou et al., 1997).

Statistical analyses used in this study included ANOVA, chi-square, and descriptive statistics. Results from this study provided evidence that health-related personal characteristics and food habits and choices differ among the three groups studied. Nonstudents reflected poorer nutritional intake and more of a tendency to be overweight than college students and college graduates. Students and graduates reported eating more foods with higher dietary fiber, more fruits and dark green vegetables, and lower fat meats and dairy products than the nonstudent group. Conclusions made by the researchers were that even though the college student and college graduate consumed a healthier diet and maintained a more ideal body weight they still did not meet the nutritional standards set by the American Dietetic Association (ADA) and put themselves at risk for future health problems. However, these authors felt that the nonstudent was at higher risk for future health problems because of current health behaviors and lack access to the health-promoting programs offered on college campuses (Georgiou et al., 1997).

Dieting and the notion that it is desirable to be less than ideal body weight is common place for college women. Studies have shown that women fall victim to the message that you need to be thin to be attractive and therefore resort to poor dietary habits and excessive exercise to maintain their appearance. Because of this trend Snelling, Schaeffer, and Lehrhoff (2002) conducted a study investigating dieting and nutritional patterns of college women. They used their findings to suggest female specific educational programs for implementation by college health educators in the areas of healthy eating and dieting.

The sample for this study was composed of 215 female volunteers in the nursing or allied health field who completed the Health and Habits Questionnaire (HHHQ) which is a food frequency and amount instrument. The HHHQ is a 100-item questionnaire based on 24-hour dietary recall research. Demographic characteristics of age, ethnicity, frequency of dieting (never, 1-5, or >5 times), height and weight (converted to BMI) are also included within the HHHQ. Results were reported using descriptive statistics in the form of percentages, means, and standard deviations (Snelling et al., 2002).

Snelling et al. (2002) reported that expected and unexpected results surfaced during data analysis. Expected findings were that overweight women (13%) or obese (4%) were significantly more likely to report dieting, 33% and 11% respectively. However, a surprising high number of normal weight subjects also reported frequent dieting. Notably, 88% in the normal weight group had been on 1-5 diets, and alarmingly 69% had participated in 5 or more diet regimes. Overall, 73% of the entire sample (normal weight, overweight, and obese) reported dieting behavior and over 50% indicated that they had dieted at least three times. However, further investigation of

dietary patterns did not reveal an unhealthy diet in any of the categories (normal weight, overweight, or obese). Daily caloric intake for the total sample averaged 1,950 calories with 54% from carbohydrates, 29% from fats, and 16% from protein. These findings are within the recommended levels for good health proposed by the National Research Council.

Based on these findings it does not appear that the HHHQ was able to measure if subjects were just watching what they ate or were actually participating in extreme dietary restrictions. This would definitely be a limitation to this study. Another limitation would be that the sample came from nursing and allied health professional students who have been noted in the literature to follow a healthier diet than the average college student.

Psychosocial Impacts on Health

Pender et al. (2002) noted that health can be impacted by psychosocial influences. Social support, stress, and psychological distress are three psychosocial factors that the literature identifies as having an impact on physical health, health promotion activities, and the individual's sense of belonging. There have been multiple studies looking at the impact of these psychosocial factors on the health of the individual.

Hale, Hannum and Espelage (2005) examined the impact of social support as a multifaceted construct that is a significant predictor of physical health. These authors conducted a study using 247 undergraduate college students (134 women, 113 men) at a large midwestern university examining the association between social support and physical health. A second purpose of their study was to differentiate the impact of several domains of support (emotional support, appraisal and affirmation, informational

assistance, intimacy, comfort, and physical affections) on college students' health (Hale et al., 2005). Participants included in this study completed a demographic data sheet, measures of social support (tangible support, belonging, disclosure, and social intimacy, and measures of physical health (health perceptions and physical symptoms). Subscales (tangible support, belonging and disclosure) from the Interpersonal Support Evaluation List, College Version (ISEL) measured the three areas of social support. Social intimacy was assessed using the Miller Social Intimacy Scale (MSIS), subjective health perceptions were measured with the Health Perceptions Scale of the abbreviated Rand Medical Outcomes Study (MOS) instrument (HPERC), and the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS) measured the general physical symptoms of the participants (Hale et. al., 2005).

Descriptive statistics, correlation and regression analysis were used to identify the critical support components or components of social support that were predictive of higher levels of physical health and health perceptions. Two dependent variables (health perceptions and physical symptoms) and four independent variables (tangible support, belonging, disclosure, and social intimacy) were used in the analysis of this study. Descriptive findings revealed similar levels of tangible support, belonging, disclosure, and social intimacy among participates. Analysis of health perceptions and physical symptoms reflected a healthy population of participants. Correlation analysis revealed positive correlations between the three subscales of the ISEL (tangible support, belonging, and disclosure) as well as the two intimacy measures (disclosure and social intimacy). The two outcome, health perception and physical symptoms, were also positively correlated in that those who reported more physical symptoms also reported

poorer health perceptions. When evaluated by gender, the independent variable belonging was statistically significant with health perceptions for women (r = -.30, p < .01) and statistically significant with physical symptoms for men (r = -.22, p < .01). Forced entry regression analyses were used to predict tangible support, belonging, disclosure and social intimacy in relation to health perception and physical symptoms. The overall model in relation to health perception was significant for women but not men and the model related to physical symptoms was not significant for either women or men. In the regression analyses, higher levels of belonging were found to be predictive of better health perceptions for women and associated with fewer physical symptoms for men, which was also evident in the correlation analyses. Results of this study were found to be consistent with findings reported in the literature on social support, which shows that having a network of positive relationships results in better health (Hale et al., 2005).

Another study looking at psychosocial impacts on health was conducted by Mahon, Yarcheski, and Yarcheski (1998) who investigated the impact of social support and loneliness on positive health practices. Mahon et al. (1998) used a correlational research design to examine the extent that loneliness mediates the relationship between perceived social support and positive health practices of young adults, age 22 to 34, enrolled in undergraduate courses at a large urban university.

Three instruments were used to collect data for the Mahon et al. (1998) study; the Personal Lifestyle Questionnaire (PLQ), the Personal Resource Questionnaire (PRQ85), and the Revised UCLA Loneliness Scale. The PLQ measured the six health-related practices of exercise, nutrition, relaxation, substance use, safety, and health promotion. Social support was measured using the 25-item PRQ85 and subjective experiences of

loneliness measured with the 20-item Revised UCLA Loneliness Scale (Mahon et al., 1998). Correlational analyses supported the hypothesized relationships identified by the researchers in this study in that all were statistically significant and in the direction predicted (Mahon et al., 1998). First, the relationship between perceived social support (PRQ85) and positive health practices (PLQ) was positive and statistically significant ($r = .47$, $p < .001$). Second, a statistically significant inverse relationship was found between perceived social support and loneliness ($r = - 65$, $p < .001$). Finally, loneliness and positive health practices were also found to have a statistically significant inverse relationship ($r = - .54$, $p < .001$). To test the impact of loneliness as a mediating variable on social support and positive health practices, three regression models were used. The first model (regressing loneliness on perceived social support) revealed that perceived social support negatively influenced loneliness, explaining 43% of the variance in loneliness. Perceived social support positively influenced positive health practices in the second model (regressing positive health practices on perceived social support) and explained 22% of the variance in the positive health practices. Sixteen percent of the variance in positive health practices was explained in the third model (regressing positive health practices on both perceived social support and loneliness) where loneliness negatively influenced positive health practices and perceived social support added 4% to the explained variance in positive health practices beyond the 16% contributed by loneliness. These findings support the study hypothesis that loneliness is at least one mediator in the relationship between perceived social support and positive health practices in young adults (Mahon et al., 1998).

As noted in the above studies, social support has been studied in terms of its role in the promotion of health. However, Edwards, Hershberger, Russell and Markert (2001) expanded this field of research to investigate the influence of stress and negative social exchange on health symptoms of college students. In this study, the authors examined the unique contributions of positive and negative social support in the relationships between stress and health symptoms among undergraduate students at a large state university.

Edwards et al. (2001) had 206 (108 men and 98 women) who volunteered to participate in their study. Participants in this study completed the Life Experiences Survey (LES) measuring life-change stress, chronic life stress was measured using the Hasseles Scale (HS), positive social exchanges was evaluated using the Social Support Inventory (SSI), and the Test of Negative Social Exchange (TENSE) was used to calculate nonsupportive social interactions. The Mental Health Index (MHI) provided an overall mental health score and two sub-scale scores measuring psychological well-being and psychological distress. Physical symptoms and sensations were assessed using the Pennebaker Inventory of Limbic Languidness (PILL). Data analyses consisted on descriptive, correlational, and multiple regression.

Several mean differences by gender were found in this study. Women reported significantly more negative social exchange and physical symptoms than the men as well as significantly lower psychological well-being scores with women in comparison to men. Correlational analyses revealed an inverse relationship between positive social support and negative social exchange. A statistically significant correlation between negative social exchange and physical symptoms was found ($r = .42$, $p < .001$) and was stronger than the correlation of any other variables with either physical or mental health.

All correlations among positive social support, negative social exchange, life event stress, and daily hassles were significant reflecting that greater stress (life event and hassles) was associated with poorer physical and psychosocial health. Six multiple regression models were analyzed with only two models revealing significant findings. The first significant model used physical symptoms, as measured by PILL, as the outcome variable which was regressed against life-even stress, daily hassles, social support, and negative social exchange (predictor variables). In this analysis negative social exchange and daily hassles accounted for the greatest variance (27% collectively) in physical symptoms. In the second regression model, psychological well-being (as measured by the MHI subscale) was used as the outcome variable and regressed against the same predictor variables. Daily hassles (HS) was the only significant predictor of psychological well-being and explained 13% of variance (Edwards et al., 2001).

Findings from this study identified negative social exchange as a significant predictor of physical symptoms and stress from daily hassles adds another dimension to the psychosocial impacts of individual health. These findings support the basis for the next study that evaluates the impact of relaxation techniques and cognitive behavioral skills to reduce psychological distress and perceived stress in college students.

Stress Management

Deckro et al. (2002) examined the effects of a six week mind/body intervention on college students' psychological distress, anxiety, and perception of stress. It is a well known fact that stress is a major issue for college students and the findings of various research studies reflect that college students have reported being overwhelmed with academic, personal, and social pressures. Even though a certain level of stress is needed

to improve performance, too much can negatively affect health. Therefore, this study was designed to examine one approach to manage stress in the college population.

A prospective randomized controlled design was used to evaluate the effect of a 6-week mind/body intervention on a self-selected group of students. One hundred twenty-eight students were randomly assigned to an experimental group (n = 63) or a control group (n = 65). The experimental group received six-90 minute group-training sessions in relaxation responses (diaphragmatic breathing, guided imagery, progressive muscle relaxation, brief relaxation exercises, yoga stretches, and mindfulness) and cognitive behavioral skills (identifying automatic thoughts, challenging cognitive distortions, affirmations, and goal setting). Each 90-minute training session consisted of lecture, discussion, and demonstration of materials as well as weekly practice of relaxation responses (RR) and cognitive behavioral interventions (CBI). It was hypothesized that the students in the experimental group would demonstrate reduction in psychological distress, anxiety, the perception of stress, and increase health-promoting behaviors during and following the completion of the intervention program as compared to the control group. Pre- and post-intervention testing was conducted on the experimental and control groups using the Global Severity Index subscale within the Symptom Checklist-90-Revised (GSI-SCL-90-R), Spielberger State-Trait Anxiety Inventory (STAI), Perceived Stress Scale, (PSS), Health-Promoting Lifestyle Profile II (HPLP II), and a demographic and health habits survey. The control group was put on a waitlist while the experimental group participated in the 6-week sessions (Deckro et al., 2002).

Descriptive statistics were used to analyze the findings in this study. Statistical analyses revealed no baseline differences between the experimental and control groups

on any of the psychological or demographic variables. However, statistically significant findings were found in the post-testing results with greater reductions in psychological distress (GSI-SCL-90-R), state anxiety (STAI), and perceived stress (PSS) in the experimental group ($p = 0.18$; $p = .001$; and $p = .008$ respectively) when compared to the control group. Differences on the HPLP II indicated a trend toward improvement in health promoting behaviors for the intervention group, but did not reach statistical significance. Deckro et al. (2002) concluded that their study supported the hypothesis that college students who attended a 6-week RR and CBI intervention program would demonstrate reduction in psychological distress, anxiety, and the perception of stress as compared to the control group.

Multiple research studies have been completed on college students evaluating factors that negatively impact their physiological health. The following section will provide a review of current research related to alcohol use, tobacco use, and participation of high risk sexual behaviors in relation to overall health.

Alcohol Use

Alcohol has a significant impact on the health of individuals and increases the risk of social consequences for both individuals and communities. It is reported that alcohol use accounts for approximately 75,000 deaths and $184 billion dollars in overall economic costs in the U.S. annually (Nelson, Naimi, Brewer, & Wechsler, 2005). Nelson et al. (2005) reports that binge drinking (consumption of 5 or more drinks on a single occasion) results in "acute impairment and is associated with a variety of problems including motor vehicle crashes, other unintentional injuries, assaults, domestic violence, rape, unintended pregnancy, vandalism, alcohol poisoning, and alcohol dependence" (p.

441). Alcohol consumption, under-age drinking, binge drinking, and altered perceptions of drinking problems are common among the college students on campuses today. This section will review various studies examining alcohol use and associated problems with college students. All articles reviewed addressed the significant prevalence and incidence of underage and college drinking. Physiological, psychological, and social impacts of alcohol use disorders will be reviewed in this section as well as articles related to predicting abuse, perceptions of drinking, and campus alcohol policies. This section will begin with an article that conducted an extensive review of literature on alcohol use in college students.

Zeigler et al. (2005) conducted a review of literature on all articles published between January 1990 through February 2003 related to effects of alcohol use on adolescents and college students. A MEDLINE search resulted in 1,371 articles initially which were narrowed to those that discussed the epidemiology of alcohol use in adolescents and young adults, pharmacology of alcohol, and consequences of alcohol consumption. Statistics on underage drinking were gathered from government publications and surveys from the National Institute of Drug Abuse (NIDA), Centers for Disease Control and Prevention (CDC), National Institute on Alcohol and Alcoholism (NIAA), National Highway Traffic Safety Administration (NHTSA), and Harvard School of Public Health (HPH). Eighty-seven references were used to provide a comprehensive overview of problematic alcohol consumption with adolescents and young adults in regard to epidemiology, neurological impacts, long-term consequences, and social impacts (Zeigler et al., 2005).

Epidemiological findings revealed that underage drinking is present in virtually every community in the U.S. and that the age when young people begin drinking decreases each year with 12 years being the average age for a first drink. According to the 2000 survey by NHTSA, alcohol use was 2.6% at 12 years of age but increased to 67% by the time the individual was 21 years (Zeigler et al., 2005). This survey also reported some staggering statistics related to the pattern of alcohol use among this age group (12-21 years) who are, for the most part, not of legal age to drink. Of the 10 million youths who reported drinking alcohol in the past 30 days, 6.8 million were classified as binge drinkers (5 or more alcoholic beverages on the same occasion at least once in the past 30 days) and 2.1 million were classified as heavy drinkers (5 or more alcoholic beverages on the same occasion at least five times in the last 30 days). When looking at college students (18-22 years) 42% reported binge drinking and 18% heavy drinking in the past month. Ziegler et al. (2005) identified findings from the 2002 NIAA report on college drinking which indicated that 31% meet the diagnostic criteria for alcohol abuse with 6% classified as alcohol dependent.

College drinkers participate in more heavy and binge drinking than any other age group examined which can lead to physiological changes in the brain and liver without evidence of chronic disease. Results of these studies revealed that underage and college students are at greater risk of neurotoxicity and harmful cognitive effects due to alcohol use as compared to those who start drinking later in life. Physiological changes in the liver have been documented in this age group in the form of elevated liver enzymes reflective of liver damage. Even though chronic disease related to alcohol use is unlikely to be present in the college student, these students report more medical complaints in the

form of headaches, sleep disturbances, appetite changes, weight loss, skin conditions, depression, mood disorders, problems with concentration, blackouts, hangovers, class absences, and poorer marks than their peers (Ziegler et al., 2005).

Heavy drinking was also shown to result in a number of neuropsychological deficits including "deficits in verbal and nonverbal performance; memory and learning; problem-solving; abstract reasoning; visuospatial function and perceptual motor skills" (Ziegler et al., 2005, p. 27). Neuropsychological tests also noted that individuals with an alcohol use disorder had lower verbal and full-scale IQ scores and demonstrated inferior performance in total reading, reading recognition, and spelling achievement when compared to controls.

Scientific research has confirmed that alcohol is a neurotoxin and Ziegler et al. (2005) reported that neurophysical changes were noted during studies that compared heavy drinkers to a control group. Magnetic resonance imaging (MRI) of the brain revealed that alcohol dependent individuals had significantly less functional activity in the frontal and parietal regions of the brain, particularly in the right hemisphere. Decreased neurological function was noted during activities related to memory such as copying a complex picture or solving a puzzle.

Ziegler et al. (2005) also reviewed literature related to the social environment and social impact on underage and college drinking. Peer pressure, right of passage into adulthood, expected behavior on college campuses, learned behavior in family setting, and increased access to alcohol on college campuses were identified as contributors to increase underage and college drinking coming from the social environment. Social impacts of rape, unwanted pregnancy, contraction of a sexually transmitted disease,

decrease self-image, lower level or self-confidence, and poorer academic performance were themes that emerged from this extensive review of literature related to college student alcohol use.

Physiological and psychological impacts of alcohol use in college students can not be ignored and it has been clearly established in the literature that drinking during the early college years is a normative behavior. Therefore, O'Conner and Colder (2005) designed a study that would identify predictors of increased alcohol use in freshmen students in the hopes of identifying effective prevention programs. A total of 533 freshman students (191 men, 342 female), under the age of 21, were included in this study. Data were collected, at a large public university, during the fifth week of the fall semester on the assumption that each participant would be more likely to be at a similar stage of transition to college life. Participants completed four questionnaires related to alcohol use. The first questionnaire asked participants to report the average number of drinks they had consumed on each day of a typical week during the past month. Responses were converted to a monthly frequency and quantity measurement for each participant. The Young Adult Alcohol Problems Screening Test (YAAPST) was used to assess alcohol-related problems. This 27-item scale asked questions like "have you gotten into physical fights when drinking?" (O'Conner & Colder, 2005, p. 13). Responses were then summed related to the frequency of occurrence over the past month. The third questionnaire used to gather data in this study was a 20-item Drinking Motives Scale which assessed four established reasons for college drinking: "enhancement, coping, social, and conformity reasons" (O'Conner & Colder, 2005, p. 13). The final questionnaire was The Sensitivity to Punishment and Sensitivity to Reward Questionnaire

(SPSRQ) which measured level of behavior that could lead to higher levels of alcohol consumption. The 48-items on this survey are designed to assess the strength of the behavioral approach/activation system (BAS) and the behavioral inhibition system (BIS). The BAS (active pursuit of reward or active avoidance of punishment) and the BIS (inhibits behavior in response to cue for punishment or non-reward) are components of a combined personality/learning theory that emphasizes motivational concepts as attributes to predict behavior. This questionnaire uses Sensitivity to Punishment (SP) items to assess BIS functioning and Sensitivity to Reward (SR) items to assess BAS functioning (O'Connor & Colder, 2005).

O'Conner and Colder (2005) used latent profile analysis to identify a typology of alcohol use based on different mean patterns related to the quantity, frequency, and alcohol-related variables. Class 1 was characterized by moderate/high quantity, very high frequency and very high problems for women, high problems for men. Low quantity, frequency, and problems were characteristics identified in Class 2 for both genders. Class 3 revealed very high quantity, high frequency for women and moderate/high frequency for men, high problems for women and moderate/high problems for men. Moderate/high quantity, high frequency for women and moderate/high frequency for men, and high problems and very high problems for women and men respectively were Class 4 characteristics. Class 5 was characterized by moderate/high quantity for women and moderate quantity for men, moderate frequency for women and moderate/high frequency for men, and moderate problems for both genders. No significant findings between men and women were revealed following analysis of the five alcohol typology models on the quantity, frequency, and alcohol-related problems variables.

Descriptive findings from this study revealed that 62.3% of women and 65.8% of men indicated drinking at least one drink/month. Findings of this study were analyzed according to gender. O'Conner and Colder (2005) report that the findings in this study support evidence found in their literature review revealing gender differences in regard alcohol consumption. Statistically significant findings were found related to gender mean differences in quantity (t (531) = 2.86, $p < .01$) and frequency (t (531) = 2.44, $p < .05$) in this study. However, gender mean differences were not found in relation to alcohol-related problems.

Correlation analysis found a positive correlation between the frequency of consumption and average quantity for both men and women. Multinomial logistic regression analysis was used to examine the relationships between SP and SR and alcohol typology. Class 2 (low quantity, low frequency, low problems) was used as the reference group in this analysis. A significant positive relation was found between SR in women and the probability of being in Class 4 (moderate/high quantity, high frequency, high problems). In analysis of the male group, a significant positive relation between SR and the probability of being in Class 3 (very high quantity, moderate/high frequency, moderate/high problems) and Class 2 was demonstrated. No other significant findings were demonstrated by gender or class. Having established a relationship between alcohol typology (Class) and SR in both males and females further regression analysis was performed to see if this relationship was mediated by reasons for drinking. Sensitivity to Reward (SR) was found to be a predictor for drinking in enhancement, coping, social, and conformity reasons in both men (Class 3 and 4) and women (Class 4 only). In

conclusion, O'Conner and Colder (2005), found gender differences in quantity and frequency but similar findings in motives to drinking and personality characteristics.

Vickers et al. (2004) feel that binge drinking intervention program should be gender based and conducted research using 412 female college students enrolled at a midwestern public university. Binge drinking has been identified as a high-risk behavior for any age group but is becoming increasing common among the 18-25 year olds. Fifty-one percent of individuals age 18-20 report binge drinking (consuming 5 or more alcoholic drinks on one occasion) and 49% in the 21-25 year old age group. The literature review for this study revealed that the college students who engage in binge drinking are more likely to use dependence substances such as cigarettes, marijuana, and cocaine. These individuals are also more likely to drive under the influence, engage in unplanned sexual activity without protection against pregnancy or sexually transmitted diseases (STDs), have a grade point average (GPA) less than 3.0, demonstrate poor performance on test or projects, miss classes, and fall behind on schoolwork. Despite the noted health and academic consequences related to binge drinking, the rates of binge drinking continues to increase among young adults.

This research study used several tools to investigate potentially modifiable factors associated with young women's binge drinking. Physical activity levels, weight concerns, and depressive symptoms were the primary variables of interest because, according to these authors, they had not been previously studied in correlation to binge drinking in college women. The short form of the Core Alcohol and Drug Survey was used to assess participants' characteristics (age, gender, ethnicity, GPA, year in school), substance use (binge alcohol consumption, tobacco, and marijuana use), and their perceptions of peers'

substance use. Depressive symptoms were assessed using the 20-item Center for Epidemiologic Studies-Depression Scale (CES-D). The Aerobics Center Longitudinal Study Physical Activity Questionnaire (ACLS) was used to measure metabolic equivalent (MET) values and measures of self-reported physical activity. Fear of weight gain, worry over weight and body shape, importance of weight, diet history, and perceived fatness were assessed using the Stanford Weight Concerns Scale (Vickers et al., 2004).

Descriptive statistics and regression analysis were used to determine the findings of this study. Fifty-eight percent of the women in this study were classified as freshmen with a mean age of 19.4 years and 95% were white (non-Hispanic). Binge drinking (at least once in the past 2 weeks) was reported in 61% of the respondents. Logistic regression was used to assess the study variables relationship to binge drinking. Binge drinking was univariately associated with lower GPA, marijuana and tobacco use in the past 30 days, and weight concerns. Multivariant analysis also identified that lower GPA, tobacco, and marijuana use were significant predictors on binge drinking. An unexpected finding related to physical activity was found during this analysis. It was hypothesized that binge drinking would result in a lower level of physical activity. However, higher levels of exercise were associated with approximately a twofold increase in the likelihood of binge drinking instead of the hypothesized decrease. Linear regression revealed that perception of peer alcohol use, marijuana use, and tobacco use were all significantly associated with higher levels of binge drinking. Depression was not statistically significant as a predictor of binge drinking (Vickers et al., 2004).

The authors of this study still endorsed the recommendation by the National Institute on Drug Abuse (NIDA) to provide gender-specific intervention programs for

alcohol and drug abuse. Gender-specific program were stressed because of documented gender differences in alcohol use, metabolism, and consequences. Gender-specific interventions targeting modification of risky health behaviors in women who binge drink should be included in these programs.

Another area of research that was evident in the review of literature related to alcohol consumption in college students was that of peer influence, perception of normal drinking habits among peers, and the social norms approach to education. The social norms approach was first suggested following analysis of studies related to student alcohol use patterns (Berkowitz, 2004). Berkowitz (2004) reported that in the 1986 study, it was found that college students consistently overestimated the extent to which their peers supported permissive drinking behaviors and also overestimated predictions of how much alcohol their peers consumed. Therefore, Perkins and Berkowitz advocated that alcohol prevention education programs focus on providing students with accurate information on peer drinking attitudes and behaviors leading to the foundation of the social norm approach. The social norm approach represented a radical change from the traditional alcohol prevention intervention strategies that provided information on abuse and negative consequences, concentrated primarily on the identification, intervention, and treatment of problem users. When alcohol (or drug) prevention programs emphasizes only problem behavior, without acknowledging the actual health norm, it may promote flawed beliefs that drinking problems are worse than is actually the case and unintentionally contribute to the problem it is trying to solve. In contrast, interventions based on social norms theory focus on the healthy attitudes and behavior of the majority and try to increase it, while also using information about healthy norms to guide

interventions with abusers (Berkowitz, 2004). The following articles reflect research related to these topics.

Advocates of the social norms approach theorize that correcting misperceptions of alcohol use among college students may reduce drinking and its consequences. Licciardone (2003) used aggregate campus-level data obtained from the Nationwide Campuses Study (NCS) to test this hypothesis. Data were collected on 82 college campuses, between November 1991 and November 1994, from 23,376 students who complete a post-program Alcohol and Drug (Core) survey. Results from these surveys were used to meet the goals of the NCS by providing information on the structures, processes, and outcomes of an 82-institution-wide drug-prevention program. Data from 25 of these colleges were excluded from this study because the data collected was from an earlier version of the Core survey and did not capture data on perceived frequency of alcohol us among the average student on a college campus.

The purpose of this study was two-fold: (1) to measure misperceptions that college students have about peer alcohol use; and (2) to explore the relationship between these misperceptions and the alcohol-related attitudes and behaviors of the individual student. The primary variable of interest for this study was the misperceptions ratio for each campus. Two Core survey items were used to compute this ratio: “How often do you think the average student on your campus uses alcohol (beer, wine, liquor)?” and “Within the last year, about how often have you used alcohol (beer, wine, liquor)?” (Licciardone, 2003, p. 239). As the misperceptions ratio approaches unity, student perceptions of peer use and self use becomes more accurate. Further data analyses were performed on the relationships between the misperceptions ratio and four Core survey alcohol-related

attitudes or behaviors (desire for alcohol availability at campus events, frequency of alcohol use, hangovers in last year, and binge drinking during the past two weeks). Descriptive statistics, simple and multiple regression models were analyzed.

The most consistent finding in this study was that campuses with a lower misperception ratio had more accurate perceptions of alcohol use. Further analysis stratified campuses according to high and low levels of alcohol use and found a strong inverse relationship between the misperceptions ratio, binge drinking, and hangovers on campuses with high levels of alcohol use. These findings support the hypothesis that the social norms approach may be more effective in a setting where the consequences of drinking are more evident (campuses with high perceived peer use and high self use) (Licciardone, 2003).

Perception of social norms and behavioral intentions in relation to college student drinking was researched by Broadwater, Curtin, Martz, and Zrull (2005). According to these authors, the relationship between peer drinking perceptions and behavioral intentions of the individual has not been assessed in the context of college student drinking, even though positive social norm campaigns are theorized to decrease college student drinking by correcting perceptions of embellished normative drinking. This study examined the perceptions of normative drinking among close friends, drinking intentions, and self-reported college student drinking.

Assessments were made initially (Time 1) and one month later (Time 2). One hundred seventy-one undergraduates (101 females, 70 males) who drank alcohol participated in the initial assessment with that number falling to 136 (83 females, 56 males) at the one month assessment. Two instruments were used to gather data for this

study. The Time-Line-Follow-Back method (TLFB) used two calendars to assess the daily self-reported quantity and frequency of alcohol consumption and desired quantity and frequency drinking. Estimates of peer drinking were obtained on the Drinking Norms Rating Form (DNRF) which asked the participants to estimate the number of drinks their immediate group of close friends consumed each day in an average week during the last month. The TLFB and DNRF were completed a second time by those participants that returned for the one month assessment (Broadwater et al., 2005).

Broadwater et al. (2005) hypothesized that participants who believed their peers drank more than they did would desire to match normative behaviors by increasing consumption. However, even though 91% of participants believed their close friends drank more than them the study results did not support this hypothesis and revealed a significant decrease between Time 1 and Time 2 in the average self-reported levels of weekly alcohol consumption ($t(138) = 2.95$, $p = .004$), mean perceptions of weekly peer drinking ($t(138) = 4.20$, $p = .001$) , and average desired drinking ($t(138) = 2.99$, $p = .003$). All correlations between actual weekly drinking, desired weekly drinking, and perceptions of peer drinking within and across Time 1 and Time 2 were significant ($p < .01$ for all). Analysis of Variance (ANOVA) results found no statistically significant differences between desired drinking and actual drinking at Time 1 and Time 2 between participants who believed their peers drank more than themselves ($n = 156$) to those who felt peers drank equal or less amounts ($n = 15$).

This study did not reveal if any social norm based intervention programs were in place before or during the time of this research, so it would not be possible to measure the effect of a social norms campaign on these findings. However, the overall premise that

college students will increase consumption based on their belief that their peers drink more than they do was not supported in any of the statistical analysis provided in this research.

Alcohol consumption is a well documented problem on college campuses today and a major public health problem for colleges, universities, and surrounding communities. Because of the magnitude of this problem campuses have been forced to develop policies related to drinking on campus (Mitchell, Toomey, & Erickson , 2005). Mitchell et al. (2005) report that "more than 43% of college students report heavy episodic drinking and thousands of students annually experience problems related to their alcohol use, including unintentional injuries, risky sexual behavior, sexual assault, fights, and traffic crashes" (p. 149). These authors hypothesized that population-level drinking patterns result from social policies, social norms, and institutional structures that work to prevent or reduce drinking on and around campuses. However, these strategies alone have not been successful in significantly reducing drinking among college students and more campus environmental policies need to be developed and enforced. Campus alcohol policies may range from instituting a complete ban on alcohol use and possession on campus, offering alcohol-free campus housing and activities, mandating responsible beverage service training in establishments both on and off campus, and restricting density of alcohol retail outlets surrounding campuses (Mitchell et al., 2005). Mitchell et al. (2005) conducted a survey to assess the presence of alcohol policies and whether institutional characteristics were likely to predict campus alcohol policies.

Alcohol policies were assessed on all 4-year colleges and universities (public, private, religious, secular) in Minnesota and Wisconsin (n = 73). Telephone interviews

were obtained from school administrators versed in the current alcohol policies on their respective campuses. Questions pertained to formal written policies currently in place, an overall campus policy statement, policies related to alcohol use at sporting events and Greek functions, as well as any policies in place that affected on and off campus alcohol establishments. Assess to alcohol on campus and during campus activities, alcohol free activities and living spaces, campus advertising related to alcoholic beverages or events serving alcohol, and overall campus environment related to alcohol consumption were surveyed during the telephone interviews (Mitchell et al., 2005). The researcher then obtained and analyzed any current written campus policies related to alcohol (student handbook, web-site information) and compared to results of interviews with school administrators to assess implementation of current alcohol policies.

Findings from this study revealed that administrators reported a variety of written alcohol policies at their respective schools but implementation of these policies varied. Descriptive statistics identified that only 32% of colleges surveyed prohibited alcohol use and 38% prohibited possession on campus (Mitchell et al., 2005). Mitchell et al. (2005) went on to report that 75% of schools prohibited beer kegs anywhere on campus and 14% prohibited alcohol at any on-campus events. Of the schools that participated in intercollegiate sports, 82% prohibited alcohol use at sporting events but 15% of schools actually sold alcohol during these events. Of the 71 residential campuses, approximately 80% offered alcohol-free campus housing. Seventy-six percent did not allow delivery of beer kegs to campus housing, and 25% restricted alcohol use in their fraternities and sororities that were under campus control. However, in the sample group, 24% of Greek organizations were not regulated by the school. Most schools surveyed restricted alcohol

advertisements on campus during home sporting events (67%), school newspapers (59%), school radio stations (73%), on-campus kiosks and bulletin boards (88%), and off-campus bars advertising in school newspaper (40%) or campus radio station (56%). Forty percent of schools surveyed allowed alcohol use on campus. On these campuses 60% had specific policies limiting the number of reduced-price drinks and 80% required responsible beverage service. All schools reported a formal process of informing students about alcohol policies and penalties, 81% posted this information on their Web site and 92% required classes covering campus alcohol policies. Most schools also reported providing a variety of alcohol-free activities at nights and on weekends (Mitchell et al., 2005).

The results of this study were encouraging in the fact that the majority of schools surveyed have a formal mechanism for addressing alcohol use on their respective campuses. However, this study fell short in looking at consistent implementation and regulation of these policies and their impact on reducing alcohol consumption with college students. Also, does knowledge of college alcohol policies influence student drinking? Research conducted by Rhodes et al. (2005) attempted to answer that question in a study looking at how students' awareness of alcohol policies might correlate with campus binge drinking rates.

Rhodes et al. (2005) conducted their research on five historically black colleges and universities (HBCU). During their review of literature it was revealed that HBCU consistently report lower alcohol use than campuses with majority white enrollments. Patterns of alcohol use (binge, no binge, and abstainers) were measured by gender (male, female) and age (18-20; 21-24; 25-34; and 34+). Two survey instruments were completed

by 1,018 students from these five HBCU with females representing 59.1% and males 40.9%. The first survey completed was The College Student Survey (TCSS) which measured alcohol use and behavioral experiences associated with alcohol intake and the second survey assessed general perceptions of college alcohol policies and their enforcement, prevention activities, alcohol use and alcohol influenced behaviors, college culture, and drinking environment on and off campus (The College Culture and Environment Survey).

Findings revealed that 184 students rated themselves as binge drinkers (18%), 680 no binge (66.7%) and 154 as abstainers (15.1%) respectively. Students aged 18-20 represented 61.3% of the sample, 21-24 year olds 29.2%, and the remaining 9.5% of the sample 25+ years in age. Of the alcohol related policies identified by school administration 43.3% of the sample were aware of these policies, 12.5% unaware, and 42.0% answered don't know to the questions asking them to acknowledge existence of these policies. Forward stepwise logistic regression analysis looking at binge drinking, written campus policies, and gender revealed a significant relationship in unaware male students reflecting that they were 3.58 (p = .001) times more likely to report binge drinking than unaware females. Campus policies, binge drinking, health risks, and gender were also analyzed using logistic regression. Again, unaware male students were 1.85 (p = .019) times more likely to report binge drinking that were unaware females (Rhodes et al., 2005). Even with the limitation of this sample coming from traditionally black universities it still reflects a significant lack of influence of written alcohol campus policies in relation to awareness and impact on binge drinking, especially with the male students. Findings suggest that campus administrators need to construct and implement

programs that reinforce current written policies to provide education and hopefully a decrease in binge drinking and overall alcohol consumption among college students.

The above studies have reported similar findings related to the seriousness of alcohol consumption among college students. College alcohol issues have gained national attention as research continues to reveal the seriousness of excessive alcohol intake and related drinking consequences. Heavy episodic alcohol use (binge drinking) has been recognized as a major public health problem affecting college students in the U.S. To address the problem of heavy drinking, current U.S. government objectives include reducing the percentage of college students engaging in binge drinking from the current 43% to 20% by the year 2010 (Healthy People 2010). College campuses must be responsible in providing policies and health promoting education to help meet this nationwide goal.

Tobacco Use

Cigarette smoking among college students is another critical public health problem and is a negative contributor to health and health promotion. The Center for Disease Control (CDC) reports that the number of 18 to 24 year olds who smoke rose from 22.9% in 1991 to 28.7% in 1997 and most recently to 32.9% in 1999 (Lenz, 2004). Studies have looked at the relationship of cigarette smoking to overall health, related health problems, concurrent alcohol use, attitudes of non-smoker and second hand smoke, and health treatments and campus programs for smokers.

Transition from high school to college has developmentally been a time that represents progression into adulthood and the freedom to make independent lifestyle choices such as to smoke or not. Health risks associated with smoking are well

established in all age groups. However, intensive tobacco marketing strategies that target the college age group can influence smoking practices of students and lead to long-term smoking. Initiation of smoking at an early age and continued smoking practices over time will lead to decline in overall health and smoking related health problems.

Patterson, Lerman, Kaufmann, Neuner, and Audrain-McGovern (2004) reported findings from three recent studies looking at reported smoking rates among college students. The Monitoring the Future study (MTFS) was completed in 2000 and provided a comprehensive account of smoking rates among American college students. Data were collected from 420 private and public U.S. schools and revealed that of the 1,350 college students surveyed 41.3% reported smoking in the past year, 28.2% in the past 30 days, and 17.8% reported daily use. The Harvard College Alcohol Study (CAS) conducted in 1993, 1997, 1999, and 2001 also gathered data related to cigarette use. The latest CAS surveyed 14, 138 college students and found that 28.5% were current smokers with almost half of this group smoking between 1-10 cigarettes/day (43.6%). The final survey reviewed was the National College Health Risk Behavior Survey (NCHRBS) completed in 1995 with 4,609 students included in the study reflecting 74.8% who had smoked at one time and 29% as current smokers.

Gender and race were examined in relation to smoking in the MTFS, CAS, and NCHRBS studies. All three studies showed insignificant findings related to gender differences and smoking. Higher prevalence of smoking among white students was consistent in the CAS and NCHRBS studies. The CAS reported 36.1% of white, 15.9% of African American, 25.6% of Hispanic, and 23.0% of Asian college students had smoked in the last 30 days (current smokers). Lifetime cigarette use was measured in the

NCHRBS study and also revealed White (78.2%), African American (72.7%), and Hispanic (60.7%) students had smoked in the past or were current smokers (Patterson et al., 2004). Patterson et al. (2004) reported that higher prevalence rates of tobacco use in White students over African American and Hispanic student has been replicated in various other studies.

Living arrangements, participation in collegiate athletics, and substance abuse have been examined in relation to smoking behaviors. The CAS reported that students living in unrestricted housing (apartment or house where smoking is allowed) were more likely to smoke when compared to those living in restricted housing (at home or where smoking was not permitted), 30.6% verses 21.0%. Results from the CAS also identified a high incidence of smoking among individuals who lived in Greek housing. Participation in sports reduced the incidence of smoking among the 17,000 students surveyed. Only 15% of students involved in daily exercise smoked compared to 20% who were partly involved and 26% who did not exercise on a regular basis. Findings from both the CAS and NCHRBS studies identified a positive correlation between use of alcohol and illegal drugs to an increased concurrent incidence of cigarette smoking (Patterson et al., 2004).

Psychological correlates such as mood, stress, attitudes, and beliefs are also related to the incidence of smoking (Patterson et al., 2004). Patterson et al. (2004) identified several studies that found statistically significant findings related to depression, perception of life satisfaction, and smoking status. In a study of 300,000 college freshmen, 31.9% reported smoking to help manage depression and occasional drug users reported higher life satisfaction scores when compared to frequent drug users. Data from the CAS study showed that students with low life satisfaction or unhappiness with life

were more likely to smoke cigarettes. Stress has also been shown to be a positive correlate to smoking in several studies using college students. In one study, academic stress was shown to be a motivator to smoke in almost half (49.3%) of the participants. Another study looked at the relationship between perceived stress and smoking. Study findings revealed that the higher the perceived stress the more likely the individual was to smoke. Attitudes toward smoking have also been measured in various studies with college student subjects. Findings were not surprising in that male students felt that smoking made them appear more masculine and females used smoking as a weight control measure. Males and females both felt that smoking made them less anxious. College students who were regular smokers felt that their smoking habit would kill them one day (55%) which was considerably higher than those who were occasional smokers (25%). Several studies also found that smokers were significantly less likely to have an internal locus of control (greater control over events), high self-efficacy (ability to complete a task or manage emotions), and positive coping strategies.

Lenz (2004) conducted a study examining tobacco, depression, and lifestyle choices in the early college years. Following a review of literature Lenz (2004) grouped 46 variables associated with tobacco use into six categories: other drug use, stress, smoking environment, lifestyle factors, mental health factors, and dieting and weight control. The 2001 College Health Survey includes 190 items related to health beliefs, health status, health care coverage, health care use, emotional and mental health, injury and harm, personal safety, fitness, health behaviors, height, weight, sexual health, demographic information, and type of residence and was used to collect data in this study. Two hundred and three 18 (26%) and 19 (74%) year old freshmen (65%) and

sophomore (35%) students were included in the data analysis for this study. Of the 203 participants in this study, 29% (n = 58) reported tobacco use (cigarettes, cigars, pipes, chewing tobacco, or snuff) in the last year and 32% (n = 64) used a tobacco product in the last month.

Significant findings from the univariate and stepwise regression were found in all six groupings. Comparative analysis revealed that prior drug use (all substances) were significantly related to increased smoking and regression analysis revealed marijuana and alcohol to be significant predictors of tobacco use ($p \leq .001$ for all). Number of credits enrolled for and number of hours worked (two of the stress variables) were statistically associated with tobacco use during univariate analysis and hours worked for pay was significantly associated with tobacco use with stepwise regression. Regression analysis revealed significant findings in regard to hours exposed to smoke on weekend (odds ratio [OR] = 1.6, $p < .001$) and weekday (OR = 1.5, $p = .023$) and tobacco use. Further analysis revealed that as current levels of fitness, fitness since high school, and consumption of fruits and vegetables decreased, tobacco use increased. In the subcategory of mental health, analysis reflected a large association with a diagnosis of or treatment for depression associated with tobacco use in the last year (OR = 10.4, $p < .001$) and last month (OR = 6.0, $p = .001$). Associations were found to be significant between frequency of diet pill use and frequency of induced vomiting and increased use of tobacco. The final stepwise regression model demonstrated the strongest association with tobacco use during the last month was marijuana use (OR = 1.6, $p < .001$), weekend exposure to smoke (OR 1.6, $p = .003$) and alcohol use (OR = 1.3, $p = 0.49$). For tobacco use during the past year marijuana use (OR = 2.0, $p < .001$), weekend exposure to smoke (OR = 1.5,

p = .001) and a diagnosis or treatment of depression (OR = 7.5, p = .008) were all significantly associated (Lenz 2004).

A couple of studies looked at the association between smoking and drinking in college students (Weitzman & Chen 2005; Dierker et al., 2005). Weitzman and Chen (2005) used national survey results to study the co-occurrence of smoking and alcohol consumption among college students. Previous studies validated that early adolescent alcohol use was a predictor of smoking initiation and escalated use during late adolescent. Therefore, the purpose of this study was to explore the risk for co-occurrence of drinking and smoking among college students. Data from the 2001 Harvard School of Public Health College Alcohol Study (CAS) were analyzed and included 10,924 students from 120 colleges in the U.S. In the overall sample, more than 98% of current smokers reported alcohol consumption and less than 1% of alcohol abstainers smoke which supports a strong relationship between alcohol use and smoking in college students (Weitzman & Chen, 2005).

Dierker et al. (2005) used a 210 day weekly time-line follow-back diary data to examine the within-person relationship between smoking and drinking among first year college students. Results from this study also revealed a high degree of significant cross-correlations between smoking and drinking in college students. Results were based on surveys completed by 912 first year college students who completed the baseline and weekly surveys throughout their first year of college. Data analyses were focused on the 225 participants who reported smoking and/or drinking on 10 more occasions during their first college year. During the course of the study (210 days) the sample reported an average of 2.4 cigarettes and 1.5 drinks per day. The cross-correlation analyses used in

this study showed that 86% of the sample exhibited a significant association between reports of smoking and drinking within the same day and also reported smoking preceded or followed alcohol consumption.

Studies conducted by Weitzman and Chen (2005) and Dierker et al. (2005) provide evidence that factors impacting health and health promoting behaviors are interrelated and that smoking in the college student is problematic. Smoking on college campuses is not a new problem and has been assessed by many researchers. Findings from these studies resulted in a position statement by the American College Health Association (ACHA) to adopt campus-wide tobacco/smoke free environments. In addition, 21 of the objectives in *Healthy People 2010* are related to tobacco use and goals have been set to decrease tobacco use to less than half of current rate. Even though national trends since 2000 have shown a decrease in tobacco use among adolescents and adults, recent students point to a sharp increase in cigarette smoking among college students (Ott, Cashin & Altekruse, 2005). Ott et al. (2005) report that 29 to 34% of college students smoke and that as many as 10 to 20% initiate smoking or become regular smoking while in college. These authors used the social norms theory to develop and provide validation for an assessment tool to measure baseline campus cigarette use and outcomes of current campus smoking prevention programs.

A convenience sample of 1,279 undergraduate students at a midwestern urban university (832 female, 447 male) completed the 37-item College Tobacco Survey (CTS) developed by Ott and associates (Ott et al., 2005). Freshmen students were the majority of respondents to this survey at 56.8%. Sophomores, Juniors, and Senior undergraduate students were represented at 24.3%, 13%, and 5.9% respectively. The CTS consisted of

four sections: "(1) patterns of cigarette use, number of friends who smoke, desire to quit by graduation, knowledge of campus prevention programs, and queries from health professionals about smoking history (12 items); (2) beliefs about cigarette smoking and smoking policies (15 items); (3) perceptions of use among peers (1 item); and (4) demographic and campus group affiliation (9 items)" (Ott et al., 2005, pg 232).

Results from this sample revealed 57.2% smoked in the last year, 41% in the last 30 days, and 31.4% were daily smokers. Eighty-nine percent reported a desire to quit smoking by graduation and of the health professionals who had asked them about their smoking, physicians and nurses were the highest at 72%. Unfortunately, only eight percent of the students were able to identify a campus prevention or cessation program. One of the most striking findings from this study revealed that 96% of their closest friends also smoked resulting in a significant correlation, $\chi^2 (4, N = 2.271) = 331.04, p < .001$ (Ott et al., 2005). Following analyses for validity (factor analysis) and reliability (Cronbach's alpha) findings indicate that the CTS has evidence of reliability and validity for use with college students and should be used as a campus assessment tool related to smoking behaviors. Campus environmental prevention programs designed following these individual campus results would result in more effective program and hopefully decrease smoking behaviors.

Another study that looked at variables that influence smoking was conducted by Martinelli (1999) and focused on the identification of health promoting behaviors that were present in smoking and nonsmoking college students. Pender's Health Promotion Model provided the framework for this study. Two hundred and thirty-eight undergraduate students from a private mid-Atlantic university participated in this study.

Four questionnaires were completed: (1) demographic data form assessing gender, smoking status, and perceived health status; (2) The Environmental Tobacco Smoke (ETS) Avoidance Scale; (3) Self Efficacy Scale; and (4) The Health Promotion Lifestyle Profile (HPLP-I).

Ninety-seven of the participants reported current smoking status with 48% male and 37% female. Path analysis was used to test the proposed explanatory model. Increased self-efficacy, avoidance of ETS, perceived health, female gender, and powerful external and internal locus of control were identified as the most effective health promotion behaviors of nonsmokers. These results provide support for the assumptions in Pender's Health Promotion Model between prior related behaviors, self-efficacy, and personal factors. This study also provides new evidence that the impact of secondhand smoke is evident in the perception of health. This study supports the premise that college students may benefit from health promotion interventions designed to influence the avoidance of secondhand smoke, improve feelings of self-efficacy, control health, and health status (Martinelli, 1999).

Ridner, Hahn, Staten, and Miller (2006) conducted a focused study on college student attitudes toward secondhand smoke among smokers and nonsmokers. The overall purpose of the study was to determine perceived importance of smoke-free environments among college students. Eight hundred and ninety-seven (18-24 year old) full-time, undergraduate students at a southeastern public university participated in this study. Several questionnaires were used to measure smoking status (non-smoker; non-daily smoker, and smoker), drinking (number of heavy episodic or binge drinking in last 30 days), marijuana use (number of times in past 30 days), gender, age, ethnicity, grade

point average (GPA), and attitudes toward secondhand smoke exposure (level of importance of a smoke-free campus environment and level student is bothered by smoking on campus) (Ridner et al., 2006).

Sample distribution in the Ridner et al. (2006) study was comparatively equal among freshmen (26%), sophomores (23%), juniors (23%), and seniors (28%). Sixty-one percent of respondents were female and 91% Caucasian. The majority of this sample (72%) were nonsmokers and 67% reported non-daily smoking with only 33% reporting smoking on a daily basis. Results of this study revealed that 85% rated smoke-free environments as either somewhat or very important. Interestingly, 66% of current smokers also reported that smoke-free environments were somewhat or very important and 30% of smokers noted they were bothered by cigarette smoke to some degree.

Significant correlations were found between the importance of smoke-free environments and binge drinking, marijuana use, GPA and being bothered by smoke. Those who perceived smoke-free environments as important had a higher GPA and reported a lower level of marijuana use and binge drinking. The overall linear regression model was significant and revealed the best predictors of the importance of a smoke-free environment to be smoking status and bothered by smoke explaining 34% of the variance (Ridner et al., 2006). Findings of this study reflecting the importance of a smoke-free environment and impact of secondhand smoke could be used as a powerful tool in smoking awareness and cessation programs on college campuses.

Smoking and tobacco use has been established as a significant health risk by many authors and research of college student smoking is plentiful. Smoking is the leading cause of preventable death in the U.S. among all age groups with nearly 438,000

deaths/year related to cigarette use (Ridner et al., 2006). Because of these well documented risks, most smokers have tried to quit smoking at least once. Smoking cessation is hard at any age and although a large proportion of college students attempt to quit only a small number are successful. Data from the CAS and NCHRBS report that 20% of college smokers report attempting to quit five or more times during the previous year and of the smokers who have ever attempted to quit, 75.2% are still smoking (Patterson et al., 2004). Therefore, a review of smoking cessation services on college campuses needs to be investigated.

Patterson et al. (2004) reported that most (55.7%) of the three hundred and ninety-three 4-year U.S. colleges and universities surveyed had some type of smoking cessation program. However, there is little demand for these programs (88% report no waiting list and 6.2% discontinued program due to lack of interest). Based on the results of the following study, a more effective approach to smoking awareness and smoking cessation may be through individual treatment by healthcare providers instead of campus-wide programs.

Koontz et al. (2004) administered a questionnaire to 348 current smoking and nonsmoking college students on a midwestern university eliciting responses to whether healthcare providers had ever asked them about their smoking status or related practices. Students were also asked to identify if a healthcare provider had ever advised them to quit, giving them specific advice on how to quit, helped them set a stop date, or arranged for follow-up treatment in their clinic or referred to a specialist.

The sample consisted primarily of freshmen (67.5%) with a mean age of 19.3. Approximately 33% of the sample were noted as nonsmokers and 67% as current

smokers. Of the current smokers, 71% reported daily use and 29% reported being occasional smokers (less than 100 cigarettes in lifetime). The majority (76.1%) reported having a regular healthcare provider (HCP) and 73.4% reported that their HCP had asked about their smoking behavior during a previous office visit. This number was increased for current smokers (77.3%). Of those asked about their smoking behavior, 56.7% were advised to quit, 22.2% had been given specific intervention for quitting, 5% were helped to set a quit date, and 4.4% were offered follow-up or referral for smoking cessation (Koontz et al., 2004).

Further analysis was conducted looking for predictive correlates of which student smokers received healthcare provider counseling. Stepwise logistic regression analyses revealed that male students were less likely to be asked about smoking habits, individuals from a small town (less than 1,000) were also less likely to be asked about smoking habits as compared to students from a city of more than one million people, and the older the individual the more likely smoking status would be assessed. If students reported smoking behavior accurately to the HCP they were more likely to be advised to quit and offered specific advice on how to quit. However, it was noted that 28% of the participants of this study underreported tobacco use and were missed altogether for intervention.

Koontz et al. (2004) states that the findings of this study represent an overall poor effort by healthcare providers to assess, address, and advise current smokers on smoking cessation methods. In addition, the findings of this study fall below the standards set in *Healthy People 2010* recommending that at least 75% of all HCPs offer smoking cessation information at every patient visit.

Smoking continues to be a significant problem among college students and decreases the overall health and health promoting behaviors of students. Through the review of literature it is evident that the current efforts of smoking cessation are incomplete and ineffective for preventing or stopping tobacco use among college students.

High Risk Sexual Behavior

High risk sexual behavior has been defined as having multiple sexual partners, participating in sex with an individual who has had multiple prior sexual partners, having sex without a condom, frequent sex, anal sex, and having sex with individuals with an unknown sexual history. Sexually transmitted diseases (STD) and unwanted pregnancy increase in individuals who participate in high risk sexual behaviors. STD are a significant health risk that impacts health promoting behaviors of college students (Koumans et al., 2005).

More than 15 million STD are reported annually in the U.S. and are predominantly caused by a bacterial transmission of Chlamydia trachomatis and/or Neisseria gonorrhoeae. These bacterial infections result in the leading causes of pelvic inflammatory disease (PID), ectopic pregnancy, infertility, and chronic pelvic pain in women. Viral infections can also be transmitted sexually and consist of herpes simplex virus type 1 (HSV-1), herpes simplex virus type 2 (HSV-2), human papilloma virus (HPV), and human immunodeficiency virus (HIV) which can lead to acquired immunodeficiency syndrome (AIDS). It has been documented that 50% of Chlamydia and gonorrhea infections occur in the 15-24 year old age group (Koumans et al., 2005). In addition, Zak-Place and Stern (2004) notes that two thirds of the 12 million STD cases in

the U.S. are reported in people under the age of 25 and it is estimated that at least half of new HIV cases are also in this age group. Recent surveys indicate that of the nearly 15 million students enrolled in the 4,048 colleges and universities approximately 57% are between 18 to 24 years of age (Koumans et al., 2005).

Chlamydia, Gonorrhea, and HIV/AIDS are reportable communicable diseases but HSV and HPV are not. Certain strains of the HPV virus have been responsible for cervical cancer in young women and make HPV transmission a potentially life-threatening condition (Canavan & Doshi, 2000).

To further compound the problem of STD transmission among college students, most adolescents and young adults attending U.S. colleges and universities are living away from home and adult supervision for the first time and have a tendency to participate in risk taking behaviors such as smoking, drinking, and high risk sexual behavior (Koumans et al., 2005). Zak-Place and Stern (2004) recognized that college students are in a developmental phase when sexual experimentation increases. Reports indicate that 75% of college students reveal being sexually active. Condom use has been identified as a primary prevention method for the transmission of STD yet less that 50% of college students surveyed reported 100% condom use (Zak-Place & Stern, 2004).

In research conducted by Zak-Place and Stern (2004) they analyze health belief factors and dispositional optimism as predictors of STD preventive behavior. Their research was based on selected constructs within the Health Belief Model (HBM) in that when a person is confronted with a health threat they perform a threat appraisal (seriousness of threat and vulnerability to threat) and coping appraisal (benefit, risk, self-efficacy) appraisal. Two hundred and two college students (93 males, 109 females) from

a large northeastern university participated in this study. Participation was restricted to heterosexual traditional college age students who ranged in age from 18-22 years. Eleven questionnaires were completed by the sample and included: (1) Health Belief Measurement; (2) Response Cost of Condom Use Scale; (3) Response Efficacy of Condom Use; (4) Response Cost and Response Efficacy Scales for STD and HIV Testing; (5) Self-Efficacy of Condom Use; (6) Self-Efficacy of STD and HIV Testing Scales; (7) STD Vulnerability and Severity Scales; (8) HIV Vulnerability and Severity Scales; (9) Life Orientation Test; (10) Intention to Use Condoms; and (11) Intention to Obtain STD and HIV Testing Scales.

Multiple regression analyses were performed on the findings from these questionnaires. Self-efficacy proved to be the primary predictor for condom use, STD, and HIV testing. However, students who perceived HIV as high in severity were less likely to intend to get HIV testing or use condoms to prevent HIV which was inconsistent with the HBM assumptions. In regard to these unexpected findings, the researchers hypothesized that college students perceived HIV as an improbable health risk for themselves and could have impacted their responses. This is a concerning finding because even though HIV is less likely than other STD in the college student population, it is still a possibility. Zak-Place and Stern (2004) appropriately suggested further research and STD intervention programs for college students.

Another study conducted by Williams, Norris, and Bedor (2003) compared sexual relationship (type of partner) and condom use with concerns about pregnancy, HIV/AIDS, and other STD transmission. Fifty-one sexually active students (73% female, 27% male) from a northeastern state college completed questionnaires assessing

demographic characteristics, sexual behavior, condom use, use of other contraceptive methods, and psychological variables relevant to sexual behavior and condom use (STD/HIV risk). Analyses focused on three sections: (1) type of partner (stranger, casual acquaintance, or serious); (2) concern about pregnancy, HIV/AIDS, or other STD; and (3) condom use (yes or no). Results from this study identified that 47% of the sample did not use a condom during their last sexual encounter regardless of type of partner. Concerns about pregnancy were significantly higher than concerns about HIV/AIDS or other STD ($p = .003$ and $p = .016$ respectively) and lead to higher condom use ($p = .024$).

Three other studies looked at safer sex practices and condom use among college age couples. Klein and Knauper (2003) studied the role of couple discussion of safer sex practices and more consistent condom use as cognitive STD avoidance strategies. Findings from two questionnaire based studies were analyzed to test the hypotheses in this study. The first study, completed by 71 female college students, measured sexual self-efficacy, assertiveness toward discussing safer sexual practices, and knowledge of STD. Findings revealed that women with low self-efficacy, assertiveness, and knowledge had a higher tendency toward avoidance of STD related thoughts. The second study, comprised of 26 female and 16 male college students, investigated the association of mental representations of condoms and STD thought avoidance and condom use. Participants in this study completed questionnaires regarding sexual self-efficacy, assertiveness, STD knowledge, STD thought avoidance, discussion of safe sex practices, mental representations of condoms (responsibility, protective, barrier to intimacy), and consistent use of condoms. Findings from this research revealed that sexual self-efficacy and assertiveness were significantly correlated to STD thought avoidance in that the

higher the self-efficacy and assertiveness the more likely the individual was to avoid transmission of STD (both significant at $p = < .001$). Differences were also noted between males and females in this sample in regard to mental representations of condoms. Consistency of condom use was statistically significant in relation to responsibility ($p = .05$) and barrier to intimacy ($p = < .001$) in men and significant in responsibility ($p = < .001$) and STD thought avoidance ($p = .05$) with women in the sample. However, consistency of condom use was not significantly correlated to protection for either men or women reflecting a further need for education.

Interactive role of partner cooperation and cognitive factors in predicting safer sex practices was investigated by Wilkinson, Holahan, and Drane-Edmundson (2002). Wilkinson et al. (2002) conducted their study using 398 unmarried college students attending one of two institutions of higher education in Texas. Partner cooperation, cognitive predictors (sexual self-efficacy, perceived normative support, attitudes toward sexuality, attitudes toward condoms), behavior predictors (substance use, years sexually active, steady partner), sociodemographic variables, and sexual practices were measured in this sample. The sample consisted of 54% female, 44% Caucasian, 31% eighteen years of age, and 51% from a higher income category (family income > $50,000/year).

As predicted, individuals who perceived more cooperation from their sexual partner to practice safer sex were significantly more likely to do so than those who saw their partners as uncooperative. Statistically significant findings were revealed with all cognitive and behavioral predictors as well as male gender (all reflect $p < .05$). In contrast, when partner cooperation was low, only one cognitive (attitude toward condoms) and one behavioral (steady partner) showed significant odds ratios. Positive

attitudes toward condoms predicted safer sexual practices and if the recent sexual partner was perceived as a steady partner, less safe sex practices were predicted (Wilkinson et al., 2002).

Tulloch et al. (2004) conducted an interventional study investigating the relationship between partner communication skills and condom use among college couples. Following results of other studies that reported low condom use among college couples (10% always use, 50% never use), the authors developed an intervention based study based on the information-motivation-behavioral skills model (IMB). The IMB model identified three variables: risk-reduction information, motivation, and behavioral skills. This study was designed to instruct college students in sexually active relationships how to effectively communicate with their partner about condom use.

The researchers examined the effects of communication skills training, relationship-specific education, and risk information related to lack of condom use with their sample of 106 heterosexual college couples. Participants were randomly assigned to one of three groups: communication skills, relationship-specific education, or risk information. Each student participant attended three single-sex group sessions. Information shared in the first session was the same for all three groups and included sharing of demographic data, relationship and sexual history, perceived risk of contracting STD/HIV, and motivation to use condoms. Session 2 was held one week later and varied among the three groups. Group 1, risk-information group (n = 30), was assessed for communication skills, Group 2, relationship-specific education group (n = 38), was given motivational information and then assessed for communication skills, and Group 3, communication-skills group (n = 38), were given information and in-depth

skills training related to target behaviors. All three groups were given a card about free and confidential STD/HIV testing at the student health center. Initial questionnaires related to condom use, perceived risk of STD, and motivation were completed two months later in Session 3 (Tulloch et al., 2004).

Tulloch et al. (2004) reported that post-intervention assessment (role-play) revealed that the communication-skills group demonstrated statistically significant findings in their more direct request for condom use and more effectively countered partner refusal for safe sexual practices than the other two groups. However, when assessed in regard to actual condom use there was not a significant change in behavior.

It is evident from these previously cited studies that high risk sexual practices exist among college students even with the threat of unwanted pregnancy and/or STD. For that reason, several researchers have tried to explain perceptions of sexual risk and sexual behavior of college students. Social Norms Theory, as a means to explain perception and sexual health behaviors, was investigated by Scholly et al. (2005). Swora (2003) researched the cultural aspects of sexual risk understandings. The impact of religiosity on sexual behavior of college students was studied by Penhollow, Young, and Denny (2005) and Dodge et al. (2005). The effect of family and peer communication with college students and that impact on dating partners was explored by Powell and Segrin (2004).

Scholly et al. (2005) found that social norms theory was upheld in their sample in respect to student overestimation of peer levels of sexual activity, number of sexual partners, incidence on STD, and unintended pregnancy. However, condom use was underestimated. A pilot study using a cultural consensus model was conducted by Swora

(2003) to determine if the content and distribution of knowledge related to sexual risk was consistent across the sample. The purpose of this study was to test the feasibility of using cultural consensus analysis to study understanding of STD and HIV/AIDS risk among groups. Twenty male and 20 female students enrolled at a private university in western New York participated in this study. Consensus analysis revealed that these students did in fact share a cultural model of knowledge related to HIV and STD risk factors. One area of gender difference was noted in that females reported receiving more sexual health counseling as opposed to their male counterparts. Overall, this group of students demonstrated a shared common knowledge related to sexual risk that was accurate in content and depth.

Sexuality is considered by most religions to represent general temptations, procreation, or as a way of strengthening an emotional bond between a man and a woman. Penhollow et al. (2005) investigated the relationship between how frequently an individual participated in church activities, their perceived level of religiosity, and frequency of selected sexual behaviors. Four hundred and eight undergraduate students from a southeastern university participated in this study. The participants completed a questionnaire that solicited information related to frequency of attendance at religious services, perceived strength of religious feelings, perception of sex as viewed by the church, and participation in sexual intercourse, oral sex, and anal sex. Statistical analyses from this study showed that those who attended religious services less frequently and had fewer religious feelings were more likely to participate in sexual activities. Logistic regression supported these findings except for receiving oral sex in females and giving oral sex and participation in sexual intercourse in males.

Dodge et al. (2005) conducted a comparative study between male college students in the U.S. (n = 193) and a sample of male college students from the Netherlands (n = 176). A comprehensive questionnaire assessing male condom use and sexual behaviors was completed by the participants in this study. Backward multivariate logistic regression was used to analyze the findings to determine any differences between the two national cultures. Findings revealed that American males were more likely to identify religion as important in their daily lives over their Dutch counterparts. Dutch participants reported a higher level of sex education at home and in school than American males. Logistic regression found that individuals with a higher importance of religion and less overall sex education were less likely to use adequate contraception. American males also reported a much higher incidence on STD and unintentional pregnancies. This study provides evidence that communications related to sexual risk is very important to decrease the consequences of sexual activities.

Powell and Segrin (2004) investigated the effect of family, peer, and dating partner communication with college students. The primary purpose of this study was to examine relationships between general communication, communication about sexuality, and sexual risks with parents, peers, and dating partners within a social learning framework. One hundred and fifty-three couples completed questionnaires. Overall, the results of this study revealed that communication in general, about sexuality, and sexual behaviors between the college student and parents, peers, and dating partner decreased participation in high risk sexual behaviors.

Sexual activity is common on college campuses and led to a study by Koumans et al. (2005) assessing STD services at U.S. colleges and universities. Random sampling

was conducted to identify 910 of the 2,755 two and four year schools for inclusion in this study. Questionnaires were mailed to these 910 school and 736 schools completed and returned the survey (81%). Sixty percent (464) of the schools had a student health center. Results revealed that schools with a health center were more likely to provide STD assessment, treatment, and education (66%). However, only 67% of these schools screened for STD on a regular basis. Student health centers were also more likely to make condoms available to the student population but availability of condoms in this study was only 52% of study institutions. Even with screening at 67%, diagnosis and treatment at 66%, and condom distribution at 52% at the colleges and universities surveyed STD management still fell below the need. Eighty-six percent of college students report some sexual activity and 68% report currently being sexually active. Therefore, comprehensive and effective sexual health education, screening, diagnosis, and treatment are essential to the health of college students.

College Health Education, Promotion, and Prevention Programs

Institutions of higher education are in a unique position to promote healthy behaviors by providing health education to students. However, little information exists in proportion to the number of students who need this information. Brener and Gowda (2001) used data from the 1995 National College Health Risk Behavior Study (NCHRBS) conducted by the CDC as part of the Youth Risk Behavior Surveillance System (YRBSS). These data revealed that approximately 77% of students reported receiving prevention information on campus related to "tobacco use, alcohol and other drug use, violence, injury and safety, suicide, pregnancy, STDs, AIDS/HIV, dietary behaviors, nutrition, and physical activity and fitness" (Brener & Gowda, 2001, p. 225).

Six percent of college students sampled reported receiving information on all these topics. However, this still falls below the goal levels established in *Healthy People 2010.*

Several strategies have been identified to help with health promotion and prevention programs on campus. Use of internet resources, internet based health education programs, message campaigns, and participation in intervention studies in and out of the classroom have proven to be effective methods of providing college health prevention, promotion, and education programs. Examples of each of the methods are profiled in the following studies.

Escoffery et al. (2005) investigated the use of the internet for the distribution of health information and found that there were inconsistencies related to accuracy of content retrieved. The authors surveyed 743 undergraduate students and found that 53% would like to get health information online, 28% would participate in an online health program, 74% have used online health resources, and 40% frequently search for health information online. College students today are of the computer era and the internet could be an effective medium to provide accurate health information to students enrolled in college classes.

A message campaign related to hand hygiene and upper respiratory illness among college students living in residence halls was also found to be effective as reflected in research by White et al. (2005). An experimental-control design study in four campus residence halls was conducted regarding frequent hand washing and the use of gel hand sanitizers to reduce incidence of colds and flu. Participants in the experimental halls were provided with a health campaign designed to increase awareness of the hand cleanliness as an avoidance strategy against colds and flu. All four residence hall participants were

provided with free Purell® hand sanitizer in their rooms, travel packs, residence hall bathrooms, and in the dining hall. However, the control group did not participate in the message health campaign. Three hundred and ninety-one students participated in the study (188 in experimental conditions, 203 in control group). All participants completed a pre- and post-study survey regarding knowledge, behaviors, and attitudes related to various health practices. Weekly survey reports documenting any cold and flu symptoms, smoking, exercise, hand washing, and use of gel sanitizers were also completed. Findings indicate that students exposed to the message campaign reported higher hand washing or sanitizer use and less cold and flu incidence during the three months (September, October, November) that data were collected.

In another study, a group of college students, under the direction of a nursing faculty member and assistant athletic director, developed and implemented an on-campus intervention exercise program. During the first exercise class student participants were informed of the goals of the program, possible risks of participation, taught how to calculate their target heart rate and calculate body mass index (using height and weight) and body measurements were obtained. Student participants also signed a health waiver prior to participation in the exercise classes. Exercise classes were conducted Monday through Thursday for one month and increased in intensity and duration as classes progressed. During the final class the eight consistent participants received their final weight and inch measurements. The average weight loss was six pounds (range 0-10) and the average loss in waist measurement was 1.87 inches (range 0-3). Even though this was a small scale participation study the results were promising and participation was more

than likely increased because it was a peer conducted program (Roman, Duffy, & Flaherty, 2004).

Riley, Durbin, and D'Ariano (2005) augmented a campus wide alcohol awareness campaign by threading alcohol issues into classroom lectures in what was called a curriculum infusion approach. The curriculum infusion approach was used in a nursing course devoted to content related to health promotion and disease prevention. Alcohol was selected as one of the health promotion issues to be examined during the course. Students examined the campus culture and the role that alcohol played in that culture, the health of students overall, and their own health behaviors. Finally, lifelong issues related to alcohol use were examined.

Results of this process revealed that 81% of the students surveyed agreed or strongly agreed that they were introduced to campus resources related to alcohol use that were previously unknown to them. Eighty-four percent agreed or strongly agreed that they used this information to educate their peers. Self-assessment of alcohol use of the participating students resulted in 44% reporting that they will modify their alcohol consumption based on knowledge gained during this process. The authors concluded that engaging students as active participants in reducing alcohol-related health risks is essential to increasing student awareness and significantly changing student behavior.

Summary

Following this review of literature it is evident that a vast body of knowledge has been generated related to impacts on health promoting behaviors of college students. Health behaviors, beliefs, interests and concerns can positively or negatively influence health. Exercise, proper nutrition, stress management, positive self-image, concept, and

efficacy can be strong proponent of a healthy student body. However, research reveals that college students do not exercise regularly, eat well, manage stress, or maintain a consistent positive self-image, concept, and/or efficacy.

College students are also influenced by negatively health impacts such as excessive alcohol consumption, tobacco use, and high risk sexual behaviors. College campuses need to provide effective educational programs related to health issues and include the student body in implementation. Student involvement in health education and intervention programs should be encouraged and a variety of mediums used to distribute information. Even with these strategies, promoting health and preventing disease among college students is a daunting task.

However, before these programs can be developed and/or implemented for an individual university campus, assessment research needs to be conducted to determine specific health education and priority health promotion intervention needs. Once campus needs have been identified a variety of educational methods can be used to improve the overall health of the campus student body.

CHAPTER III

METHODS

Introduction

This descriptive comparative study was designed to assess health promoting factors that impact the lifestyles of students attending college at a large southeastern university. The importance of a healthy college student is evident in *Healthy Campus 2010: Making it Happen* developed and monitored by the American College Health Association (American College Health Association, 2002). *Healthy Campus 2010* was modeled after *Healthy People 2010* which was developed through a collaborative effort of the U.S. Department of Health and Human Services to outline and provide national goals for improving the health of Americans (Pender, Murdaugh, & Parsons, 2002). Health promoting behaviors adopted as a young adult have a greater probability of leading into a higher level of health as the individual ages decreasing morbidity, mortality, and health care costs.

In order to implement campus specific health promotion programs, assessment data about the college population is needed. Therefore, this study examined three purposes in assessing students at a large southeastern university. The first purpose was to determine the degree to which college students engage in health-promoting lifestyles. Identifying differences in health-promoting lifestyles between college freshman, sophomore, junior, senior, and graduate students was the second purpose. The

third and final purpose was to determine if there are any differences in demographic findings that contribute to or prevent participation in a health-promoting lifestyle. Information gained from this study will be used to develop assessment, educational, and intervention programs to promote health-promoting behaviors among college students. Demographic findings may elicit target groups where assessment, education, and intervention are a priority to prevent future health problems.

This chapter will discuss the methodology used to address the following research questions:

Research Questions

1) What is the overall health-promoting lifestyle (as assessed by the Health-Promoting Lifestyle Profile II) among a sample of college students (undergraduate and graduate) attending a large southeastern university?
2) What are the health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management in college students?
3) Is there a difference between freshman, sophomore, junior, senior, and graduate students in overall health-promoting lifestyle or in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management?
4) Are there differences in overall health-promoting lifestyle score and subscale scores that can be explained by demographic survey findings?

Design of the Study

The descriptive comparative design of this study was used to examine health-promoting factors in college student's lifestyles. The convenience sample included freshman, sophomore, junior, senior and graduate students aged 19 and older. Participants were recruited from all currently registered undergraduate and graduate students at a large southeastern university during the fall semester. In Fall 2005, the researcher worked through the Director of Institutional Research and Assessment to circulate an email requesting participation in this study to all currently enrolled students on the Auburn University campus. Following IRB approval a formal written request was made to Dr. Drew Clark, Director of Institutional Research and Assessment regarding release of the approved letter with information on a study assessing health-promoting behaviors in college students. This letter directed interested students to link to a secure website that housed the survey instruments.

Participants received an explanatory information letter via email describing the voluntary and confidential nature of the study. Those that agreed to participate were linked to a website where they acknowledged the informed consent, and completed the Demographic Data Form plus the HPLP II. Completion and submission of these surveys acted as implied informed consent for inclusion in the study. Individuals had the right to refuse to participate by not linking to the website initially or by not completing any part of the surveys once in the website.

Population and Sample

The sample for this study consisted of all currently registered undergraduate and graduate students enrolled at a large southeastern university during the Fall 2005

semester. The convenience sample consisted of all volunteers who completed an on-line Demographic Data Form and the Health-promotion Lifestyle Profile II (HPLP II) survey. Participants were placed in groups according to his/her self-reported student classification (freshman, sophomore, junior, senior, or graduate). Sample size was determined by performing a power analysis. Power is defined as the ability of the study to detect differences or relationship that exist in the population, or correctly reject the null hypothesis (Pedhazur & Schmelkin, 1991; Sanocki, 2001). The formula used to determine power for the statistical analysis using one-way ANOVA used in this study was: 103 + m (number of variables) = sample size (Green, 1991). When calculating this equation, the number of variables used in this study was 69, therefore, 103 + 69 = 172 minimum subjects for this study. The resultant number of 1,752 participants well exceeded the minimum number of subjects and provided more generalizable findings.

In order to generalize the findings of this study, university campuses with similar population size, gender, and ethnic representation were reviewed. Fall 2004 enrollment data at this large southeastern public university revealed a total undergraduate and graduate enrollment of 22,928 students reflecting 51.5% male and 48.4% female students. Of these students 87% were white non-hispanic and 7% black non-hispanic (Auburn University Office Institutional Research and Assessment [OIRA], 2004) These statistics are representative of other land-grant and public 4-year universities in the South, Southeast, Midwest, and Western United States with similar enrollment figures (National Center for Education Statistics, 2004)

Instrumentation

Instruments used in this study consisted of a researcher developed demographic data form (Appendix A) and the Health-Promoting Lifestyle Profile II (HPLP II) (Appendix B). The independent variables for this study were age, body mass index (BMI), major area of college study, gender, race, student classification, member of a fraternity and sorority, history of medical disease, family history of chronic disease, smoking status, alcohol use, and sexual activity. The dependent variable was the individual participant's total and sub-scale mean scores on the HPLP II.

The demographic data form gathered information regarding the participant's age, height/weight, gender, race, major area of college study, student classification, fraternity or sorority member, history of medical disease, family history of chronic medical disease, smoking status, alcohol use, and sexual activity.

The HPLP II is a revised version of the Health-Promoting Lifestyle Profile (HPLP). The HPLP was constructed from the Lifestyle and Health Habits Assessment (LHHA), a 100-item checklist used by nursing students to measure positive health behaviors in patients (Walker, Sechrist, & Pender, 1987). "The LHHA is arranged in 10 categories: General Health Practice, Nutrition, Physical/Recreational Activity, Sleep, Stress Management, Self-Actualization, Sense of Purpose, Relationships with Others, Environmental Control, and Use of the Health Care System" (Walker, Sechrist, & Pender, 1987, p. 77). The initial (pilot) HPLP survey consisted of questions from the LHHA hypothesized to be components of a health-promoting lifestyle. Prior to pilot testing question responses were changed from the yes/no format of the LHHA to a Likert-scale format (1 = never, 2 = sometimes, 3 = often, and 4 = routinely).

The pilot form of the HPLP was administered to a convenience sample of 173 graduate and senior undergraduate nursing students in an effort to evaluate item clarity and response variance to estimate reliability (Walker, Seichrist, & Pender, 1987). Items were modified to improve clarity and then administered after 2 weeks to 92 of the original pilot sample. Reliability coefficients were high on this form of the survey (r = .919) and a test-retest measure (r = .854). Content validity was evaluated by four nursing faculty who were familiar with the health-promotion literature. Modifications were made in the original items and several were added. The resulting survey instrument contained 107 items (Walker, Seichrist, & Pender, 1987).

Walker, Seichrist, & Pender (1987) stated that "item analysis was conducted on the pool of 107 items to identify those which contributed most to the homogeneity or internal consistency of the measures, followed by factor analysis to investigate the factoral composition (dimensions) of the refined items pool, and by reliability measure to estimate the internal consistency of the instrument in its final form" (p. 77). This form of the HPLP was administered to 1,107 adults who varied in participation in health-promoting behaviors. Nine hundred and fifty two survey instruments were sufficiently completed and included in further analysis.

Following item analysis 37 items were eliminated which represented undesirable health practices and/or items that varied in interpretation. The remaining 70 items were subjected to factor analysis through a step-wise process. Twenty-two additional items were removed and the remaining items were grouped in six instead of the original 10 subscales. Self-actualization, health responsibility, exercise, nutrition, interpersonal support, and stress management were the six health-promoting categories were identified.

The remaining 48 items and 6 subscales were subjected to a repeated factor analysis in which all items loaded on expected factors at a level of .35 or higher.

The final structure of the 48-item HPLP is as follows: Self-actualization = 13 items; Health Responsibility = 10 items; Exercise = 5 items; Nutrition = 6 items; Interpersonal support = 7 items; and Stress Management = 5 items. The reliability coefficient for the total instrument was .922 with alpha coefficients for subscales ranging from .702 to .904 (Walker, Seichrist, & Pender, 1987). "To evaluate stability, the HPLP was administered twice to a sample of 63 adults at an interval of 2 weeks. Pearson *r* was .926 for the total scale and ranged from .808 to .905 for the subscales" (Walker, Seichrist, & Pender, 1987, p. 80).

The instrument used for this study (HPLP II) was a revised version of the HPLP. Revisions in the HPLP were based on research and feedback from users and modification were made to reflect more current health information and to achieve a more even distribution across subscales (Stuifbergen & Becker, 2001). The HPLP II measures current health-promoting behaviors and is grounded in the major domains of the healthy lifestyle according to the Health-Promotion Model (Pender, Walker, Sechrist, & Stromborg, 1988) The HPLP II is a 52-item, 4-point Likert scale consisting of six subscales; spiritual growth, health responsibility, nutrition, physical activity, stress management, and interpersonal relations (Adams, Bowden, Humphrey, & McAdams, 2000). Adams, Bowden, Humphrey, & McAdams (2000) reports reliability coefficients as: total score = .943; spiritual growth = .864; health responsibility = .861; nutrition = .800; stress management = .793; and interpersonal relations .872 for the HPLP II. Reliability measures were obtained following administration to a sample of 712 adults.

A review of health-promoting lifestyle literature led to the modifications made to the names of three of the six subscales. These modifications were made in the hopes of more accurately characterizing the nature and content of the subscales (Personal Communication, Susan Noble Walker, August 2004). The Self-Actualization subscale was renamed Spiritual Growth to decrease confusion with the outcome state described by Abraham Maslow in his Hierarchy of Needs. Interpersonal Relations replaced the Interpersonal Support subscale to distinguish it from the broader construct of social support. The Exercise subscale was replaced with Physical Activity to reflect a wider range of activities (Personal Communication, Susan Noble Walker, August 2004).

Like the HPLP, the HPLP II uses a 4-point Likert scale to measure the frequency of each survey questions related to established health-promoting behaviors. Respondents were asked to respond to questions such as: eat 3 meals daily (nutrition measure) by answering 1 = never, 2 = sometimes, 3 = often, or 4 = routinely (Walker, Seichrist, & Pender, 1987). Means were computed on all 52 items (total mean score) and on each sub-scale (individual sub-scale score) by summing values for each item and dividing by the number of items in total instrument or individual sub-scale. Overall and sub-scale scores range from 1.00 to 4.00 with mean scores closer to 1.00 reflecting a lack of wellness behavior (unhealthy lifestyle) and those closer to 4.00 denoting an optimal wellness behavior (healthy lifestyle) (Odom, 2001).

Cronbach alpha coefficients were calculated on the total and sub-scale scores from the sample used in this study. Alpha coefficients are measures of internal consistency (reliability) and reflect homogeneity of items on the HPLP II as measure of a health-promotion lifestyle.

Data Collection

Approval for the study was received from the University Institutional Review Board (IRB) late Summer 2005 (Appendix C). Following IRB approval an email was sent to all currently enrolled freshmen, sophomore, junior, senior, and graduate students asking them to participate in this study early in the Fall 2005 semester (Appendix D). This email contained informed consent information, introduction to the researcher, overview of the purpose of the study, guarantee of confidentiality, approximate length of time for completion, any risks and benefits to participation, and detailed instructions of how to link to the website containing the research documents. Informed consent to participate in the study was established once the student linked to the website where the research documents were housed. Potential participants were asked to indicate consent to participate in the study and validate that they were 19 years of age older. At that point they clicked on an agree or quit key. If they agreed to participate in the study they were linked to the Demographic Data Form which included age, gender, race, student classification, member of fraternity or sorority, major area of college study, height/weight, history of medical disease, family history of chronic disease, smoking status, alcohol use, and sexual activity and then to the 52-item HPLP II. Permission for the use of the HPLP II was requested and obtained from the author of the instrument prior to distribution (Appendix E). Data from the completed surveys returning to the website were confidential and automatically entered into a data base in a collective format.

Approximately two weeks after the initial email request for participation in the study a follow-up email (Appendix F) was distributed requesting those that have not previously participated to do so. Again, a brief overview of the project and participation

instructions was included. Following this second contact, no further contact with potential research participants was made.

Research Questions and Data Analysis

1) What is the overall health-promoting lifestyle (as assessed by the Health-Promoting Lifestyle Profile II) among a sample of college students (undergraduate and graduate) attending a large southeastern university?

Overall health-promoting lifestyle was calculated by summing the responses of the 52 items on the HPLP II and dividing by the total number of items. Means and standard deviation were calculated for the entire sample of undergraduate and graduate college students. Higher mean scores represent a higher level of health-promoting behavior.

2) What are the health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management in college students?

Scores for the six sub-scales were calculated by summing the respective items on the profile that comprise each subscale as prescribed by Walker, Sechrist, and Pender (1987). Means and standard deviation for each of these sub-scales were determined.

3) Is there a difference between freshman, sophomore, junior, senior, and graduate students in overall health-promoting lifestyle or in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management?

Mean scores for overall health-promoting lifestyle and each of the six sub-scales were calculated separately for freshman, sophomore, junior, senior, and graduate in the

sample of college students. Further analysis included conducting a one-way Analysis of Variance (ANOVA), with the five student classification groups, to determine whether there was a significant difference between health-promoting lifestyle behaviors and student classification. Higher HPLP II and subscale mean scores represent a higher level of health-promoting behavior. An alpha level of .05 was used to determine statistical significance.

4) Are there differences in overall health-promoting lifestyle score and subscale scores that can be explained by demographic survey findings?

Information obtained from the demographic data form were analyzed to identify any differences or relationships between HPLP II scores and the various demographic variables. Pearson correlation analysis was conducted on the continuous data related to age, body mass index (BMI) score (calculated from height/weight), total number of sexual partners in lifetime, and frequency of condom use during sex (measured in percentage). In using correlation analyses, several assumptions were made to help generalize the findings beyond the sample. These assumptions are as follows: 1) the sample was representative of the population; 2) the variables approximated a normal distribution; 3) the independent and dependent variable had approximate variability; and 4) the relationship between the independent and dependent variable was linear (Munro, 2001).

Categorical data from gender (male/female), member of a fraternity or sorority (yes/no), medical history of disease (yes/no), family history of chronic disease (yes/no), condom use (yes/no), prior or current bisexual relationship (yes/no), and prior or current homosexual relationship (yes/no) were analyzed to determine differences using *t*-tests.

In using the *t*-test, the following assumptions were made: 1) sample means (from the population) reflected a normal distribution; 2) the dependent variable was measured at the interval level; 3) samples had equal variance; and 4) all observations within each sample were independent (Burns & Grove, 2001). The *t*-test was robust to moderate violations of its assumptions meaning that the results can be assumed to be reliable even if one or more of the assumptions was violated (Munro, 2001).

Race (Caucasian; African-American; Other), Smoker (Non-Smoker – never smoked; Non-Smoker – previously smoked; Current Social Smoker – 1 or more cigarettes/month; Current Daily Smoker – 1 or more cigarettes/day), Alcohol Use (Never used; Current non-drinker, previously drank; Social drinker – 1 or more drink/month; Mild drinker – 4-7 drinks/month; Moderate drinker - 4-7 drinks/week; Heavy drinker – 1 or more drinks/day), Sexual activity (Virgin – never participated in oral or genital sex; Previous sexual activity - but not currently; Currently sexually active) and Major Area of College Study were analyzed using ANOVA techniques. Assumptions considered when using ANOVA include: 1) homogeneity of variance; 2) independence of observations; 3) normal population distribution from which the random sample was drawn; and 4) interval-level data (Burns & Grove, 2001). Statistical analyses using ANOVA has been shown to be fairly robust so that even if the assumptions were slightly violated, the results will still reflect findings close to the truth (Munro, 2001). When a statistically significant finding was determined through ANOVA, posthoc testing was applied to determine where the statistically significant differences existed in the subscales of health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth, and stress management. This posthoc testing was done to help reduce the potential for Type I

errors (Burns & Grove, 2001). Homogeneity of variance testing was performed to measure the equality or error variance.

Multiple linear regression methods were used to evaluate the relationships between the independent variables of age, BMI, gender, race, student classification, fraternity or sorority member, major area of college study, previous history of medical disease, family history of chronic medical disease, smoking status, alcohol use, sexual activity, and the dependent variable health promotion total and subscale scores. An alpha level of .05 was used to determine statistical significance. There are four main assumptions about the relationships between the dependent and independent variables involved in multiple regression analysis. Multiple regression assumptions include: 1) the relationship between the dependent and independent variables are a linear relationship; 2) variables are measured without error; 3) the variance of errors is the same across all levels of the independent variable (homoscedasticity); and 4) the independent and dependent variables are both normally distributed (Pedhazur, 1997).

Summary

The majority of college students today fall in the 20-30 year old age group. Previous studies have identified that many young adults do not practice health-promoting behaviors and current college cultures do not emphasize a health-promoting lifestyle (Odom, 2001). Studies that concentrate on the health-promoting behaviors of young people are important because young adulthood is considered a time when positive health-promoting influences can alter unhealthy behaviors and choices. Also, assessment of health-promoting behaviors in college students is important because organized medicine does not focus on this age group because of the limited economic incentives in a

traditionally healthy group (Odom, 2001). Therefore, the results of this study can influence health-promoting intervention programs designed for college students or individuals of college age (young adults).

All students at this large southeastern university are issued an email account and instructed that the primary form of campus communication is via email. Therefore, it was decided to use the university email service to sample the entire freshman, sophomore, junior, senior, and graduate student population at an appointed time during the 2004-2005 academic year. Students who sufficiently completed the instruments were included in the convenience sample for this study and are representative of the population of college students enrolled in like university settings.

This chapter described the methods that were used in this study to address the research questions. The purpose of the study, sample, instrumentation, data collection techniques, and data analysis were reviewed in detail. The following chapter will detail the findings of this study.

CHAPTER IV

FINDINGS

Introduction

The purpose of this study was threefold: 1) to determine the degree to which college students engage in health-promoting lifestyles; 2) to identify differences in health-promoting lifestyles between college freshmen, sophomore, junior, senior, and graduate students; and 3) to determine if there are any differences in demographic findings that contribute to or prevent participation in a health-promoting lifestyle. Four research questions were posed in this study and included: 1) What is the overall health-promoting lifestyle (as assessed by the Health-Promoting Lifestyle Profile II) among a sample of college students (undergraduate and graduate) attending a large southeastern university? 2) What are the health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management in college students? 3) Is there a difference between freshman, sophomore, junior, senior, and graduate students in overall health-promoting lifestyle or in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management? 4) Are there differences in overall health-promoting lifestyle score and subscale scores that can be explained by demographic survey findings?

This chapter presents the results of the statistical analyses used to address the four research questions posed in this study. Following IRB approval, data were collected through an email request for participation and completion of study instruments sent to all currently enrolled undergraduate and graduate students, fall 2005 semester at a large southeastern university. This email contained introduction to the researcher, information pertaining to informed consent, overview of the purpose of the study, statement related to confidentiality, approximate length of time for completion of study instruments, any risks and benefits to participation, and detailed instructions of how to link to the website containing the research documents. Informed consent to participate in the study was established once the student linked to the website and completed the surveys. Data from the completed surveys returning to the website were confidential and automatically entered into a data base in a collective format. Approximately two weeks later a follow-up email was distributed requesting those that had not previously participated to do so. A coding error related to Greek status, on the demographic data form, prevented retrieval of this data and therefore was not available during analyses. Data were analyzed using the Statistical Package for Social Sciences 12.0 (Shannon & Davenport, 2001).

Participants

A convenience sample of 1,752 from the total 23,333 (13.32%) students enrolled at this large southeastern university during the fall 2005 semester participated in this study. The mean age on the campus during this semester was 20.5 years of age with the mean for the study sample 23.6 (SD = 6.810). The higher mean age for this sample is reflective of the sample composition in that 56% of this sample was represented by senior (27.5%) and graduate students (28.5%). Freshmen students accounted for 8.2% of

respondents, sophomores 16.9% and juniors 18.9% respectively. The reduced number of younger respondents in the study reflected the age minimum of 19 years of age for participation. Seventeen percent of the students on campus were under the age of 19 during the fall semester 2005. Student classifications for the entire 23,333 students were freshmen 24.9% (n = 5,574); sophomore 18.0% (n = 4,039); junior 18.3% (n = 4,102); senior 24.6% (n = 5,507); and graduate 14.2% (n = 3,169). Nine hundred and forty-two students were classified as undergraduate non-degree and first professional students and were not considered in the above frequency and percentage numbers (Auburn University Office of Institutional Research and Assessment [OIRA], 2005).

The total number of males students enrolled was 11,878 (50.9%) with females represented by 11,455 students (49.1%). The gender distribution for this sample was 37.6% male (n = 657) and 62.4% female (n = 1,092). Of the total 23,333 student population for fall semester 2005, Caucasian students were clearly the majority student ethnic group on this campus at 83.5% (n = 19,472), African-Americans represented 7.9% (n = 1,834), other ethnicity (American Indian/Alaskan; Asian/Pacific Islander; and Hispanic) contributing to 3.2% (n = 744 collectively), and the remaining 5.4% were noted as unknown or non-resident alien. Ethnicity representation for this study consisted of 89.5% (n = 1,557) Caucasian, 5.2% (n = 90) African-American, and 5.3% (n = 92) noted as other (refer to Table 1).

Data related to declared major area of college study were also collected. Twelve schools/colleges were represented on this campus and grouped for analysis (Group 1 – Agriculture, Forestry & Wildlife Science; Group 2 – Architecture, Design & Construction, Business; Group 3 – Education, Liberal Arts; Group 4 – Engineering,

Science & Mathematics; and Group 5 – Human Sciences, Nursing, Pharmacy, Veterinary Medicine). Office of Institutional Research and Assessment (2006) reported fall 2005 enrollment statistics for Group 1 as 1,476 students (6.4% of total student population), Group 2 reflected 5,463 students (23.6%), Group 3 was the largest group with 7,315 reported students (31.5%), Group 4 consisted of 6,238 students (26.9%) and finally Group 5 included 2,682 students (11.6%). The largest group represented on the campus was Group 3, followed by Group 4, 2, 5, and 1 respectively. Students from Group 3 (Education and Liberal Art) were the highest percent of participants in the study representing 33.1%. The remaining four major area of college study groups were represented in the following order: Group 5 (22.6%); Group 4 (21.2%); Group 2 (17.2%); and Group 1 (5.9%). It was assumed that Group 5, consisting of human science, nursing, pharmacy, and veterinary medicine students, would be more interested in the health and health promotion questions found in the study and could have contributed to their increased participation even though total campus enrollment is less than Group 4 and 2 respectively. Table 1 represents campus population and sample frequencies and percentages in relation to student classification, gender, ethnicity, and major area of college study, and Chi-square results to evaluate sample representativeness.

Table 1

Distribution of campus and sample by classification, gender, ethnicity, major study area

	Campus		Study		
	Frequency	Percent	Frequency	Percent	χ^2
Classification					466.413***
Freshmen	5,574	24.9	144	8.2	
Sophomore	4,039	18.0	296	16.9	
Junior	4,102	18.3	330	18.9	
Senior	5,507	24.6	481	27.5	
Graduate	3,169	14.2	499	28.5	
	22,391	100.0	1,750	100.0	
Gender					126.341***
Male	11,878	50.9	657	37.6	
Female	11,455	49.1	1,092	62.4	
	23,333	100.0	1,749	100.0	
Ethnicity					47.040***
Caucasian	19,472	83.5	1,557	89.5	
African-American	1,834	7.9	90	5.2	
Other	744	3.2	92	5.3	
	22,050	94.6	1,739	100.0	

Table 1, continued

Major Study Area					220.303***
Group 1	1,476	6.4	103	5.9	
Group 2	5,463	23.6	299	17.2	
Group 3	7,315	31.4	575	33.1	
Group 4	6,238	26.9	369	21.2	
Group 5	2,682	11.6	393	22.6	
	23,174	99.9	1,739	100.0	

Note: Missing data in some categories will result in a lower than the study $n = 1752$. SPSS valid percent totals were reported.
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Chi-square analyses were performed to assess the representativeness of the sample against the entire student body. Significant findings at the $p < .001$ were found for classification, gender, ethnicity, and major area of study. In regard to student classification, there were fewer freshmen in this sample and more graduate students than was represented on campus. Lower freshmen numbers could have been related to the fact that students had to be 19 years of age or older to participate. Seventeen percent of students on campus were 18 years of age or younger at the time of the study. Graduate student participation was more than expected when comparing the total number participated to total number of graduate students on campus. Age was not broken down for graduate students specifically but students 24 years of age and older represented 19% of the total number of students on campus at the time of this study. It can be assumed that the older the student the more exposure they have had to research methods and the more likely they would be to participate in a study.

African-Americans were underrepresented in this study in comparison to the total number of African-American students on campus. Gender split on campus for fall 2006 was 51% male and 49% female. However, more females (62.4%) than males (37.6%) participated in this study. Major areas of study also differed significant when the sample was compared to the entire campus. Students who reported a major in agriculture, forestry and wildlife science, architecture, design and construction, business, engineering, and science and math were not as likely to participate in this study as students in human science, nursing, pharmacy, and veterinary medicine. The nature of the questions found in this study could explain the increased participation from the students in health related fields of study. Education and liberal art students were adequately represented in this sample when compared to the campus totals.

Reliability

All six subscales of the HPLP II were tested for reliability, as well as the overall instrument. Computation of Cronbach's alpha coefficient provides a measure of internal consistency reliability. Measures of internal consistency are used to determine the extent to which items in a subscale or instrument go together (Munro, 2001). A Cronbach's alpha coefficient of 1.00 denotes a perfect correlation with .70 considered the lowest acceptable value for a well-developed psychosocial instrument. Reliability tests the stability, equivalence, and homogeneity of the instrument (Burns & Grove, 2001). Internal consistency reliability analysis of the instrument in the current study yielded a Cronbach's alpha coefficient of .930 for total lifestyle score. Coefficients for the six subscales were: health responsibility = .834; physical activity = .847; nutrition = .803; spiritual growth = .847; interpersonal relations = .840; and stress management = .719.

Odom (2001) reported reliability coefficients on the HPLP II in a previous study with as sample of 554 adults as: total score = .943; health responsibility = .861; physical activity = .850; nutrition = .800; spiritual growth = .864; interpersonal relations .872 and stress management = .793. Reliability coefficients from this study were comparable to those reported by Odom (2001).

Analysis of Data

Instruments used consisted of a researcher developed demographic data form and the Health-Promoting Lifestyle Profile II (HPLP II) (Pender et. al, 1988). The independent variables for this study were age, body mass index (BMI), major area of college study, gender, race, student classification, history of medical disease, family history of chronic medical disease, smoking status, alcohol use, and sexual activity. The dependent variable was the individual participant's total and subscale mean scores on the HPLP II.

The HPLP II is a 52-item, 4-point Likert scale that measures current health-promoting behaviors and consists of six subscales; health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Overall health-promoting lifestyle scores were calculated by summing the responses of the 52 items on the HPLP II and dividing by the total number of items. Means and standard deviation were calculated for the entire sample. Scores can range from one (never) to four (routinely) with the higher mean scores representing a higher level of health-promoting behavior. Scores for the six subscales were calculated by summing the respective items on the profile that comprise each subscale and dividing by the number of items within the subscale. Means and standard deviation for each of these subscales were determined.

The demographic data form gathered information regarding the participant's age, height/weight, gender, race, major area of college study, student classification, history of medical disease, family history of chronic medical disease, smoking status, alcohol use, and sexual activity. Information obtained from the demographic data form was analyzed to identify any differences or relationships between HPLP II scores and the various demographic variables. Pearson correlation analyses were conducted on the continuous data related to age, body mass index (BMI) (calculated from height/weight), total number of sexual partners in lifetime, and frequency of condom use during sex (measured in percentage). Categorical data for gender (male/female), medical history of disease (yes/no), family history of chronic medical disease (yes/no), condom use (yes/no), prior or current bisexual relationship (yes/no), and prior or current homosexual relationship (yes/no) were analyzed to determine differences using independent samples t-tests.

Race (Caucasian; African-American; Other), Smoker (Non-Smoker – never smoked; Non-Smoker – previously smoked; Current Social Smoker – 1 or more cigarettes/month; Current Daily Smoker – 1 or more cigarettes/day), Alcohol Use (Never used; Current non-drinker, previously drank; Social drinker – 1 or more drink/month; Mild drinker – 4-7 drinks/month; Moderate drinker - 4-7 drinks/week; Heavy drinker – 1 or more drinks/day), Sexual activity (Virgin – never participated in oral or genital sex; Previous sexual activity - but not currently; Currently sexually active) and Major Area of College Study was analyzed using ANOVA techniques.

Conservative posthoc Scheffe testing was used to help reduce the potential for Type I error with this large sample. Levene's test was used to determine homogeneity of

variance. Effect size was determined using the Cohen's *d* statistic for *t*-tests and Eta^2 with ANOVA analysis.

Multiple linear regression methods were used to evaluate the relationships between the independent variables of age, BMI, gender, race, student classification, major area of college study, previous history of medical disease, family history of chronic medical disease, smoking status, alcohol use, sexual activity, and the dependent variable health promotion total and subscale scores. Simultaneous regression analysis was used to evaluate all eleven predictor (independent) variables (full model). Backward elimination analysis was then applied to identify the common predictors as they related to total lifestyle and subscales scores on the HPLP II (restricted model). The restricted model identified predictors that occurred beyond what would be expected by chance. An alpha level of .05 was used to determine statistical significance with all analyses.

Prior to using the independent variables for statistical analyses they were coded for analysis. Dummy coding was used for gender, student classification, previous history of medical disease, family history of chronic medical disease, smoking status, alcohol use, sexual activity, prior or current bisexual or homosexual relationship, and condom use. Gender was coded female as zero and male one; all yes/no questions were coded yes as one and no zero. Student classification was coded one through five with freshmen as one and graduate students five, coding for smoking status was one through four with non-smoker/never smoked as one and smoker, one or more cigarettes/day four, alcohol use one for never used through six for one or more drinks/day, and sexual activity coding as one for virgin through three representing currently sexually active individuals. Criterion-

coding was used for ethnicity and major area of college study in that the sample mean for each group was used for analysis.

Results

Data analyses were directed by the four research questions identified in this study. The four research questions will be used to guide the presentation of results.

Research Question 1

What is the overall health-promoting lifestyle (as assessed by the HPLP II) among a sample of college students (undergraduate and graduate) attending a large southeastern university?

HPLP II analyses revealed a mean total lifestyle score (TLS) on the HPLP II of 2.6824 (*SD* = .41337). Normative data has not been established for this instrument and therefore, comparison to instrument norms and study findings could not be made. (personal communication Susan N. Walker, May 26, 2006). Mean scores between two and three reflect an average to above average response to health promotion questions with a "sometimes" or "often" response related to health promotion questions. Subscale analyses were used to help investigate the inquiry posed in research question number two.

Research Question 2

What are the health-promoting behaviors in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management in college students?

Health responsibility (HR) questions asked if participants sought out health related information through communication with health care providers, media (TV, radio), or seminars. Questions related to self inspection and body system monitoring (i.e.

breast self-exams) were also included in the health responsibility subscale. Regular exercise, leisure activities, stretching, daily activity level, and target heart rate monitoring were questions within the physical activity (PA) subscale. Healthy eating habits and consumer information related to nutritional value of foods were assessed by the nutrition (NU) subscale. Spiritual growth (SG) was measured by questions related to feelings of self-worth, purpose, positive life outlook, and connection with forces outside of self. Social support, physical intimacy, and ability to relate with others were measured by questions within the interpersonal relations (IR) subscale. Stress management (SM) subscale questions addressed recognition of stressful situations and stress reduction techniques. Subscale means ranged from a low of 2.1878 (SD = .58755) in the health responsibility subscale to a high of 3.169 (SD = .53573) for spiritual growth. Means, standard deviation, and number of questions are noted in Table 2 for total lifestyle and subscale scores. Since instrument normative data was not available, comparison of instrument and study means and standard deviations could not be made.

Table 2

HPLP II total lifestyle and subscale scores

	M	*SD*	# questions
Total Lifestyle Score	2.6824	.41337	52
Subscale Scores			
Spiritual Growth	3.1690	.53573	9
Interpersonal Relations	3.1430	.54266	9
Nutrition	2.5769	.58406	9
Physical Activity	2.4969	.69890	8
Stress Management	2.4774	.50637	8
Health Responsibility	2.1878	.58755	9

n = 1710

Research Question 3

Is there a difference between freshmen, sophomore, junior, senior, and graduate students in overall health-promoting lifestyle or in the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management?

One-way ANOVA was employed to provide data related to the presence of differences between student self-reported classifications and HPLP II scores. ANOVA compares the variance within each group and the variance between groups. Statistically significant differences were found in the total lifestyle score and the subscales related to HR, NU, SG, and SM. Table 3 presents ANOVA results.

Table 3

ANOVA results for student classifications and HPLP II scores

	F	*Scheffe*
Total Lifestyle Score	3.431**	G > J
Subscale Scores		
Health Responsibility	8.087***	G > F, So, J
Nutrition	7.920***	G > F, So, J
Spiritual Growth	2.928*	G > J
Stress Management	2.794*	G > F
Interpersonal Relations	1.372	
Physical Activity	1.335	

df = 4 between groups; 1703 within groups; 1707 total
G = graduate; J = junior; So = sophomore; F – freshmen
* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Homogeneity of variance was maintained with this analysis in that none of the Levene's statistics were significant. Significance ranged from $p = .765$ in the stress management to $p = .120$ in health responsibility subscales.

Scheffe post hoc testing was used to determine the location of the differences after ANOVA analysis examining differences between student classification and HPLP II scores. A significance level of $p = .05$ and confidence interval of 95% was used for this analysis. Several statistically significant differences were found between graduate students and underclassmen with graduate students reporting the highest mean scores in TLS and HR, NU, SG, and SM subscales. In regard to total lifestyle scores, graduate students were statistically significantly different than juniors ($p = .049$). Graduate

students differed significantly with freshmen, sophomore, and juniors in the subscale health responsibility ($p = .031$; $p < .001$; and $p = .012$ respectively). Statistically significant differences between graduate students and freshmen, sophomore, and juniors students were also found in the nutrition subscale ($p = .020$; $p < .001$; and $p = .006$ respectively). Graduate students significantly differed from junior students in the area of spiritual growth ($p = .027$). Graduate students did not differ significantly with seniors on any HPLP II scores. No statistically significant differences were found in post hoc testing for the physical activity or interpersonal relations subscales.

Research Question 4

Are there differences in overall health-promoting lifestyle scores that can be explained by demographic survey findings?

Multiple linear regression, Pearson correlations, and one-way ANOVA analyses were used to investigate this research question. Multiple linear regression methods were used to identify predictors from the eleven demographic variables of age, BMI, gender, ethnicity, student classification, major area of college study, previous history of medical disease, family history of chronic medical disease, smoking status, alcohol use, and sexual activity. Simultaneous regression analysis was used to evaluate all eleven predictor (independent) variables (full model). Backward elimination analysis was then applied to identify the common predictors as they related to total lifestyle and subscales scores on the HPLP II (restricted model).

The full model was derived from simultaneous regression analysis where all eleven independent variables were entered at the same time and regressed on the dependent variables, TLS and then the mean scores from the HR, PA, NU, SG, IR, and

SM subscales. Backward elimination regression analysis was then used to arrive at the restricted model for each of the dependent variables. Summaries of the full and restricted model results are provided in Table 4.

Table 4

Overview summary of full and restricted models from simultaneous and backward elimination regression analysis of the demographic independent variables on the HPLP II scores (dependent variables)

	Full[a]		Restricted	
Dependent Variable	R^2	F	R^2	F
Total Lifestyle Score	.067	10.665***	.063[b]	18.250***
Health Responsibility	.115	19.244***	.113[c]	29.636***
Physical Activity	.053	8.326***	.051[d]	14.452***
Nutrition	.076	12.200***	.074[e]	18.646***
Spiritual Growth	.058	9.145***	.055[f]	13.662***
Interpersonal Relations	.078	12.444***	.076[g]	22.244***
Stress Management	.038	5.869***	.032[h]	13.650***

$n = 1636$; ***$p < .001$

Model Variables:

a. Full - age, BMI, gender, family history, previous history, classification, smoke, alcohol, sex active, ethnicity, major
b. TLS - age, BMI, gender, smoke, ethnicity, major
c. HR - age, gender, previous history, smoke, sex active, ethnicity, major
d. PA - BMI, gender, previous history, smoke, alcohol, ethnicity
e. NU - age, BMI, gender, classification, smoke, ethnicity, major
f. SG - age, BMI, previous history, smoke, alcohol, ethnicity, major
g. IR - BMI, gender, smoke, sex active, ethnicity, major
h. SM - BMI, gender, previous history, major

Durbin-Watson statistic was evaluated with each of the restricted models. This statistical test is used to evaluate the serial correlation among the residuals. Durbin-Watson is reported in a range from zero (indicating a high positive correlation) through four (indicating a high negative correlation) (Burns & Grove, 2001). Residual correlations for the seven restricted models ranged from 1.946 to 2.067. Statistical significance ($p < .001$) was reached in the full and restricted models for all seven dependent variables tested. However, explained variance was low in all models and ranged from a high of 11.5% in the HR subscale to a low of 3.8% (stress management) in full models and 11.3% (health responsibility) to 3.2% SM subscale in restricted models.

BMI, gender, smoking status, ethnicity, and major were variables present in six of the seven models. Age and previous history of medical disease were evident as predictor variables in four of the seven models. Alcohol and sexual behaviors demonstrated predictive properties in two of the seven regression models. Finally, student classification was evident in only one of the seven models. Family history of chronic medical disease was not included as a predictor variable for participation in health promotion activities in any of the seven regression models. The results of each regression model will be presented in the following sections. Full and restricted model summaries will be discussed for each.

Model 1 - Total Lifestyle

Total lifestyle scores represent the dependent variable in this regression model and for the full model all eleven independent variables were used to identify any demographic characteristics of the sample that significantly influenced the TLS scores. Age, BMI, gender, smoking status, ethnicity, and major area of college study were

statistically significant in the full model and accounted for 6.7% of explained variance in TLS scores. Following backward regression all six significant independent variables from the full model remained significant with 6.3% of variance explained ($R^2\Delta$ = -.004, F = 1.33, *df* 5/1624, $p > .05$). Table 5 provides a summary of the regression coefficient details in regard to the relationship between significant demographic independent variables and TLS HPLP II scores.

Table 5

Regression coefficient summary for full and restricted models for TLS

	Full		Restricted	
Independent Variable	β	t	β	t
Age	.084	2.811**	.111	4.419***
BMI	-.111	-4.359***	-.115	-4.535***
Gender	-.066	-2.479*	-.062	-2.343*
Smoking status	-.119	-4.506***	-.105	-4.325***
Ethnicity	.070	2.862**	.070	2.902**
Major	.116	4.437***	.115	4.423***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Semipartial correlation analysis in the restricted model identified three negative and three positive correlations representing the unique contribution of each independent variable to TLS scores. Age (r = .106), ethnicity (r = .070), and major area of college study (r = .106) were positively correlated with BMI (r = -.109), gender (r = - .056), and smoking status (r = -.104) correlated negatively to TLS scores. In regard to the positive correlations, older students, African-Americans, and health science, nursing, pharmacy,

and veterinary students (Group 5) had higher health promotion scores than younger students, Caucasians, other ethnicities, and all other majors of college study. Lower total lifestyle mean scores were evident in individuals with higher BMI's, smokers, and males. Previous history of medical disease was the first independent variable excluded from this model followed by sexual activity, family history of chronic medical disease, alcohol use, and student classification in that order.

Model 2 - Health Responsibility

Health responsibility was the first of the six subscales evaluated with simultaneous and backward regression. In the full model age, gender, previous history of medical disease, sexual activity, ethnicity, and major area of college study were significant predictors for the nine health responsibility questions on the HPLP II and explained 11.5% of the variance. Smoking status was added to the previous six independent variables in the restricted model. Explained variance for the restricted model was 11.3% ($R^2\Delta$ = -.002, F = 1.0, df 4/1624, p > .05). Table 6 provides a summary of the regression coefficient details in regard to the relationship between significant demographic independent variables and HR subscale HPLP II scores.

Unique contributions of each independent variable, on HR subscale scores, in the restricted model was noted following semipartial correlation analysis. Age, *(r* = .140), previous history of medical disease (r = .096), sexual activity (r = .057), ethnicity (r = .072), and major area of college study (r = .109) were positively correlated. Older students, African-Americans, students reporting previous history of medical disease, current sexually active students, and students in Group 5 of major area of college study had higher mean HR scores. Negatively correlated semipartial values were evident with

gender (r = - .143) and smoking status (r = - .051) reflecting lower health promotion scores in smokers and males. Alcohol status, family history of chronic medical disease, BMI, and student classification were removed from the model in that order. Smoking status was not significant until alcohol use, family history of chronic medical disease, and BMI were removed from the full model during backward regression.

Table 6

Regression coefficient summary for full and restricted models for HR subscale

	Full		Restricted	
Independent Variable	β	t	β	t
Age	.130	4.444**	.148	6.010***
Gender	-.151	-5.812***	-.156	-6.124***
Previous history	.104	4.189***	.098	4.131***
Smoking status	-.045	-7.750	-.052	-2.180*
Sex activity	.056	2.145*	.060	2.440*
Ethnicity	.076	3.211**	.073	3.087**
Major	.119	4.674***	.119	4.688***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Model 3 - Physical Activity

Analysis related to the third regression model identified five independent variables that were predictors of PA scores in the full model and six in the and restricted model. In both models BMI, gender, smoking status, alcohol use, and ethnicity were significantly correlated to PA HPLP II subscale scores. Previous history of medical disease was significant in the restricted model only. Explained variance in the full model

was 5.3% and was reduced to 5.1% ($R^2\Delta$ = -.002, F = .67, df 5/1624, p > .05) following backward elimination on the variables. A summary of regression coefficient details in regard to the relationship between significant demographic independent variables and PA subscale HPLP II scores is presented in Table 7.

Table 7

Regression coefficient summary for full and restricted models for PA subscale scores

	Full		Restricted	
Independent Variable	β	t	β	t
BMI	-.087	-3.380***	-.111	-3.252***
Gender	.097	3.813***	.093	3.760***
Previous history	-.045	-1.760	-.048	-1.941*
Smoking status	-.158	-5.930***	-.161	-6.104***
Alcohol use	.100	3.553***	.097	3.641***
Ethnicity	.077	2.965**	.074	2.990**

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Sexual activity, student classification, family history of chronic medical disease, age, and major area of college study were excluded from the full model during backward elimination. Unique contributions of BMI (r = -.079), smoking status (r = -.147), and previous history of medical disease (r = -.047) were noted as negative semipartial correlations reflecting a lower level of physical activity in individuals with a higher BMI, those that smoked, and with a previous history of medical disease. Positive semipartial correlations included gender (r = .091), alcohol use (r = .088) and ethnicity (r = .072).

Caucasians, males, and those students who consumed alcohol scored higher on the questions related to the PA subscale.

Model 4 - Nutrition

The nutrition subscale for the HPLP II identified seven independent predictor variables in both the full and restricted regression models. Age, BMI, gender, student classification, smoking status, ethnicity, and major area of college study were all statistically significantly correlated to the subscale scores related to nutrition. The full model explained 7.6% of the variance and was reduced to 7.4% in the restricted model (7.4%; $R^2\Delta$ = -.002, F = .83, df 4/1624, p > .05). Table 8 provides a summary of the regression coefficient details in regard to the relationship between significant demographic independent variables and NU subscale HPLP II scores.

Table 8

Regression coefficient summary for full and restricted models for NU subscale

	Full		Restricted	
Independent Variable	β	t	β	t
Age	.085	2.829**	.076	2.627**
BMI	-.054	-2.094*	-.058	-2.282*
Gender	-.134	-5.033***	.127	-4.855***
Student classification	.103	3.576***	.104	3.678***
Smoking status	-.122	-4.622***	-.108	-4.460***
Ethnicity	.102	4.150***	.109	4.480***
Major	.062	2.415*	.060	2.332*

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Semipartial correlation analysis revealed three negative and four positive correlations representing the unique contributions of each independent variable not shared by other independent variables in relation to the dependent variable nutrition subscale score. Positive correlations included age (r = .063), student classification (r = .088), ethnicity (r = .107), and major area of college study (r = .056). BMI (r = -.65), gender (r = -.116), and smoking status (r = -.106) were negatively correlated to NU subscale scores. Caucasians, older students, graduate students, and students in health related majors had scores reflecting a higher level of healthy eating habits. Heavier students, smokers and males had scores reflective of a poorer intake of healthy foods. Sexual activity was the first independent variable excluded from the full model. Previous history of medical disease, family history of chronic medical disease, and alcohol use were also excluded prior to the final restricted model.

Model 5 - Spiritual Growth

Spiritual growth was the fourth of the six subscales evaluated with simultaneous and backward regression. In the full model age, BMI, smoking status, ethnicity, and major area of college study were significant predictors for the nine spiritual growth questions on the HPLP II and explained 5.8% of the variance. Previous history of medical disease and alcohol use were added to the previous five independent variables in the restricted model. Explained variance for the restricted model was 5.5% decreasing the amount of the variance explained by .3% ($R^2\Delta$ = -.003, F = 1.33, df 4/1624, p > .05). Table 9 provides a summary of the regression coefficient details in regard to the relationship between significant demographic independent variables and SG subscale HPLP II scores.

Table 9

Regression coefficient summary for full and restricted models for SG subscale

	Full		Restricted	
Independent Variable	β	t	β	t
Age	.069	2.282*	.086	3.425**
BMI	-.141	-5.464***	-.141	-5.603***
Previous history	-.050	-1.942	-.055	-2.259*
Smoking status	-.069	-2.579**	-.076	-2.891**
Alcohol use	-.049	-1.781	-.054	-2.050*
Ethnicity	.107	4.395***	.104	4.289***
Major	.071	2.726**	.076	3.129**

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Unique contributions of each independent variable, on SG subscale scores, in the restricted model was noted following semipartial correlation analysis. Age, *(r* = .082), ethnicity (*r* = .103), and major area of college study (*r* = .075) were positively correlated. African-American students, health related majors, and older students scored higher on questions related to spiritual growth. Negatively correlated semipartial values were evident with BMI (*r* = -.135), previous history of medical disease (*r* = -.054), smoking status (*r* = -.070), alcohol use (*r* = -.049). Lower levels of SG were evident with heavier students, those who reported previous medical problems, smokers, and those that drank on a weekly or daily basis. Gender, family history of chronic medical disease, sexual activity, and student classification were removed from the model in that order. Previous history of medical disease was not significant until gender and family history of chronic

medical disease were removed from the full model during backward regression. Alcohol use did not reach significance until gender, family history of chronic medical disease, and sexual activity were removed.

Model 6 - Interpersonal Relations

Analysis related to the fifth regression model identified six independent variables that were predictors of IR scores in both the full and restricted models. In both models BMI, gender, smoking status, sexual activity, ethnicity, and major area of college study were significantly correlated to IR HPLP II subscale scores. Explained variance in the full model was 7.8% and was reduced to 7.6% following backward elimination on the variables ($R^2\Delta$ = -.002, F = .66, df 5/1624, $p > .05$). A summary of regression coefficient details in regard to the relationship between significant demographic independent variables and IR subscale HPLP II scores is presented in Table 10. Age, family history of chronic medical disease, alcohol, student classification, and previous history of medical disease were excluded from the full model during backward elimination.

Unique contributions of BMI (r = -.056), gender (r = -.148) and smoking status (r = -.057) were noted as negative semipartial correlations. Male gender, higher BMI, and smokers scored lower on questions associated with interpersonal relations. Health majors, sexually active students, and African-American students were positively correlated to IR. Positive semipartial correlations included sexual activity (r = .116), ethnicity (r = .066) and major area of college study (r = .091).

Table 10

Regression coefficient summary for full and restricted models for IR subscale scores

	Full		Restricted	
Independent Variable	β	t	β	t
BMI	-.060	-2.357*	-.057	-2.355*
Gender	-.167	-6.291***	-.163	-6.227***
Smoking status	-.064	-2.449*	-.058	-2.381*
Sexual activity	.106	3.982***	.119	4.866***
Ethnicity	.065	2.721**	.066	2.769**
Major	.097	3.721***	.099	3.828***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Model 7 - Stress Management

Analysis related to the final regression model identified four independent variables that were predictors of SM scores in both the full and restricted models. In both models BMI, gender, previous history of medical disease, and major area of college study were significantly correlated to SM HPLP II subscale scores. Explained variance in the full model was 3.8% and was reduced to 3.2% ($R^2\Delta$ = -.06, F = 2.25, df 7/1624, $p > .05$) following backward elimination on variables. A summary of regression coefficient details in regard to the relationship between significant demographic independent variables and SM subscale HPLP II scores is presented in Table 11. Alcohol, age, student classification, family history of chronic medical disease, ethnicity, and smoking status were excluded from the full model during backward elimination. Unique contributions of BMI (r = -.126) and previous history of medical disease (r = -.064) were noted as

negative semipartial correlations. Positive semipartial correlations included gender (r = .077) and major area of college study (r = .115). Males and agriculture, forestry, and wildlife science students demonstrated more stress management techniques that the other groups. Individuals with reported previous medical disease and higher BMI's reported a lower level of stress management.

Table 11

Regression coefficient summary for full and restricted models for SM subscale scores

	Full		Restricted	
Independent Variable	β	t	β	t
BMI	-.121	-4.666***	-.129	-5.164***
Gender	.081	3.079**	.082	3.169**
Previous history	-.054	-2.083*	-.065	-2.627*
Major	.125	4.814***	.097	4.704***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 12 summarizes the amount of unique variance for each independent variable, by model, which is evident after controlling for the other independent variables. Explained variance was low in all correlations between the independent variables (age, BMI, gender, family history of chronic disease, previous history of medical disease, student classification, smoking status, alcohol use, sexual activity, ethnicity, and major) and the dependent variables of the HPLP II TLS and HR, PA, NU, SG, IR, and SM subscale mean scores.

Table 12

Summary of statistically significant semipartial correlations of independent variables for TLS, HR, PA, NU, SG, IR, and SM models (percent variance explained)

	Models						
Independent Variable	TLS	HR	PA	NU	SG	IR	SM
Age	1.1%	1.5%	----	0.4%	0.7%	----	----
BMI	1.2%	----	0.6%	0.3%	1.8%	0.3%	1.6%
Gender	0.3%	1.1%	0.8%	1.4%	----	2.2%	0.6%
Family Hx	----	----	----	----	----	----	----
Previous Hx	----	0.9%	----	----	0.3%	----	0.4%
Classification	----	----	----	0.8%	----	----	----
Smoker	1.1%	0.3%	2.2%	1.1%	0.5%	0.3%	----
Alcohol Use	----	----	0.8%	----	0.2%	----	----
Sex Activity	----	0.3%	----	----	----	1.3%	----
Ethnicity	0.5%	0.5%	0.5%	1.1%	1.1%	0.4%	----
Major	1.1%	1.1%	----	0.3%	0.6%	0.8%	0.3%

Pearson correlations were used to determine relationships between HPLP II scores and the continuous data results from age, BMI, total number of sexual partners in lifetime, and frequency of condom use during sex. Results from Pearson correlation analyses revealed statistically significant relationships among several of the four demographic variables and total lifestyle and subscale HPLP II scores. Table 13 provides the correlational matrix for HPLP II scores and selected demographic variables. An additional correlational analyses also revealed a statistically significant relationship

between the number of sexual partner in lifetime and percent of condom use (r = -.134, p = .01). As the number of sexual partners increased the percentage of condom use decreased.

Table 13

Correlational matrix of age, BMI, number of sex partners, condom use, and HPLP II

HPLP II scores	TLS	HR	PA	NU	SG	IR	SM
Age	.074**	.167**	-.005	.102**	.049*	.019	-.034
BMI	-.113**	.000	-.097**	-.073**	-.125**	-.085**	-.121**
# partners	.054	.084**	.039	.050	.021	.003	.031
% condom	.094**	.046	.071*	.037	.117**	.113**	.120

*$p \leq .05$ level (2-tailed); **$p \leq .01$ level (2-tailed)

Age influenced the mean scores in the total and three subscale scores in that the older the participant, the higher the TLS, HR, NU, and SG scores. BMI demonstrated a low negative relationship with TLS and five of the six subscale scores. Individuals reporting a higher number of sexual partners scored higher in the HR subscale and the higher the percentage of condom use demonstrated a positive relationship to TLS and four of the six subscale scores.

Demographic variables of a categorical nature (gender, medical history of disease, family history of chronic medical disease, condom use, prior or current bisexual or homosexual relationship) were examined for mean differences using *t*-tests. Statistically significant differences were found between HPLP II scores and gender, medical history, family history, and bisexual relationships. Levene's test for equality of variance was not

significant and equal variance is assumed in this analysis. Condom use and prior or current homosexual relationship did not reach significance in this analysis. Significant results are presented in Table 14.

Table 14

Mean differences in HPLP II score by gender, family hx, medical hx, and bisexual

	t-statistic			
	Gender Female/Male	Medical Hx Yes/No	Family Hx Yes/No	Bisexual Yes/No
HPLP II scores				
TLS	5.135***	.648	-.160	.962
HR	9.001***	-5.833***	-3.688***	-.303
PA	-3.493***	3.021**	2.323*	2.039*
NU	6.043***	.190	-.245	.919
SG	2.682**	2.396*	.420	.410
IR	9.109***	.512	-1.840	.198
SM	-1.311	3.115**	2.787**	.727

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean differences were present for gender in the TLS and five of the six HPLP II subscales. Females had higher scores than males in TLS and subscales related to HR, NU, SG, and IR. Males scored higher in PA and SM subscales. Individual who reported a previous history of medical disease or family history of chronic disease had higher mean scores in the subscale HR which could reflect increased contact with health care providers for disease management. Higher mean scores for PA, SG, and SM subscales were found in individuals without previous history of medical disease. Higher PA and

SM subscale scores were found with the absence of family history of chronic disease. Physical activity was the only statistically significant mean difference in relation to bisexual preference. Individuals who reported a bisexual preference had increased PA mean scores. Homosexual preference and condom use *t*-tests failed to reveal significance in the TLS or any of the six subscale scores.

Effect size for the analyses related to mean differences was calculated using the Cohen's *d* statistic ($d = 2t/\sqrt{df}$) and were found to be small. Results of Cohen's *d* statistic calculations ranged from .44 (IR scores and gender) to -.008 (family history of chronic disease and TLS scores). Appendix G details the for mean, standard deviation, *t* statistic, and Cohen's *d* effect size for the TLS and all six subscale findings in regard to gender, previous medical history of disease, family history of chronic disease, sexual preference, and condom use.

ANOVA analyses were used to determine any differences in mean scores between and within groups of different ethnic groups, smokers, drinkers, sexual activity, and different college majors in relation to total lifestyle and subscale HPLP II scores. Statistically significant findings were found in all ANOVA analyses and the F-statistic and significance levels are noted in Table 15.

Table 15

ANOVA results for ethnicity, smoking status, alcohol use, and HPLP II scores

	F-statistic					
	Ethnicity		Smoking Status		Alcohol Use	
HPLP II scores		Eta^2		Eta^2		Eta^2
TLS	2.833	.003	10.050***	.02	1.711	.01
HR	7.323***	.01	2.969*	.01	4.673***	.01
PA	6.592***	.01	12.196***	.02	2.365*	.01
NU	6.951***	.01	10.156***	.02	.703	.002
SG	8.208***	.01	8.387***	.01	4.717***	.01
IR	3.820*	.005	1.522	.003	2.887*	.01
SM	1.321	.002	1.836	.003	.922	.003

ANOVA results for sexual activity, major and HPLP II scores

	F-statistic			
	Sexual activity		Major	
HPLP II scores		Eta^2		Eta^2
TLS	10.576***	.01	10.451***	.02
HR	10.659***	.01	19.534***	.04
PA	2.510	.003	.696	.002
NU	4.493*	.01	6.135***	.01
SG	12.911***	.02	3.167*	.01
IR	21.099***	.02	2.927***	.03
SM	1.623	.002	3.318**	.01

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Levene's statistic to test for homogeneity of variance, Scheffe post hoc analysis to determine the location of differences, and Eta^2 to determine effect size were used with each ANOVA test. A 95% confidence interval and significance level of .05 was used for all analysis. Each ANOVA analysis will be reported separately.

Homogeneity of variance was significant in the TLS ($p = 0.40$) and SM ($p = .003$) scores but not significant in any other subscales for ethnicity. Post hoc Scheffe testing revealed that African-Americans ($n = 86$) differed significantly from the Caucasian ($n = 1525$) in regard to HR ($p = .002$), PA ($p = .006$), NU ($p = .001$), SG ($p < .001$) and IR ($p = .50$) subscales and with Other ($n = 86$) in NU ($p = .039$), and SG ($p = .001$) subscales. African-American students had higher health promotion mean scores in HR, SG and IR and lower PA and NU means than the Caucasian and Other groups. However, because of the unequal sample sizes across groups a harmonic mean of the group size was used. When the harmonic mean was applied none of the mean differences were significant and Type I error levels can not be guaranteed. Effect size values, measured by Eta^2, were all less than .01 or less and even though statistically significant, clinical significance is not likely.

ANOVA results related to smoking levels maintained homogeneity of variance for all scores except SG ($p < .001$) and IR ($p = .011$). Smokers, one or more/day ($n = 200$) were statistically significantly different ($p \leq .05$) from non-smoker, never smoked ($n = 1155$), non-smoker, previously smoked ($n = 219$) or smoker, one or more/month ($n = 134$) in all scores except the subscales IR and SM in post hoc Scheffe testing. Non-smokers had the highest health promotion means scores in TLS and all subscale scores over non-smoker, previously smoked, and current smokers. Current smokers consistently

had the lowest means in TLS and all subscale scores. Significance did not hold when the harmonic mean was applied. Effect size values were all .02 or less with this ANOVA.

Level of alcohol consumption was also analyzed using ANOVA. Only two of the four statistically significant differences held with post hoc Scheffe testing. Students that reported drinking 4-7 drinks/week (n = 341) remained statistically significantly different in the HR and SG subscales than the other five groups (never used [n = 295]; current non-drinker/previously drank [n = 155]; 1 or more drinks/month [n = 350]; 4-7 drinks/month [n = 359]; and 1 or more drinks/day [n = 209]). Statistical significance was not maintained in the PA or IR subscales. These findings reflect that if a person drank 4-7 drinks/week (social drinking levels) they were more likely to seek medical attention and demonstrated higher levels of self worth and purpose. This could be reflective of group participation in which the majority of campus drinking takes place. Based on the Levene statistic, homogeneity of variance was maintained in the total and subscales scores. Effect size was .01 or less in this analysis.

All statistically significant differences were maintained following post hoc Scheffe testing with the ANOVA related to sexual activity. The previously sexually active/not currently (n = 405) was significantly different than virgins (n = 429) in the TLS (p = .003), SG (p < .001), and IR (p = .026) subscales. Virgins had significantly higher health promotion scores than those that had been sexually active in the past. Previously sexually active/not currently was also significantly different than the group that reported being currently sexually active (n = 873) in TLS (p < .001), HR (p < .001), NU (p =.015), SG (p = .002), and IR (p < .001) subscales. Students reporting current sexual activity had the highest mean scores in total and all subscales except SG where

score from the virgin group was highest. Significance was not reached when harmonic mean was used in TLS or any subscale. Homogeneity of variance was maintained in all measures except the subscale IR which reported significance at $p = .34$. As with the other ANOVA results, effect size was small at .02 or less on all measures.

The final ANOVA analysis was looking for differences in HPLP II scores and major area of college study. In the initial ANOVA analysis the total and all subscales scores were significant except PA. All held significance in post hoc Scheffe testing except the subscale SM. Group 5 (Human Science, Nursing, Pharmacy, and Veterinary Medicine [$n = 382$]) had the highest mean scores in TLS and all the subscales except SM. Group 1 (Agriculture, Forestry & Wildlife Science [$n = 100$]) was the only group that was not statistically significantly different than the other four groups in post hoc testing related to TLS. Mean TLS scores for Group 2 (Architecture, Design & Construction, Business [$n = 290$]) statistically differed from Group 3 (Education, Liberal Arts [$n = 566$]) at $p = .033$ and Group 5 ($p = .002$). Group 3 was also statistically different from Group 4 (Engineering, Science & Math [$n = 359$]) at $p < .001$ in regard to TLS scores. Group 4 and Group 5 were also significantly different on TLS scores ($p < .001$). The subscale HR found Group 5 differed from Group 1 ($p = .002$), Group 2 ($p < .001$), and Group 4 ($p < .001$). Group 3 was statistically different in HR scores from Group 2 and Group 4 at $p < .001$ level. The NU subscale also revealed significance between Group 4 and Group 3 ($p = .040$) and Group 5 ($p = .001$). Group 5 was also significantly different than Group 2 at $p = .020$. Overall, Group 5 and Group 3 had higher mean scores than Group 2 and Group 4. Only one statistically significant difference was noted between Group 4 and Group 5 ($p = .043$) in post hoc testing with the SG subscale. The IR subscale

maintained significance between Group 2 and Group 3 ($p = .014$) and Group 2 and Group 5 ($p = .003$) as well as Group 4 and Group 3 ($p < .001$) and Group 4 and Group 5 ($p < .001$). Statistically significant differences did not hold up during post hoc testing in the SM subscale. Using the harmonic mean, no significance was reached. Effect size was also .04 or for this analysis. Violation of homogeneity of error variance was found with significance in the HR ($p = .004$), PA ($p = .001$) and NU ($p < .001$) subscales.

Summary

Chapter IV has presented the results of the four research questions examined in this study. Descriptive statistics, multiple linear regression, ANOVA, Pearson correlation, and independent samples t-test were computed on the data collected to provide statistical analyses for the research questions posed. Statistically significant results were evident during the inferential statistical analyses used to address data in research questions three and four. All seven regression models revealed statistically significant demographic predictor variables for the total and six subscales of the HPLP II.

Specific findings will be summarized in Chapter V, conclusions, implications, limitations discussed, as well as recommendations for future study. Implications derived from the results of this study will be discussed in regard to students, educators, health care providers, and university administration.

CHAPTER V

SUMMARY, CONCLUSIONS, LIMITATIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

Participating in health promoting behaviors has demonstrated higher levels of health, feelings of self-worth, and prevention or management of chronic disease. Scientific research has indicated that individuals that start following a healthy lifestyle at an early age will have less chronic illness later in life. Findings from research conducted on the college population notes that college students do not consistently participate in health promoting behaviors and also under appreciates the significance that healthy habits at an early age will have on health in later life.

Heath care costs are skyrocketing in the face of an aging society to cover the costs related to chronic diseases. However, the majority of chronic diseases can be prevented or controlled through proper health maintenance screening, diet, exercise, and stress management. Chronic disease can also be prevented by abstaining from the use of tobacco products, drinking in moderation, and participation in safe sex practices. Genetic predisposition to disease can not be controlled but individuals with known genetic tendencies can take control of their lifestyle at an early age to minimize, and in some cases prevent, the course of disease. Health organizations around the world have recognized and responded to the staggering trend toward an unhealthy lifestyle and have established a series of international goals for healthy living known as *Healthy People*

2010. College campuses modified these global health goals and developed goals specific for students who currently represent the student body on college campuses across the U.S. (*Healthy Campus 2010).*

This study was designed to assess the current health promotion standards of students at a large southeastern university. The incidence and prevalence of chronic disease has continually risen in the southern states over the last two to three decades and a study of students from this region was designed to identify areas of greatest concern related to health. This chapter includes a summary of the study, conclusions, limitations, implications, and recommendations for further research and practice.

Summary

In order to implement campus specific health promotion programs, assessment data about the college population is needed. Therefore, this study examined three purposes in assessing students at a large southeastern public university. The specific purposes of this study were to determine the degree to which college students engage in health-promoting lifestyles, to identify differences in health-promoting lifestyles between college freshmen, sophomore, junior, senior, and graduate students, and to determine if there are any differences in demographic findings that contribute to or prevent participation in a health-promoting lifestyle. Descriptive and inferential statistical analyses were performed on the sample of 1,752 students currently enrolled at a large southeastern university during the fall 2005 semester. A description of the sample was provided in regard to age, student classification, gender, ethnicity, and major area of college study. Mean scores were provided for the total lifestyle and six subscale scores on the HPLP II for each participant.

Mean scores for overall total health-promoting lifestyle and each of the six subscales were calculated separately for freshman, sophomore, junior, senior, and graduate students. Further analysis included a one-way Analysis of Variance (ANOVA), with the five student classification groups, to determine whether there was a significant difference between health-promoting lifestyle behaviors and student classification.

Information obtained from the demographic data form was analyzed to identify any differences or relationships between HPLP II scores and the various demographic variables. Pearson correlation analysis was conducted on the continuous data related to age, BMI, total number of sexual partners in lifetime, and frequency of condom use during sex. Categorical data from gender (male/female), previous medical history of disease (yes/no), family history of chronic disease (yes/no), condom use (yes/no), prior or current bisexual relationship (yes/no), and prior or current homosexual relationship (yes/no) were used to determine differences using t-tests.

Race, smoking status, alcohol use, sexual activity, major area of college study were analyzed using ANOVA techniques. When a statistically significant finding was determined through ANOVA, posthoc Scheffe testing was applied to determine where the statistically significant differences existed in the subscales. Multiple linear regression methods were used to evaluate the relationships between the independent variables of age, BMI, gender, race, student classification, major area of college study, previous history of medical disease, family history of chronic medical disease, smoking status, alcohol use, sexual activity, and the dependent variable health promotion total lifestyle and subscale scores.

Information gained from this study will be used to develop programs to promote health-promoting behaviors among college students. Recommendations will be made in regard to assessment, awareness, education, and intervention programs campus-wide, or with specific subgroups, designed to prevent or minimize future health problems.

Conclusions

Participants for this study included a convenience sample of 1,752 college students who were recruited through an email request for participation. Voluntary participants were asked to complete a demographic data form and the HPLP II. The total lifestyle mean score, for the sample, was 2.6824 which was slightly higher than the average 2.5. Odom (2001) assessed health promoting behaviors with 554 college men and women using the HPLP II revealing a TLS mean of 2.66. Thus, the overall total lifestyle score for this study was similar to the Odom (2001) study. The six subscale of the HPLP II include questions related to HR, PA, NU, SG, IR, and SM. Items for each subscale were randomly placed within the survey instrument. This mean reflects the participants response to 52 questions related to measures of a healthy lifestyle. Five (PA, NU, SG, IR and SM) of the six subscale mean scores were also average or above in this sample. The subscale with questions related to health responsibility fell below the mean of 2.5 (2.1878) reflecting lower responses to questions about interactions with health care providers, health prevention, and health maintenance activities. Students in this sample had means greater than 3.0 in the subscales of interpersonal relations (3.1430) and spiritual growth (3.1690) reflecting an “often” or “routinely” response to the questions in these subscales. Odom (2001) and Larouche (1998) found that college students scored lowest in HR and SM and highest in IR and SG. Oleckno and Blacconiere (1990) studied

1,077 students and found they also scored lowest in the HR subscale. Low HR scores are reflective of the students' lack of contact with health care providers and lack of initiative to seek out health related information. However, this sample reported higher scores in IR and SG subscales reflecting higher feelings of self-worth, purpose, positive outlooks, were socially engaged, reported satisfying relationships, and good social support networks.

Differences between freshmen, sophomore, junior, senior, and graduate students were evaluated and findings revealed that graduate students demonstrated higher TLS and HR, NU, and SG subscales. Older students were more likely to seek out health care and discuss health concerns with health care provider, consume healthier foods, and express more purpose and self-worth. Freshmen had the highest means scores in the PA and SM subscales but ANOVA findings did not reach significance. Junior students had the lowest means in TLS, PA, SG, IR, and SM but findings were not significant.

Eleven independent variables were examined in regard to levels of reported health promotion through regression analyses. Statistical significance was found in regard to each variable and the impact on overall health promotion scores. However, explained variance was low and even though statistical significance was found, clinical significance may not be present. Age was found to be a statistically significant predictor in four of the regression models and supported the ANOVA findings that investigated mean differences by student classification. Older participants reported higher levels of total lifestyle score, health responsibility, nutrition, and spiritual growth. BMI was negatively correlated in six of the seven regression models. This negative correlation reflected the heavier the individual the lower reported health promotion scores. Overall, females reported higher

scores than males in TLS and HR, NU, SG, and IR subscales and males engaged in a higher level of physical activity and reported doing better at managing stress than females. These findings were similar to those reported by Buckworth and Nigg (2004) in that males reported higher levels of activity than females. Huang et al. (2003) assessed BMI, dietary habits, and physical activity in 736 college students. In the Huang et al (2003) study 21.6% of the participants were overweight, 4.9% obese, and 69% consumed less than the recommended servings of fruits and vegetables per day. The mean BMI for the current study was 24.23 (*SD* = 4.809) with a range of 14.58 to 55.43 revealing an above mid-point normal range BMI for this sample. The Department of Health and Human Services, National Institutes of Health reports a normal weight BMI between 18.5 to 24.9 (National Heart, Lung, and Blood Institute, 2006).

Family history of chronic medical disease was not a significant predictor of reported health promotion. Previous history of medical disease had a positive correlation with students engaging more with health care providers and taking a more active role in health maintenance. However, individuals with reported history of medical disease scored lower in the areas of physical activity, spiritual growth, and stress management. Student classification was only predictive in regard to nutrition in that graduate students, seniors, and juniors reported higher level of healthy food choices. Smokers reported lower health promotion scores in total and all subscales except stress management. This is not a surprising finding since most individuals who smoke report using smoking as a means of reducing stress. Patterson et al. (2004) reported that smoking has been shown to be a positive correlate to stress in several studies using college students. In studies reviewed

by Patterson et al. (2004) academic stress, perceived stress, decreased internal locus of control, have all been associated with increase smoking incidence.

Surprisingly, alcohol consumption was not perceived as a health threat nor had a negative impact on any measure except spiritual growth. This study was contrary to the majority of alcohol studies with college students. Ziegler et al. (2005) identified findings which indicated that 31% meet diagnostic criteria for alcohol abuse and 6% classified as alcohol dependent. Heavy drinking and binge drinking in college students was shown to result in a number of neuropsychological deficits (Ziegler et al., 2005). Broadwater et al. (2005) investigated the social norming concept among college students related to alcohol consumption. Findings from the Broadwater et al. (2005) study identified that 91% of participants felt their friends drank more than them and a desire to match normative behavior was theorized to increase consumption but was not supported statistically in their study. An increased level of physical activity was actually reported by the cohort who reported consuming more alcohol in this study.

Individuals who were currently sexually active were more likely to seek out medical care and engage more with health care providers and self-monitoring techniques, like self-breast exams. Sexually active individual also reported higher levels of healthy interpersonal relationships. Condom use decreased with increased sexual activity but could be reflective of a more responsible monogamous relationship. Klein and Knauper (2003) studied the role of couple discussion and safer sex practices. Findings from their study differed from this study in that in the Klein and Knauper (2003) found that evidence of increased discussion of safe sex practices increased condom use as a cognitive sexually transmitted disease avoidance strategy.

Even though African-Americans were a minority in this sample (and on this campus) as compared to Caucasians, they reported higher mean scores on TLS, HR, SG, IR, and SM. Physical activity and nutrition were the only two subscales that African-American were lower than Caucasians and other ethnic groups. Students who reported a major course of study in health science, nursing, pharmacy, or veterinary medicine consistently had the higher group means on all the health promotion questions and subscales, except stress management, reaching significance in all measures except for physical activity. Overall, a higher BMI, female gender, current smokers, African-Americans, and health related majors provided the best predictive impact on levels of self-reported health promotion. In this study, African-American ethnicity and a health related major of college study increased health promotion scores. However, the African-Americans who responded to this study were individuals who are currently pursuing a college degree and may not be representative of the African-American population as a whole. Individuals with a higher BMI, male gender, and smokers reported lower HPLP II scores. More female than males completed the surveys and could have influenced the findings. More female than male participants were evident in almost all of the studies reviewed in Chapter II, reflecting a consistent increased number of college student participants in research studies related to health promotion and risk-taking behaviors. Previous research supported the findings in this study in relation to individuals with a higher BMI and those that smoke demonstrating a lower level of health promoting behaviors.

Limitations

In addition to the limitations noted in Chapter I, several study specific limitations were noted after data analysis. This study was conducted at one southeastern university and may not be representative of college students across the country. The sample was compiled from the students that volunteered to complete the two questionnaires for this study and may limit generalizability. A convenience sample of 1,752 for a possible 23,333 subjects participated in this study. Chi-square analyses revealed that the sample was not representative of the campus in regard to student classification, gender, ethnicity, or major area of college study.

Cigarette smoking was the only measure of nicotine assessed in this study. Other forms of tobacco (dip, sniff, and chew) have associated health risks and should be included in future studies. Levels of alcohol consumption were measured in this study. College students are also tempted by illicit drugs and participation in the use of illicit drugs should be measured in future research. The level of sexual activity was assessed in this study without taking into consideration that currently sexually active students may be in a long term monogamous relationship, which significantly decreases their risk of sexually transmitted disease. Length of current sexual relationship should be assessed in future research related to sexual activity of college students.

African-Americans and other ethnicities were underrepresented in this study and the majority of studies reviewed. Diabetes, hypertension, heart disease, and stroke are common among African-Americans and a source of health and financial concern for these individuals. These diseases, even though they have a genetic predisposition, can be managed by maintaining a healthy lifestyle. Future research should include a larger, more

ethnically diverse sample, in order to promote an increased awareness of health promoting behaviors in this population.

Greek organizations on college campuses are often criticized for their activities that center around alcohol consumption. Due to a coding error analysis for this study was not available to determine if student who belonged to a fraternity or sorority were more like to consume alcohol at a higher level than other non-Greek students. Therefore, inclusion of Greek status could provide this data in future research.

Implications

Findings from this study could have implications for several groups. Implications in regard to students, educators (campus-wide and classroom), health care providers (student health center), and university administrators (student services and overall campus goals) will be addressed.

Students

Adaptation of a healthy lifestyle as a young adult has been proven to prevent or decrease the severity of medical disease in later years. Awareness and educational programs related to the importance of healthy habits and maintenance of ideal weight, nutrition, relaxation techniques, sufficient hours of sleep, development of supportive and meaningful relationships, and establishing a positive outlook on life would provide the foundation for modification of behaviors that lead to a healthy lifestyle. College students tend to initiate or escalate certain risk-taking behaviors during the college years that could negatively impact health. Therefore, programs related to the awareness of health risks associated with tobacco use, alcohol consumption, sedentary lifestyle, and sexual activity need to be provided on all college campuses.

Age, BMI, gender, smoking status, major area of college study, previous history of medical disease, family history of chronic disease, alcohol use, and sexual activity were all statistically significant predictors on health promoting behaviors. Findings from this study revealed that graduate students had higher health promotion scores in TLS and the HR, NU, SG, and SM subscales when compared to underclassmen. Therefore, the earlier in the college experience the student is exposed to these health issues the better the expected outcomes. A realistic goal for these programs would be to increase awareness of health risks instead of a goal of complete compliance.

Educators (Campus-wide and Classroom)

Most college campuses already provide numerous awareness and educational programs for students related to health promoting and risk taking behaviors. However, attendance and impact of these programs has been traditionally low in changing behavior in the college student. The findings from this study found that overall students did not take responsibility for their health by seeking out health related materials or advise from health professionals. Therefore, other avenues of awareness and educational programs should be examined. Today's college students are more computer literate than students in the past and use the internet on a regular basis as a source of information, including health information. Provision of student focused health programs through the campus intranet systems would assure that students on the campus were provided with accurate and relevant information related to health topics. Programs that are interactive and have the ability to provide information based on the student needs would result in higher use over a module-type or canned presentation.

Educational and awareness programs need to go to the students instead of expecting the students to come to the programs. Campus health educators need to provide programs in the residence halls, sororities, fraternities, student activity center, recreational facilities, and any other area on campus where students tend to gather. Programs need to be informal and interactive. Participant completion of brief surveys, before, during, or after a program would serve as a needs assessment to guide individualized future programs.

Campus educators need to use peer educators to disseminate health related information. Studies have shown that students attend more to presentations from peers as opposed to programs set-up by faculty or staff. However, integration of campus health concerns should be incorporated in a variety of courses across campus and not just in health related classes. Targeted selection of awareness and educational programs related to age, gender and ethnicity should also be implemented and individualized in response to campus needs.

Health Care Providers

The majority of universities have some level of health care provided on campus. These services can range from something as simple as a nurse hotline where students can get answers to health care questions to a full service student health center with the ability to handle complex medical conditions on an inpatient or outpatient basis. No matter what services are offered, health care professions need to take the opportunity to discuss health promotion and health maintenance with students during all encounters. Asking questions about health practices can lead to a discussion and point of contact educational sessions with students. Students can receive individualized feedback, clarification of health

information, and encouragement to pursue a healthier lifestyle. Heath care providers should also be role models for student by practicing healthy habits themselves.

Some of the health education programs on campus should be provided by the campus health care providers to allow the opportunity for students to interact with them in a group setting. Once this initial contact has been made, students will be more likely to come to the health center for further assessment, treatment, or advice as needed.

University Administration

Assessment, awareness, and educational programs related to health issues will require support and funding from the university administration. Supporting health education programs through the campus student newspaper, campus television or radio station, daily student intranet mailings, and campus notice boards are ways that healthy habits can be disseminated to students. Internet based awareness programs on risk taking behaviors, such as drinking, smoking, and high risk sexual activity, can be introduced at freshmen orientation and required completion by all students before or during the first semester of college life. Awareness and encouragement to make educated healthy choices can be a more effective approach with this age group as opposed to stressing all the negatives related to risk taking behaviors that impact health. Tracking of this data can help with the direction of future campus health programs. These programs are not without cost and funding sources approved by administration would be necessary for continued implementation.

Ongoing assessment of health promoting and/or risk taking behaviors among the current student population is necessary to guide educational offerings and health care needs. Having one central location for this data would prevent duplication of programs

and decrease the cost to campus administration. Incentives to participate in health programs and healthy lifestyle practices could be provided in the form of a discount at the student union, bookstore, or campus recreational facility.

Recommendations

The findings of this study suggest that college students do not consistently exhibit healthy habits. Negative correlations were seen between smoking, alcohol use, and lower mean scores on total lifestyle measures and subscale scores on the HPLP II. Significant differences were seen between the younger students and upperclassmen and graduate students. So it is possible that with maturity or a longer exposure to campus life student make wiser choices related to health. Research has shown that individuals as young as early teens have already established unhealthy behaviors related to diet, exercise, smoking, drinking, and sexual activity. Research to address populations younger than college age should be conducted to provide evidence to support early intervention programs. Investigational studies of the older students should focus on identification of influences, over the course of their college experiences, which were instrumental in promoting a healthier lifestyle than they may have demonstrated as a freshmen or sophomore.

As evident in the review of literature, numerous research studies have been conducted to assess the level of health or incidence of risk taking behaviors among college students. However, only a limited number of studies were interventional in nature. Therefore, it would be beneficial for future research to be one of experimentation or intervention to start investigating what methods are effective in changing unhealthy behaviors. These studies should include the freshmen and possibly high school students

to facilitate and earlier adoption of a healthy lifestyle. Getting students involved in an interventional exercise program, for example, could provide the catalyst for a long term pattern of exercise.

Students attend college to expand their knowledge base in a chosen field. This environment of learning should be used to the advantage of the researcher exploring healthy habits and behaviors among college students. Studies that investigate motivational factors that encourage health promoting behaviors in college students should be conducted and used to guide educational programs.

The sample for this study was taken from one university and therefore generalizability is limited. Replication of this study at other colleges and universities, across the country would enhance generalizability. Caucasian females were the predominant gender who participated in this study. Research that includes more males and a diverse ethnicity would provide findings that could be generalized to larger groups.

Summary

Health promoting behaviors are important for an individual at any age. Assessment of these behaviors in college students is vital to help support positive behaviors and change behaviors that are known to have a negative impact on health. College students are more likely to change behavior based on knowledge gained through evidence-based research. Assessment studies can set the stage for intervention studies. Hopefully, either type of study will increase awareness related to the benefits of health promoting behaviors and lead to changes in unhealthy behaviors. Medical research and the expanded understanding of disease management will provide a continued need for assessment and interventional research related to health promoting behaviors.

This study identified several areas that should be addressed on this campus to improve student health. Increased awareness of behaviors that impact health will lead the student to make informed decisions about their own health. Behavior change has to start with the individual and only when change is valued by the individual will incorporation of a healthier lifestyle take place. Campus health educators, classroom educators, campus health care providers, and university administrators need to work together to provide the programs to build a healthy campus community.

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APPENDICES

APPENDIX A

DEMOGRAPHIC DATA FORM

APPENDIX C - DEMOGRAPHIC DATA FORM

Please answer the following questions:

Age _____

Height _____

Weight _____

For the following questions check the one that applies:

Gender
_____Male
_____Female

Race
_____Caucasian
_____African-American
_____Other

Student Classification
_____Freshman
_____Sophomore
_____Junior
_____Senior
_____Graduate Student

Major Area of College Study
_____Agriculture, Forestry & Wildlife Science
_____Architecture, Design & Construction, Business
_____Education, Liberal Arts
_____Engineering, Science & Mathematics
_____Human Sciences, Nursing, Pharmacy, Veterinary Medicine

Member of a sorority or fraternity
_____ Yes _____ No

Previous history of medical disease
_____Yes _____No

Family history of chronic medical disease
_____Yes _____No

For the following questions check the one that applies:

SMOKING STATUS:
Select the response that best describes your smoking habits over the last 6 months.
_____Non-smoker, never smoked
_____Non-smoker, previously smoked
_____Smoker, 1 or more cigarettes/month
_____Smoker, 1 or more cigarettes/day

ALCOHOL USE:
Select the response that best describes your drinking habits over the last 6 months.
_____Never used
_____Current non-drinker, previously drank
_____1 or more drinks/month
_____4-7 drinks/month
_____4-7 drinks/week
_____1 or more drinks/day

SEXUAL ACTIVITY:
_____Virgin, never participated in oral or genital sex
_____Previously sexual activity, but not currently*
_____Currently sexually active*

****If previously or currently sexually active, please answer the following questions:***

Total number of lifetime sexual partners _____

Prior or current bisexual relationship
_____Yes
_____No

Prior or current homosexual relationship
_____Yes
_____No

Condom use
_____Yes**
_____No

**If condom user please note the percentage of time you use a condom _____%.

APPENDIX B

HEALTH PROMOTION LIFESTYLE PROFILE II

LIFESTYLE PROFILE II

DIRECTIONS: This questionnaire contains statements about your *present* way of life or personal habits. Please respond to each item as accurately as possible, and try not to skip any item. Indicate the frequency with which you engage in each behavior by circling:

N for never, **S** for sometimes, **O** for often, or **R** for routinely

		NEVER	SOMETIMES	OFTEN	ROUTINELY
1.	Discuss my problems and concerns with people close to me.	N	S	O	R
2.	Choose a diet low in fat, saturated fat, and cholesterol.	N	S	O	R
3.	Report any unusual signs or symptoms to a physician or other health professional.	N	S	O	R
4.	Follow a planned exercise program.	N	S	O	R
5.	Get enough sleep.	N	S	O	R
6.	Feel I am growing and changing in positive ways.	N	S	O	R
7.	Praise other people easily for their achievements.	N	S	O	R
8.	Limit use of sugars and food containing sugar (sweets).	N	S	O	R
9.	Read or watch TV programs about improving health.	N	S	O	R
10.	Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).	N	S	O	R
11.	Take some time for relaxation each day.	N	S	O	R
12.	Believe that my life has purpose.	N	S	O	R
13.	Maintain meaningful and fulfilling relationships with others.	N	S	O	R
14.	Eat 6-11 servings of bread, cereal, rice and pasta each day.	N	S	O	R
15.	Question health professionals in order to understand their instructions.	N	S	O	R
16.	Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).	N	S	O	R
17.	Accept those things in my life which I can not change.	N	S	O	R
18.	Look forward to the future.	N	S	O	R
19.	Spend time with close friends.	N	S	O	R
20.	Eat 2-4 servings of fruit each day.	N	S	O	R
21.	Get a second opinion when I question my health care provider's advice.	N	S	O	R
22.	Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).	N	S	O	R
23.	Concentrate on pleasant thoughts at bedtime.	N	S	O	R
24.	Feel content and at peace with myself.	N	S	O	R
25.	Find it easy to show concern, love and warmth to others.	N	S	O	R
26.	Eat 3-5 servings of vegetables each day.	N	S	O	R

	NEVER	SOMETIMES	OFTEN	ROUTINELY
27. Discuss my health concerns with health professionals.	N	S	O	R
28. Do stretching exercises at least 3 times per week.	N	S	O	R
29. Use specific methods to control my stress.	N	S	O	R
30. Work toward long-term goals in my life.	N	S	O	R
31. Touch and am touched by people I care about.	N	S	O	R
32. Eat 2-3 servings of milk, yogurt or cheese each day.	N	S	O	R
33. Inspect my body at least monthly for physical changes/danger signs.	N	S	O	R
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).	N	S	O	R
35. Balance time between work and play.	N	S	O	R
36. Find each day interesting and challenging.	N	S	O	R
37. Find ways to meet my needs for intimacy.	N	S	O	R
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.	N	S	O	R
39. Ask for information from health professionals about how to take good care of myself.	N	S	O	R
40. Check my pulse rate when exercising.	N	S	O	R
41. Practice relaxation or meditation for 15-20 minutes daily.	N	S	O	R
42. Am aware of what is important to me in life.	N	S	O	R
43. Get support from a network of caring people.	N	S	O	R
44. Read labels to identify nutrients, fats, and sodium content in packaged food.	N	S	O	R
45. Attend educational programs on personal health care.	N	S	O	R
46. Reach my target heart rate when exercising.	N	S	O	R
47. Pace myself to prevent tiredness.	N	S	O	R
48. Feel connected with some force greater than myself.	N	S	O	R
49. Settle conflicts with others through discussion and compromise.	N	S	O	R
50. Eat breakfast.	N	S	O	R
51. Seek guidance or counseling when necessary.	N	S	O	R
52. Expose myself to new experiences and challenges.	N	S	O	R

HEALTH-PROMOTING LIFESTYLE PROFILE II

Scoring Instructions

Items are scored as	Never (N)	=	1
	Sometimes (S)	=	2
	Often (O)	=	3
	Routinely (R)	=	4

A score for overall health-promoting lifestyle is obtained by calculating a mean of the individual's responses to all 52 items; six subscale scores are obtained similarly by calculating a mean of the responses to subscale items. The use of means rather than sums of scale items is recommended to retain the 1 to 4 metric of item responses and to allow meaningful comparisons of scores across subscales. The items included on each scale are as follows:

Health-Promoting Lifestyle	1 to 52
Health Responsibility	3, 9, 15, 21, 27, 33, 39, 45, 51
Physical Activity	4, 10, 16, 22, 28, 34, 40, 46
Nutrition	2, 8, 14, 20, 26, 32, 38, 44, 50
Spiritual Growth	6, 12, 18, 24, 30, 36, 42, 48, 52
Interpersonal Relations	1, 7, 13, 19, 25, 31, 37, 43, 49
Stress Management	5, 11, 17, 23, 29, 35, 41, 47

3/95: snw

APPENDIX C

INSTITUTIONAL REVIEW BOARD APPROVAL

Auburn University

Auburn University, Alabama 36849

Office of Human Subjects Research
307 Samford Hall

Telephone: 334-844-5966
Fax: 334-844-4391
hsubjec@auburn.edu

August 30, 2005

MEMORANDUM TO: Eva jean Dubois
ADED

PROTOCOL TITLE: "Assessment of Health-Promoting Factors in College Students' Lifestyles"

IRB FILE: #05-157 EP 0508

APPROVAL DATE: August 25, 2005
EXPIRATION DATE: August 24, 2006

The above referenced protocol was approved by IRB Expedited procedure under Expedited Category #7 on August 25, 2005. You should report to the IRB any proposed changes in the protocol or procedures and any unanticipated problems involving risk to subjects or others. Please reference the above authorization number in any future correspondence regarding this project.

If you will be unable to file a Final Report on your project before August 24, 2006, you must submit a request for an extension of approval to the IRB no later than August 15, 2006. If your IRB authorization expires and/or you have not received written notice that a request for an extension has been approved prior to August 24, 2006, you must suspend the project immediately and contact the Office of Human Subjects Research for assistance.

A Final Report will be required to close your IRB project file. You are reminded that consent forms must be retained at least three years after completion of your study.

If you have any questions concerning this Board action, please contact the Office of Human Subjects Research at 844-5966.

Sincerely,

Peter W. Grand jean /ebg

Peter W. Grand jean, Chair
Institutional Review Board for the Use of Human Subjects in Research

cc: William Spencer
James Witte

APPENDIX D

SURVEY PARTICIPATION REQUEST

WELCOME TO A STUDY ON HEALTH PROMOTING BEHAVIORS

Below if the information letter and link to survey documents.
Thanks to all who chose to participate.

INFORMATION ON A STUDY ASSESSING HEALTH-PROMOTING BEHAVIORS IN COLLEGE STUDENTS

You are invited to participate in a research study designed to assess health-promoting behaviors in college students. This study is being conducted by Eva Jean Dubois, doctoral candidate in Adult Education, under the supervision of Dr. James Witte. I hope to learn more about health-promoting behaviors of college students. You were selected as a possible participant because you are currently enrolled at Auburn University. You must be age 19 or older to participate in this study.

Participation is entirely voluntary. If you decide to participate, all you have to do is click on the link below and follow the instructions. You will be led to a website with a Demographic Data Form and the 52-item Health-Promoting Lifestyle Profile II (HPLP II). Please follow the instruction on the website for completing these surveys. Completion of these 2 surveys will take approximately 10-15 minutes. Consent for participation in this study is implied with your completion and submission of these surveys. There are no direct benefits to you for participation. However, the results of this study could lead to development, implementation, and maintenance of health education/promotion programs specific for the Auburn University student population.

Because this study involves the collection of confidential questionnaire information, there are no anticipated risks or discomforts associated with participation. Only the researchers will have access to these emails and no attempt will be made to identify the participants with the data. The only information that will be collected

in the database will be the participants' responses to the questions. No identifying information is requested and logging in is not required to participate in this study.

Data collected during this research will be used to fulfill the requirements for completion of my dissertation. Seth Humphrey, website designer, Eva Jean Dubois, principle investigator, Dr. James Witte, Dr. Marie Witte, Dr. Margaret Ross, and Dr. K. J. Ellison, dissertation committee members will be the only individuals with access to the data. The collective data may be used in publications or presentations.

The information you provide will be grouped with the responses of others and will not be associated with any single individual. Your individual responses will never be identified with you in any way and will be stored in a secure database. You may choose to withdraw from the study at any time by not submitting any or all of the questions or surveys. However, after you have submitted the surveys there will be no way of withdrawing your information since there will not be a way to identify your individual responses.

Your decision whether or not to participate will not jeopardize your future relations with Auburn University or the Educational Foundations, Leadership, and Technology (EFLT) Department. If you have any questions please contact Eva Jean Dubois, 844-6760, (duboiej@auburn.edu) or my committee chair, Dr. James Witte, Adult Education, EFLT, 844-3054, witteje@auburn.edu and we will be happy to answer them.

For more information regarding your rights as a research participant you may contact the Office of Human Subject Research or the Institutional Review Board by phone at 334-844-5966 or email at hsubjec@auburn.edu or IRBchair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTICIPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. YOU MAY PRINT THIS PAGE FOR YOUR RECORDS.

Sincerely,
Eva Jean Dubois
Doctoral Candidate, Adult Education, EFLT

CLICK HERE TO GO TO THE SURVEYS
http://www.auburn.edu/nursing/surveys/healthpromotion

APPENDIX E

PERMISSION TO USE HPLP II

PERMISSION FORM

I plan to use the *Health-Promoting Lifestyle Profile II* in a research or evaluation project entitled:

Assessment of Health-Promoting Lifestyle in College Students

I am enclosing a check for twenty US dollars ($20.00) payable to the **University of Nebraska Medical Center College of Nursing**.

☒ English ☐ Spanish ☐ Both

EVA JEAN DUBOIS
Print Name

Eva Jean Dubois
Signature

DOCTORAL CANDIDATE - ADULT EDUCATION
Position

(334) 844-6760
Area Code Telephone #

AUBURN UNIVERSITY
216 MILLER HALL
AUBURN UNIVERSITY, AL 36849
Mailing Address

duboiej@auburn.edu
E-mail Address

Permission is granted to the above investigator to copy and use the *Health-Promoting Lifestyle Profile II* for non-commercial data collection purposes such as research or evaluation projects provided that content is not altered in any way and the copyright/permission statement at the end is retained. The instrument may be reproduced in the appendix of a thesis, dissertation or research grant proposal without further permission. Reproduction for any other purpose, including the publication of study results, is prohibited without specific permission.

Susan Noble Walker
Susan Noble Walker

9/14/04
Date

Please send two signed copies of this page to:

Susan Noble Walker, Ed.D., R.N., F.A.A.N.
College of Nursing
University of Nebraska Medical Center
985330 Nebraska Medical Center
Omaha, Nebraska 68198-5330

6/10/04

APPENDIX F

FOLLOW-UP SURVEY PARTICIPATION REQUEST

FOLLOW-UP REQUEST FOR YOUR PARTICIPATION IN A HEALTH PROMOTION STUDY

Dear Auburn University Student:

This email is a reminder that you are invited to participate in a research study assessing health-promoting behaviors in college students. This study is being conducted by Eva Jean Dubois, doctoral candidate at Auburn University under the supervision of Dr. James Witte, Adult Education, EFLT. If you decide to participate, all you have to do is click on the link below. You must be age 19 or older to participate in this study. If you have already completed the surveys, your participation is greatly appreciated.

Any information obtained during this study will remain anonymous. Your individual responses will never be identified with you in any way. The only people who will have access to the data collected are the website designer and researchers involved in this study. To view more details about this study, please view the information letter attached to the email.

Again, your participation is very important to this research study and I would like to thank you in advance for taking the time to participate.

Sincerely,
Eva Jean Dubois
duboiej@auburn.edu

CLICK HERE FOR THE SURVEYS:
http://www.auburn.edu/nursing/surveys/healthpromotion

APPENDIX G

MEAN, STANDARD DEVIATION, t STATISTIC, AND EFFECT SIZE FOR TLS AND SIX HPLP II SUBSCALES IN REGARD TO GENDER, MEDICAL HISTORY, FAMILY HISTORY, BISEXUAL PREFERENCE, HOMOSEXUAL PREFERENCE, AND CONDOM USE

Mean, standard deviation, t statistic, and effect size for TLS in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores	*Mean*	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	2.7221	.41442	5.135***	.25
Male	2.6167	.40323		
Medical History				
No	2.6858	.40921	.648	.03
Yes	2.6847	.41693		
Family History				
No	2.6810	.41258	-.160	-.008
Yes	2.6847	.41693		
Bisexual preference				
No	2.6859	.41214	.962	-.05
Yes	2.6432	.40800		
Homosexual preference				
No	2.6830	.41171	-.313	-.02
Yes	2.6994	.42705		
Condom use				
No	2.6903	.42031	.576	-.03
Yes	2.6771	.40538		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for HR in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores

	Mean	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	2.2845	.58437	9.001***	.43
Male	2.0256	.55812		
Medical History				
No	2.1605	.57938	-5.833***	-.28
Yes	2.4289	.60638		
Family History				
No	2.1577	.58004	-3.688***	-.18
Yes	2.2775	.60264		
Bisexual preference				
No	2.1960	.57735	-.303	-.02
Yes	2.2150	.64259		
Homosexual preference				
No	2.1944	.57992	-1.024	-.05
Yes	2.2701	.63220		
Condom use				
No	2.2021	.60616	.302	.02
Yes	2.1922	.57172		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for PA in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores

	Mean	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	2.4519	.69066	-3.493***	-.16
Male	2.5736	.70582		
Medical History				
No	2.5151	.69932	3.021**	.15
Yes	2.3485	.68823		
Family History				
No	2.5203	.69917	2.323*	.11
Yes	2.4304	.69497		
Bisexual preference				
No	2.5116	.70865	2.039*	.11
Yes	2.3573	.60007		
Homosexual preference				
No	2.5068	.70344	1.024	.05
Yes	2.4154	.69951		
Condom use				
No	2.4834	.73002	-.718	-.04
Yes	2.5117	.68959		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for NU in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores

	Mean	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	2.6422	.57744	6.043***	.29
Male	2.4673	.57967		
Medical History				
No	2.5798	.58125	.190	.009
Yes	2.5711	.60478		
Family History				
No	2.5730	.58203	-.245	-.02
Yes	2.5809	.58557		
Bisexual preference				
No	2.5841	.58347	.919	.05
Yes	2.5266	.54155		
Homosexual preference				
No	2.5829	.57970	.927	.05
Yes	2.5145	.60047		
Condom use				
No	2.6075	.58695	1.519	.08
Yes	2.5580	.58170		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for SG in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores

	Mean	*SD*	*t*	*Cohen's d Effect size*
Gender				
.				
Female	3.1971	.52279	2.682**	.13
Male	3.1254	.55264		
Medical History				
No	3.1807	.52934	2.396*	.12
Yes	3.0795	.57798		
Family History				
No	3.1703	.54042	.420	.02
Yes	3.1578	.52280		
Bisexual preference				
No	3.1531	.54012	.410	.02
Yes	3.1292	.56519		
Homosexual preference				
No	3.1504	.53970	-.622	-.03
Yes	3.1932	.56971		
Condom use				
No	3.1802	.52857	1.532	.08
Yes	3.1341	.54455		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for IR in regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores	*Mean*	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	3.2332	.51592	9.109***	.44
Male	2.9918	.55187		
Medical History				
No	3.1467	.53931	.512	.03
Yes	3.1248	.57030		
Family History				
No	3.1292	.54258	-1.840	-.09
Yes	3.1844	.53912		
Bisexual preference				
No	3.1492	.53912	.198	.01
Yes	3.1377	.53916		
Homosexual preference				
No	3.1465	.53858	-.732	-.04
Yes	3.1966	.55339		
Condom use				
No	3.1514	.53356	.082	.004
Yes	3.1489	.53894		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Mean, standard deviation, t statistic, and effect size for in SM regard to gender, medial history, family history, bisexual preference, homosexual preference, and condom use

Total Lifestyle Scores	*Mean*	*SD*	*t*	*Cohen's d Effect size*
Gender				
Female	2.4652	.51317	-1.311	-.06
Male	2.4984	.49516		
Medical History				
No	2.4910	.50163	3.115**	.15
Yes	2.3666	.53619		
Family History				
No	2.4973	.50344	2.787**	.14
Yes	2.4192	.51076		
Bisexual preference				
No	2.4790	.51471	.727	.04
Yes	2.4389	.47154		
Homosexual preference				
No	2.4743	.50820	-1.313	-.07
Yes	2.5596	.59132		
Condom use				
No	2.4695	.52479	-.252	-.01
Yes	2.4768	.50610		

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$