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The Impact Of A College Wellness Course On Wellness Knowledge, Attitude, And Behavior

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THE IMPACT OF A COLLEGE WELLNESS COURSE
ON WELLNESS KNOWLEDGE, ATTITUDE,
AND BEHAVIOR

by

Marion L. Askegaard
Bachelor of Arts, Concordia College, 1985
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A Dissertation
Submitted to the Graduate Faculty
of the
University of North Dakota
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

Grand Forks, North Dakota
August
2000
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This dissertation meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

Harvey Knudt  
Dean of the Graduate School

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ACKNOWLEDGMENTS

This document is not my work alone, but the product of a lot of work, guidance, and support from a number of people. I would like to express my sincere thanks and appreciation to the following individuals.

First, I would like to extend a sincere “Thank You” to my advisor, Dr. Myrna Olson. She has been an exemplary academic model for me. She has provided me with valuable direction and insight, shown me unyielding perseverance, supported me through successes and failures, and challenged me to grow professionally and personally.

Second, I would like to thank all of the members of my committee: Dr. John Williams, Dr. Margaret Zidon, Dr. Beverly Uhlenberg, and Dr. Thomas Mohr. I value each of their areas of expertise and appreciate the work and time they have contributed to this project. A special “thank you” to Dr. John Williams for his help running the statistical analysis for the study.

I appreciate the assistance provided from the following Concordia College Wellness instructors with data collection for this study: Steve Baumgartner, Dave Klug, Garrick Larson, Deb Lein, Dr. Larry Papenfuss, Doug Perry, Bonnie Siverson, and Duane Siverson.

I also would like to thank the Health and Physical Education Department secretaries, Darla Ward and Deb Peschong, for allowing me to purchase paper, printer
ribbon, pencils, envelopes, and photocopies through them. Most importantly, I appreciate their interest and support through all phases of my graduate study.

Finally, I would like to express my sincere gratitude to my husband, Andrew, for all of the support and patience he has shown me throughout this journey. It is his unconditional love that has enabled me to complete this project.

I would like to dedicate this dissertation to my parents, Paul and Lou Strand. With their loving care and encouragement, I have been able to achieve many academic and professional goals.
ABSTRACT

The purpose of this study was to determine if participation in a college wellness course resulted in an improvement in knowledge, attitude, and behavior relating to physical activity, nutrition, and stress management.

Three hundred forty-eight students enrolled in the Wellness course at Concordia College, Moorhead, Minnesota, took The Wellness Knowledge, Attitude, and Behavior Instrument during the first class period (pretest) and last week (posttest) of the course.

Analysis of Variance (ANOVA), with repeated measures on one factor, was conducted to determine whether there would be statistically significant differences between the pretest and posttest wellness knowledge, attitude, and behavior scores. Three-way ANOVAs were conducted to determine differences between female and male scores and between freshmen and upperclassmen scores.

Results showed that there was a significant improvement in the wellness knowledge scores for physical activity, nutrition, and stress management from pretest to posttest. Upperclassmen mean scores were significantly higher than freshmen mean scores in the areas of nutrition and total wellness knowledge. Female mean scores were significantly higher than male mean scores in the area of wellness knowledge relating to stress management from pretest to posttest. There was not a significant improvement in attitude relating to physical activity, nutrition, or stress management from pretest to posttest. However, female mean scores were significantly higher than male mean scores
in the areas of nutrition and total wellness attitude. There was a significant improvement in reported behavior relating to physical activity and nutrition from pretest to posttest. In addition, male mean scores for behavior relating to physical activity were significantly higher than female mean scores, and female mean scores for behavior relating to nutrition were significantly higher than male mean scores. Explanations for the findings were suggested and further studies were recommended.
CHAPTER I
INTRODUCTION

The three leading causes of death for all age groups in the United States are heart disease, cancer, and strokes (Anspaugh, Hamrick, & Rosato, 1997). All three of these are considered lifestyle diseases, meaning they are largely caused by the way people live. They are also chronic diseases that usually progress over a long period of time, often as the result of behaviors established early in life. Most health professionals agree that healthy lifestyles that involve physical activity, diet, and personal health habits offer the most potential for preventing or delaying health problems (Anspaugh et al., 1997).

Of all of the topics presented in health education courses, it is the belief of the researcher that lack of physical activity, poor dietary habits, and poor stress management strategies are the most significant contributors to these chronic diseases. Fahey, Insel, and Roth (1999) support this belief by including these strategies as three of their top four most important behaviors and habits by which individuals can maximize quality of life. The adoption of healthier lifestyles that incorporate positive behaviors in these areas could promote higher levels of health, reduce the incidence of chronic diseases, and increase longevity. Physically active individuals are less likely to develop or die from heart disease, respiratory disease, high blood pressure, cancer, and diabetes (Fahey et al., 1999). In addition, physical activity helps control weight, reduces feelings of depression and anxiety, and promotes psychological well-being. A diet low in fat, saturated fats, and
cholesterol and high in fiber, grains, fruits, and vegetables also helps reduce the risk of major chronic diseases such as heart disease, cancer, stroke, and diabetes. Appropriate stress management plays an important role in preventing fatigue, sleep disturbances, stomach/digestive disorders, high blood pressure, cardiovascular disease, and impairment of the immune system.

Health promotion efforts date back to the late 1800s (Barnes, 1996). However, it was not until the early 1970s that health education programs focused on attitude and behavior changes as well as increasing knowledge (Carlson, DeJong, Robison, & Heusner, 1994). College classroom health courses were among the first to adapt new curricula to facilitate the shift in emphasis. As reported by McClaren and Sarris (1985), the college student was the ideal candidate for preventive health programs as upon entering college students often function independently for the first time. They are confronted with increased individual responsibility and personal decision-making. For example, they are making decisions ranging from choosing where and what foods to eat; what social groups to become involved with which may include decisions about alcohol, tobacco, and drugs; and when and where to seek medical help. Many also become less physically active and experience more stress as their academic schedules become increasingly demanding. It was further reported that the lifestyle behaviors of students were not conducive to optimal health (Berkowitz & Perkins, 1986; Oaks, Warren, & Harsha, 1987; Skinner & Woodburn, 1984).

Nearly all colleges and universities offer an introductory health class (Barnes, 1996). Results of a 1991 study indicated that 85% of the institutions surveyed offered a
general health education course. Of those institutions that did offer a general health education course, only 16% reported it being a requirement for graduation (Kittleson & DeBarr, 1991). Most schools offer these health courses as an elective. Concordia College, the institution of interest in this study, is one of a few that require health education for graduation. This course is referenced to as PE 111 – Wellness.

The Concordia College Wellness course combines the use of activity, instruction, and evaluation to increase awareness and promote health-related fitness. The goals of the course include assessment of health-related components (cardiorespiratory endurance, muscular strength and endurance, and body composition); motivating students to adopt physically active lifestyles; exposing students to enjoyable physical activities that can be used for a lifetime; and reducing and preventing health problems related to diet, alcohol, sexually transmitted diseases, and stress. It is highly recommended that students take this course during their first year, an attempt early in their college career to help students make informed decisions that will impact their success. A copy of the current Wellness syllabus is included in Appendix A.

The impact of college health courses on student knowledge, attitudes, and behaviors remains uncertain as research is limited and inconsistent (Carlson et al., 1994; Cottrell, Carey, Tricker, & Zavela, 1988; Geren Edwards & Dziuban, 1986; McClanahan, 1993; McClaren & Sarris, 1985; Welle & Kittleson, 1994). It is important to continue to assess our health promotion programs, not only because of the competition for financial resources, but for the field of health education to determine whether health education is
actually doing what it aims to do, and most importantly, to determine the impact that educators and programs are having on the lives of individuals.

Rationale for the Study

It is important to administrators as well as students that required courses produce observable results. Education is under considerable pressure to produce results. It is important for all educators to show that their classes are making an impact on students. In this respect health education is somewhat unique because it is expected to change individual behaviors much more so than other disciplines, whose aim is to provide knowledge and understanding. This study will not only allow administrators of the core curriculum at Concordia College to determine whether the wellness course is increasing knowledge, but, as is particularly important to health education, it will also determine student attitude and behavior changes. The interview results will provide insight to why there were or why there were not changes in knowledge, attitude, and behaviors. If this course is not increasing student knowledge, changing attitudes, and changing behaviors, different teaching methods and/or curricula may have to be utilized to meet educational goals.

This study will also provide useful information for the field of health education. The goals for health education are not only increasing individual health knowledge, but ultimately, changing attitudes toward and increasing individual health promoting behavioral changes. The relationship between health knowledge and attitude has been frequently studied (Corbin & Chevrette, 1974; Dotson & Stanley, 1972; Hatton, 1996; Keogh, 1961; Moode & Finkenberg, 1994; Mowatt, DePauw, & Hulac, 1988; Wear,
The relationships amongst knowledge, attitude, and behavior change have also been thoroughly researched (Barnes, 1996; Carlson et al., 1994; Cottrell et al; 1988; Cottrell & St. Pierre, 1983; Geren Edwards & Dziuban, 1986; McClanahan, 1993; McClaren & Sarris, 1985; Moody, Rienzo, & Colson, 1979; Nicholson, Price, & Higgins, 1990; Petosa, 1984; Welle & Kittleson, 1994). It is conclusive that health education results in increases in health knowledge. It is less obvious, certainly not agreed upon, that an increase in health knowledge results in increases in health attitudes and/or health behaviors. Therefore, the relationship between knowledge, attitudes, and behaviors needs further investigation.

Statement of the Problem

Although a number of previous research studies indicate that health and wellness courses do produce increases in health knowledge, there appears to be mixed results about increases in health attitudes and behaviors. Concordia College has had a wellness requirement since 1985. However, this course has never been formally evaluated. The purpose of this study was to determine if participation in a college wellness course resulted in an improvement in knowledge, attitude, and behavior relating to physical fitness, stress management, and nutrition.

Research Hypotheses

Hypothesis 1: There will be a significant change in the students' wellness knowledge at the completion of the Wellness course.

Hypothesis 2: There will not be a significant change in the students' reported wellness attitude at the completion of the Wellness course.
Hypothesis 3: There will not be a significant change in the students' reported behavior at the completion of the Wellness course.

Assumptions

It is assumed that the instrument used actually measured students' wellness knowledge, attitude, and behaviors. It was also assumed that the students answered the questions on the instrument and during the interview accurately and honestly. Lastly, it is assumed that any changes in students' wellness knowledge, attitude, and behaviors were due to the influence of the Wellness course and not other variables such as history, maturation, or testing effects.

Delimitations

The questionnaire and interviews were completed by students enrolled in the Wellness course at Concordia College during Blocks 2 and 3 of the 1999-2000 academic year. Therefore, this study is delimited to students in the Wellness course at Concordia College. The independent variable of the study was the students' participation in the Wellness course, and the dependent variables were their wellness knowledge, wellness attitudes, and wellness behaviors. Investigation into specific health education methodology was not a part of this study.

Limitations

The results of this study may not be applicable to other populations. The subjects in this study may not be representative of the general student population.
Definition of Terms

The following resources were consulted to establish the working definition of terms for this study: Anspaugh et al., 1997; Bucher and Wuest, 1987; Caspersen, Powell, and Christenson, 1985; Dunn, 1973; Fahey et al., 1999; Grawunder and Steinmann, 1980; Green, Kreuter, Deeds, and Partridge, 1980; Greenberg and Dintiman, 1997; Hales, 1999; Merriam-Webster’s Collegiate Dictionary, 1981; Saunders, 1988; Simons-Morton, Green, and Gottlieb, 1995.

Attitude – Attitude refers to the mental position an individual takes relating to a concept or situation.

Behavior – An individual’s behavior denotes the way in which they act or respond to a specific situation.

Health – Health means more than merely the absence of disease. The modern concept of health incorporates a balance of an individual’s total physical, social, emotional, intellectual, and spiritual well-being.

Health-behavior gap – The difference between what people know and what they actually do regarding their health is referred to as the health-behavior gap.

Health education – Health education is the process through which individuals are provided with the tools needed to voluntarily make decisions about and modify behaviors relating to health.

Healthy lifestyle – A healthy lifestyle is a lifestyle where good choices and healthy behaviors are practiced which lead to a high quality of life. Fahey et al. (1999) consider the most important behaviors and habits to include “be physically active, choose...
a healthy diet, maintain a healthy body weight, manage stress effectively, avoid use of
tobacco and other drugs, use alcohol wisely if at all, and protect yourself from disease
and injury” (pp. 4-5).

Health-related fitness – The development of qualities that protect against disease
is considered health-related fitness. The components of health-related fitness include
cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body
composition. Performance-related fitness, on the other hand, consists of speed, power,
balance, coordination, agility, and reaction time.

Physical activity – Physical activity refers to any motion of the body generated by
skeletal muscle that results in energy expenditure.

Physical fitness – The state of fitness that protects against disease and/or enhances
athletic ability is considered physical fitness.

Wellness – To achieve wellness one must be practicing attitudes and behaviors
that improve quality of life and maximize personal potential. Wellness emphasizes the
need to take personal responsibility for these attitudes and behaviors. By making
deliberate lifestyle choices that optimize physical, social, emotional, intellectual, and
spiritual well-being one is achieving high-level wellness.

Summary

The belief that physical activity, nutrition, and stress management are significant
components of an effective health education program; the insight that existing research
assessing knowledge, attitudes, and behaviors in health education is inconclusive; and the
realization that the wellness requirement at Concordia College has never been evaluated
created both a need for and an interest in this research. Using The Wellness Knowledge, Attitude, and Behavior Instrument designed by Mary K. Dinger in 1994 (Dinger, Watts, & Barnes, 1998) (Appendix C), a health education requirement was evaluated for its effectiveness in changing knowledge, attitudes, and behaviors related to physical fitness, nutrition, and stress management.
CHAPTER II
REVIEW OF LITERATURE

This section of the dissertation reviews the literature and research concerning health education. The first part of the chapter establishes the history of health education in colleges and universities in the United States. The second part of the chapter examines the history of health education at Concordia College in Moorhead, Minnesota. The final part of the chapter reviews research involving health knowledge, attitudes, and behaviors after completion of a college-level health education course.

History of Health Education in Colleges and Universities in the United States

The philosophy and format for education in the United States was modeled after the education system of England (Welch, 1996). We also borrowed the philosophy and format for physical education from several other European systems. The following is a brief history of the changing importance and structure of physical education and health education in the colleges and universities in the United States.

During the colonial period in the United States (1607-1783) conditions did not permit organized physical education programs (Bucher & Wuest, 1987). The majority of the population was farmers or farm laborers who received enough physical exercise from working long, hard hours on the farms. In addition, for many of the territories, participation in play during the few leisure hours that existed was against religious
beliefs. Only a few settled sections of the nation allowed participation in popular sports of their home countries. For example, the Dutch engaged in skating, hunting, and fishing. Other popular sports in Virginia were boxing, wrestling, horse racing, cock-fights, and fox hunting. Colonial schools did not devote any of their time to organized physical education as they solely focused on the three Rs at the elementary level and preparation for college at the secondary level.

It was during the national period (1784-1861), the period from the American Revolution to the Civil War, in United States history that physical education began to be recognized as an important element in the growth of society. Secondary schools were now focusing their education on preparing individuals for a living rather than for college. Physical activity, they conceded, did “promote a healthy change from the mental phases of school life” (Bucher & Wuest, 1987, p. 115). However, games and sports were only offered as after-school activities.

It was also during the national period that German gymnastics was first introduced to the United States (Welch, 1996). The first attempts to implement gymnastics at Round Hill School in Northampton, Massachusetts, and Harvard University in Boston in 1823 were unsuccessful. A few years later it was reintroduced in cities of German settlement where it flourished. Turnverein societies (German gymnastic societies) were organized to promote the development of fitness and national pride. They eventually had considerable influence on the physical education profession including the construction of gymnasiums in larger cities and the formation of gymnastic and athletic clubs by many leading institutions of higher learning.
Many outstanding leaders and new ideas influenced physical education in the United States after the Civil War to 1900 (Bucher & Wuest, 1987). Dr. Dio Lewis, noted for advancing physical education to a respected position in the United States, introduced a new system of gymnastics to the United States in 1860. Instead of building large muscles and strength, Lewis was more interested in developing agility, grace of movement, flexibility, and improving general health and posture. Lewis also established the first normal school for physical education in Boston for training physical education teachers in 1861.

Hartvig Nissen and Baron Nils Posse introduced Swedish gymnastics to the United States in 1885 (Welch, 1996). Swedish gymnastics was recognized in the United States for its medical values. Mary Hemenway and Amy Morris Homans promoted the growth of Swedish gymnastics through establishing the Boston Normal School of Gymnastics for teachers to offer instruction in Swedish gymnastics (Bucher & Wuest, 1987).

Physical education made major advances in colleges and universities with the construction of gymnasiums and the development of programs in this area (Bucher & Wuest, 1987). Health education in the United States colleges and universities had its roots in physical education and hygiene courses (Christmas, 1995).

During the 1800s and early 1900s, communicable or infectious diseases were the major causes of death. Influenza, pneumonia, tuberculosis, smallpox, polio, diphtheria, and dysentery were often fatal. In response to epidemics of these diseases sweeping through and disabling college campuses, student health centers were established, medical
doctors were hired, and hygiene courses were added to the college curricula. The instructors were initially physicians who also had training in gymnastics (physical educators) (Bucher & Wuest, 1987). Amherst College was one of the first institutions of higher learning that hired a medical doctor to oversee its health center, teach its hygiene course, and head the physical education department (Welch, 1996). In 1861, Edward Hitchcock, M.D., assumed the position of Professor of Hygiene and Physical Education at Amherst College. This gave hygiene and physical education academic status amongst university disciplines and set a precedent for other colleges and universities (Hackensmith, 1966).

The University of California at Berkeley is credited with being one of the first universities to develop a modern, comprehensive health program in 1901. The formation of complete medical programs for students dating back to 1903 is a further response to epidemics and the care of students on college campuses (Christmas, 1995).

The First World War provided an additional "impetus for expansion of college health programs," particularly at the federal level (Christmas, 1995, p. 242). Not only were young men found to be unfit to handle the physical demands of war, federal initiatives were introduced in an attempt to help control infectious diseases. By the end of World War I, federal aid was dispersed to establish more comprehensive student health centers. Through these centers, Congress recommended that colleges coordinate and integrate in one department or service,

the teaching of informational hygiene; individual health examinations, consultation and conference; physical training activities; emergency care of
students in clinic and infirmary; sanitary supervision of the various parts of the institution; and the development of a hygiene consciousness in the institution as a whole. (Christmas, 1995, p. 242)

By 1920, well-established health centers could be found on most campuses across the country (Boynton, 1962). Physician directors of these health centers formed the American Student Health Association, later to be renamed the American College Health Association (ACHA), and proposed a change in the pattern of college hygiene programs from physical education-centered to medical-centered. They promoted health of college students through health education, preventive medical care, and attention to healthful environment in the campus community. In 1922, the United States Bureau of Education organized a conference to standardize a definition of health education and establish the training required for teachers of health education (Barnes, 1996). By 1943, the qualifications for all health education workers were defined.

Once the scope of health education had been established, some major changes in the field of health began to take place (Rosen, 1958). Health education professionals realized that it was not enough to simply provide information. What was being done with that information appeared to be most important. Progress toward disease prevention could not occur without change in lifestyle habits. Health educators turned to the social sciences for a better understanding of how to work with individuals and groups in the area of behavior change. As a result many physical education departments changed their emphasis from physical education alone to one of health and physical education. Most colleges and universities began offering classes in personal health. Increasingly, these
classes were taught by individuals with advanced degrees in health rather than physical education. In 1954, Dr. Ruth Boynton, director of the health service at the University of Minnesota, hired the nation's first college health educator (Zimmer, 1994).

By 1950, the threat of communicable diseases had been drastically reduced, due in part to the development of vaccines as well as health promotional efforts. As a result, interest among health professionals turned from communicable diseases to the prevention of chronic diseases. With this shift in emphasis came another major movement in the field of health education and health promotion. There was heightened interest in health problems related to personal behavior and lifestyle factors (Simons-Morton et al., 1995). Research suggested saturated fats, cholesterol, cigarette smoking, and lack of exercise were risk factors for heart disease. It was also reported that consuming more dietary fiber and avoiding cigarettes were behaviors found to be important in reducing the incidence of cancer. By this time it was evident that the leading causes of health-related illnesses and deaths in the United States were related to personal health behaviors.

As heart disease, cancer, and unintentional injuries become relatively more prominent health threats, the role of health behavior in the form of better eating and exercise habits, avoidance of cigarette smoking, safe driving practices, and the early detection of disease becomes crucial. (Simons-Morton et al., 1995, p. 64)

This provided the impetus for our present day wellness approach to health education.

Halbert L. Dunn, John W. Travis, and Donald B. Ardell all made significant contributions to defining and promoting the Wellness Movement in the United States.
These men devoted much of their careers to distinguishing between preventive health and high-level wellness. They believed preventive health was largely defensive and reactive, designed to protect one against illness and disease. Wellness, they contended, “advocates life enhancement or health enrichment and is achieved through a health promoting, integrated lifestyle” (Ardell, 1977, p. 58).

In the late 1950s, Halbert L. Dunn, a physician, public health administrator, health statistician, lecturer, and author, introduced the term wellness. Dunn had evidently become concerned about the health status of individuals through his work with vital statistics. It began to bother him that doctors, nurses, and health care workers were so focused on disease, disability, and death. Dunn was intrigued with the definition of health that had been provided by the World Health Organization in 1947, which states, “Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity” (as cited in Dunn, 1973, p. 1).

Using this definition Dunn (1973) declared his own interpretation of high-level wellness:

High-level wellness for the individual is defined as an integrated method of functioning which is oriented toward maximizing the potential of which the individual is capable. It requires that the individual maintain a continuum of balance and purposeful direction within the environment where he is functioning.

(pp. 4-5)

In his book, High-Level Wellness, Dunn went on to explain the interrelatedness and interdependency of the whole human being. High-level wellness was achieved when an
individual found personal satisfaction and a sense of purpose in life (Ardell, 1977). He became so concerned about the breakdown of the individual, the family, and the community that he spent the rest of his life promoting the wellness concept.

Halbert Dunn's work moved a young doctor of the time, John Travis, to leave the formal practice of medicine and also devote his life to health education. The focus of Travis' health education was on self-responsibility. He redefined health from health as nonsickness to health as a positive state of well-being. In 1975, John Travis opened the first wellness center, the Wellness Resource Center in Mill Valley, California, as an entity for assisting individuals to become experts on themselves. He wanted to teach people how to be completely healthy. The Wellness Resource Center used no drugs, gave no prescriptions, did no lab work, provided no physical examinations, and saw no patients. Instead, clients learned to relax, to experience themselves, to remove barriers, to improve communication skills, to enhance creativity, to envision desired outcomes, to take full responsibility for oneself, to love oneself (Ardell, 1977).

Donald B. Ardell had been involved with health planning prior to encountering the work of Dunn and Travis. Dr. Henrik Blum, head of the health-planning department at the University of California at Berkeley, introduced Ardell to Dunn's book in 1975. Ardell (1977) explains his experience upon reading *High-Level Wellness* as "being hit with a bolt of benevolent lightning" (p. 5). It hit him that this is what health planners should be attempting.

Ardell immediately dropped out of the health-planning system. He began reading all of the health books he could find, visiting all the health centers in existence, talking to
and exchanging letters with other wellness interested people throughout the country, and practicing the techniques of this “new medicine” (Ardell, 1977, p. 5).

During his early study and pursuit of wellness, Ardell attended a lecture where Dr. John Travis was explaining the nature and purposes of his Wellness Resource Center. This experience greatly changed his thinking about health. Historically health had been associated with the absence of illness. Travis, however, had explained a continuum model of health that included the traditional definition of health but continued to a state of high-level wellness. Absence of disease became the neutral point on the continuum. Premature death marked the far left. High-level wellness marked the far right. Traditional medicine, in Travis’ view, dealt only with the left half of the continuum. Ardell was sold on this new perception of health.

It was through the words of Dunn and the work of Travis that Ardell developed his conclusions about wellness. Ardell believed that there is no single cause of wellness, no one thing an individual can do to get it, no course or book that alone will motivate an individual to pursue wellness. Rather, wellness consists of many possibilities. Individuals can pursue wellness from whatever direction they choose. Ardell (1977) further concluded,

Attention to lifestyle and environment offers the most rewarding paths to improved levels of health. Wellness initiatives in one area of your life will reinforce health-enhancing behaviors in other areas. It is even possible to be well in the midst of illness and dying. A state of high level wellness is within the reach of all. (pp. 6-7)
Travis' Wellness Resource Center worked with four dimensions of wellness: stress management, self-responsibility, nutritional awareness, and physical fitness. Ardell (1977) added a fifth, environmental sensitivity, completing the current wellness concept.

In the 1970s and 1980s attitudes toward health changed (Bucher & Wuest, 1987). Preventive medicine, disease prevention and health promotion, and wellness were emphasized. This led to the acknowledgment of physical education's contribution to health and promotion of wellness. Colleges and universities were adding to, and changing, the curricula in health education to include health-related fitness as well as performance-related fitness (Carlson et al., 1994).

In the last two decades, research connecting personal health behaviors with morbidity and mortality rates in the United States has increasingly captured the attention of health educators, government officials as well as the American public (Simons-Morton et al., 1995). The more recent stimulus in health education has come from the United States Department of Health and Human Services (USDHHS), which has sponsored and produced documents such as Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention (http://www.library.ucsf.edu/tobacco/docs/html/1188.031), Healthy People 2000: National Health Promotion and Disease Prevention Objectives (http://www.cdc.gov/nchs/about/otheract/hp2000/hp2000.htm), and Healthy People 2010 (http://www.cdc.gov/nchs/about/otheract/hpdata2010/2010fa28.htm).

The USDHHS's national healthy people initiatives seek to prevent unnecessary disease and disability and to achieve a better quality of life for all Americans. Healthy
people reports include national goals based on 10-year agendas. Each report includes both broad goals (such as increasing the life span of healthy Americans and reducing health inequalities among special populations within our society) and specific, measurable objectives in many different priority areas that relate to wellness (physical activity, nutrition, stress management, and environmental awareness). Healthy people objectives serve as the basis for national monitoring and tracking of health status, health risks, and use of preventive services. They encompass individual actions as well as larger-scale changes in environmental and medical services (Fahey et al., 1999).

In addition to providing goals and objectives for the general population, these documents have stimulated additional action from educational institutions. For example, some of that action has been mandated in the form of the Comprehensive School Health Program for elementary and secondary education. Other actions have been voluntary, such as increased numbers of colleges and universities offering programs for professional health education preparation and/or health education requirements for graduation. Consumerism, the women’s movement, growing concerns about sexually transmitted infections including HIV and AIDS, and the increasing use of alcohol and drugs on campus also contributed to the recognition of urgent health education needs during the 1980s (Zimmer, 1994).

In 1985 the Task Force on Achieving the Health Objectives in Higher Education was formed by the American College Health Association (ACHA) to assess how well colleges and universities were meeting the national health objectives outlined in Healthy People: The Surgeon General’s Report on Health Promotion and Disease Prevention.
The task force discovered that baseline data of health statistics on young adults in the traditional college-age population (i.e., 17 to 24 years) did not exist. Furthermore, little or no data could be found that provided measured trends about the health behaviors and risk factors characteristic of student populations. Many colleges and universities had developed their own health programs, and studies and surveys had been done in a large number of institutions; still, this information had not been connected to any national monitoring system (Gordon, 1995).

The Task Force on Achieving the Health Objectives in Higher Education emphasized the importance of having higher education and college populations play a role in setting national goals. Their report stimulated greater attention to student populations and their health issues. From 1987 to 1989, the task force encouraged the ACHA and members in the higher education community to articulate a commitment to disease prevention and promotion of positive health behaviors and environments. With the publication of Healthy People 2000, it was evident that students as a population group and higher education were recognized as national concerns regarding health promotion and disease prevention (Gordon, 1995). Of the 22 priority areas and 300 goals outlined in Healthy People 2000, almost half address the characteristics, problems, and needs facing young adults and institutions of higher education (http://www.cdc.gov/nchs/about/otheract/hp2000/hp2000.htm). A few of those priority areas are physical activity and fitness, nutrition, tobacco, substance abuse, alcohol and other drugs, mental health and mental disorders, violent and abusive behavior, unintentional injuries, HIV infection,

The most recent Surgeon General’s report, Healthy People 2010, more specifically identifies focus areas applicable to young adults and institutions of higher education. For example, in addition to those priority areas listed in Healthy People 2000, Healthy People 2010 adds access to quality health services, health communication, respiratory diseases, family planning and sexual health, injury and violence prevention, and vision and hearing (http://www.cdc.gov/nchs/about/otheract/hpdata2010/2010fa28.htm).

During the past decade, the Center for Disease Control has developed the Youth Risk Behavior Survey (YRBS) and the National College Health Risk Behavior Survey (CHRBS). These instruments are designed to track health status and health behaviors of high school and college students, respectively, at state and national levels (Gordon, 1995). The baseline data collected through these instruments also helps direct health education programming, as well as research efforts for creating better instrumentation for measuring health knowledge, attitudes, and behaviors.

Survey results as reported by the American Association for Health Education (AAHE) in 1991 indicated an increase in institutions both offering and requiring a general health education course from 1981. However, it was evident that relatively little had been done to increase the role of health education as a general course requirement in United States colleges and universities. Only about 3.9% of the total student population
completed a general health education course in 1991 (Kittleson & DeBarr, 1991). More recent national statistics are not yet available.

Concordia College is one of 13 private institutions of higher education in Minnesota. Like Concordia, six other private institutions require a health or wellness course for graduation. Of the remaining six institutions, three offer some form of health education as an elective, and three do not require or offer health education at all.

Additional work of ACHA-based task forces and committees has included documents entitled Healthy Campus 2000 – Making it Happen, College Health 2000: A Perspective Statement, and College Health 2000: Strategies for the Future (Gordon, 1995). These documents are further attempts to encourage campuses to address the national health objectives and improve health and environments at colleges and universities. For example, Healthy People 2000 specifically identifies postsecondary educational institutions as settings where young adults should be targeted for exercise promotion. Students at colleges and universities generally have access to exercise facilities and training opportunities (e.g., physical education classes) (Fletcher, 1998).

Although the need for health education in schools has always been relatively easy to demonstrate, evidence as to its effectiveness has been more elusive. Improvements in health behavior have proved difficult to accomplish, difficult to measure when successfully achieved, and difficult to connect to specific programs even when accurately measured. Only a very few studies have successfully evaluated and impacted school health education programs. The first study to have a significant impact on health curricula was the School Health Education Study conducted in 1964. This study involved...
a nationwide survey of school health education programs, including assessments of student knowledge, attitudes, and behavior. It led to the development and testing of a model curricula in health education (Simons-Morton et al., 1995).

The School Health Education Evaluation (SHEE) project was the second successful attempt to measure health knowledge, attitude, and behavior. It involved more than 30,000 children in 1,071 classrooms from 20 states. These students were participating in four different model health curricula: School Health Curriculum Project (SHCP), Project Prevention, Health Education Curriculum Guide (HECG), and the 3 Rs and High Blood Pressure (HBP). A pretest and posttest were administered to the students measuring overall knowledge, attitude, practice, and program-specific knowledge to determine each program’s effectiveness in these areas. In every case significant improvements were found in all four variables among the four curricula (Connell, Turner, & Mason, 1985).

Research of health education in public elementary and secondary schools also led to the evaluation of health education programs in colleges and universities. The relationships amongst health knowledge, attitude, and behavior change have been researched (Barnes, 1996; Carlson et al., 1994; Cottrell et al., 1988; Cottrell & St. Pierre, 1983; Geren Edwards & Dziuban, 1986; McClanahan, 1993; McClaren & Sarris, 1985; Moody et al., 1979; Nicholson et al., 1990; Petosa, 1984; Welle & Kittleson, 1994). The relationship between health knowledge and attitude has also been frequently studied (Corbin & Chevrette, 1974; Dotson & Stanley, 1972; Hatton, 1996; Keogh, 1961; Moode & Finkenberg, 1994; Mowatt et al., 1988; Wear, 1951). It is conclusive that
health education results in increases in health knowledge. It is less obvious, certainly not agreed upon, that an increase in health knowledge results in increases in health attitudes or health behaviors. The most recent studies involving health knowledge, attitude, and/or behavior will be discussed in the final section of this chapter.

History of Health Education at Concordia College

Concordia College, Moorhead, Minnesota, is a liberal arts college of the Evangelical Lutheran Church in America. As a college of the church, Concordia “seeks to equip students with the knowledge, methods, attitudes and discipline needed for a lifetime of service to God and others” (wysiwyg://67/http://www.cord.edu/dept/registrar/catalog/purpose/html). Pursuit of knowledge is seen as a significant form of service in Christ. The constitution of the Concordia College Corporation states that the curriculum of the college shall be in accord with the Christian faith as taught in the Evangelical Lutheran Church in America. Therefore, “Concordia is committed to fostering the spiritual, intellectual, physical, social and emotional growth in students that will help them achieve the fullest development of personality and life” (wysiwyg://67/http://www.cord.edu/dept/registrar/catalog/purpose/html).

The philosophy of developing the total person was evident in some of Concordia’s earliest publications. In an 1898 graduation speech delivered by Wilhelm Rognlie, the first individual to receive a degree from Concordia, physical development as well as mental and moral development were important for the whole man. He stated, “When we have a well disciplined mind supported by a strong, well developed body, and these controlled by a pure heart, an incorruptible moral purpose that recognizes man’s
true relation to God and to his fellowman, we have the only well equipped and true noble man” (Rognlie, 1898, p. 4).

The college President, the Concordia College Record, and the Concordia Banner (the early college news publication) have all documented encouragement for participation in physical activity very early in the college’s history. Supervised play hours were offered each evening Monday through Saturday, with extra play permitted on Saturday. Students were encouraged to take long walks into the countryside, to swim, or run as a means of fulfilling the body’s needs. Getting fresh air was also promoted. In addition, the 1905 Concordia College Record indicates the existence of a course in physical culture. It was intended for students of all departments to develop the body as a basis for health and beauty.

Concordia’s first physical education requirements date back to the 1920-21 academic year. Physical education became a requirement for all freshmen, sophomores, and juniors. Six credits needed to be earned before graduation. Two periods of physical education per week, each an hour long, for one semester counted as one credit. The freshman course included seasonal competitive games, group athletics, and gymnastic exercises. The sophomore course was simply a continuation of the freshman activities and the junior course was an advancement of the sophomore course. Seniors could take physical education as an elective (Concordia College Record, 1921).

In addition to the physical education requirements for graduation, physical examinations were also required of all students before they could be assigned to work in the physical education department. Any abnormality or weakness was brought to
students' attention and they were advised regarding the physical exercises to take and avoid accordingly. Students who had some physical defect were enrolled in individual physical education (Concordia College Record, 1926).

In 1926, separate physical education requirements were designated for men and women. Men were required to complete three years of physical education. Two years of physical training were required of women, “unless excused on account of physical disability evidenced by a certificate from the college physician” (Concordia College Record, 1927, p. 51). The curriculum for men included seasonal competitive games, group athletics, marching, calisthenics, and corrective exercises. The curriculum for women included seasonal games (specifically stated as field hockey, field ball, soccer, track, and tennis). Indoor winter activities included calisthenics, marching tactics, and rhythmic movements. It was noted for women only that any weakness detected through the required physical examination was to be worked on as their physical education requirement (Concordia College Record, 1927).

The 1927-28 academic year marked the first year for a Personal Hygiene course at Concordia College. It was a one-credit elective course emphasizing “the hygiene of the body and sanitation in daily living” (Concordia College Record, 1928, p. 53). As noted in the history of health education in colleges and universities in the United States, the early work of the American College Health Association (ACHA) was primarily the promotion and instruction of “hygiene” courses (Zimmer, 1994, p. 276). Evidently, Concordia saw the value of the ACHA suggestion and included it in their curriculum.
The women's section of the Personal Hygiene course included one hour of
recitation per week. The previous physical education requirements remained. Men and
women were enrolled in separate sections of the Personal Hygiene course as with all of
the physical education requirements (Concordia College Record, 1928).

By 1928, physical education had taken on an additional emphasis. The aim of
physical education, as stated in the Concordia College Record (1929), was “to correct
faulty posture; to foster the spirit of play and comradeship; and to aid in establishing
sound health habits” (p. 58). A course including fundamentals of physical education and
a Methods and Materials in Health Education course were added to the curriculum for
students who were preparing to become special teachers of physical education. Methods
of teaching health as well as techniques of physical inspection of pupils were studied in
these courses.

Two additional physical education changes were made in 1928. Intramural
athletics were an added opportunity for men, and women were offered membership in the
Women’s Athletic Association, which simply consisted of play in inter-class games.
Participation in either of these new organizations was voluntary. Secondly, an extended
physical education program was established to prepare students to become special
teachers in physical education. The additional courses included First Aid, a Coaching
Course, and a Teacher’s Course (Concordia College Record, 1929).

The requirements in physical education as well as the scope of the department
significantly changed in 1936. The new objectives of the Physical Education Department
included “to promote the health and physical efficiency of the student, to assist in the
building of character through fair play in games and sports, to foster worthy use of leisure
time, and to train leaders in physical education and recreation” (Concordia College
Record, 1937, p. 74). Physical education was still required of all freshmen, sophomore,
and junior students. However, Personal Hygiene was no longer an elective, but a
requirement of all freshmen and new students who had not had a college course in
hygiene. The course was now designed to “increase knowledge and interest in the
fundamental principles of health and health improvement” (Concordia College Record,
1937, p. 76). All of the general physical education requirements were taken for no
academic credit. Physical education theory courses were added for students specializing
in physical education to fulfill the final objective of the department. Among the theory
courses was the first Practice Teaching or peer teaching course (Concordia College
Record, 1937).

The Minnesota Requirements for a High School Standard Special Certificate in
Physical Education greatly expanded the physical education curriculum at Concordia in
1937. Among the new Theory and Practice Courses in Physical Education was a separate
health education course. It was simply called Health Education. It was a semester course
worth two credit hours and was available to both men and women. A full time faculty
member of the department and his assistants taught principles, materials, programs, and
methods in presenting health education activities. The physical education and personal
hygiene requirements for the general student body remained. Women and men were
required to complete three years of physical education. Men, however, were allowed to
fulfill their physical education requirements through participation in the men’s intramural
At this time there were no intramural opportunities for women (Concordia College Record, 1936).

The requirements were reduced to two years of physical education and the Personal Hygiene course during the 1939-40 academic year. College documents indicate that a number of upperclassmen were having trouble meeting the graduation requirement in physical education. It was recommended that a committee look into the matter and report back to the Faculty Senate (Faculty Senate meeting notes, February 23, 1939). No further documentation regarding suggestions by the committee or actions of the Faculty Senate was located. Concordia also added a separate nutrition course to its physical education curriculum in 1939 (Concordia College Record, 1940).

In 1940, the physical education requirements were renamed “Service Courses” (Concordia College Record, 1940, p. 78). The Service Courses (physical education requirements) were revised briefly in 1944 to include participation for men as long as they were attending college (all four years). The four-year physical education requirement was reduced to two years again in 1950, to be taken during freshman and sophomore years (Concordia College Record, 1950). Men were also required to participate in intramurals an additional three hours per week.

The 1941-42 academic year marked the first year that Health was included in the title of the department (Physical Education and Health Department) (Concordia College Record, 1942). This seems primarily due to the addition of a Nursing Education program offered by Concordia in cooperation with Fairview Hospital, Minneapolis, Minnesota. The separate health course listings included Health 125 & 127 – Hygiene, required of all
freshman men and women, respectively; Health 127n. – Introduction to Nursing; Health 151 & 152 – Hygiene, intended primarily for students in nursing education; and Health 331 – First Aid (Concordia College Record, 1942, pp. 82-83).

The nursing program was removed from the Physical Education and Health Department after the 1943-44 academic year. There was no longer a separate listing of health courses the following year. All physical education and health curriculum courses were listed under the Theory and Practice Courses in Physical Education (Concordia College Record, 1945). In 1948, however, the professional physical education and health courses were again listed separately (Concordia College Record, 1949).

In 1950, Concordia’s Physical Education and Health Department grew from two full time faculty to five. The physical education and personal hygiene requirements remained intact, but the hygiene course took on a new scope. The title of the course became Healthful Living and was designed to give the student an appreciation of healthful living as it applied to the individual and to the community. Interestingly enough, this course was not taught by a full time faculty member of the department in 1950.

The name, description, and content of the original Personal Hygiene course was changed again in 1951. The course was removed from the Physical Education and Health Department and transferred to the Education Department. It became Education 101 – Orientation. It was designed to give new students helpful suggestions for college life and knowledge of the aims and purposes of college work. It was divided into three units: general orientation, use of the library, and correct study habits. Each unit was
designed as a special course with lectures, supplementary reference work, and an examination was required of all freshmen with no academic credit awarded (Concordia College Record, 1953). Concordia seemed to have temporarily lost its health education requirement for the general student population, since the remaining physical education requirements were strictly physical activity courses.

The general physical education requirements (or Service Course requirements) did not change again until the 1967-68 academic year. Beginning in 1967, only freshmen were required to complete two semesters of work in physical education. Credit was once again awarded for successfully completing the courses. One credit was earned for each of the two semesters. The course met for two one-hour periods per week. Men and women still participated in separate activities. Additional physical activity courses were offered as electives for upperclassmen and included a variety of individual and small-group activities (Concordia College Record, 1968).

The physical education courses, both the general activity requirements and the professional curriculum, became coeducational in 1971. Faculty Senate meeting notes reveal a committee report regarding a proposed health and physical education curriculum change. The report reads,

The department (health and physical education) can be commended for presenting an interesting and new curriculum. The nature of the innovations can be seen in proposed co-educational courses and in such offerings as Sport and the American Society, Practicum in Community Recreation, and the consolidated coaching technique courses. (Beta One Committee report, January 28, 1971)
The proposed curriculum was approved by the Faculty Senate (Faculty Senate meeting notes, February 1, 1971).

Additional changes within the curriculum include a shift away from some team sports to more individual and recreational type of activities. The required freshman options included archery, badminton, bowling, gymnastics, golf, fencing, swimming, tumbling and trampoline, tennis, ice skating, curling, recreational games, modern dance, body dynamics, slimnastics, and weight training. The upperclassman electives were also coeducational with the same activities offered at an advanced level. The requirement changed from an entire semester course to one-quarter course per semester (Concordia College Record, 1971). It is assumed that freshmen participated in an activity for half of each of the first and second semesters.

Health education became a separate curriculum again in 1974. Health education major and minor courses were separated from the physical education requirements. This was a change mandated by the Minnesota State Department of Education. Broad physical education majors (physical education major/health minor) were no longer being approved in Minnesota. The new program required the students to prepare in definite individual majors and minors. This curriculum change had been approved by the curriculum committee and was passed by the Faculty Senate (Faculty Senate meeting notes, March 26, 1974). Members of the Physical Education and Health Department continued to teach courses in both the physical education and the health curriculum (Concordia College Record, 1974).
The most recent formal changes in the physical education requirements for graduation from Concordia College were made in 1985. Instead of PE 111 – Activities I and PE 112 – Activities II, the courses became PE 111 – Wellness and PE 112 – Physical Education Activities. The new Wellness course consisted of “a discussion of wellness concepts and healthful lifestyles, emphasizing physical fitness, nutrition, and stress management” (Concordia College Record, 1985, p. 114). Physical activity was also a scheduled part of the Wellness course. In order to fulfill the PE 112 requirement, students could choose one activity from a variety offered (e.g., badminton, bowling, golf, cross-country skiing, social dance, racquetball, scuba diving, tennis, volleyball, and bicycle touring). Each course remained a one-quarter credit course and was offered every block throughout the academic year (one-half of the semester). It was recommended that these courses be taken during the freshman year (Concordia College Record, 1985).

Vernon “Finn” Grinaker was the individual largely responsible for the development, implementation, and teaching of the original Wellness course at Concordia College. Although the formal requirements were not in the books until 1985, Grinaker had been teaching “wellness” concepts dating back almost to his starting date at Concordia in 1949. By the time administration requested the change in 1985, Grinaker had already developed manuals containing wellness lecture and lab materials that all of his students purchased for the courses he taught. Grinaker had titled the PE 111 – Activities I course “Foundations” and later “LIFE (Lifestyle Improvement Fitness Education)” before it officially became Wellness (V. F. Grinaker, personal communication, November 9, 1999). His Foundations and LIFE manuals contain very
detailed objectives, lectures, and labs covering the very material that became the content of the Wellness course (Grinaker, 1975, 1984).

The current physical education requirements at Concordia College include PE 111 – Wellness and PE 112 – Physical Education Activities. Each course is one-quarter credit and meets for eight weeks or one-half of a semester.

[The PE 111 – Wellness description is] discussion of the components of health-related fitness: cardiorespiratory endurance, muscular strength and endurance, flexibility and body composition, as well as nutrition, stress management and alcohol education. Students are exposed to a variety of lifetime activities that promote health and well-being. (Concordia College Record, 1999, p. 131)

It is recommended that students take PE 111 during their freshman year. A copy of the current Wellness syllabus is included in Appendix A. Students may choose from a variety of activities offered to fulfill the PE 112 requirement. PE 112 can be taken any time over the course of a student’s four years.

Physical education and health education have been important offerings at Concordia throughout its history, as they have remained a part of the core curriculum. Their effectiveness in regards to changing knowledge, attitudes, and behaviors, however, has never been evaluated. The two formal evaluations of the health and physical education curriculum in 1973 and 1993 included only the major programs in the department (the Health major and the Physical Education major) and involved an outside evaluator and an alumni survey. More recent attempts have been made to informally
evaluate students' knowledge, attitude, and behaviors in the current Wellness course through pretest and posttest self-assessments (Appendix G). The individual credited with implementing the self-assessments felt the information could be used to direct the curricula of the course (V. Wensel, personal communication, November 8, 1999). However, results of those assessments have never been compiled or evaluated (L. Papenfuss, personal communication, April 13, 2000).

Concordia College Student Affairs and The Campus Health Promotion Committee have also administered revised versions of the National College Health Risk Behavior Survey in 1998 and 1999 (Papenfuss, 1998, 1999). The stated purpose of the survey is "to obtain information regarding the perceptions, behaviors and values of Concordia College students" (Papenfuss, 1998, p. 1). The information collected in the survey was used to identify programming needs of the students, compare health behaviors of current students with students of the past and the future, and compare the health behaviors of Concordia students with national data on college student health behaviors (Papenfuss, 1998). The results have never been connected to any specific course curricula (L. Papenfuss, personal communication, April 13, 2000).

Recent Research Involving Students' Health Knowledge, Attitudes, and Behaviors After Completing a College Health Course

It is extremely important for the field of health education to determine whether health education is actually doing what it aims to do. This includes improving students' health knowledge, attitudes, and behaviors relating to health promoting concepts. The following section will report on some of the more current research that has looked at
aspects of health knowledge, attitude, and/or behavior change for individuals who have taken a college health education class.

Much of the study conducted by Higgins, Nicholson, Price and Case (1992) was devoted to comparing grades in health classes to grades in other introductory courses across disciplines. Part of the study, however, looked at knowledge gain after taking a college health class. One hundred ninety-one students at three universities completed the Health Knowledge Inventory as a pretest and posttest to a college health course. A statistically significant increase in mean scores from 61.2 to 66.0 resulted, indicating that learning had occurred by the end of the health course. However, because the knowledge gain was very modest, the researchers indicated that it cannot be assumed that an increase in health knowledge will result from participation in a college health class. Their results seemed to imply that little learning may be occurring in some college health courses.

McClanahan (1993) conducted an investigation to examine the influence of instructional approach on students’ lifestyle behaviors. She compared a cognitive-based fitness and wellness course and an activity-based course in order to determine if either approach had a superior influence on lifestyle behaviors of college students.

Two hundred seventy-five undergraduate students at Memphis State University served as the subjects for the study (McClanahan, 1993). A group of 95 students was enrolled in an activity-based class (aerobics), 106 students were enrolled in a cognitive-based class (Concepts of Fitness and Wellness), and 74 students were enrolled in a business class (control group). The activity-based group spent about two-thirds of the time participating in physical activity and one-third of the time discussing fitness and...
wellness concepts. The cognitive-based group performed an initial fitness assessment, but the remainder of the course involved paper and pencil assessments and lectures on wellness concepts.

**Testwell: A Self-Scoring Wellness Assessment Questionnaire** was administered to all of the subjects in the McClanahan (1993) study at the beginning and end of their respective courses. The questionnaire measures self-reported lifestyle behaviors in the following areas: physical fitness, nutrition, self-care, drugs and driving, social-environmental concerns, emotional awareness, emotional control, intellectual issues, occupational satisfaction, and spiritual satisfaction. A comprehensive wellness score was calculated as well as a score for individual topic areas.

The results of McClanahan's research indicated that both the cognitive-based and activity-based group means were significantly greater than the control group mean on the posttest. However, the activity-based score was significantly higher than either of the other group means indicating that the activity-based group was the most successful at moving participants toward more positive physical lifestyle behaviors. The activity-based instructional approach more significantly influenced physical lifestyle behaviors. The activity-based and cognitive-based groups also reported significant increases in physical wellness concepts while the difference in the control group's pretest and posttest scores was not found to be significant. When comparing the difference between groups at posttesting, the only significant difference was between the activity-based group and the control group. The activity-based group reported the higher scores. McClanahan (1993) concluded that wellness programs that use an instructional
approach based on experiential learning theory are more effective in influencing physical wellness concepts than those that use a more traditional cognitive-based approach.

One year later, Carlson et al. (1994) conducted a study designed to compare the effects of a college-level, health promotion course before and after major course revisions. The original course included both lecture and activity/practicum sessions, a required activity/exercise log, physiologic assessment, and a term project involving relating course topics to students' individual lifestyles with a lifestyle plan/projection for the future. The revised course added a number of quizzes, supplementary reading assignments, a nutritional and substance abuse assessment, and detailed lecture outlines and handouts for the students and instructors.

Four hundred forty-five college students who enrolled in the health promotion course (195 who took the original course and 250 who took the revised course) were asked to complete a 65-item questionnaire for Carlson et al.'s (1994) study. The evaluation instrument was developed specifically for the course by a panel of health education, exercise physiology, and nutrition experts. Part of the questionnaire contained modified questions from other questionnaires and health risk appraisals. The instrument assessed students' knowledge, attitudes, and behaviors in the following content areas: exercise and fitness, nutrition, substance abuse, stress management, safety, cancer and cardiovascular disease risk factors. The questionnaire was given as a pretest and as a posttest (Carlson et al., 1994).

Results of the study described above showed that participation in either course produced statistically significant improvements in health-related knowledge. All content
areas showed significant improvements in both courses except stress management, which improved only in the revised course. The attitude results indicated that significant gains occurred in overall scores as well as in each of the content areas except cancer, which had high pretest scores to begin with. There were less significant changes in behaviors. Although overall both the original course and the revised course positively affected health behavior, cardiovascular disease was the only area in which significant behavior changes were produced by both courses. When comparing the effects of the revised curriculum with those of the original curriculum, the data indicate that the revised course showed significantly greater improvements in three of the seven content areas (stress, cancer, and cardiovascular disease) (Carlson et al., 1994).

In their conclusions, Carlson et al. (1994) noted that the data support the effectiveness of both of the health promotion courses. Regarding the specific purpose of the study, the data also supported the effectiveness of the course revisions in producing several significant improvements in knowledge, attitude, and behavior.

Welle and Kittleson (1994) conducted research to determine the effect of health education and physical education teaching strategies on overall wellness levels. Undergraduate students were randomly selected from five sections of a general health education course, five sections of physical education activity courses, and one physical education lecture course. Two sections of the general health education group identified one specific health risk, which they were to attempt to reduce over the 10-week course. They became the “goals” courses in which one class period per week was devoted to working on setting weekly goals, providing social support, and developing plans to
achieve their goals. The other three sections of the general health education group consisted of lectures on a variety of health topics and were referred to as the "lectures" courses. The physical education activity courses included two sections of jogging, two sections of "non-impact" exercise, and one section of general conditioning. The physical education lecture course served as the control group.

Students' level of wellness for Welle and Kittleson's (1994) study was assessed the first and last days of the 10-week quarter with the Stevens Point Wellness Assessment Instrument. Analysis of covariance was used to statistically eliminate differences among the preexisting groups, adjust for an unbalanced research design, and separate the amount of change that was caused by the treatment effect (i.e., the teaching method).

Of the five teaching methods in this study, only the "lectures" and "goals" courses significantly increased wellness scores (reported attitude and behavior toward wellness issues). No significant difference in the ability to improve wellness was found between the "lectures" and the "goals" courses. In their conclusion, the researchers indicated that traditional health education courses do have an impact on improving students' overall wellness. Physical education activity courses alone, on the other hand, do not significantly improve overall wellness. Therefore, wellness is more complex than just physical fitness (Welle & Kittleson, 1994).

Moode and Finkenberg (1994) conducted a study to assess whether students enrolled in a wellness course changed their attitude toward physical activity and whether there were gender differences in this change. The Attitude Toward Physical Activity Inventory was administered to 70 women and 46 men enrolled in a college physical
education course at the beginning and end of a semester. The inventory measures six
domains of physical activity: Social Experience, Health and Fitness, Pursuit of Vertigo,
Aesthetic Experience, Catharsis, and Ascetic Experience.

Results of Moode and Finkenberg’s (1994) study indicated that participation in a
wellness course, which included a component of physical activity, was associated with
higher attitude scores on physical activity at the end of the course. Significant gender
differences were noted on four of the six domains. Men’s attitude scores were
significantly higher for Social Experience, Health and Fitness, Aesthetic Experience, and
Ascetic Experience. Women demonstrated significantly higher attitude scores from
pretest to posttest on Health and Fitness, and men reported significantly higher attitude
scores from pretest to posttest on Ascetic Experience (Moode & Finkenberg, 1994).

In a very comprehensive study, Barnes (1996) attempted to determine whether
those students who showed an increase in health knowledge as the result of participating
in an undergraduate health course also reported better attitudes and behaviors toward
health issues. The study utilized a two-group, repeated-measures design with an
experimental and a control group. The experimental group consisted of 102 students in
four sections of the Elements of Health Education course. The control group consisted of
28 students in four randomly selected sections of the Introduction to Bowling course.

A revised version of The Wellness Knowledge, Attitude, and Behavior Instrument
(Dinger et al., 1998) was used to measure college students’ knowledge, attitude, and
behavior in the areas of physical activity, nutrition, and stress management. The
questionnaire was administered prior to, at the end of, and four months after the
completion of the health education and bowling courses (i.e., pretest, posttest, and post posttest administrations). Differences in the students' wellness knowledge, attitude, and behavior scores after the completion of the health education and bowling classes and four months thereafter were studied. In addition, correlations were run between the wellness knowledge, attitude, and behavior scores for the pretest, posttest, and post posttest administrations to determine the relationship between the three dependent variables.

The results of Barnes' (1996) study included a significant increase in the wellness knowledge scores of both the experimental and control groups. However, the increase for the experimental group occurred between the pretest and posttest data collection and the greatest increase for the control group occurred between the posttest and post posttest data collection. The knowledge scores of the experimental group were significantly higher than those scores of the control group. No significant increase in wellness attitude scores of the experimental group was found from pretest to posttest data collection, but a significant increase in wellness attitude scores did occur between pretest and post posttest data collection. A significant increase in wellness attitude scores also occurred in the control group between the pretest and post posttest data collection. The attitude scores of the experimental group were significantly higher than those scores of the control group. A significant increase in the wellness behavior scores of the experimental group from the pretest to posttest data collection was found. Wellness behavior scores were also significantly higher at the post posttest data collection compared to the pretest data collection. There was no significant change in the wellness behavior scores of the control
group, and the behavior scores of the experimental group were not significantly higher than the control group at either the posttest or post-posttest data collections.

With caution, Barnes' (1996) study can be interpreted to show that the health education course positively correlated with increases in students' wellness knowledge, attitudes, and behaviors. However, wellness attitude scores for both the experimental and control groups increased between pretest and post-posttest data collections. In addition, the wellness behavior scores of the experimental group were not significantly higher than the control group at either the posttest or post-posttest data collections.

That same year (1996), Hatton concluded a study that investigated whether participation in a wellness class would change students' attitude towards physical activity. One hundred sixty-eight college students enrolled in wellness classes at Oklahoma State University were administered the Attitude Toward Physical Activity Inventory during the second and fourteenth week of the course. The inventory is categorized into six domains of physical activity including Social Experience, Health and Fitness, Pursuit of Vertigo, Aesthetic Experience, Catharsis, and Ascetic Experience. A 3-way analysis of variance (ANOVA), with repeated measures on one factor, was utilized to analyze the data.

Hatton's (1996) results indicated very small overall changes in the mean scores between pretest and posttest for the six domains. However, significant pretest to posttest differences were found for four of the six domains: Social Experience, Health and Fitness, Aesthetic Experience, and Catharsis. The mean scores for Social Experience and Aesthetic Experience increased, whereas the mean scores decreased for Health and
Fitness and Catharsis. Significant differences were also found between male and female test scores for Pursuit of Vertigo, Aesthetic Experience, and Ascetic Experience. The male subjects recorded higher scores in Ascetic Experience and Pursuit of Vertigo. The female subjects recorded higher scores in Aesthetic Experience.

In 1997, Pearman et al. conducted research to evaluate the impact of a required college health and physical education course on selected health knowledge, attitudes, and behaviors of alumni. A survey questionnaire was mailed to 1,950 former students of two private, coeducational liberal arts institutions in the southeastern United States. The students had been randomly selected from the graduating classes of 1985, 1987, 1989, 1991, and 1993. A total of 979 alumni returned a mail survey questionnaire. The respondents included 581 from College A, which had required all students to take a lifetime health and physical education course, and 398 alumni from College B, which offered no required or elective courses in the area of lifetime health and physical education.

The survey questionnaire used in the Pearman et al. (1997) study was an adaptation of the Health Habits and History Questionnaire (HHHQ) developed in 1987 by the Division of Cancer Prevention and Control and the National Cancer Institute (NCI). The survey contained four main sections: general health knowledge; attitudes about the influence of College A’s required course on alumni’s exercise, eating, smoking, and alcohol consumption habits. College B alumni were asked to rank the influence of their overall college experience on these behaviors; smoking, physical activity, and nutritional practices; and frequency of consumption of 98 food items (nutritional analysis).
In Pearman et al.'s (1997) study, the required lifetime health and physical education course appeared to have had a positive effect on selected health knowledge, attitudes, and behaviors of those individuals who had completed it. Alumni of College A were more likely to know their personal blood pressure and blood cholesterol levels than were College B alumni. College A alumni were more likely to know the recommended dietary fat percentage than were the College B alumni. Alumni attitude scores showed that the required course had more positive influences on the College A alumni’s exercise, dietary, smoking, and alcohol consumption behaviors than the overall college experience had on College B graduates. There were no significant between-group differences on self-reported physical activity habits. However, fewer alumni from College A reported they had smoked 100 or more cigarettes in their lifetime and only 4% of those alumni currently smoked compared to 10% of College B alumni. Alumni who had taken the College A required course were more likely to consume fewer calories, more total carbohydrates, more complex carbohydrates, less sodium, and less dietary cholesterol than the comparison alumni.

In the final study examined for this section of the literature review, Pinto, Cherico, Szymanski, and Marcus (1998) looked at student participation in reported vigorous and moderate-intensity exercise to assess changes in the students’ exercise behavior from the first year of college to the second year. A questionnaire was mailed to 708 randomly selected first-year university students. The questionnaire assessed student demographics and participation in vigorous and moderate exercise over the preceding seven days. Three hundred thirty-two students responded to the first questionnaire (T1).
A year later, those 332 respondents were sent a similar questionnaire (T2), of which 242 responded.

The questionnaire used in the above study included demographic information, current smoking status, and preferences for modes of support for exercise. Specific questions such as “How many times in the past seven days did you engage in vigorous exercise such as jogging, running, aerobic dance, rowing, or other aerobic activities that made you sweat and breathe hard?” and “How many times in the past seven days did you engage in moderate exercise such as walking, slow biking, gardening, or other moderate activities that made you sweat a little?” were also included in the questionnaire to determine intensity of exercise (Pinto et al., 1998, p. 24).

At each assessment in the Pinto et al. (1998) study, the sample of students was divided into two groups based on self-reported minutes of exercise. Those who met recommendations for vigorous or moderate-intensity exercise were classified as active. Those who did not meet recommendations for vigorous or moderate-intensity exercise became the sedentary group. At T1, 58% of the sample were active and 42% were sedentary. At T2, 64% of the sample reported exercising at or above recommended levels, and 36% were classified as sedentary. For the group as a whole, no significant differences were reported regarding average number of minutes spent in either vigorous or moderate-intensity exercise between T1 and T2.

To determine changes in exercise behavior, the research sample from the Pinto et al. (1998) study was further divided into subgroups. Those who met recommendations for vigorous or moderate-intensity exercise at both T1 and T2 (n = 100) were categorized...
as active-active. Those who did not meet recommendations for vigorous or moderate-intensity exercise at either T1 or T2 (n = 53) were classified as sedentary-sedentary. The active-sedentary subgroup was those students who met recommendations for vigorous or moderate-intensity exercise at T1 but not at T2 (n = 31), and the sedentary-active subgroup was those students who did not meet the recommendations for vigorous or moderate-intensity exercise at T1 but did so at T2 (n = 41).

Surprisingly, the data in the Pinto et al. (1998) study did not indicate an overall decline in the duration of exercise participation among students from the first year to the second year of college. In fact, the proportion of students who met recommendations for regular exercise increased. What the data did indicate, however, was a significant number of students (42% of the sample population) were either inactive or exercising below recommended levels at T1. For the group as a whole, monthly newsletters were the most often preferred (26%) mode of support in adopting or maintaining exercise in the college setting. This was followed by a weekly seminar over a semester (16%) and “other” responses (16%) (i.e., meeting one-on-one with an instructor several times a week, greater availability of gym facilities, and group-based programs). In the sedentary-sedentary and active-sedentary groups, the greatest number of participants indicated no time/not interested preferences.

Higgins et al. (1992) showed an increase in health knowledge. Although the increase appeared to be small, additional health knowledge research in combination with health attitudes and behaviors conclusively indicates that health education produces
increases in health knowledge (Barnes, 1996; Carlson et al., 1994; Pearman et al., 1997). Studies by Carlson et al. (1994), Hatton (1996), and Moode and Finkenberg (1994) proved an increase in attitude toward physical activity, although Hatton reported a very small increase. An increase in health behavior was determined through the studies of McClanahan (1993), Pinto et al. (1998), and Welle and Kittleson (1994). When health knowledge, attitude, and behavior were examined in combination, health knowledge and attitude decisively improved (Barnes, 1996; Carlson et al., 1994; Pearman et al., 1997). However, in this combination, these results failed to report any significant change in health behavior. Such findings contribute to the complexity of assessing the relationship amongst health knowledge, attitude, and behavior. As has been suggested in most of the studies examined for this literature review, there is a need to continue to evaluate the effectiveness of health education courses on student health knowledge, attitude, and behavior, with more consistent instrumentation.
CHAPTER III
METHODS AND PROCEDURES

This chapter includes the methods and procedures for the study. The selection of the subjects, the instrument, the method of data collection, and the statistical procedures used to analyze the data are described. The purpose of the study was to determine whether participation in a wellness course changed students' knowledge, attitude, and behavior relating to physical activity, nutrition, and stress management. The Institutional Review Boards of both the University of North Dakota and Concordia College approved the study protocol.

Selection of Subjects

The subjects for this study were college students at Concordia College, Moorhead, Minnesota, enrolled in PE 111 – Wellness during Block 2 of fall semester (October 25th through December 17th) and Block 3 of spring semester (January 4th through February 25th) of the 1999-2000 academic year. PE 111 is a required course for graduation recommended to be taken during a student's first year at Concordia. It is an eight-week course or one-half of a semester course. A general Wellness syllabus is presented in Appendix A. Thirteen sections of Wellness were surveyed for a total of 348 students.
A follow-up interview was conducted with randomly selected subjects (n = 17) from the 13 Wellness sections to further investigate changes in knowledge, attitude, and behaviors relating to wellness issues.

The Instrument

The instrument used in this study is a revised version of The Wellness Knowledge, Attitude, and Behavior Instrument (WKABI) (Dinger et al., 1998) (Appendix C). Permission to use the instrument was received from Mary K. Dinger (Appendix B). It is designed to measure college students’ knowledge, attitudes, and behaviors in the areas of physical activity, nutrition, and stress management.

Dinger developed the original instrument for her dissertation in 1994. A pool of 152 items was constructed and substantiated by Dinger and a panel of health education experts (Dinger et al., 1998). It was pilot tested by a group of 58 college students in a personal wellness course to elicit reactions and suggestions for improving the items. In addition, five full professors in the field of wellness measurement reviewed the instrument. Following the pilot testing and review, the instrument was revised and administered to another 207 college students enrolled in a personal wellness course. Statistical and psychometric procedures reduced the instrument to 85 items. Changes and updates in the sub-scale areas (food labels and physical activity requirements had changed since the original instrument was constructed) further reduced the instrument (Dinger et al., 1998).

Dinger’s revised 75-item WKABI was administered toward the end of a semester to 831 students enrolled in the personal wellness course. The Statistical Packages for the...
Social Sciences (SPSS) was used to complete the statistical analysis. The Knowledge, Attitude, and Behavior Scales were separated for the analysis. An item analysis was completed on the items within each of the three scales. Item scores were correlated with total scores. Items that did not meet the Corrected Item-Total Correlations statistical criterion of $\geq .30$ were deleted. Internal consistency reliability was calculated for each of the three scales. An internal consistency reliability coefficient value of $\geq .70$ was considered acceptable. The statistical method used to determine the appropriate number of factors was an eigen value $\geq 1.00$. Items were included within a factor if they loaded $\geq .40$ (Dinger et al., 1998).

After completion of the item analysis, the resulting WKABI contained 64 items: Knowledge Scale = 33 items, Attitude Scale = 14 items, and Behavior Scale = 17 items. The internal consistency reliability of the Knowledge Scale has a Kuder-Richardson 20 value of .7572. The Attitude and Behavior Scales report a coefficient alpha of .8384 and .7658 respectively (Dinger et al., 1998).

The Wellness Knowledge, Attitude, and Behavior Instrument consists of 69 questions (Table 1). It contains the 64 items developed by Dinger with five additional demographic questions concerning age, gender, class standing, ethnic origin, and place of residence. Part I (questions 6–38) measures knowledge of physical activity, nutrition, and stress management concepts. The questions consist of four multiple-choice options. Part II (questions 39–52) is intended to determine students' attitudes relating to physical activity, nutrition, and stress management by using a five-point Likert scale (strongly agree, agree, undecided, disagree, and strongly disagree). Part III (questions 53–69)
consists of a five-point Likert scale to assess students’ behavior relating to physical activity, nutrition, and stress management. This scale includes the responses always, most of the time, some of the time, not very often, and never.

Table 1

The Content Areas of The Wellness Knowledge, Attitude, and Behavior Instrument

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Age</th>
<th>Item Number</th>
<th>Total Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Class Standing</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ethnic Background</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Part I – Knowledge (Multiple Choice A-D)</td>
<td>Physical Activity</td>
<td>6-16</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>17-29</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Stress Management</td>
<td>30-38</td>
<td>9</td>
</tr>
<tr>
<td>Part II – Attitude (Likert Scale A-E)</td>
<td>Physical Activity</td>
<td>39-43</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>44-48</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Stress Management</td>
<td>49-52</td>
<td>4</td>
</tr>
<tr>
<td>Part III – Behavior (Likert Scale A-E)</td>
<td>Physical Activity</td>
<td>53-57</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Nutrition</td>
<td>58-64</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Stress Management</td>
<td>65-69</td>
<td>5</td>
</tr>
<tr>
<td>Total Items</td>
<td></td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>
The Method of Data Collection

Pretest Procedures

Eight instructors who taught the Wellness course at Concordia during Blocks 2 and 3 of the 1999-2000 academic year were asked to participate in the study. Two of the instructors taught three sections each, three instructors taught two sections each, and the remaining three instructors taught one section each. The researcher met with all seven of the instructors as a group to explain the purpose of the study, the dates for administration of the study instrument, and provided both verbal and written instructions concerning the administration of the instrument (Appendix D). Informed consent forms, copies of the instrument, computerized answer sheets, No. 2 pencils, two large envelopes in which to collect the informed consent forms and the instrument, and a second copy of written instructions were provided for each instructor the morning of the date of administration.

The instrument was administered to a total of 443 students during the first class period of each of the Block 2 and Block 3 Wellness sections (September 2-3 for Block 2 and January 4-5 for Block 3). Written instructions, prepared by the researcher, were read to the students by each instructor to ensure uniformity in the data collection procedures. Upon completion and collection of the informed consent forms, students were asked to complete the research questionnaire. Students were asked to fill in their answers on the computerized answer sheets using a No. 2 pencil. They were specifically instructed not to record their name or ID number on the answer sheet as to ensure subject confidentiality. The research instrument and the computerized answer sheets were
collected separately as they were completed. The consent form (Appendix E) and the research questionnaire took approximately 20 minutes to complete.

Posttest Procedures

The posttest was administered to 348 students during the last week of classes for Blocks 2 and 3 (December 6th through 10th for Block 2 and February 20th through 25th for Block 3). A reminder was sent to all of the instructors one week prior to administering the posttest. Written instructions, prepared by the researcher, were again provided to each instructor to read to the students. Copies of the instrument, computerized answer sheets, No. 2 pencils, two large envelopes in which to collect the instrument and the computerized answer sheets separately, and a second copy of written instructions were provided for each instructor the morning of the date of administration.

Interview Procedures

Section numbers of each of the participating Wellness classes were sent to Computer Services at Concordia College that randomly selected 25 students (10 from Block 2 and 15 from Block 3) for follow-up interviews. The researcher contacted each randomly selected student to arrange the interview date and time. Of the 25 randomly selected students, 17 students agreed to participate in the interview (7 from Block 2 and 10 from Block 3).

The follow-up interviews were conducted within one week of the end of each of the blocks. Each student was read the purpose and procedures for the interview and asked to read and sign a consent form. The students were then asked seven questions pertaining to their experience in the Wellness course (Appendix F). The researcher hand
wrote the students’ responses to the interview questions. The interviews took approximately 15 minutes each.

The main objective of the one-on-one interviews was to gather data about the subjects’ personal perspectives. It was believed that interviews could yield data rich in meaning and insight about the Wellness course that could not be collected through a written questionnaire. Therefore, questions for the interview were posed in an open-ended manner to encourage each subject to express his or her personal view.

Analysis of Data

The independent variable of the study was the subjects’ participation in the Wellness course. The dependent variables were their wellness knowledge, attitudes, and behaviors as measured by The Wellness Knowledge, Attitude, and Behavior Instrument. It was assumed that changes in subjects’ wellness knowledge, attitudes, and behaviors were due to influences of the Wellness course and not other variables such as history, maturation, or testing effects.

The Computer Center at Concordia College scanned the computerized answer sheets and developed a data set of frequencies for each of the instrument items. DH Research in Fargo, North Dakota, compiled a data set for questions 6–64. The data were then analyzed using SPSS on the North Dakota Higher Education Computer Network (NDHECN) mainframe housed at North Dakota State University. Frequencies and percentages were computed for the demographic information. The mean scores and Analysis of Variance (ANOVA) summaries for reported wellness knowledge, attitude, and behavior were computed.
Analysis of Variances (ANOVAs), with repeated measures on one factor, were conducted to determine statistically significant differences between the pretest and posttest wellness knowledge, attitude, and behavior scores. Three-way ANOVAs were conducted to determine differences between females and males and between freshmen and upperclassmen.

Information from the interviews was reported in descriptive form. There was no qualitative analysis of the interviews. The information will be used to make changes in the Wellness course at Concordia College.
CHAPTER IV

RESULTS

The purpose of this study was to determine if participation in a college wellness course resulted in improvement in knowledge, attitude, and behavior relating to physical activity, nutrition, and stress management. The following sections contain the results of the data analysis.

Students enrolled in Wellness during Block 2 and Block 3 of the 1999-2000 academic year were asked to participate in this study. Concordia’s academic year is divided into two semester terms (fall and spring). Each semester is further divided into two blocks (two eight-week sections). Fall semester contains Blocks 1 and 2. Spring semester contains Blocks 3 and 4. Each block class meets for half of the semester. The data collection for this study took place during Block 2 and Block 3, spanning parts of fall semester 1999 and spring semester 2000.

Four hundred forty-three students took The Wellness Knowledge, Attitude, and Behavior Instrument pretest, and 348 students took the posttest (21% of the pretest population did not take the posttest). Two hundred seventeen students took the pretest Block 2. One hundred fifty-two students took the posttest Block 2. Two hundred twenty-six students took the pretest Block 3. One hundred ninety-six students took the posttest Block 3. Overall, a greater number of students completed the study from Block 3 as compared to Block 2 (Block 2 = 152 students, Block 3 = 196 students). The difference
between the pretest and posttest numbers reflects the number of students who were absent
the days the posttest was administered.

Demographic Information

Eighty percent of the subjects were 19 years of age or younger. Only 3% of the
subject population was 22 years of age or older, indicating that the vast majority of
subjects were traditional college-age students in their first or second year. The subjects’
ages are displayed in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Frequencies and Percentages of Subjects’ Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 2</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>18 yrs. or Younger</td>
</tr>
<tr>
<td>19 yrs.</td>
</tr>
<tr>
<td>20 yrs.</td>
</tr>
<tr>
<td>21 yrs.</td>
</tr>
<tr>
<td>22 yrs. or Older</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

The subjects’ gender is indicated in Table 3. Fifty-nine percent of the subjects
were female, and 41% were male. Although 44 more students from Block 3 participated
in this study, the percentages of females and males for Blocks 2 and 3 were nearly the
same (58% females and 42% males Block 2, and 59% females and 41% males Block 3).
This distribution percentage very closely matches the overall distribution of female and male students at Concordia College.

Table 3

Frequencies and Percentages of Subjects' Gender

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>88</td>
<td>116</td>
<td>59</td>
</tr>
<tr>
<td>Male</td>
<td>64</td>
<td>79</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>196</td>
<td>100</td>
</tr>
</tbody>
</table>

The majority of the subjects (71%) were freshman students with sophomores making up 20% of the subject population. Again, the percentages of freshman and sophomore students in Blocks 2 and 3 parallel the total percentages of these categories enrolled at Concordia College. Table 4 displays the subjects’ class standing.

Table 4

Frequencies and Percentages of Subjects’ Class Standing

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>112</td>
<td>136</td>
<td>71</td>
</tr>
<tr>
<td>Sophomore</td>
<td>28</td>
<td>41</td>
<td>20</td>
</tr>
<tr>
<td>Junior</td>
<td>9</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Senior</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Graduate or Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>196</td>
<td>100</td>
</tr>
</tbody>
</table>
The subjects' ethnicity is presented in Table 5. Ninety-one percent of the subjects described themselves as Caucasian. Block 2 contained a slightly greater mix of ethnicity than Block 3, including 2 more African-American and Asian students and 1 more student who classified himself or herself as belonging to the "Other" category.

Table 5

Frequencies and Percentages of Subjects' Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>2</td>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>Asian</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Caucasian</td>
<td>135</td>
<td>183</td>
<td>91.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>152</td>
<td>195</td>
<td>100</td>
</tr>
</tbody>
</table>

Three hundred ten subjects, or 89%, lived in dormitories. This group represents freshman and sophomore students as they are required to live in the dormitories during their first two years at Concordia. The remaining upperclassmen indicated living in off-campus housing. It is believed that the "Other" category referred to living with parents at home. The subjects' place of residence is displayed in Table 6.
Table 6

**Frequencies and Percentages of Subjects' Place of Residence**

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dormitory</td>
<td>136</td>
<td>174</td>
<td>89</td>
</tr>
<tr>
<td>Fraternity or Sorority House</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Off-Campus Apartment or House</td>
<td>15</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>153</td>
<td>196</td>
<td>100</td>
</tr>
</tbody>
</table>

The statistical methods used to test the hypotheses were Analysis of Variance (ANOVA) and 3-way Analysis of Variance. Analysis was run on wellness knowledge, wellness attitude, and wellness behavior as each related to physical activity, nutrition, and stress management. In addition, 3-way analyses were run to determine if there were any significant differences between freshmen and upperclassmen and females versus males. Level of significance was set at $p < .01$. Mean scores are also reported for pretest and posttest results from both Block 2 and Block 3 during which the data were collected.

**Analysis of Variance**

Mean scores and ANOVA summaries for wellness knowledge are displayed in Tables 7-14.
Table 7

Mean Scores for Wellness Knowledge of Physical Activity

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Mean Scores</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>6.63</td>
<td></td>
<td>6.62</td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td></td>
<td>229</td>
</tr>
<tr>
<td>Posttest</td>
<td>6.9</td>
<td></td>
<td>7.29</td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td></td>
<td>196</td>
</tr>
</tbody>
</table>

Table 8

ANOVA Summary for Wellness Knowledge of Physical Activity

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>52.406</td>
<td>2</td>
<td>26.204</td>
<td>9.257</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>45.607</td>
<td>1</td>
<td>45.607</td>
<td>16.111</td>
<td>.000*</td>
</tr>
<tr>
<td></td>
<td>3.954</td>
<td>1</td>
<td>3.954</td>
<td>1.397</td>
<td>.238</td>
</tr>
<tr>
<td>Explained</td>
<td>59.008</td>
<td>3</td>
<td>19.669</td>
<td>6.948</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>2069.311</td>
<td>731</td>
<td>2.831</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01

The ANOVA summary for wellness knowledge of physical activity showed a significant increase in knowledge from pretest to posttest for students in both Block 2 and Block 3. This summary did not indicate a significant difference in those scores between Block 2 and Block 3.
Table 9

**Mean Scores for Wellness Knowledge of Nutrition**

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Mean Scores</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td>7.2</td>
<td></td>
<td>7.14</td>
</tr>
<tr>
<td><strong>Number of Students</strong></td>
<td>195</td>
<td></td>
<td>229</td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td>7.83</td>
<td></td>
<td>7.89</td>
</tr>
<tr>
<td><strong>Number of Students</strong></td>
<td>115</td>
<td></td>
<td>196</td>
</tr>
</tbody>
</table>

Table 10

**ANOVA Summary for Wellness Knowledge of Nutrition**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>87.936</td>
<td>2</td>
<td>43.969</td>
<td>10.268</td>
<td>.000</td>
</tr>
<tr>
<td><strong>PRE</strong></td>
<td>87.581</td>
<td>1</td>
<td>87.581</td>
<td>20.453</td>
<td>.000*</td>
</tr>
<tr>
<td><strong>BLOCK</strong></td>
<td>0.063</td>
<td>1</td>
<td>0.063</td>
<td>0.015</td>
<td>.904</td>
</tr>
<tr>
<td>Explained</td>
<td>88.48</td>
<td>3</td>
<td>29.493</td>
<td>6.888</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>3130.165</td>
<td>731</td>
<td>4.282</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*\( p < .01 \)

The ANOVA summary for wellness knowledge of nutrition indicated a significant increase in knowledge of nutrition from pretest to posttest of students in both Block 2 and
Block 3. This analysis did not show a significant difference between the mean scores of Block 2 and Block 3.

Table 11

**Mean Scores for Wellness Knowledge of Stress Management**

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>5.91</td>
<td>6.22</td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td>229</td>
</tr>
<tr>
<td>Posttest</td>
<td>6.73</td>
<td>6.58</td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td>196</td>
</tr>
</tbody>
</table>

Table 12

**ANOVA Summary for Wellness Knowledge of Stress Management**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>59.206</td>
<td>2</td>
<td>29.603</td>
<td>8.568</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>53.842</td>
<td>1</td>
<td>53.842</td>
<td>15.583</td>
<td>.000*</td>
</tr>
<tr>
<td>BLOCK</td>
<td>2.706</td>
<td>1</td>
<td>2.706</td>
<td>0.783</td>
<td>.377</td>
</tr>
<tr>
<td>Explained</td>
<td>68.268</td>
<td>3</td>
<td>22.756</td>
<td>6.586</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>2525.759</td>
<td>731</td>
<td>3.455</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P < .01

As with knowledge of physical activity and nutrition, the ANOVA summary showed a significant increase in the wellness knowledge of stress management from...
pretest to posttest of students in Block 2 and Block 3. Again, the difference in the mean scores between Block 2 and Block 3 was not statistically significant.

Table 13
Mean Scores for Total Wellness Knowledge

<table>
<thead>
<tr>
<th></th>
<th>Mean Scores</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block 2</td>
<td>Block 3</td>
</tr>
<tr>
<td>Pretest</td>
<td>19.74</td>
<td>19.97</td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td>229</td>
</tr>
<tr>
<td>Posttest</td>
<td>21.47</td>
<td>21.75</td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td>196</td>
</tr>
</tbody>
</table>

Table 14
ANOVA Summary for Total Wellness Knowledge

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>580.348</td>
<td>2</td>
<td>290.174</td>
<td>15.616</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>PRE</td>
<td>549.878</td>
<td>1</td>
<td>549.878</td>
<td>29.593</td>
</tr>
<tr>
<td>BLOCK</td>
<td>11.445</td>
<td>1</td>
<td>11.445</td>
<td>0.616</td>
<td>.433</td>
</tr>
<tr>
<td>Explained</td>
<td>580.436</td>
<td>3</td>
<td>193.479</td>
<td>10.413</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>13582.898</td>
<td>731</td>
<td>18.581</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\*p < .01

The final ANOVA summary of wellness knowledge indicated statistically significant increases in the total wellness knowledge scores relating to physical activity,
nutrition, and stress management. The mean scores of Block 3 were higher at both the pretest and posttest than Block 2. However, there was not a significant difference in the mean scores of total wellness knowledge between students in Blocks 2 and 3.

The ANOVA summaries for wellness attitude did not show significant differences from pretest to posttest relating to physical activity, nutrition, or stress management; therefore, the tables were not included. However, an explanation of the wellness attitude results is presented.

The mean scores of wellness attitude relating to physical activity decreased from pretest to posttest for both Block 2 and Block 3. Because the attitude portion of the instrument was reported using a Likert scale with 1–5 ranging from strongly agree to strongly disagree, the lower the mean scores the more positive the attitude. Therefore, students in Block 2 and Block 3 reported more positive attitudes relating to physical activity at the end of the course than the beginning of the course. The ANOVA summary, however, showed no statistically significant difference between the pretest and posttest mean scores or between the mean scores of wellness attitude relating to physical activity for Block 2 and Block 3.

The mean scores for wellness attitude relating to nutrition decreased from pretest to posttest for both Block 2 and Block 3, indicating an increase in attitude relating to nutrition. The ANOVA summary did not indicate the wellness attitude relating to nutrition to be statistically significant.

The mean scores of wellness attitude relating to stress management also decreased from pretest to posttest for Block 2 and Block 3. This indicated an increase in attitude
relating to stress management did occur. However, the ANOVA summary did not show the increase in attitude to be not statistically significant. There was no significant difference between the mean scores of Block 2 and Block 3.

Although the mean scores indicated an increase in total wellness attitude relating to physical activity, nutrition, and stress management from the pretest to the posttest, the ANOVA summary showed that the increases were not statistically significant. As with the wellness knowledge analysis, there was no significant difference in wellness attitude scores between Blocks 2 and 3.

Mean scores for wellness behavior and ANOVA summaries are displayed in Tables 15-20.

Table 15

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Mean Scores</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>13.24</td>
<td>14.08</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>12.44</td>
<td>12.05</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td>196</td>
<td></td>
</tr>
</tbody>
</table>
Table 16

ANOVA Summary for Wellness Behavior Relating to Physical Activity

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>424.437</td>
<td>2</td>
<td>212.218</td>
<td>9.154</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>417.152</td>
<td>1</td>
<td>417.152</td>
<td>17.993</td>
<td>.000*</td>
</tr>
<tr>
<td>BLOCK</td>
<td>20.518</td>
<td>1</td>
<td>20.518</td>
<td>.885</td>
<td>.347</td>
</tr>
<tr>
<td>Explained</td>
<td>490.943</td>
<td>3</td>
<td>163.648</td>
<td>7.059</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>16947.542</td>
<td>731</td>
<td>23.184</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01

The ANOVA summary of wellness behavior relating to physical activity showed a significant difference between the pretest and posttest mean scores. Since the Likert scale used in the behavior part of the WKABI ranged from 5 = Always to 1 = Never, the lower the mean score the more positive the behavior. The mean scores from Block 2 and Block 3 decreased from pretest to posttest, therefore indicating the students reported more positive behavior relating to physical activity at the end of the course than the beginning.
Table 17

Mean Scores for Wellness Behavior Relating to Nutrition

<table>
<thead>
<tr>
<th></th>
<th>Mean Scores</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block 2</td>
<td>Block 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>20.06</td>
<td>19.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td>229</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>19.35</td>
<td>18.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td>196</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 18

ANOVA Summary for Wellness Behavior Relating to Nutrition

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>203.488</td>
<td>2</td>
<td>101.744</td>
<td>6.766</td>
<td>.001</td>
</tr>
<tr>
<td>PRE</td>
<td>171.109</td>
<td>1</td>
<td>171.109</td>
<td>11.380</td>
<td>.001*</td>
</tr>
<tr>
<td>BLOCK</td>
<td>20.138</td>
<td>1</td>
<td>20.138</td>
<td>1.339</td>
<td>.248</td>
</tr>
<tr>
<td>Explained</td>
<td>212.169</td>
<td>3</td>
<td>70.723</td>
<td>4.703</td>
<td>.003</td>
</tr>
<tr>
<td>Residual</td>
<td>10991.668</td>
<td>731</td>
<td>15.036</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01

The ANOVA summary of wellness behavior relating to nutrition showed a statistically significant difference in the mean scores from pretest to posttest. The mean scores for students in Block 2 and Block 3 decreased from pretest to posttest indicating an improvement in reported behavior relating to nutrition. There was no significant
difference between the mean scores of Block 2 and Block 3, although the mean scores of
the students in Block 3 were lower at both the pretest and posttest. This would appear to
indicate that the students in Block 3 reported more positive behavior at the beginning and
the end of the course than Block 2 students.

Table 19

Mean Scores for Total Wellness Behavior

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>48.77</td>
<td>48.78</td>
</tr>
<tr>
<td>Number of Students</td>
<td>195</td>
<td>229</td>
</tr>
<tr>
<td>Posttest</td>
<td>47.35</td>
<td>45.96</td>
</tr>
<tr>
<td>Number of Students</td>
<td>115</td>
<td>196</td>
</tr>
</tbody>
</table>

Table 20

ANOVA Summary for Total Wellness Behavior

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>1006.747</td>
<td>2</td>
<td>503.373</td>
<td>7.812</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>902.445</td>
<td>1</td>
<td>902.445</td>
<td>14.005</td>
<td>.000*</td>
</tr>
<tr>
<td></td>
<td>55.689</td>
<td>1</td>
<td>55.689</td>
<td>.864</td>
<td>.353</td>
</tr>
<tr>
<td>Explained</td>
<td>1089.796</td>
<td>3</td>
<td>363.265</td>
<td>5.637</td>
<td>.001</td>
</tr>
<tr>
<td>Residual</td>
<td>47103.992</td>
<td>731</td>
<td>64.438</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P < .01

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Although the ANOVA summary indicated no significant difference in the mean scores of students' reported behavior relating to stress management, the mean scores increased from pretest to posttest. According to the Likert scale used for the behavior section of the WKABI, this indicated that students actually reported more negative behavior relating to stress management at the end of the Wellness course. Block 3 mean scores were lower at both the pretest and the posttest, indicating slightly more positive behavior than Block 2. There was no significant difference between the mean scores of Block 2 and Block 3.

The ANOVAs of wellness behavior indicated statistically significant differences in reported behavior relating to physical activity and nutrition as well as total wellness behavior from pretest to posttest. Physical activity, nutrition, and total wellness behavior mean scores all showed an increase in reported behavior. Stress management mean scores did not show a significant difference from pretest to posttest. There was no significant difference in total wellness behavior scores between Block 2 and Block 3 students.

Three-Way Analysis of Variance

Mean scores and 3-way ANOVA summaries are charted and graphed only for those wellness knowledge, attitude, and behavior scores comparing class standing and gender that were statistically significant. This information is also displayed in Tables 21-34 and Figures 1-7.

Two-way ANOVA indicated a significant increase in wellness knowledge of nutrition from pretest to posttest. The 3-way ANOVA further showed a significant
Table 21

Mean Scores for Wellness Knowledge of Nutrition Comparing Class Standing

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th></th>
<th>Block 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Scores</td>
<td></td>
<td>Mean Scores</td>
<td></td>
</tr>
<tr>
<td>Freshmen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>6.99</td>
<td></td>
<td>6.85</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>148</td>
<td></td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>7.55</td>
<td></td>
<td>7.77</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>83</td>
<td></td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Upperclassmen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>7.85</td>
<td></td>
<td>7.82</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>47</td>
<td></td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>8.56</td>
<td></td>
<td>8.13</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>32</td>
<td></td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

Table 22

ANOVA Summary for Wellness Knowledge of Nutrition Comparing Class Standing

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>177.003</td>
<td>3</td>
<td>59.001</td>
<td>14.154</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>83.093</td>
<td>1</td>
<td>83.093</td>
<td>19.934</td>
<td>.000</td>
</tr>
<tr>
<td>BLOCK</td>
<td>.467</td>
<td>1</td>
<td>.467</td>
<td>.112</td>
<td>.738</td>
</tr>
<tr>
<td>CLASS STANDING</td>
<td>89.067</td>
<td>1</td>
<td>89.067</td>
<td>21.367</td>
<td>.000*</td>
</tr>
<tr>
<td>Explained</td>
<td>188.151</td>
<td>7</td>
<td>26.879</td>
<td>6.448</td>
<td>.000</td>
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<tr>
<td>Residual</td>
<td>3030.494</td>
<td>727</td>
<td>4.1680</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01
difference between freshmen and upperclassmen scores. The mean scores of wellness
knowledge of nutrition of the upperclassmen were higher than the mean scores of the
freshmen at both the pretest and posttest. This is also depicted in Figure 1.

Figure 1. Mean wellness knowledge of nutrition scores from pretest to posttest
comparing class standing.

The 3-way ANOVA summary of wellness knowledge comparing freshmen with
upperclassmen showed a statistically significant difference in total wellness knowledge
scores. Upperclassmen demonstrated higher mean scores on the pretest and posttest in
both Block 2 and Block 3. However, the freshmen scores showed a greater increase in
total wellness knowledge than the upperclassmen (Figure 2), particularly freshmen Block
3. There was not a significant difference in mean scores between Block 2 and Block 3.
Table 23

**Mean Scores for Total Wellness Knowledge Comparing Class Standing**

<table>
<thead>
<tr>
<th>Mean Scores</th>
<th>Block 2</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>19.19</td>
<td>19.45</td>
</tr>
<tr>
<td>Number of Students</td>
<td>148</td>
<td>162</td>
</tr>
<tr>
<td>Posttest</td>
<td>20.89</td>
<td>21.66</td>
</tr>
<tr>
<td>Number of Students</td>
<td>83</td>
<td>136</td>
</tr>
<tr>
<td>Upperclassmen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>21.47</td>
<td>21.03</td>
</tr>
<tr>
<td>Number of Students</td>
<td>47</td>
<td>67</td>
</tr>
<tr>
<td>Posttest</td>
<td>22.97</td>
<td>21.95</td>
</tr>
<tr>
<td>Number of Students</td>
<td>32</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 24

**ANOVA Summary for Total Wellness Knowledge Comparing Class Standing**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>884.321</td>
<td>3</td>
<td>294.774</td>
<td>16.249</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>528.940</td>
<td>1</td>
<td>528.940</td>
<td>29.156</td>
<td>.000</td>
</tr>
<tr>
<td>BLOCK</td>
<td>6.653</td>
<td>1</td>
<td>6.653</td>
<td>.367</td>
<td>.545</td>
</tr>
<tr>
<td>CLASS STANDING</td>
<td>303.973</td>
<td>1</td>
<td>303.973</td>
<td>16.756</td>
<td>.000*</td>
</tr>
<tr>
<td>Explained</td>
<td>974.426</td>
<td>7</td>
<td>139.204</td>
<td>7.673</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>13188.907</td>
<td>727</td>
<td>18.142</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01

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Figure 2. Mean total wellness knowledge scores from pretest to posttest comparing class standing.

The 2-way ANOVA summary showed a significant increase in wellness knowledge of stress management. Three-way ANOVA further indicated a significant difference between female and male scores. Female mean scores were significantly higher at the posttest. Female mean scores were higher than the male mean scores both at the pretest and posttest Block 3. These differences are shown in Figure 3. There was no significant difference in the mean scores between Block 2 and Block 3.
Table 25

Mean Scores for Wellness Knowledge of Stress Management Comparing Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean Scores</th>
<th>Block 2</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>5.89</td>
<td>6.34</td>
</tr>
<tr>
<td>Female</td>
<td>Number of Students</td>
<td>148</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>7</td>
<td>6.83</td>
</tr>
<tr>
<td></td>
<td>Number of Students</td>
<td>70</td>
<td>116</td>
</tr>
<tr>
<td>Male</td>
<td>Pretest</td>
<td>5.93</td>
<td>6.01</td>
</tr>
<tr>
<td></td>
<td>Number of students</td>
<td>87</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>6.31</td>
<td>6.23</td>
</tr>
<tr>
<td></td>
<td>Number of students</td>
<td>45</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 26

ANOVA Summary for Wellness Knowledge of Stress Management Comparing Gender

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>83.590</td>
<td>3</td>
<td>27.863</td>
<td>8.151</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>PRE</td>
<td>53.830</td>
<td>1</td>
<td>53.830</td>
<td>15.747</td>
</tr>
<tr>
<td></td>
<td>BLOCK</td>
<td>2.119</td>
<td>1</td>
<td>2.119</td>
<td>.620</td>
</tr>
<tr>
<td></td>
<td>GENDER</td>
<td>23.361</td>
<td>1</td>
<td>23.361</td>
<td>6.834</td>
</tr>
<tr>
<td>Explained</td>
<td>104.968</td>
<td>7</td>
<td>14.995</td>
<td>4.387</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>2481.829</td>
<td>726</td>
<td>3.418</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01
Two-way ANOVA did not indicate a significant increase in attitude relating to nutrition from pretest to posttest, although there was a slight increase. When comparing gender, however, the 3-way ANOVA summary did show a significant difference between female and male reported attitude scores relating to nutrition. The mean scores of females were lower on both the pretest and posttest. Because the attitude portion of the instrument was reported using a Likert scale with 1–5 ranging from strongly agree to strongly disagree, the lower the mean scores the more positive the attitude. Therefore, females reported a more positive attitude relating to nutrition than males (Figure 4).
Table 27

Mean Scores for Attitude Relating to Nutrition Comparing Gender

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>10.78</td>
<td>11.07</td>
</tr>
<tr>
<td>Number of Students</td>
<td>108</td>
<td>136</td>
</tr>
<tr>
<td>Posttest</td>
<td>10.93</td>
<td>10.72</td>
</tr>
<tr>
<td>Number of Students</td>
<td>70</td>
<td>116</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>13.24</td>
<td>12.66</td>
</tr>
<tr>
<td>Number of Students</td>
<td>87</td>
<td>92</td>
</tr>
<tr>
<td>Posttest</td>
<td>12.53</td>
<td>12.34</td>
</tr>
<tr>
<td>Number of Students</td>
<td>45</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 28

ANOVA Summary for Wellness Attitude Relating to Nutrition Comparing Gender

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>625.507</td>
<td>3</td>
<td>208.502</td>
<td>19.586</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>PRE</td>
<td>1</td>
<td>14.831</td>
<td>1.393</td>
<td>.238</td>
</tr>
<tr>
<td></td>
<td>BLOCK</td>
<td>1</td>
<td>3.271</td>
<td>.307</td>
<td>.580</td>
</tr>
<tr>
<td></td>
<td>GENDER</td>
<td>1</td>
<td>599.655</td>
<td>56.331</td>
<td>.000*</td>
</tr>
<tr>
<td>Explained</td>
<td>652.020</td>
<td>7</td>
<td>93.146</td>
<td>8.7850</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>7728.459</td>
<td>726</td>
<td>10.645</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01
The 2-way ANOVA summary did not show a significant increase in total wellness attitude from pretest to posttest. The 3-way ANOVA summary, however, showed a significant difference between female and male reported total wellness attitude. The mean scores of females were lower at both the pretest and posttest. This indicated that the females reported a more positive attitude relating to physical activity, nutrition, and stress management than the males at both the beginning and the end of the Wellness course. This is clearly shown in Figure 5.

Figure 4. Mean wellness attitude relating to nutrition scores from pretest to posttest comparing gender.
Table 29

**Mean Scores for Total Wellness Attitude Comparing Gender**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean Scores</th>
<th>Block 2</th>
<th>Mean Scores</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>24.72</td>
<td>24.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>108</td>
<td>136</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>23.61</td>
<td>23.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>70</td>
<td>116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>26.63</td>
<td>26.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>87</td>
<td>92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>25.2</td>
<td>25.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>45</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 30

**ANOVA Summary for Total Wellness Attitude Comparing Gender**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>808.416</td>
<td>3</td>
<td>269.472</td>
<td>7.050</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>186.389</td>
<td>1</td>
<td>186.389</td>
<td>4.876</td>
<td>.028</td>
</tr>
<tr>
<td>BLOCK</td>
<td>9.039</td>
<td>1</td>
<td>9.039</td>
<td>.236</td>
<td>.627</td>
</tr>
<tr>
<td>GENDER</td>
<td>586.144</td>
<td>1</td>
<td>586.144</td>
<td>15.334</td>
<td>.000*</td>
</tr>
<tr>
<td>Explained</td>
<td>818.949</td>
<td>7</td>
<td>116.993</td>
<td>3.061</td>
<td>.004</td>
</tr>
<tr>
<td>Residual</td>
<td>27751.013</td>
<td>726</td>
<td>38.225</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*$p < .01$
Figure 5. Mean total wellness attitude scores from pretest to posttest comparing gender.

The 2-way ANOVA summary indicated a significant difference in wellness behavior relating to physical activity from pretest to posttest. In addition, 3-way ANOVA showed a significant difference between female and male reported behavior relating to physical activity. The responses on the behavior portion of the WKABI were a Likert scale ranging from 1 = Always to 5 = Never. Lower scores on this scale indicated a more positive behavior relating to the measured wellness issues. Male mean scores were lower at both the pretest and posttest than female mean scores. Therefore, males reported more positive involvement with physical activity than females (Figure 6).
Table 31

**Mean Scores for Wellness Behavior Relating to Physical Activity Comparing Gender**

<table>
<thead>
<tr>
<th></th>
<th>Block 2</th>
<th>Mean Scores</th>
<th>Block 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>14.73</td>
<td>15.04</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>108</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>13.36</td>
<td>13.09</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>70</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>11.38</td>
<td>12.65</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>87</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>11.02</td>
<td>10.54</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>45</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Table 32

**ANOVA Summary for Wellness Behavior Relating to Physical Activity Comparing Gender**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>1719.868</td>
<td>3</td>
<td>573.289</td>
<td>26.621</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>PRE</td>
<td>444.051</td>
<td>1</td>
<td>444.051</td>
<td>20.620</td>
</tr>
<tr>
<td></td>
<td>BLOCK</td>
<td>14.637</td>
<td>1</td>
<td>14.637</td>
<td>.680</td>
</tr>
<tr>
<td></td>
<td>GENDER</td>
<td>1297.878</td>
<td>1</td>
<td>1297.878</td>
<td>60.268</td>
</tr>
<tr>
<td>Explained</td>
<td>1800.335</td>
<td>7</td>
<td>257.191</td>
<td>11.943</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>15634.375</td>
<td>726</td>
<td>21.535</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .01
Figure 6. Mean wellness behavior relating to physical activity scores comparing gender.

The 2-way ANOVA summary did show a significant difference in reported wellness behavior relating to nutrition from pretest to posttest amongst the total study population. The 3-way ANOVA identified a significant difference in reported behavior relating to nutrition between females and males. Again, because of the Likert scale used in the behavior portion of the WKABI, the lower mean scores indicated a more positive wellness behavior. For behavior relating to nutrition, female mean scores were lower at both the pretest and posttest. However, male mean scores appeared to show a much greater improvement from pretest to posttest (Figure 7).
Table 33
Mean Scores for Wellness Behavior Relating to Nutrition Comparing Gender

<table>
<thead>
<tr>
<th></th>
<th>Mean Scores</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block 2</td>
<td>Block 3</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>18.95</td>
<td>19.26</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>108</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>18.99</td>
<td>18.43</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>70</td>
<td>116</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>21.44</td>
<td>20.86</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>87</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>19.91</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td>Number of Students</td>
<td>45</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Table 34
ANOVA Summary for Wellness Behavior Relating to Nutrition Comparing Gender

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>606.821</td>
<td>3</td>
<td>202.274</td>
<td>13.984</td>
<td>.000</td>
</tr>
<tr>
<td>PRE</td>
<td>159.689</td>
<td>1</td>
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<td>11.040</td>
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*p < .01

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Figure 7. Mean wellness behavior relating to nutrition scores comparing gender.

Interview Analysis

The subjects for the post Wellness course interviews were randomly selected by the Senior Systems Analyst at Concordia College Computer Services. Ten subjects were randomly selected from 7 different sections (5 instructors, 2 students from each instructor) of the Block 2 Wellness course. Fifteen subjects were randomly selected from 8 different sections (5 instructors, 3 students from each instructor) of the Block 3 Wellness course. A total of 17 subjects from the random selection agreed to participate in the one-on-one interview with the researcher, including 7 subjects from Block 2 and 10
subjects from Block 3. All subjects responded to a list of seven questions prepared by the researcher (Appendix F).

When asked, "Do you think you have gained knowledge in the areas of physical activity, nutrition, and stress management having taken the Wellness course? Please explain," a majority of the students indicated they had increased their knowledge particularly in the areas of physical activity and nutrition. Ten of these students noted that the personal fitness projects, fitness assessment labs, and the dietary analysis projects were instrumental in making this change. One student stated, "The fitness assessments and dietary analysis made me more aware of my personal habits. The information becomes more effective when it pertains to your own lifestyle."

For those few students who did not indicate that they had gained any knowledge by completing the Wellness course, the common response was that it is just a repeat of what they have had in high school health and physical education classes. Students also indicated that either they spent very little time or no time on the stress management/time management topic.

Students were asked, "Do you think your attitude toward these areas has changed after completing the Wellness course? Please explain." A number of the students reported that their attitude had changed some relating to the area of nutrition, but the majority of the students who indicated a change in attitude pointed out more of a change relating to physical activity. A couple common responses from this group were "I didn’t feel like you needed to be a competitive athlete to do well in this course" and "I was encouraged to learn that you don’t have to sweat or work to exhaustion to benefit from
physical activity.” Other responses included “It wasn’t just another high school phy. ed. class” and “It was good to learn why exercise and eating right is so important, what are the benefits and the consequences.”

About an equal number of students indicated no change in attitude. The most stunning comment was “My habits and attitudes were developed in high school, they aren’t going to change anymore now.” Additional comments included “There was nothing new” and “Most of the assignments were just busy work.”

The third question asked, “Have you changed any behaviors relating to physical activity, nutrition, or stress management since enrolling in the Wellness course? Please explain.” Again, the majority of the students reported that they had changed their behavior in one or more of the areas. Of those responding positively, 10 indicated the areas of physical activity and nutrition, primarily because of the requirements to complete a fitness log and dietary analysis. A couple of the students mentioned that the personal fitness assessment results were good motivators to get active. These students believed that the class served as good reinforcement for personal habits and that it is important to be periodically reminded to stick to or return to good habits.

Most of those students who reported little, if any, change in behavior indicated that they were already fairly active. A few students were skeptical about maintaining any behavior change that had occurred during the class. One of those students responded, “I have good intentions on keeping up the physical activity that was encouraged in class, but like usual, once it isn’t required it probably won’t last long.” Another student stated, “Change is internally motivated. No one approach or person can motivate change. It
usually takes a personal event to get you to change behavior.” A personal event would be something like a significant illness or accident that would cause you to change behavior in order to prevent it from happening again.

Question four asked, “In your opinion, what was the most valuable aspect of the Wellness course? Why?” The majority of the responses to this question included the personal fitness projects, personal fitness assessments, in-class activity, the dietary analysis, and the mix of lecture and activity provided in the course. The only other aspects of the course that were even mentioned included the Alcohol 101 project, the biological impact of alcoholism (from the On Campus Talking About Alcohol unit or OCTAA), and the little “tidbits” or facts from each of the topics presented.

When probing into why the personal fitness assessment or fitness projects and dietary analysis project were the most valuable, the responses centered around comments like “My scores on the personal fitness assessments motivated me to start becoming active,” “Being able to do activity in class was my only chance to be active,” or “I didn’t realize how poorly I was eating.”

Question five asked, “In your opinion, what was the least valuable aspect of the Wellness course? Why?” Students identified the OCTAA unit, sexual assault/sexual violence information, and the smoking information. When asked why these areas were least valuable, the common responses were “It is all common sense stuff” or “It was review from high school.” A number of students also identified the stress management information as not being very valuable, but went on to explain that that was because they did not spend enough time on the subject, or none at all, or the method of presenting the
information was not very affective. These students further indicated that they believed the topic itself is a valuable one.

The sixth question asked, "Do you think the Wellness course will benefit you in the future? Why or why not?" Some of the students noted that the physical activity part will be of benefit in the future. Others believed that the alcohol information may impact them later in life. Some students were unsure whether the course will benefit them in the future. The remaining few did not think the course would benefit them at all. One student summed it up by stating, "This class was interesting, but it will not benefit me as much as some of the other classes I have taken."

Most students were pleasantly surprised with the content of the course when asked, "Is there anything else you would like to share with me about your experiences in the Wellness course?" They appeared to have a preconceived idea of what the class would be like prior to its beginning, but were surprised when it wasn't "just another high school phy. ed. class." Most of the students interviewed also commented that the Wellness course should remain a part of the core curriculum, and that it should be taken during the freshman year. One student suggested that it could be a semester class. A sampling of other comments included provide more group activity, provide more opportunity for individual activity, include more fast food information in the nutrition unit, spend more time on sexually transmitted diseases, use a different approach with alcohol or do not cover it at all, more activity and less lecture, plan more carefully the order to present the topics (i.e., connect alcohol and sexual assault/sexual violence or
nutrition with cardiovascular disease), and do not make the students buy the text for the course as it was not used enough to warrant the cost.
CHAPTER V
SUMMARY, CONCLUSIONS, DISCUSSION, AND
RECOMMENDATIONS

Summary

College and university student wellness courses and programs suffer from a lack of evaluation. The required health education course at Concordia College has never been formally evaluated. Previous research also suggests there is a need to continue to evaluate the effectiveness of health education courses on student health knowledge, attitude, and behavior with consistent instrumentation since the research that has been done has produced varying results. By using a recently developed research instrument, this study attempted to determine whether participation in a college-level wellness course resulted in increased wellness knowledge, better attitudes relating to health, and increased use of health promoting behaviors.

The subjects of this study were college students at Concordia College, Moorhead, Minnesota, enrolled in PE 111 – Wellness during Block 2 of fall semester and Block 3 of spring semester of the 1999-2000 academic year. Concordia is a private, liberal arts college of the Evangelical Lutheran Church in America. The Concordia College Wellness course combines the use of activity, instruction, and fitness assessment to increase awareness and promote health-related fitness. PE 111 is a required course for graduation recommended to be taken during a student’s first year at Concordia. It is an
eight-week course or one-half of a semester course (one block). Ten different instructors teach the Wellness course over an academic year. The qualifications of instructors range from an individual with a Ph.D. in health education to individuals with B.S. or B.A. degrees in physical education. The majority of the instructors have master’s degrees in a physical education or health-related area. Many of the instructors are head coaches who also teach in the Physical Education and Health Department.

The Wellness Knowledge, Attitude, and Behavior Instrument (Appendix C) was administered to all subjects the first class period and during the last week of each section. The individual section instructor administered the questionnaire to his or her respective section for both data collections. The researcher conducted interviews of randomly selected students who completed the posttest questionnaire at the end of each block. Four hundred forty-three students completed the pretest questionnaire and 348 students completed the posttest questionnaire. Seventeen students participated in the posttest interviews.

The Wellness Knowledge, Attitude, and Behavior Instrument is designed to measure college students’ knowledge, attitudes, and behaviors in the areas of physical activity, nutrition, and stress management. It consists of 69 questions. The first five questions are demographic questions concerning age, gender, class standing, ethnic origin, and place of residence. Part I of the instrument contains 33 multiple-choice knowledge questions with four possible answers. Part II consists of 14 attitude questions that use a five-point Likert scale. The responses include strongly agree, agree, undecided, disagree, and strongly disagree. Part III consists of 17 behavior questions...
which also use a five-point Likert scale with these possible responses: always, most of the time, some of the time, not very often, and never. The knowledge section of the instrument was found to have a Kuder-Richardson 20 reliability coefficient of .7572. The attitude scale was determined to have a coefficient alpha of .8384. The coefficient alpha for the behavior scale was calculated at .7658 (Dinger et al., 1998).

The independent variable of the study was the subjects' participation in the health education class. The dependent variables were their health knowledge, health attitude, and health behaviors as measured by The Wellness Knowledge, Attitude, and Behavior Instrument. It is assumed that changes in subjects' health knowledge, health attitudes, and health behaviors were due to the influence of the Wellness course and not other variables such as history, maturation, or testing effects.

A descriptive analysis of the data was performed to establish a demographic profile of the students. The data were further analyzed using SPSS on the North Dakota Higher Education Computer Network (NDHECN) mainframe housed at North Dakota State University. Mean scores and ANOVAs were computed. Analysis of Variance (ANOVA), with repeated measures on one factor, was conducted to determine whether there will be statistically significant differences between the pretest and posttest wellness knowledge, attitude, and behavior scores. Three-way ANOVA was used to determine if there were differences between pretest and posttest wellness knowledge, attitude, and behavior scores of freshmen and upperclassmen and females and males. In cases where the subjects did not answer questions in the attitude and behavior sections of the questionnaire, a number three was substituted in the Likert scale for statistical analysis.
Interviews were conducted after the posttest to provide descriptive analysis for the statistical results.

Conclusions

The main findings of the study were as follows:

First, there was a significant increase in the wellness knowledge scores for physical activity, nutrition, and stress management from pretest to posttest. The 3-way ANOVA showed a significant difference between freshmen and upperclassmen nutrition and total wellness knowledge scores. The mean scores of the upperclassmen for nutrition and total wellness knowledge were higher than the mean scores of the freshmen at both the pretest and the posttest. Three-way ANOVA also indicated a significant difference between female and male wellness knowledge scores of stress management. Female mean scores for knowledge of stress management were higher than the male mean scores at the posttest. Block 2 female mean scores of stress management were higher than male mean scores both at the pretest and posttest.

Second, there was not a significant improvement in attitude related to physical activity, nutrition, and stress management from pretest to posttest. When comparing gender, however, 3-way ANOVAs did show a significant difference between female and male reported attitude scores related to nutrition and total wellness attitude. Because the attitude portion of the instrument was reported using a Likert scale with 1–5 ranging from strongly agree to strongly disagree, the lower the mean scores the more positive the attitude. For both attitude related to nutrition and attitude related to total wellness, female mean scores were lower at the pretest and the posttest. Therefore, it appears that the
females reported a more positive attitude related to physical activity, nutrition, and stress management than males both at the pretest and at the posttest.

Third, there was a significant increase in reported behavior related to physical activity and nutrition from pretest to posttest. Students actually reported a decrease in behavior related to stress management from pretest to posttest. The 3-way ANOVAs showed a significant difference between female and male mean scores of reported behavior related to physical activity and nutrition. The responses on the behavior portion of the WKABI were a Likert scale ranging from 1 = Always to 5 = Never. Lower scores on this scale indicated a more positive behavior related to the measured wellness issue.

Male mean scores for behavior related to physical activity were lower at both the pretest and the posttest than the females mean scores, indicating that the males reported more positive involvement with physical activity than the females. Female mean scores for reported behavior related to nutrition were lower at the pretest and the posttest than the male mean scores for reported behavior related to nutrition. Therefore, females are reporting more positive wellness behavior related to nutrition than males.

The overall results for this population showed a significant increase in wellness knowledge of physical activity, nutrition, and stress management and a significant increase in the reported wellness behavior related to physical activity and nutrition.

Discussion

In this section of the chapter the results of the study are discussed. First, the changes in wellness knowledge are examined. Secondly, the lack of changes in reported
wellness attitude is discussed. Lastly, the changes in reported wellness behavior are analyzed.

Given prior research findings, it may have been expected that the wellness knowledge of the experimental group would show an increase from the beginning of the Wellness course to the end of the Wellness course. The studies of Higgins et al. (1992), Carlson et al. (1994), Barnes (1996), and Pearman et al. (1997) all indicated increases in wellness knowledge. However, knowledge gains may be a false assumption and need to be better controlled and measured. For example, Higgins et al. stated that the knowledge gain in their study was modest and little learning may be occurring in some college health classes. Pearman et al.'s study must also be interpreted with caution. In this study, alumni were surveyed on select health-related topics where learning could have occurred through maturation and history.

It must also be noted that participation in the Wellness course may be only part of the reason the students in this study showed an increase in wellness knowledge. The students may have also been exposed to other health promotion efforts during the time they were taking the Wellness course. Other health promotion efforts could include activities or materials provided in the students' dorms, the health fair on campus, watching television or reading material promoting health issues, or attending other lectures promoting health on campus. Students' interest in wellness may have become aroused by taking the pretest, which stimulated them to participate in wellness activities outside of class. In addition, Barnes (1996) pointed out in his study that there is evidence
to show that test scores will increase without any treatment due to the effect of taking the same test on repeated occasions.

It was not surprising that the mean scores for wellness knowledge of upperclassmen were higher than the mean scores of freshmen. Maturation and exposure to additional wellness information/courses could explain the increased knowledge. That female mean scores of stress management knowledge were higher than the male mean scores is somewhat confusing based on recent information that indicates student stress is rising, especially among women (Reisberg, 2000). Reisberg reported that women were nearly twice as likely to report feeling overwhelmed than men were. Apparently, females' knowledge of stress management is higher than males, but they are not using that knowledge to help manage their own stress. No other research examined for this study analyzed the wellness knowledge differences between females and males.

Although it can be reported that the mean scores for wellness attitude did increase slightly, that they did not show a significant increase from pretest to posttest is disappointing. This is an area where research certainly does not produce conclusive results. Moode and Finkenberg (1994), Carlson et al. (1994), Barnes (1996), and Hatton (1996) all proved increases in health attitudes. These increases, however, were significant only in relation to selective health and physical activity topics or time frames within the research. In a study by Carlson et al., significant changes in only attitude related to stress and cardiovascular disease were demonstrated. The significant attitude changes for both the experimental and control groups occurred between pretest and post posttest in Barnes' study. Hatton's study reported very small changes in the mean
attitude scores between pretest and posttest for four of six domains. Only the Social Experience and Aesthetic Experience domains produced significant increases in attitude from pretest to posttest.

Both Barnes (1996) and Hatton (1996) suggested that one semester may be too short a period for the students' attitude to change dramatically. Carlson et al. (1994) sited research that demonstrates improvements in attitude and behavior require either specific intervention programs relating to individual topics or greater time commitments. Concordia’s Wellness course is only one-half of a semester (eight weeks) and only part of one or two class periods (20–40 minutes) are spent on each topic area. The attitude of the instructor may be considered a contributing factor as well. An instructor who is enthusiastic and models healthy attitudes and behaviors will have a more positive impact on individuals than one who does not.

The significant difference between female and male reported attitude scores related to nutrition and total wellness was anticipated. It appears that females generally have more of an interest in wellness issues such as physical appearance, health, and fitness. Moode and Finkenberg’s (1994) study reported higher attitude scores for women on the Attitude Toward Physical Activity Inventory domain “Health and Fitness.” Using the same inventory, Hatton’s (1996) research indicated higher attitude scores for women on the domain “Aesthetic Experience.”

The interview analysis of reported attitude changes seems to support the statistical findings since about an equal number of students believed their attitude had changed as those that did not feel their attitude changed much. It may be important to note, however,
that although the changes in reported attitude scores did not change significantly, the mean scores did show a slight increase in reported attitude related to all three topic areas evaluated in this study. This would suggest that the Wellness course was effective in changing wellness attitudes in a positive manner.

It can be argued that behavior change may be the ultimate positive outcome of any health education course. If this is the case, the Wellness course appears to be doing an effective job of changing self-reported students’ wellness behaviors. This study did show a significant increase in reported behavior related to physical activity and nutrition as a result of participating in a college wellness course. However, like a number of other studies evaluating behavior change (Barnes, 1996; Carlson et al., 1994; McClanahan, 1993; Pearman et al., 1997; Pinto et al., 1998; Welle & Kittleson, 1994), this study shows behavior change is not only inconclusive, but also very selective. In addition to the positive behavior change related to physical activity and nutrition, this study revealed a decrease in reported behavior related to stress management.

McClanahan’s (1993) research indicated that both the cognitive-based and activity-based approaches to wellness instruction produced favorable changes in behavior. However, the activity-based instructional approach (based on experiential learning theory and student involvement theory) more significantly influenced lifestyle behaviors. McClanahan’s discussion of the results indicated that although actual participation in the desired behaviors is an important part of behavior change, behavior change also has cognitive influences. McClanahan warns, “It is unreasonable to expect students enrolled in health or wellness classes to change behaviors just because they
understand that specific behaviors are harmful. Likewise, it is unreasonable to expect students enrolled in a physical fitness class to change health behaviors just because they exercise” (p. 44). She contends that wellness implies an integration of various aspects of life; therefore, wellness educators need to use an integrative approach to instruction of these courses. McClanahan also points out that the information obtained from her pretest-posttest design is useful, but implications for permanent lifestyle changes are not appropriate from such a short period of time.

Welle and Kittleson (1994) also discussed the issue of wellness behavior change. Like McClanahan, they stated that a balance between physical activity and health lecture seems to be most effective in increasing the overall wellness of participating students. They further explained that in order to achieve optimal wellness, a life-long attitude must be instilled. They contend that “perhaps the focus on the activity-based courses for one term is insufficient to provide such attitudes, whereas the health education courses tend to focus on such life-long preparation” (p. 12).

The interview analysis clearly supported the statistical results of reported behavior change. Throughout the entire sequence of questions, those students indicating any changes specifically pointed out their positive experiences with the personal fitness projects, personal fitness assessments, and the dietary analysis. They noted that these areas were the most valuable part of the class.

On the other hand, stress management was noted as one of the least valuable parts of the course. Some students commented that stress management was not covered in their section. In addition, both Block 2 and Block 3 end with examination periods in all
academic areas. Block 2 ends with semester finals before Christmas break. Block 3 ends with mid-semester finals prior to mid-semester break. These examination periods tend to be times of increased stress for students. Given this information, it is not surprising that this study indicated a significant increase in reported behavior related to physical activity and nutrition and a decrease in reported behavior related to stress management.

Additional support for wellness behavior change related to physical activity and nutrition could come from the knowledge that behavior modification is more likely if students have the opportunity to practice or participate in positive health behaviors. Concordia's Wellness course allows students the opportunity to participate in physical activity nearly every class period. Students are also required to complete a personal fitness project involving logging activity throughout the entire course. Another of the Wellness course assignments is recording food intake for three consecutive days and running a dietary analysis. It is believed that these specific activities (health behavior contracts) positively influenced wellness behavior, at least during the course (Welle & Kittleson, 1994).

In this study, males reported more positive behavior related to physical activity than females. Females reported more positive behavior related to nutrition. Additional insight to these specific health behaviors related to gender may come from studies by Mooe and Finkenberg (1994) and Hatton (1996). Although both studies measured attitude related to physical activity, their measures were subdivided into six domains of physical activity and the results were reported also by gender. Mooe and Finkenberg reported that men's attitude scores were significantly higher than women's in four of the
six domains of physical activity: Social Experience, Health and Fitness, Aesthetic Experience, and Ascetic Experience. Only Pursuit of Vertigo mean scores for men were lower than the mean scores for women. Hatton also reported significant gender differences in attitude related to physical activity. She found the men’s scores for Ascetic Experience to be higher than women’s scores.

That females reported more positive wellness behavior related to nutrition follows closely the more positive attitude related to nutrition reported by females. Moode and Finkenberg (1994) also reported a significant difference between pretest and posttest for women on the Health and Fitness domain with the posttest scores being higher. Females are generally more concerned about body image, diet, and weight loss. However, they are more apt to deal with these issues through dieting or adjustments in nutrition than through physical activity.

Another possible explanation for the combination of gender differences in behavior related to physical activity and nutrition involves the type of students recognized at Concordia. It has been observed that a greater percentage of female students seems to be highly goal oriented in relation to academics and often explain that they do not have time to be physically active. Males, on the other hand, seem to be a bit more socially oriented and are more likely to take time to participate in team sport activities with other males (basketball, touch football, Ultimate Frisbee, etc.). The Wellness classes also seem to provide more opportunity for team or group activity than personal fitness activities, which may be more appealing to males.
Recommendations

This study has added to the understanding of the effects of a college wellness course on wellness knowledge, attitude, and behavior. The results must be interpreted with caution as a very specific group of students who were taking a specific wellness course was evaluated over a very short period of time. The following recommendations are offered:

Recommendations for the Concordia College Wellness Course

First, the Wellness course should be a full semester course instead of the current one-half semester. This may improve the changes in wellness attitude and behavior.

Second, an additional course or seminar should be required of students during their senior year to follow up on the concepts presented in the first-year Wellness course. This may facilitate more permanent changes in attitude and behavior relating to health and wellness issues.

Third, within the current curriculum, more time and possibly a different approach should be given to stress management. This may mean providing additional inservice or workshop training to the instructors of the course.

Fourth, more individual fitness activities should be provided during the activity portions of the course. This may specifically improve female behavior relating to physical activity.

Fifth, perhaps males should be allowed to choose more competitive group activities during the activity portions of the course. This may specifically improve male attitude in relation to physical activity.
Sixth, attempts could be made to connect dorm floors or groups to sections of the Wellness course. This may encourage increased behavior relating to wellness issues.

Seventh, instructors should provide more rationale and prevention tactics for the topics covered versus the basic explanation of what the topic is (provide the why and the how versus only what). This seems to be more favorable teaching methodology with students. It is less likely to be information they have had in high school courses.

Eighth, instructors should provide more recent statistics relating to wellness issues. For example, provide Concordia College statistics for alcohol and drug abuse and sexual assault/sexual violence. This appears to be more relevant to the students.

Ninth, instructors should make the nutrition information applicable to college students. For example, use foods and food values that are presented through the dining service on campus, provide fast food information, and provide information on the current nutritional fads (i.e., antioxidants, legal lean body mass building agents).

Tenth, different teaching approaches should be implemented for alcohol use/abuse, sexual assault/sexual violence, and smoking. These were topics identified as least valuable.

Eleventh, the Concordia College Physical Education and Health Department should consider publishing their own Wellness text. This may help control the cost for students as well as help standardize the course for instructors.

Recommendations for Further Research

First, a longitudinal study which monitors the students' knowledge, attitudes, and behaviors as students advance from their freshman through their senior years would
provide further understanding of the impact of a college wellness course. Time will provide the students the opportunity to put into practice what the students have gained in knowledge from the Wellness course.

Second, more research should be done using the same instrument in order that more meaningful comparisons between studies can be made. Studies using the same instrument are also needed to develop norms for wellness knowledge, attitude, and behavior for a student population.

Third, additional studies need to examine the role of teachers and health education methodology in influencing knowledge, attitude, and behavior change. Studies need to determine which are the most effective ways for teachers to teach health-promoting behaviors and for students to learn health-promoting behaviors.

Fourth, further study of the relationship between wellness knowledge, attitude, and behavior is needed. Not only should future studies measure knowledge, attitude, and behavior, the important factors apart from wellness knowledge and attitude that effect wellness behavior need to be determined.
APPENDIX A

CONCORDIA COLLEGE WELLNESS SYLLABUS
Course Description: Discussion of the components of health-related fitness: cardiorespiratory endurance, muscular strength and endurance, flexibility and body composition, as well as nutrition, stress management and alcohol education. Students are exposed to a variety of lifetime activities that promote health and well-being. Required for graduation.

Goals:
1. To assess students in each of the components of Health-Related Fitness:
   - Cardiorespiratory Endurance
   - Muscular Strength & Endurance
   - Flexibility
   - Body Composition

2. To motivate students to adopt physically active lifestyles.

3. To expose students to a variety of enjoyable physical activities.

4. To reduce and prevent health problems related to diet, alcohol, sexually transmitted diseases (including HIV) and stress.

Components: PE 111 - Wellness combines the use of activity, instruction and evaluation to increase awareness and promote health-related fitness.

ACTIVITY
- Poker Run/Walk
- Rollerblading
- Wallyball
- Cobber Club Visit
- Circuit Training
- Ultimate Frisbee
- Aerobics and Water Aerobics
INSTRUCTION

- Why Cardiorespiratory Endurance?
- Why Muscular Strength & Endurance?
- Why Flexibility?
- Why Body Composition?
- Dietary Practices
- Alcohol Education - OCTAA
- STD's/HIV/AIDS
- Stress Management

EVALUATION

- Fitness Assessment Labs
- H-R Fitness Project
- Nutripro Dietary Analysis
- Tests/Quizzes
- Attendance/Participation

Academic Integrity: Honesty and integrity are important values in this learning community and are expected for this course. Violations of policy (e.g., cheating or plagiarism) will result minimally, in failure of the exam or assignment, and maximally in failure of the course and report to the Academic Dean.

Attendance: Attendance is expected. Failure to attend class (the second absence in a T/TH section or third absence in a MWF section) may result in lowering of your grade and/or an Academic Performance Referral. You are expected to notify your instructor concerning excused absences that you know in advance will occur.


Course Competencies: Upon completion of PE 111, students will be able to:
1. Define health, wellness and physical fitness.
2. Describe the five components of health-related fitness and their importance to overall well-being.
3. Assess one's current level of health related fitness using a variety of testing measures.
4. Develop a plan for improving one or more component's of health related fitness incorporating the principles of training, conditioning and safety.
5. Identify and participate in several modes of exercise that can be used for a lifetime.
6. Analyze one's current dietary intake utilizing a computer analysis and the food pyramid guidelines.
7. Distinguish between body weight and body composition and describe principles of safe weight loss.
8. Identify theories of stress and methods relaxation.
9. One week of the course is devoted to teaching a curriculum titled "On Campus Talking About Alcohol" (OCTAA). The assessment of OCTAA is done through one of the required quizzes. The information for which students are responsible is identified on the handout titled "Talking About Alcohol Study Guide/Resources". In addition, students complete an assignment with an interactive CD-ROM titled "Alcohol 101" (see handout). INTASC Standard #10 E.
10. Discuss the health related risks associated with unsafe sexual practices, specifically, STD, and HIV infection.
Assignments: While specific assignments and grading procedures may vary from instructor to instructor, each section of PE 111 will include the following:

1. A Health-Related Fitness Project.
The purpose of this project is to develop and implement a plan to improve one or more of the health related components of fitness.

2. A Nutritional Analysis.
The purpose of this project is to analyze one's current dietary intake and make recommendations that would promote compliance with the U.S. Dietary Recommendations.

3. Health-Related Fitness Labs.
Various lab assignments are designed to assess areas of health related fitness including: Cardiorespiratory Endurance, Flexibility, Muscular Strength and Endurance and Body Composition.

4. Quizzes and Exams.
The number of which is determined by the individual instructor.

Grading: Criteria for grading will be presented by each individual instructor.

Dress/Lockers/Towels: Instructors will let students know in advance when it is necessary to dress for activity. Lockers are available for students enrolled in PE activity and wellness classes. Students may obtain lockers by applying at the equipment room window. Lockers must be cleared and checked in at the equipment room window by 5:00 p.m. on the last day of class. Towels will be supplied for all students upon presentation of an ID card at the equipment room window.

Injury: It is the student's responsibility to immediately report to the instructor any injury incurred during the class.

Limiting Conditions: A student having a handicap, or condition which may limit participation in a course must notify the instructor during the first class period.

Dr. Larry Papenfuss Home page
Marion,

You may use my instrument for your research. Please share the results and data with me, I am in the process of attempting to establish norms for college students.

The article and its psychometric properties were published in Measurement in Physical Education and Exercise Science, 2(2), 69-83. Please let me know if you need me to send you a copy of the article.

Good luck with your research, I look forward to working with you in the future.

Mary Dinger

>Dr. Dinger,
>I am an instructor at Concordia College in Moorhead, MN and a doctoral student through the University of North Dakota in Grand Forks, ND. I have been communicating this summer with Dr. Jeremy Barnes about your Wellness Knowledge, Attitude, and Behavior Instrument. I will be assessing our Wellness course at Concordia for my dissertation project and am interested in using the instrument that you have established. I am willing to provide you with results from my research as well as any fee that would be required for use of your research tool.
>
>Please let me know if you have any questions or concerns regarding this request. I can also be reached at the following telephone numbers:
>  (218)299-4710 at Concordia
>  or (218)236-1524 at my home
>
>Thank you for your consideration.
>
>Marion Askegaard
>
>Marion Askegaard mailto:maskegaard@cord.edu
>Cobber Home Page: http://www.cord.edu/dept/sports
>PH 218-299-4164 FAX 218-299-4189
>Concordia College 901 S 8th St Moorhead Minnesota, 56562
APPENDIX C

WELLNESS KNOWLEDGE, ATTITUDE, AND BEHAVIOR INSTRUMENT
THE WELLNESS KNOWLEDGE, ATTITUDE, AND BEHAVIOR INSTRUMENT

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Mary K. Dinger
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Introduction - This questionnaire is designed to assess your knowledge, attitudes, and behaviors regarding important wellness components. Please answer each question honestly.
You will NOT be identified.

**DO NOT WRITE ON THE TEST.**
PLACE ALL RESPONSES ON THE ANSWER SHEET ONLY.

**THANK YOU FOR YOUR TIME AND COOPERATION**

1. How old are you?
   A. 18 years or younger
   B. 19 years
   C. 20 years
   D. 21 years
   E. 22 years or older

2. What is your gender?
   A. Female
   B. Male

3. What is your class standing?
   A. Freshman
   B. Sophomore
   C. Junior
   D. Senior
   E. Graduate or Other

4. How do you describe yourself?
   A. African-American
   B. Asian
   C. Caucasian
   D. Hispanic
   E. Other

5. Where do you live?
   A. Dormitory
   B. Fraternity or Sorority House
   C. Off-Campus Apartment/House
   D. Other
Part I - Read each statement or question carefully. Select the **BEST** response and fill in the corresponding circle on your answer sheet.

6. When lifting weights for general physical fitness it is best to:
   A. lift as much weight as possible.
   B. hold your breath during the lifting phase.
   C. emphasize the lifting phase rather than the lowering phase.
   D. move the joint through its entire range of motion.

7. An individual who desires to improve flexibility should:
   A. stretch to the point of pain and hold the stretch.
   B. use bouncing movements throughout the stretch.
   C. attempt to hold stretches for 10-30 seconds.
   D. quickly stretch to the point of pain and then relax.

8. Which of the following is an example of anaerobic activity?
   A. Jogging
   B. Tennis
   C. Lap Swimming
   D. Cross-country skiing

9. What is the recommended minimum number of days per week to exercise in order to improve or maintain cardiorespiratory fitness?
   A. 2
   B. 3
   C. 4
   D. 5

10. What advantage does dieting and moderate exercise have over dieting alone with regards to weight loss?
    A. Exercise causes fat to change into muscle.
    B. Exercise causes additional muscle fiber formation.
    C. Exercise is an easier method of weight loss.
    D. Exercise maintains muscle tissue.

11. Aerobic exercise conditioning has been shown to increase:
    A. high density lipoprotein cholesterol (HDL).
    B. low density lipoprotein cholesterol (LDL).
    C. very low density lipoprotein cholesterol (VLDL).
    D. none of the above types of cholesterol.

12. Wendy, a 20 year old female, wants to begin an exercise program. Calculate her target heart rate using 60% and 75% of maximum heart rate. What is Wendy's target heart rate?
    A. 110 - 140 beats/minute
    B. 120 - 150 beats/minute
    C. 132 - 165 beats/minute
    D. 140 - 160 beats/minute
13. Which of the following is the best advice for managing leg soreness which has resulted from exercising the previous day?
   A. Take a slow walk.
   B. Do not exercise for several days.
   C. Rub ointment on sore leg muscles.
   D. Take a hot shower.

14. How do you know if you are exercising at an intensity which is beneficial to your health?
   A. Your muscles are sore the next day.
   B. You feel tired following your exercise session.
   C. Your pulse is within your target heart rate zone during exercise.
   D. You are sweating and having difficulty breathing.

15. John wants to increase his muscular strength by lifting weights. His program should consist of:
   A. high repetitions and light weights.
   B. low repetitions and heavy weights.
   C. low repetitions and light weights.
   D. high repetitions and heavy weights.

16. The two arteries most suitable for taking a heart rate while exercising are the:
   A. jugular and carotid.
   B. carotid and radial.
   C. radial and jugular.
   D. coronary and radial.

17. How many calories are in a pound of human fat?
   A. 1500
   B. 2500
   C. 3500
   D. 4500

18. Which is the best weight loss method?
   A. Reduce fat calories and drink plenty of water
   B. Reduce fat calories and lift weights
   C. Reduce fat calories and increase protein calories
   D. Reduce fat calories and engage in aerobic exercise

19. A safe weight loss program would recommend losing no more than how many pounds per week?
   A. 1-2 lbs
   B. 3-4 lbs
   C. 5-6 lbs
   D. 7-8 lbs

20. Which of the following contains the most calories per gram?
   A. protein.
   B. carbohydrate.
   C. alcohol.
   D. fat.
Use the following label information to answer questions 21-23.

<table>
<thead>
<tr>
<th>GRANOLA BAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTRITION FACTS</td>
</tr>
<tr>
<td>Serving Size: 1 bar</td>
</tr>
<tr>
<td>Amount Per Serving</td>
</tr>
<tr>
<td>Calories</td>
</tr>
<tr>
<td>Calories from Fat</td>
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<tr>
<td>Dietary Fiber</td>
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<tr>
<td>Sugars</td>
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<tr>
<td>Protein</td>
</tr>
</tbody>
</table>

21. If you ate two granola bars, how much fat would you have eaten?
   A. 8 grams
   B. 12 grams
   C. 16 grams
   D. 18 grams

22. One granola bar contains how many calories of carbohydrate?
   A. 60 calories
   B. 90 calories
   C. 120 calories
   D. 150 calories

23. What percentage of the total calories in one granola bar is from fat?
   A. 36%
   B. 38%
   C. 40%
   D. 42%

24. Which of the following types of cholesterol is protective against heart disease?
   A. High density lipoprotein cholesterol (HDL)
   B. Low density lipoprotein cholesterol (LDL)
   C. Very low density lipoprotein cholesterol (VLDL)
   D. None of the above types of cholesterol protect against heart disease.
25. Which of the following does NOT help prevent osteoporosis?
   A. Consumption of calcium rich foods
   B. Consumption of foods high in vitamins A and D
   C. Increased protein intake
   D. Exercise

26. High saturated fat intake is associated with high ____________ intake.
   A. fiber.
   B. cholesterol.
   C. carbohydrate.
   D. vitamin.

27. If we consume fewer calories than we use:
   A. body water is used for energy.
   B. vitamins are used for energy.
   C. body fat is used for energy.
   D. body fat turns into muscle.

28. Which of the following behaviors is best for preventing heart disease?
   A. Eating more saturated fats than unsaturated fats.
   B. Eating more unsaturated fats than saturated fats.
   C. Eating more cholesterol than saturated fat.
   D. Eating more saturated fat than cholesterol.

29. The best examples of high fiber foods include:
   A. milk products of any kind.
   B. meat, poultry and fish.
   C. pastries, breads, and cookies.
   D. fruits and vegetables.

30. A physiological response to stress is:
   A. increased digestion.
   B. increased heart rate.
   C. decreased sugar in the bloodstream.
   D. decreased adrenaline.

31. Which of the following is a typical stressful situation?
   A. Getting married
   B. Having a baby
   C. Retirement
   D. All of the above are typical stressful situations

32. Which of the following represents a negative response to stress?
   A. Reliving a stressful situation in your mind
   B. Viewing problems as challenges
   C. Adopting a positive attitude
   D. Accepting personal failures

33. Which of the following is NOT a guideline for reducing stress?
   A. Have realistic expectations
   B. Be flexible and accept change
   C. Become more assertive
   D. Become more aggressive
34. Which of the following can be defined as "the body's non-specific response to any demand placed on it?"
   A. Stress
   B. Stressor
   C. Muscle tension
   D. Adrenaline release

35. Which of the following is NOT a benefit of stress management?
   A. Decreased muscular tension
   B. Increased levels of physical energy
   C. Decreased attention span
   D. Decreased resting heart rate

36. Worrying about things that are out of our control and letting anxiety interfere with our performance are examples of:
   A. neustress.
   B. distress.
   C. eustress.
   D. stress.

37. Which of the following is NOT a result of chronic stress?
   A. Decreased blood platelet formation
   B. Weakening of the immune system
   C. Increased blood pressure
   D. Increased risk for cardiovascular disease

38. Which of the following stress management techniques involves tightening muscle groups and releasing them upon command?
   A. Meditation
   B. Visual imagery
   C. Biofeedback
   D. Progressive relaxation
Part II - Read each statement carefully. Select the response that best describes the way you feel about the statement. Fill in the corresponding circle on your answer sheet, using the choices stated below:

A = Strongly Agree
B = Agree
C = Undecided
D = Disagree
E = Strongly Disagree

39. Exercise can help me control my weight.
40. Regular exercise can help me stay healthy.
41. I feel better about myself when I exercise.
42. Exercise can help me live longer.
43. I have more energy when I exercise on a regular basis.
44. I seldom think about my eating habits.
45. The information on a nutrition label is important.
46. As long as my weight remains constant, I do NOT need to worry about my diet.
47. It is important for me to keep up with the latest nutrition information.
48. I do NOT need to be concerned about my diet if I supplement it with vitamins.
49. When under pressure one should try to remain calm.
50. A person should make time to relax every day.
51. Exercise can help me reduce my stress level.
52. Relaxation exercises are a waste of time.
Part III - Read each statement carefully. Select the response that best describes your BEHAVIOR relative to the statement. Fill in the corresponding circle on your answer sheet, using the choices stated below:

- A = Always
- B = Most of the Time
- C = Some of the Time
- D = Not Very Often
- E = Never

53. I exercise aerobically for at least 20 minutes, three times per week.
54. I do some form of stretching exercises at least three times per week.
55. I engage in some sort of physical activity every weekend.
56. I engage in some sort of physical activity every day.
57. I engage in exercises to enhance my muscular strength and/or endurance (for example, weight lifting or calisthenics) at least two times per week.
58. I choose foods based on how they may affect my future health.
59. I choose foods based on how they taste.
60. I minimize my intake of fats.
61. I read the nutritional labels of the foods I eat.
62. I eat fast foods.
63. I eat vegetables.
64. I eat fruit.
65. I make time to relax daily.
66. I skip meals in order to complete my work or other responsibilities.
67. Whenever possible I try to do two things at once, such as eating and driving.
68. I cram for exams.
69. I procrastinate.
APPENDIX D

WELLNESS INSTRUCTOR DATA COLLECTION INSTRUCTIONS
Wellness Instructors - Blocks 2 & 3
Research Project: Knowledge, attitude, and behavior related to physical activity, nutrition, and stress management after completing a college Wellness course.

Data Collection Information

✓ Please read the following to your students:

You are being asked to complete a questionnaire for Marion Askegaard, a graduate student doing research for her doctoral dissertation at the University of North Dakota. The purpose of this research is to examine your current knowledge, attitude, and behavior relating to physical activity and wellness issues. There are minimal risks in filling out the questionnaire. Your participation is voluntary and you have the option to discontinue your participation at any time without penalty from the University of North Dakota or Concordia College.

This research will not only help Marion complete her dissertation, but will help assess our current Wellness course and indicate what prevention efforts and services need to be made available to students.

Your name will only be written on the consent form. Your consent form and questionnaire will be collected separately so that your name cannot be matched with any results. Only the primary researcher and Kay Schneider, Director of Assessment and Institutional Research at Concordia College, will have access to the results of the individual questionnaires. The questionnaires will be kept on file in the office of the Department Chair for 3 years following the completion of the study. The results as a whole will be presented to the Curriculum Review Committee, for curriculum revision purposes; to Student Affairs, for programming purposes; and be published in the researcher’s doctoral dissertation.

The questionnaire will take approximately 15 minutes to complete.

✓ PLEASE DO NOT INDICATE TO THE STUDENTS THAT THERE WILL ALSO BE A POST-TEST

✓ Hand out the Consent Forms and have the students read and sign them. Then collect them in the appropriate envelope.

✓ Hand out the Questionnaires, Computerized Answer Sheets and #2 pencils. Please emphasize the importance of filling out the computer forms accurately. Do not fill in their name or I.D. numbers on the computer answer sheets – only circle in #'s 1-69.

✓ Upon completion, have the students return the answer sheets and questionnaires to the appropriate envelope. Collect the pencils in the container provided.

Thank You For Your Help!
Wellness Instructors – Blocks 2 & 3

Research Project: Knowledge, attitude, and behavior related to physical activity, nutrition, and stress management after completing a college Wellness course.

Post-Test Data Collection Instructions

✔ Please indicate to your students that this is a follow-up questionnaire to the one presented at the beginning of the block. ONLY THOSE STUDENTS WHO COMPLETED THE PRE-TEST ARE TO COMPLETE THE POST-TEST!

✔ Remind your students of the purpose of the study: The purpose of this research is to examine your current knowledge, attitude, and behavior relating to physical activity and wellness issues. There are minimal risks in filling out the questionnaire. Your participation is voluntary and you have the option to discontinue your participation at any time without penalty from the University of North Dakota or Concordia College.

This research will not only help Marion complete her dissertation, but will help assess our current Wellness course and indicate what prevention efforts and services need to be made available to students.

The results as a whole will be presented to the Curriculum Review Committee, for curriculum revision purposes; to Student Affairs, for programming purposes; and be published in the researcher's doctoral dissertation.

✔ Hand out the Questionnaires, Computerized Answer Sheets and #2 pencils. Please re-emphasize the importance of filling out the computer forms accurately. Do not fill in their name or I.D. numbers on the computer answer sheets – only circle in #'s 1-69.

✔ Upon completion, have the students return the answer sheets and questionnaires to the appropriate envelope. Collect the pencils in the container provided.

✔ If a student chooses to withdraw from the study, please remove their consent form from your packet and let me know how many withdrew or how many did not complete the post-test due to dropping the course since the pre-test or an absence.

✔ For the instructors information only (not to be relayed to the students...): Ten students from Block 2 have been randomly selected (computer selected... through Computer services), to be interviewed after the completion of the post-tests. The list of students includes two from each of the Wellness instructors. I will be calling each of the students who have been chosen and arrange an interview time with them before the end of finals (Friday, December, 17th). Your responsibilities with this project end with the post-test. If you are teaching a Wellness course Block 3, I will be asking you to again participate in the pre- and post-test administration.

Thanks again for your time and help with this project! Marion
APPENDIX E

CONSENT FORMS
Knowledge, attitude, and behavior related to physical activity, nutrition and stress management after completing a college Wellness course.
Concordia College - Department of Health and Physical Education
Marion Askegaard

Consent Form

Please read the following information carefully. It contains an overview of the project, a description of the procedures involved, and a statement regarding what will be done with the information collected. Please ask any questions you may have about the study.

What is the study about?
The purpose of this research is to examine your current knowledge, attitude, and behavior relating to physical activity and wellness issues.

Who is conducting the study?
Marion Askegaard, a graduate student doing research for her doctoral dissertation at the University of North Dakota, is the researcher for this study.

What will I be asked to do?
You will be asked to fill out a questionnaire. This instrument includes questions about your knowledge, attitude and behaviors related to physical activity, nutrition, and stress management.

What are the risks?
There are minimal risks in filling out this questionnaire. This questionnaire is voluntary and you have the option to discontinue your participation at any time without penalty from the University of North Dakota or Concordia College. The questionnaire will take approximately 15 minutes to complete.

What are the benefits?
This research will help determine what areas of health and wellness should be included in our Wellness courses. It will also help determine the effectiveness of the current Wellness course and indicate what prevention efforts and services need to be made available to students.

What will be done with the results from my questionnaire?
Your name will only be written on the consent form. This will be removed from the results of your questionnaire so that your name will not be matched with any results. Only the primary researcher and Kay Schneider, Director of Assessment and Institutional Research at Concordia College, will have access to the results of the individual questionnaires. The questionnaires will be kept on file in the office of the Department Chair for 3 years following the completion of the study.
The results as a whole will be presented to the Curriculum Review Committee, for curriculum revision purposes; to Student Affairs, for programming purposes; and be published in the researcher’s doctoral dissertation.

What will be done with the consent form?
The consent forms will be kept in the office of the primary researcher for 3 years following the completion of the study.

If you have any questions about this study, please contact Marion Askegaard at 299-4710, Dr. Papenfuss at 299-4440, or Dr. Myrna Olson at 701-777-3188.

BY SIGNING BELOW, I INDICATE THAT ALL OF MY QUESTIONS HAVE BEEN ANSWERED AND I AM ENCOURAGED TO ASK ANY QUESTIONS THAT I MAY HAVE CONCERNING THIS STUDY IN THE FUTURE. I UNDERSTAND THAT I MAY REFUSE TO PARTICIPATE NOW, OR MAY WITHDRAW AT ANY TIME IN THE FUTURE WITHOUT PENALTY. I MAY RECEIVE A COPY OF THIS FORM IF I SO DESIRE. I FREELY AND WILLING GIVE MY CONSENT TO PARTICIPATE IN THIS STUDY.

NAME (Please print)__________________
SIGNATURE___________________________DATE____________
Knowledge, attitude, and behavior related to physical activity, nutrition and stress management after completing a college Wellness course.

Concordia College - Department of Health and Physical Education
Marion Askegaard

Consent Form

Please read the following information carefully. It contains an overview of the project, a description of the procedures involved, and a statement regarding what will be done with the information collected. Please ask any questions you may have about the study.

What is the study about?
The purpose of this research is to examine your current knowledge, attitude, and behavior relating to physical activity and wellness issues.

Who is conducting the study?
Marion Askegaard, a graduate student doing research for her doctoral dissertation at the University of North Dakota, is the researcher for this study.

What will I be asked to do?
You will be asked to answer a series of questions that will assess your knowledge, attitude and behaviors related to physical activity, nutrition, and stress management. In addition, you will be asked for permission to audio tape the interview. The interview will take approximately 15 minutes to complete.

What are the risks?
There are minimal risks in participating in this interview. This interview is voluntary and you have the option to discontinue your participation at any time without penalty from the University of North Dakota or Concordia College.

What are the benefits?
This research will help determine what areas of health and wellness should be included in our Wellness courses. It will also help determine the effectiveness of the current Wellness course and indicate what prevention efforts and services need to be made available to students.

What will be done with the results from my interview?
Your name will only be written on the consent form only. You will not be identified by name or number on the notes secured during your interview. Only the primary researcher and Kay Schneider, Director of Assessment and Institutional Research at Concordia College, will have access to the results of the individual results of the interview. The notes will be kept on file in the office of the Department Chair for 3 years following the completion of the study.

The results as a whole will be presented to the Curriculum Review Committee, for curriculum revision purposes; to Student Affairs, for programming purposes; and be published in the researcher's doctoral dissertation.

What will be done with the consent form?
The consent forms will be kept in the office of the primary researcher for 3 years following the completion of the study.

If you have any questions about this study, please contact Marion Askegaard at 299-4710, Dr. Papenfuss at 299-4440, or Dr. Myraa Olson at 701-777-3183.

BY SIGNING BELOW, I INDICATE THAT ALL OF MY QUESTIONS HAVE BEEN ANSWERED AND I AM ENCOURAGED TO ASK ANY QUESTIONS THAT I MAY HAVE CONCERNING THIS STUDY IN THE FUTURE. I UNDERSTAND THAT I MAY REFUSE TO PARTICIPATE NOW, OR MAY WITHDRAW AT ANY TIME IN THE FUTURE WITHOUT PENALTY. I MAY RECEIVE A COPY OF THIS FORM IF I SO DESIRE. I FREELY AND WILLING GIVE MY CONSENT TO PARTICIPATE IN THIS STUDY.

NAME (Please print)______________________

SIGNATURE___________________________ DATE______________
APPENDIX F

INTERVIEW QUESTIONS
Research Project: The impact of a college wellness course on wellness knowledge, attitude, and behavior

Interview Questions

1. Do you think you have gained knowledge in the areas of physical activity, nutrition and stress management having taken the Wellness course? If you have had a change in knowledge, briefly describe the event, activity, or behaviors that caused that change. (What specific class event, activity, or person was instrumental in facilitating that change?)

2. Do you think your attitude toward these areas has changed after completing the Wellness course? Please explain.

3. Have you changed any behaviors relating to physical activity, nutrition, or stress management since enrolling in the Wellness course? Please explain.

4. In your opinion, what was the most valuable aspect of the Wellness course? Why?

5. In your opinion, what was the least valuable aspect of the Wellness course? Why?

6. Do you think the Wellness course will benefit you in the future? Why or why not?

7. Is there anything else you would like to share with me about your experiences in the Wellness course?
APPENDIX G

CONCORDIA COLLEGE WELLNESS SELF-ASSESSMENT
PRE

PE 111 - WELLNESS SELF-ASSESSMENT

Year ___ Block ___ Instructor ___________________ ID Number ______________

The information gathered in this assessment is used for an evaluation of the effectiveness of this course. Student ID numbers are used only to compare pre and post results in aggregate form. Individual student data is confidential and will not be communicated.

PART A - KNOWLEDGE

1. Do you know your personal blood pressure? yes no
   If yes, what is it? ___/___

2. Do you know your total cholesterol level? yes no
   If yes, what is it? ____ mg/dl

3. Do you know what the recommended percentage of calories coming from fat is? yes no
   If yes, what is it? ___ % or less.

4. Do you know how much moderate physical activity is recommended in order to reduce risks for premature death? yes no
   If yes, what is it? ___ minutes, ___ or more days/week

5. Do you know how many drinks per day may be consumed and still be considered low risk for alcohol and impairment problems? yes no
   If yes, how many? ___ drinks

PART B - SELF REPORTED STATUS

For numbers 1 through 6, use the following scale to respond:

a. very poor    b. poor    c. average    d. above average    e. excellent

___ 1. How would you rate your current level of cardiorespiratory endurance?
___ 2. How would you rate your current level of flexibility?
___ 3. How would you rate your current level of strength?
___ 4. How would you rate your current body composition?
___ 5. How would you rate your motivation to be physically active?
___ 6. How would you rate your current dietary/nutritional habits?

(OVER)
7. Which best describes your current state of physical activity?
   a. I do not engage in physical activity and have no intention of taking action in the near future (PRECONTEMPLATION).
   b. I do not engage in physical activity regularly, but I have been thinking about starting (CONTEMPLATION).
   c. During the last month, I have started to become physically active on occasion (PREPARATION).
   d. I have been physically active 3 or more times a week for the last six months (ACTION).
   e. I have engaged in vigorous exercise 3-5 times per week for more than 12 months (MAINTENANCE).

8. Which best describes your current (last 30 days) smoking behavior?
   a. I don't smoke
   b. infrequent - a couple times in the last 30 days
   c. occasional - every week in the last 30 days
   d. frequent - most days in the last 30 days
   e. frequent - daily or almost daily in the last 30 days

9. Which best describes your current (last 30 days) drinking behavior?
   a. I don't drink
   b. infrequent with 4 drinks or less per occasion
   c. infrequent with sometimes more than 4 drinks per occasion
   d. frequent with 4 drinks or less per occasion
   e. frequent with sometimes more than 4 drinks per occasion

10. In the event that you or a friend were to experience an act of sexual violence, who would you be most likely to contact for help and support?

PART C - ATTITUDES

For questions numbered 11 - 22, use the following scale to respond:

a. strongly agree   b. agree   c. not sure   d. disagree   e. strongly disagree

11. Physical activity is fun.

12. There are very few physical activities that I enjoy.

13. Physical activity is less important than my studies.

14. Engaging in regular physical activity takes too much time.

15. I have more energy when I am physically active.

16. I sleep better when I am physically active.

17. I feel less stressed when I am physically active.

18. I feel better about myself when I am physically active.

19. I am comfortable with my weight and body composition.

20. I make a conscious effort to eat low fat and higher fiber foods.

21. Getting drunk once and a while does not affect one's health or studies.

22. Lifetime physical education and health classes should be required for graduation from Concordia.
POST

PE 111 - WELLNESS SELF-ASSESSMENT

Year ____ Block ____ Instructor _______________ ID Number _____________

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PART A - KNOWLEDGE

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   If yes, what is it? ____/____

2. Do you know your total cholesterol level? yes no
   If yes, what is it? ____mg/dl

3. Do you know what the recommended percentage of calories coming from fat is? yes no
   If yes, what is it? ____% or less.

4. Do you know how much moderate physical activity is recommended in order to reduce risks for premature death? yes no
   If yes, what is it? ____ minutes, ____ or more days/week

5. Do you know how many drinks per day may be consumed and still be considered low risk for alcohol and impairment problems? yes no
   If yes, how many? ____ drinks

PART B - SELF REPORTED STATUS

For numbers 1 through 6, use the following scale to respond:

a. very poor  b. poor  c. average  d. above average  e. excellent

____ 1. How would you rate your current level of cardiorespiratory endurance?
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____ 3. How would you rate your current level of strength?
____ 4. How would you rate your current body composition?
____ 5. How would you rate your motivation to be physically active?
____ 6. How would you rate your current dietary/nutritional habits?

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   c. During the last month, I have started to become physically active on occasion (PREPARATION).
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   e. I have engaged in vigorous exercise 3-5 times per week for more than 12 months (MAINTENANCE).

8. Which best describes your current (last 30 days) smoking behavior?
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   c. occasional - every week in the last 30 days
   d. frequent - most days in the last 30 days
   e. frequent - daily or almost daily in the last 30 days

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   a. I don't drink
   b. infrequent with 4 drinks or less per occasion
   c. infrequent with sometimes more than 4 drinks per occasion
   d. frequent with 4 drinks or less per occasion
   e. frequent with sometimes more than 4 drinks per occasion

10. In the event that you or a friend were to experience an act of sexual violence, who would you be most likely to contact for help and support?

---

PART C - ATTITUDES

For questions numbered 11 - 22, use the following scale to respond:

a. strongly agree   b. agree   c. not sure   d. disagree   e. strongly disagree

11. Physical activity is fun.
12. There are very few physical activities that I enjoy.
13. Physical activity is less important than my studies.
14. Engaging in regular physical activity takes too much time.
15. I have more energy when I am physically active.
16. I sleep better when I am physically active.
17. I feel less stressed when I am physically active.
18. I feel better about myself when I am physically active.
19. I am comfortable with my weight and body composition.
20. I make a conscious effort to eat low fat and higher fiber foods.
21. Getting drunk once and a while does not affect ones health or studies.
22. Lifetime physical education and health classes should be required for graduation from Concordia.
REFERENCES


Boynton, R. B. (1962). Historical development of college health services. Student Medicine, 10(7), 294-305.


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