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A Comparative Study Of Cardiovascular Risk Factors Between Black And White Adolescent Males

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A COMPARATIVE STUDY OF CARDIOVASCULAR RISK FACTORS BETWEEN BLACK AND WHITE ADOLESCENT MALES

By

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Abstract

The purpose of this descriptive study was to compare the existence of cardiovascular risk factors between black and white adolescent males within the 18 and 19 year age range. A total of 22 male subjects, 13 white and 9 black, completed a three-day diary of diet, exercise, and smoking activity entitled The Heart Health Profile. Subjects were also interviewed concerning family history of cardiovascular disease, and measurements of blood pressure, percentage of body fat, and body weight were obtained.

The researcher hypothesized that when black and white adolescent males were compared, there would be no significant difference relative to seven cardiovascular risk factors: smoking, blood pressure, dietary cholesterol intake, percentage of body fat, percentage of body weight above maximum allowable weight, aerobic exercise, and family history of cardiovascular disease. When the two groups were compared using the t-test, the only hypothesis which was significant at the .05 level was family history of cardiovascular disease. Thus, hypothesis VII was rejected. Since there was no significant difference at the .05 level between the two groups

relative to the other six risk factors, the researcher failed to reject hypotheses I through VI.

CHAPTER I

The Research Problem

Over 200 years ago the concept of cardiovascular disease was described to the Royal College of Physicians in London. However, it was only 70 years ago that Herrick introduced the term "myocardial infarction" as being the end result of the disease process (Borhani, 1983). During the ensuing years medical science has taken great strides in identifying the causes of cardiovascular disease and establishing recommendations for the prevention and control of the underlying pathology.

Cardiovascular disease is pandemic in today's modern civilized society. The following statistics from the American Heart Association (1984) validate the threat of this national health problem to the welfare and survival of millions of Americans: (1) myocardial infarction is the leading cause of death in the United States, leading to almost 559,000 deaths annually; (2) 42,750,000 Americans have one or more forms of heart or vascular disease; (3) over 1/5 of all persons killed by cardiovascular disease are under age 65; (4) approximately 1/3 of the men in the United States will have suffered from coronary artery disease by the age of 60; (5) an

estimated 64.4 billion dollars will be spent in 1984 for the care of clients with cardiovascular disease. The extent of cardiovascular disease is also reflected in the fact that open heart surgery for coronary artery bypass has become one of the largest businesses of our nation with over 600,000 operations being performed annually (American Heart Association, 1984).

Since the incidence of cardiovascular disease is significant in the researcher's family, these statistics are a major personal concern. In addition to the father's history of coronary artery disease, both maternal and paternal grandparents' deaths were due to cardiovascular disease. Several uncles are also currently receiving treatment for various forms of cardiovascular disease.

Another factor which stimulated the researcher's interest was past experience as head nurse in an intensive care unit. While employed in this setting, the researcher became even more acutely aware of the devastating effects of cardiovascular disease upon the family unit. The lack of education in the prevention of cardiovascular disease also became evident in that most clients who were admitted to the unit following a myocardial infarction were unaware of the detrimental effects of precipitating risk factors.

A third major concern of the researcher is the increasing evidence that cardiovascular disease begins in early childhood when

lifelong health habits are being established. In one of the earlier studies conducted to confirm the onset of atherosclerotic disease in children, Holman (1958) found that fatty streaks within the arteries appear by the third to fifth month of age and increase in number during the first 20 years. According to Strong (1976), fatty streaks are present in the aorta of virtually all children by the age of three. These streaks, which are irreversible, increase in size, number, and distribution, first becoming evident in the coronary arteries. Even though there is considerable debate as to the relationship of the fatty streak to more advanced lesions, the most commonly accepted hypothesis is that the fatty streak gradually progresses into the formation of fibrous plaques by the third decade of life (Strong, 1976).

Although the overt clinical manifestations of cardiovascular disease rarely occur prior to the adult years, early as well as advanced atherosclerotic disease has been found in the aortas and coronary arteries of children and young adults dying of unrelated disease and war injuries (Lauer, Conner, Leaverton, & Reiber, 1975). Various researchers, who have sought evidence to support the onset of cardiovascular disease during childhood, have also found an increase in the incidence of risk factors that precipitate the onset and progression of cardiovascular disease in school-age children

(Crow, Brown, Hubbard, & Copeland, 1982; Dennison, Golaszwewski, Klick, & Wolfgang, 1980; Lauer, et. at., 1975; Wolfgang & Dennison, 1982).

Krogseng (1979) describes atherosclerosis as a disease process which develops insidiously over many years, with the onset in early childhood. When the disease becomes evident in adulthood, through the clinical manifestations of angina pectoris, myocardial infarction, or stroke, the effects are often severe and catastrophic to the client and family. Thus, primary intervention directed toward controlling risk factors should be a major concern of all health care professionals involved in the delivery of health care to children.

The major risk factors which increase predisposition to atherosclerotic cardiovascular disease are smoking, hyperlipidemia, hypertension, obesity, lack of exercise, and stress (The American Heart Association, 1983; Borhani, 1983; Brunner, 1980; Crittenden, 1979; Dennison, 1980 Krogseng, 1979; & Strong, 1976). According to Borhani (1983), three of these risk factors--hyperlipidemia, hypertension, and smoking--have been the focus of most epidemiologic studies in that they have been found to be directly responsible for the development of atherosclerotic lesions. They also account for most of the variance in the incidence of cardiovascular disease. The other three risk factors--obesity, lack of exercise, and

stress--have not been clearly verified as direct causes of atherosclerosis. However, both indirectly contribute to the development of atherosclerotic cardiovascular disease by affecting cholesterol level and blood pressure (Crittenden, 1979).

Other factors which correlate with the incidence of atherosclerosis are age, sex, race, family history, and diabetes mellitus (Brunner, 1980; Crittenden, 1979; Krogseng, 1979). However, these factors, although important, are not as significant in epidemiological studies as the major risk factors in that they are considered unmodifiable. Diabetes mellitus is controllable, but the basic pathological cause of the disease cannot be modified.

Crittenden (1979) contends that if progress is to be made in controlling the rampant increase in cardiovascular disease in the United States, efforts must be directed toward prevention. Research in cardiovascular disease indicates that the ability to recognize cardiovascular disease risk factors and implement programs to modify the effects of risk factors increases the potential coronary victim's chances of avoiding a myocardial infarction or surviving with less damage to cardiac tissue (Krogseng, 1979).

According to McCance and Reiber (1982), prevention of cardiovascular disease should be a major priority of health care systems. Preventive programs should be directed toward avoiding the

onset of cardiovascular disease, as well as modifying predisposing risk factors. Prevention is crucial to the control of cardiovascular disease in that it minimizes the detrimental effects of risk factors which contribute to the onset and progression of pathological changes within the cardiovascular system.

Strong (1976) contends that prevention of cardiovascular disease should begin in youth since evidence indicates that the disease process begins during childhood. Too, health patterns are more readily established in the childhood years. Even though modification of lifestyle is possible during adulthood, compliance is much more difficult to maintain. Also, since the atherosclerotic process may already be well advanced, life-style modification of the adult is likely to be much less beneficial than a preventive program initiated during childhood.

Crittenden (1979) advocates the development of educational programs that will effectively modify behavior to allow youth to accept and adapt healthful living habits aimed at the prevention of cardiovascular disease. Every effort should be made to identify risk factors at an early age and modify or eliminate detrimental lifestyles. Children should be discouraged from beginning to smoke, and obesity should be discouraged through proper diet and exercise. Hypertension detection programs should be implemented early in life, observed at

routine intervals, and controlled when detected.

Early education in the prevention of cardiovascular disease through a diet low in cholesterol and saturated fats has also been recommended (American Heart Association, 1984; Crittenden, 1979; Strong, 1976). Maximum benefits of dietary instruction would be achieved by introducing the educational program in childhood with emphasis on those children with a family history of coronary heart disease (Crittenden, 1979).

The evidence supporting the early onset of cardiovascular disease and the value of implementing preventive programs during childhood has great significance to the scope of practice of the family nurse clinician (FNC). The nursing profession has always been challenged to influence the client toward more positive health behaviors (Krogseng, 1979). The scope of practice of the FNC facilitates the accomplishment of this goal due to the accessibility to the client, family, and community afforded through the clinical setting. The FNC also has access to those organizations through which large numbers of children can be reached, such as schools, churches, and community organizations. Thus, the FNC has a unique opportunity and responsibility for the development of preventive health care programs, including children as well as adults. This is a critical challenge in relation to the control of cardiovascular disease

in that early intervention has been shown to retard or minimize risk factors inherent in the disease process (McCance & Reiber, 1982).

Because of the rampant increase in the incidence of cardiovascular disease within the past decade, the researcher believes that the FNC must implement measures to control the progression of the disease. Due to the direct impact that the FNC has on the health status of the general public, the researcher feels that the FNC could contribute to the control of cardiovascular disease by: (1) implementing risk factor detection programs within the clinic, school, or community setting; implementing health education programs directed toward the prevention of cardiovascular disease; (3) implementing individual and group counseling sessions for the purpose of modifying or eliminating existing risk factors; and (4) facilitating health-maintenance through regular evaluation of clients who are at risk for developing cardiovascular disease.

Although research has confirmed the existence of cardiovascular risk factors in children from age 6 through 17, no studies have been conducted to establish the risk status of 18 and 19 year-old adolescents. Too, no studies have validated race or sex as risk factors in this age group. Thus, the purpose of this study was to examine the existence of cardiovascular disease risk factors in black and white male adolescents within the 18 and 19 year-old age group.

The study was seeking an answer to the following question: What is the difference in the extent of cardiovascular disease risk factors between black and white adolescent males?

CHAPTER II

Theoretical Basis of Study

As a primary health care provider, the family nurse clinician must assume a major role in the establishment of health care programs directed toward the prevention and early detection of cardiovascular disease. A vital aspect of her responsibility in this area is the assessment of risk factors among the target population. The data obtained through assessment yield valuable information concerning the type and extent of preventive health care needed by the population under study, thus forming the basis upon which to structure preventive health care guidelines.

The assessment of cardiovascular risk factors and subsequent development of a preventive health care program should be founded upon a nursing theory which would provide sound guidelines for nursing actions. In that preventive care embodies the early detection of risk factors with subsequent intervention directed toward increasing the client's knowledge of preventive self-care practices, Orem's self-care model establishes the most appropriate theoretical foundation upon which to build a preventive health care program.

Orem's self-care model views man as being responsible for

performing self-care measures to achieve and maintain wellness. She defines self-care as "the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well being" (Orem, 1980, p. 35). This is a vital component of preventive health care in that the client must maintain self-care practices that contribute to the prevention of cardiovascular disease. Once the FNC has assessed for and educated the client in the predisposing risk factors associated with cardiovascular disease, the client, alone, has the ability to modify his lifestyle to eliminate such factors.

According to Orem (1980) self-care activity is deliberate action. It is goal-directed, self-initiated, and self-directed, and is affected by the client's values and goals. This, too, is applicable to the prevention of cardiovascular disease. Even though the FNC collaborates with the client in establishing goals for his self-care, the client must accept the value of preventive health care practices in maintaining the integrity of cardiovascular function. Preventive health practices must be self-initiated and self-directed with the FNC serving as assessor, teacher, and counselor.

Orem identifies three types of self-care requisites: universal, developmental, and health-deviation (Riehl & Roy, 1980). The universal and health-deviation requisites are particularly applicable

to the prevention of cardiovascular disease. Universal self-care requisites are the "common needs of all human beings for the intake of air, water, and food; and for bringing about and maintaining living conditions that support life processes, the formation and maintenance of structural integrity, and promotion of functional integrity" (Orem, 1980, p. 37). This is the primary purpose of preventive health care; to assess the integrity of life processes and subsequently promote living conditions that promote and maintain structural and functional integrity.

According to Orem (1980) health-deviation self-care requisites occur as a result of deviations from normal structural and functional integrity which bring about actions directed toward prevention, regulation of further extension, and minimization of ultimate effects of such deviations. This exemplifies another responsibility of the FNC in the prevention and control of cardiovascular disease--the early detection of risk factors and subsequent mitigation of their effects. Prevention and early detection are vital to successful eradication of cardiovascular disease.

Orem (1980) views the goal of nursing as assisting the client to maintain, regain, or stabilize his state of health. She describes the relationship between the nurse and the client as a complementary one. By this she means that the nurse acts to assist the client to

assume responsibility for health-related self-care deficits by: (a) making up for these deficits through improving the client's self-care capabilities; and (b) supplying the conditions necessary for the client to withhold, for therapeutic reasons, his own self-care or to maintain or increase his level of self-care in or to maintain, protect, and promote his functioning as a human being.

This description of the goal of nursing and the relationship of the nurse to the client is particularly applicable to the goal and purpose of a preventive health care program designed for the prevention and early detection of cardiovascular risk factors. Here, too, the primary goal is to assist the client to maintain, regain, or stabilize his state of health relative to cardiovascular integrity. Accordingly, the primary function of the FNC is to assist the client to assume the responsibility for preventing the development of cardiovascular disease through: (1) preventing exposure to risk factors; (2) minimizing the effects of unavoidable risk factors such as heredity, and (3) increasing the client's level of self-care through education.

Orem's theory involves three systems of nursing activities which are designed to meet the client's self-care requirements according to the extent to which self-care is disrupted--the wholly compensatory system, the partly compensatory system, and the

supportive-education system (Riehl & Roy, 1980). The system that should be utilized by the FNC in the prevention of cardiovascular disease is the supportive-educative system. According to Thibodeau (1983), the supportive-educative system is utilized by the nurse when the individual is capable of performing, or learning to perform, those measures which are necessary to accomplish his self-care demands, but for which he needs assistance in the form of support, guidance, and teaching. This, again, describes the role of the FNC in assisting the client to assume the responsibility for implementing self-care practices which prevent or minimize his susceptibility to cardiovascular disease.

As has been shown, Orem's self-care model emphasizes the role of the client in assuming the responsibility for his health care. Inherent in this role is the maintenance of health and prevention of disease, both of which are vital aspects in the successful control of cardiovascular disease.

This study tested Orem's theory through the assessment of cardiovascular risk factors among adolescents. The data obtained was utilized to determine if a self-care deficit existed relative to the prevention of cardiovascular disease. The results of the study will be utilized to improve self-care potential through the supportive-educative system.

CHAPTER III

Hypotheses

Theoretical Null Hypotheses

1. When the mean incidence of smoking is assessed, there will be no significant difference between black and white adolescent males.

2. When the mean blood pressure is assessed, there will be no significant difference between black and white adolescent males.

3. When the mean daily cholesterol intake is assessed, there will be no significant difference between black and white adolescent males.

4. When the mean percentage of body fat is assessed, there will be no significant difference between black and white adolescent males.

5. When the mean percentage of body weight above maximum allowable weight is assessed, there will be no significant difference between black and white adolescent males.

6. When the mean incidences of aerobic exercise is assessed, there will be no significant difference between black and white adolescent males.

7. When the mean family history of cardiovascular disease is assessed, there will be no significant difference between black and white adolescent males.

Theoretical Definitions

1. assessed--as observed according to appropriate methods

2. mean incidences of smoking--the mean incidence as determined by the average number of cigarettes smoked daily.

3. mean blood pressure--the average of two readings taken over the left brachial artery with the client in a sitting position using a stethoscope and an aneroid sphygmometer.

4. mean cholesterol intake--the average daily consumption as determined by a 3-day diet analysis.

5. mean percentage of body fat--the average percentage as determined by the criteria established by the Army Weight Control Program (Department of the Army, 1983).

6. mean percentage of body weight--average of two readings taken on a beam-type balance scale with the subject clothed and shoeless.

7. maximum allowable weight--an arithmetic calculation for each subject using the criteria established by the United States Army (Department of the Army, 1983).

8. mean incidence of aerobic exercise--the average incidence

of physical activity which increases body oxygen requirements for a minimum duration of 15 minutes as determined from a 3-day exercise diary.

9. mean family history of cardiovascular disease--the average incidence of myocardial infarction, hypertension, stroke, rheumatic fever, or diabetes within the immediate family, including maternal and paternal grandparents, aunts, and uncles.

10. no significant difference--using the t-test at the .05 level of significance.

11. black and white adolescent males--students between the ages of 18 and 19 at a small university in West Central Alabama who are either of Caucasian or Negro origin.

Operational Hypotheses

1. When the mean incidence of smoking as determined from a 3-day diary of cigarettes smoked is calculated for black and white students, aged 18 and 19, and compared using the t-test, there will be no significant difference at the .05 level.

2. When the mean blood pressure is calculated from two readings over the left brachial artery of black and white male students, aged 18 and 19, and the results are compared using the t-test, there will be no significant difference at the .05 level.

3. When the mean daily cholesterol intake as determined from

a 3-day diet diary analysis is calculated for black and white male students, aged 18 and 19, and the results are compared using the t-test, there will be no significant difference at the .05 level.

4. When the mean percentage of body fat as determined by the criteria established in The Army Weight Control Program is calculated for black and white male students, aged 18 and 19, and the results are compared using the t-test, there will be no significant difference at the .05 level.

5. When the mean percentage of body weight above maximum allowable weight of black and white male students, aged 18 and 19, is determined using the criteria established in The Army Weight Control Program, and the results compared using the t-test, there will be no significant difference at the .05 level.

6. When the mean incidence of aerobic exercise as determined from a 3-day exercise diary is calculated for black and white male students, aged 18 and 19, and the results are compared using the t-test, there will be no significant difference at the .05 level.

7. When black and white male students, aged 18 and 19, are interviewed concerning family history of cardiovascular disease, and the mean incidence of disease is calculated and compared using the t-test, there will be no significant difference at the .05 level.

CHPATER IV

Review of the Literature

The following review of the literature clearly supports the need for early intervention in the control of atherosclerotic cardiovascular disease. Although the researcher found only two studies which validated the existence of cardiovascular risk factors in adolescents, two additional studies are summarized which document the evidence of risk factors in younger children. Much has been written validating the effects of risk factors on children in general. Thus, the researcher has structured the review of literature in the following manner: (1) a theoretical discussion of the value of identifying cardiovascular risk factors during childhood; (2) a discussion of the major risk factors with research validating the detrimental effects of each upon the cardiovascular system; and (3) a summary of research studies conducted for the purpose of detecting cardiovascular risk factors in children.

Value of Identifying Risk Factors

Atherosclerotic cardiovascular disease has generally been viewed as a problem of our aging population. However, as will be shown, investigations have revealed that atherosclerotic lesions

begin during the early years in life. According to Strong (1976), atherosclerosis has a long latent period. It begins early in life and progresses at a very slow, but variable rate depending upon the existence and intensity of risk factors which facilitate progression of the disease. Thus, the disease exists long before it becomes clinically evident.

Glueck (1978) described the progression of atherosclerotic heart disease through four specific stages: (1) the development of fatty arterial streaks; (2) formation of fibrous plaques within the arterial wall; (3) development of fibrotic and calcified arterial lesions; and (4) clinical atherosclerotic cardiovascular disease. According to Crittenden (1979) the initial onset of these stages very often begins in childhood.

McNamara (1971) compiled the autopsy results of 200 casualties during the Korean and Vietnam wars in order to determine the existence of coronary atherosclerosis in young adults. He found that 45% to 75% of the casualties, the mean age of which was 22 years, had advanced atherosclerotic disease. The data from this study suggested that half of young American men are already predisposed to atherosclerotic cardiovascular disease by the end of their second decade of life.

Strong (1976) advocates detection of risk factors at an early

age in order to prevent the development of atherosclerotic lesions. In describing the importance of early control of risk factors he states:

> The fallacy of "don't be concerned with cholesterol in the child" isolates the child and the disease from its natural history. To allow children to develop habits which, when they become adults must be altered is absurd. If excessive cholesterol is injurous to the adult, don't let the person get used to it as a child. This logic holds true for all risk factors. (p. 70)

Further support of early identification of risk factors is provided by Crittenden (1979) who points out that early modification of known risk factors may retard or reverse the development of atherosclerosis. He describes the vast treatment measures now being directed to adults with symptomatic disease as being after the fact. Thus, he recommends the initiation of preventive measures early in childhood when the disease is beginning.

Major Risk Factors

According to the American Heart Association (1977), smoking is the single most preventable risk factor in cardiovascular disease. This fact is supported by findings from a study conducted by the Department of Health, Education, and Welfare (1975). This study revealed that the effects of smoking on cardiovascular disease is

independent of other major risk factors and is greatly increased when other risk factors exist. Feinleib and Williams (1975) further found that mortality from cardiovascular disease is 1.6 times higher in cigarette smokers than among non-smokers. In that there has been a dramatic increase in the incidence of smoking among adolescents within the past decade, vigorous efforts should be initiated to educate youth in the effects of smoking on cardiovascular disease. If not, the incidence of cardiovascular disease in this segment of the population may continue to rise.

Hyperlipidemia has the highest single correlation with the risk of major coronary artery disease (American Heart Association, 1978). The serum cholesterol level has been shown to have a linear relationship to the risk of developing cardiovascular disease (Strong, 1976). That is, the higher the serum cholesterol, the greater the risk of cardiovascular disease.

The California Society of Pedatric Cardiology (1975) has established a serum cholesterol level of 190 to 200 mg. % as the upper limit of normal for adolescents. However, according to Glueck (1974), 10% to 20% of American children from 6 to 16 years have serum cholesterol levels above 200 mg. %. This dramatizes the need for early intervention to prevent the establishment of eating habits which predispose children to hyperlipidemia. Brunner (1980) states,

"A preventive approach to atherosclerotic heart disease should be started at birth with a lifelong plan to limit calories, saturated fat, cholesterol, and excessive carbohydrates" (p. 512).

The relationship of hypertension in childhood to the later development of atherosclerosis has not been clearly established. However, Brunner (1980) reports that over 24 million people in the United States have hypertensive cardiovascular disease. Prolonged elevation of blood pressure eventually damages the coronary arteries and decreases the pumping efficiency of the heart which leads to angina pectoris, coronary occlusion, and heart failure (Brunner, 1980). Thus, early detection of hypertension is vital to health. Crittenden (1979) recommends that routine blood pressure measurements begin by the third year of life and be repeated at each general physical examination thereafter.

In discussing sedentary living as a risk factor, Brunner (1980) states that there is a definite relationship between habitual lack of exercise and cardiac disease. She recommends physical exercise in the prevention of cardiovascular disease because it increases cardiac output and coronary blood flow. On the other hand, Crittenden (1979) contends that there is no clear proof of the value of regular exercise in preventing atherosclerosis. However, he does recommend exercise because of its beneficial effects in controlling obesity. Strong (1976)

also advises regular exercise because it tends to decrease resting blood pressure, reduces tension, and enhances a sense of well-being.

Although there is no clear documentation of the relationship of obesity to atherosclerotic cardiovascular disease, it is considered to be a major risk factor due to its effects on hyperlipidermia and hypertension. Brunner (1980) reports that the obese are more susceptible to cardiovascular disease due to an increased cardiac workload, increased blood pressure, altered lipid metabolism, and impaired glucose tolerance, all of which are associated with excess body weight.

Strong (1980) recommends intervention during early infancy in order to prevent obesity during adolescence. He states that the obese adolescent usually had larger and more fat cells than normal during infancy which contributed to obesity during later life. Thus, the establishment of proper eating habits at a very early age is crucial to later weight control.

The contribution of stress to the development of cardiovascular disease is supported by McCance and Reiber (1982) who identify the individual with a Type A personality as being highly susceptible to cardiovascular disease. The Type A personality is characterized by perfectionism, compulsiveness, tension, and the tendency to

perpetuate a hurried lifestyle, all of which lead to the development of poor dietary habits and smoking. Stress also results in stimulation of the sympathetic nervous system which, in turn, reduces coronary artery circulation (Brunner, 1980). The stress brought about by emotional crises may also precipitate acute events in individuals with preexisting atherosclerotic heart disease (Strong, 1976).

In discussing the management of risk factors in general, Monahan (1982) states that modification of behaviors which contribute to cardiovascular disease is essential. The client must comply with the therapeutic regimen established to modify risk factors and seek medical attention when signs and symptoms develop.

Krogseng (1979) reports that nationwide investigations called the Multiple Risk Factor Intervention Trials are currently being implemented in order to determine the effects of intervention in clients with multiple risk factors. Based upon preliminary findings, he recommends the initiation of client education and motivation efforts to reduce behaviors which contribute to increased risk. He contends that people can and will change health-defeating behaviors when properly influenced to do so.

Research Into the Existence of Cardiovascular Risk Factors in Children

The existence of cardiovascular risk factors in children has been validated through research. Lauer, et. al. (1975) conducted an

investigation of school-age children for the purpose of determining the distribution of serum cholesterol and triglycerides, blood pressure, and excess body weight. The sample consisted of 4,829 students between the ages of 6 and 18 years. The following data were collected from each student:

1. a dietary history
2. blood analysis for cholesterol and triglycerides
3. blood pressure
4. body weight and height
5. triceps skinfold thickness

The data were analyzed according to criteria which had been established for adults and from data gathered from other studies.

The striking finding from this study was the large number of children, particularly adolescents, who were already at high risk for the development of cardiovascular disease. The results of the serum cholesterol analysis revealed that 24% of the children studied had cholesterol levels above 200 mg./dl.; and 1% above 260 mg./dl. The serum triglyceride levels, although significant, were not as striking as the serum cholesterol levels in that only 15% were found to be above 140 mg./dl. or more.

The blood pressures of the children increased significantly with age. For example, no children between the ages of 6 and 9

years had blood pressures above 140 mmHg. systolic or above 90 mmHg. diastolic. However, in the age group from 14 to 18 years of age, 8.9% had systolic blood pressures above 140 mmHg. and 12.2% had diastolic blood pressures above 90 mmHg. Both systolic and diastolic pressures were at or above these levels in 4.4% of the children studied.

Obesity also increased through the school years. At ages 6 to 9 years, 20% had weights relative to those of the group as a whole greater than 110%, and 5% were greater than 130%. In the age group of 14 to 18 years, 25% had relative weights greater than 110%, and 8% were greater than 130%.

The researchers concluded that the foregoing data indicated that a considerable number of school-age children had risk factors which in adults are predictive of coronary heart disease. They recommended further research into the identification of children at risk not only for the benefits to the children themselves, but also to facilitate the discovery of other family members with known coronary risks.

Further evidence supporting the early development of cardiovascular risk factors was found by Gilliam, Katch, Thorland, and Weetman (1977). They studied active children between the ages of 7 and 12 years for the purpose of quantifying coronary heart disease

risk factors. The sample consisted of 47 boys and girls who underwent a comprehensive medical and physical evaluation in order to assess the risk factors of obesity, blood lipids, and exericse tolerance. A family medical history was also obtained in order to determine the unmodifiable risk of hereditary predisposition to coronary heart disease. Obesity was assessed using hydrostatic weighing, and blood lipids were determined through laboratory analysis of a blood sample for cholesterol and triglycerides. In addition, each child performed an increment type bicycle ergometer work capacity test in order to determine exercise capacity.

The results of this study substantiated the prevalence of coronary heart disease risk factors in children. Of the 47 children studied, 62% had at least one identifiable risk factor and a family history of coronary heart disease, 20% had three risk factors, and 10% had four risk factors. The data also validated the development of multiple risk factors at a very early age. Therefore, the authors suggested that further research be conducted in order to identify the existence of risk factors at other stages in development. They also recommended research into the use of diet modification and prescribed physical activity as one possible means of intervention during early childhood in the control of potential development of coronary heart disease risk factors.

The cardiovascular disease risk status of the adolescent population was studied by Wolfgang and Dennison (1982). The purpose of their study was to statistically analyze self-report behavior and biomedical risk factors in adolescents. The sample consisted of all students enrolled in a required health education program at Central High School in Lancaster, New York. The mean age of the sample was 17.3 years with 47.5% females and 52.5% males.

Self-report and biomedical data were collected and analyzed independently. Self-report variables included mean daily smoking frequency, percentage of daily intake as fat, percentage of dietary fat intake as saturated fat, and the amount of dietary cholesterol intake. The self-report data were obtained using a personal diary utilizing the bogus pipeline approach to encourage accurate and honest responses.

Biomedical variables included carbon monoxide levels, total serum cholesterol, high density lipoprotein cholesterol, and the ratio of total cholesterol to high density cholesterol. Due to the lack of research with adolescent subjects, a recommended level for each variable had to be derived from suggested criteria based on available adult data. The researchers restricted both self-reported and biomedical data to the behaviors of smoking, dietary intake, and

serum lipid levels since these risk factors yield most readily to modification.

The results of the self-reported data revealed that the mean of the sample was above the recommended level for smoking, percent of diet as fat, and percent of total diet as saturated fat. Of the total population studied, 32% smoked, 77% had excess dietary fat intake, and saturated fat was elevated in 91%.

The means of the sample for biomedical data were also above recommended levels on all factors. The percentages of the population above the recommended levels for the biomedical data were smaller in magnitude than the self-reported percentages. Carbon monoxide was elevated in 17% of the population, total cholesterol in 17%, high density lipoproteins in 32%, and total cholesterol to high density lipoproteins in 6%. However, the researchers advised that these percentages be viewed with caution since adult levels were used for analysis of results. They stated that if the recommended levels of total cholesterol had been lowered to the feasible level for adolescents, as recommended by the American Heart Association, the percentage of risk would have been elevated to 90%.

It was evident through both means and percentiles that the adolescents evaluated in this study were at an elevated risk for

developing cardiovascular disease. The researchers recommended smoking and nutrition education for adolescents since one of every three subjects in the study smoked and only one of every ten met the saturated fat intake criteria.

Additional investigation into potential predisposition of children to cardiovascular disease was undertaken by Crow, Brown, Hubbard, and Copeland (1972) who developed a health assessment battery for students in grades 1 through 6 in the Clovis Unified School District in California. The purpose of this study was to identify cardiovascular risk factors in these children and subsequently diminish such factors through the promotion of a more healthy lifestyle.

The battery included measurements in height, weight, blood pressure, flexibility, and skin-fold tests for body fat composition. Although more than 5,000 students were administered the tests within the battery, a random sample of only 100 males and 100 females at each grade level was utilized for statistical analysis.

At each grade level the means and standard deviations were calculated by sex for each variable. The most significant findings were as follows:

1. The means and variability after grade four indicated more children beginning to exceed 25% body fat. Correlations between

body fat and weight ranged from .32 in the first grade to .80 in the sixth grade.

2. The percentage of body fat was correlated positively with both systolic and diastolic blood pressures. The coefficient averaged .21 over the six grades for systolic and .22 for diastolic blood pressures.

3. The mean scores of all grade levels on the flexibility test ranged from 17.3 cm. to 21.5 cm. in comparison to the acceptable range of 25 cm. to 29 cm.

Based upon these findings the researchers recommended a longitudinal study to monitor students' growth patterns in order to identify students warranting follow-up study. The results were also utilized to validate increased emphasis upon cardiorespiratory fitness, nutrition, and physical fitness within the Clovis Unified School District. It was hoped that students would gain increased knowledge and awareness to aid in developing a more healthy lifestyle through exposure to this program.

Conclusion

As has been shown, the researcher found from the review of literature that atherosclerotic cardiovascular disease begins early in life and that the existence of risk factors further precipitates the progression of pathological changes within children. Thus, the

researcher believed that further investigation into the identification of risk factors in children was vital in order to provide validation of the need to implement prevention health care programs in the early years in schools throughout the United States.

The researcher also believed that this investigation would be valuable to further test Orem's theory of self-care. If the existence of risk factors is viewed as a self-care deficit, the results of this study could be utilized to validate the need for nursing intervention via the supportive-educative mode.

Although much of the literature confirmed the existence of cardiovascular risk factors in children, no studies were found comparing the extent of risk factors between the black and white adolescent populations. In that hypertension has been documented as a risk factor more prevalent among the Negro race (American Heart Association, 1983), and heart disease, in general, is more prevalent in males (American Heart Association, 1983; Brunner, 1980), the researcher believes that an investigation comparing the incidence of risk factors among black and white males was warranted. The information obtained could be utilized in determining those adolescents at greatest risk for developing cardiovascular disease.

CHAPTER V

Research Design and Methodology

Research Design

The research design employed in this study was descriptive. The major purpose of this type of research design is to provide an accurate description of a small number of variables across a large number of subjects (Waltz & Bausell, 1981). A careful analysis of the data collected through descriptive research may reveal relevant factors or relationships between the variables studied and the identified problem. Thus, by using an inductive process, descriptive generalizations may lead to tentative explanations concerning the relationships between phenomena (Polit & Hungler, 1983).

In this study, the researcher surveyed black and white adolescent males to determine the extent of cardiovascular risk factors among the two groups. The survey was comparative in that the researcher compared the two groups as to which was at greatest risk.

Variables

The dependent variables in the study were the cardiovascular

disease risk factors measured by the researcher: incidence of smoking; blood pressure; cholesterol intake; weight; body fat composition; aerobic exercise; and family history of cardiovascular disease. The independent variables were the age, sex, and race of the subjects. Intervening variables were:

1. The subjects' previous knowledge concerning cardiovascular risk factors and subsequent alteration in lifestyle to prevent cardiovascular disease;

2. The motivation of the subjects to complete the Heart-Health Diary and meet appointments for measurement of physical data at the specified time;

3. The honesty and accuracy of the subjects in completing the Heart-Health Diary; and

4. The personal value system of each subject relative to the importance of preventing cardiovascular disease.

Selection of Subjects

The researcher conducted the study among freshmen students enrolled at a small university in West Central Alabama. The primary service area of the university consisted of Sumter, Choctaw, and Marengo counties. The total enrollment was 1,577 at the time of the study; 180 were black males and 416 were white males. The average age of the students enrolled was 20.4 years.

Subjects were selected from male students enrolled in the physical education classes at the university. All 18 and 19 year old, black and white males were invited to voluntarily participate in the study. However, the study was limited to the first 25 black males and the first 25 white males who volunteered to participate.

Data Gathering Process

The Provost of the university was contacted to obtain permission to submit a proposal for the research study to the Human Relations Committee of the university, from whom written consent to conduct the study at the university was obtained (See Appendix A). After receiving written consent for the study (See Appendix B), the Chairperson of the Department of Physical Education and Recreation was contacted by telephone to explain the data gathering process and establish the time frame for obtaining volunteer subjects. A memorandum was circulated by the department chairperson to the physical education teachers notifying them that the researcher was coming into all classes to explain the purpose of the study and seek volunteer subjects.

At each class meeting, the researcher submitted a letter to all 18 and 19 year-old black and white males explaining the study (See Appendix C) as well as verbally explaining the requirements for

participation. The researcher then requested volunteers who were asked to sign a written consent form (See Appendix D). The volunteers were then instructed in how to complete the Heart-Health Diary (See Appendix E), and an appointment time was established for obtaining physical measurements. The subjects were asked to bring the completed diary with them when reporting for the measurement of physical data. Each subject was contacted by telephone following failure to keep the scheduled appointment.

Instrumentation

The tool utilized for data collection was adapted from a tool developed by Wolfgang and Dennison (1982) in a similar study of cardiovascular risk factors in adolescents. The tool, entitled The Heart-Health Profile, consisted of a three-day diary of diet, smoking incidents, and physical activity. The validity and reliability of the tool was established on middle-class adolescents in Western New York. The tool was assumed to have face validity and reliability within the confines of this study. The researcher also used a supplemental data sheet for recording actual body weight, body fat measurements, and results of the interview regarding family history of cardiovascular disease (See Appendix F).

Statistical Analysis

The t-test was used to analyze each hypothesis. The t-test was selected because the researcher was testing the means between two small groups.

Assumptions

1. Susceptibility to cardiovascular disease begins at an early age.

2. Adolescents will be willing to participate in the study.

3. The FNC will utilize the results of the study in structuring preventive health care programs for adolescents.

4. Decreasing the risk of cardiovascular disease is important to adolescents.

Limitations

1. Limiting the study to a small rural area in the South may prevent generalization to urban areas outside the South.

2. Limiting the study to 18 and 19 year-old adolescents may prevent generalization to all adolescents.

3. The small sample size may prevent generalization.

4. The study may not be generalized to adults or children below the age of adolescence.

CHAPTER VI

Analysis of Data

The purpose of this study was to compare the existence of cardiovascular risk factors between black and white male adolescents within the 18 and 19 year age range. Data were collected relative to 6 variables: smoking, blood pressure, dietary cholesterol, body weight, percentage of body fat, participation in aerobic exercise, and family history of cardiovascular disease. A three-day diary of smoking, exercise, and diet was utilized in collecting data relative to these variables. The data obtained from the interview concerning family history of cardiovascular disease, as well as values obtained from the assessment of blood pressure, percentage of body fat, and actual weight were recorded on a supplemental data sheet.

A total of 22 black and white males participated in the study, all of which ranged in age from 18 to 19 years. There were 13 males in the white group and 9 males in the black group.

Of the 9 black male subjects, 4 did not smoke. The average incidence of smoking of the remaining 5 black subjects ranged from 8 to 12. The highest incidence of aerobic exercise over the 3-day period was 4 and the lowest was 0, with four subjects indicating no

participation in any form of exercise. The incidence of family history of cardiovascular disease ranged from 0 to 5. The systolic blood pressures ranged from 110 to 152 and the diastolic from 70 to 96. The average dietary cholesterol for the three-day period ranged from 362 mg. to 910 mg. Percentage of body fat measurements ranged from 12.9 to 26.2. The maximum allowable weights were individualized for each subject with the lowest being 149 pounds and the highest being 194 pounds. The actual weights of the subjects ranged from 156 to 205 pounds.

Of the 13 white male subjects 10 did not smoke. The average incidence of smoking of the remaining 3 subjects ranged from 10 to 19. The highest incidence of aerobic exercise over the three-day period was 4 and the lowest was 0, with 8 subjects indicating no participation in any form of exercise. The lowest incidence of familial cardiovascular disease among the white subjects was 0, and the highest was 4. The systolic blood pressure ranged from 118 to 146 and the diastolic from 74 to 96. The average dietary cholesterol for the three-day period ranged from 331 mg. to 986 mg. Percentage of body fat measurements ranged from 19 to 35.3. The maximum allowable weights were also individualized for the white subjects with the minimum being 133 pounds and the maximum 204 pounds. The actual weights of the

subjects ranged from 126 to 285 pounds. The raw data for both groups can be found in Table 1.

Hypothesis I

The researcher hypothesized that when the mean incidence of smoking was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis, the raw data were subjected to the t-test to determine if there was a statistically significant difference at the .05 level. The t value was -.50 which was not significant ($p = .619$). A comparison of the groups by the t-test may be found in Table 2. Since there was no significant difference between the two groups, the researcher failed to reject hypothesis I.

Hypothesis II

The second hypothesis stated that when the mean blood pressure was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis a t-test analysis was performed. The t value of the systolic blood pressure was -.76 and the t value of the diastolic blood pressure was -.61. Since neither t value was significant at the .05 level, the researcher failed to reject hypothesis II. This comparison may be found in Table 3.

Table 1

Raw Data - Risk Factors

Subject	[a]SM	[b]AE	[c]FH	[d]BP	[e]DC	[f]% BF	[g]MAW	[h]ACW
B1	12	3	0	136/88	607	12.9	193	177
B2	10	3	5	142/96	765	19	172	170
B3	0	0	4	146/90	362	24	194	205
B4	8	0	2	126/84	665	22	186	194
B5	0	4	2	130/70	910	20	163	163
B6	0	0	5	128/84	421	26.2	189	205
B7	12	2	3	152/90	413	19	168	156
B8	0	3	5	110/74	824	24	149	157
B9	0	0	4	126/80	364	20	172	168
W1	0	3	1	130/80	986	23	175	182
W2	0	2	0	118/80	550	19	141	139
W3	0	0	0	118/84	432	19	133	132
W4	0	4	1	120/80	389	24	166	175
W5	14	0	0	130/92	635	19	172	170
W6	0	2	3	144/94	331	19	138	137
W7	10	0	1	130/90	609	30	166	190
W8	0	0	4	120/86	425	24	142	149
W9	0	0	1	122/88	804	24	204	215
W10	0	0	3	130/80	580	28.2	157	175
W11	19	2	2	128/74	360	19	127	126
W12	0	0	1	146/96	546	26.2	136	148
W13	0	0	3	144/86	470	35.3	231	285

[a]Mean incidence of Smoking over 3 days
[b]Total incidences of Aerobic Exercise over 3 days
[c]Total incidence of Familial CV Disease
[d]Mean Blood Pressure
[e]Mean Dietary Cholesterol over 3 days
[f]Percentage Body Fat
[g]Maximum Allowable Weight
[h]Actual Weight

Table 2

Comparison of the Incidences of Smoking Between Black and White Adolescent Males Using the *t*-Test

Group	N	$\bar{M}$	SD	*t*
Black	9	3.30	6.55	-.50
White	13	4.67	5.66	

Table 3

Comparison of the Systolic and Diastolic Blood Pressures Between Black and White Adolescent Males Using the *t*-Test

Variable	Group	N	$\bar{M}$	SD	*t*
Systolic	Black	9	132.89	12.65	-.76
	White	13	129.23	9.99	
Diastolic	Black	9	86.22	6.52	-.61
	White	13	84.46	6.74	

Hypothesis III

The researcher hypothesized that when the mean daily cholesterol intake was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis a *t*-test analysis was performed. The *t*-value was -.53 which was not significant

at the .05 level (p = .603). Therefore, the researcher failed to reject hypothesis III. A comparison of the groups by the t-test is presented in Table 4.

Table 4

Comparison of the Mean Daily Cholesterol Intake Between Black and White Adolescent Males Using the t-Test

Group	N	$\overline{M}$	SD	t
Black	9	592.33	211.13	-.53
White	13	547.46	185.31	

Hypothesis IV

The fourth hypothesis stated that when the mean percentage of body fat was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis, a t-test analysis was performed to determine if there was a statistically significant difference at the .05 level. The t-value was 1.51 which was not significant at the .05 level (p = .145). A comparison of the groups by the t-test may be found in Table 5. Since there was no significant difference at the .05 level, the researcher failed to reject hypothesis IV.

Table 5

Comparison of Percentage of Body Fat Between Black and White Adolescent Males Using the *t*-Test

Group	N	$\overline{M}$	SD	*t*
Black	9	20.78	3.83	1.51
White	13	23.77	5.02	

Hypothesis V

The fifth hypothesis stated that when the mean percentage of body weight above maximum allowable weight was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis, raw data were subjected to the *t*-test. The *t*-value was 1.57 which was not statistically significant at the .05 level ($p = .131$). Therefore, the researcher failed to reject hypothesis V. A comparison of the groups using the *t*-test is presented in Table 6.

Table 6

Comparison of the Percentage of Body Weight Above Maximum Allowable Weight Between Black and White Adolescent Males Using the t-Test

Group	N	$\overline{M}$	SD	*t*
Black	9	1.00	10.70	1.57
White	13	10.38	15.46	

Hypothesis VI

The researcher hypothesized that when the mean incidence of aerobic exercise was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis, data were subjected to the *t*-test. The *t*-value was -1.01 which was not statistically significant at the .05 level ($p = .323$). Thus, the researcher failed to reject hypothesis VI. A comparison of the groups using the *t*-test may be found in Table 7.

Table 7

Comparison of Incidences of Aerobic Exercise Between Black and White Adolescent Males Using the *t*-Test

Group	N	$\overline{M}$	SD	*t*
Black	9	1.67	1.66	-1.01
White	13	1.00	1.41	

Hypothesis VII

The seventh hypothesis stated that when the mean family history of cardiovascular disease was assessed, there would be no significant difference between black and white adolescent males. To test this hypothesis, the *t*-test was performed. The *t* value was -2.75 which was statistically significant at the .05 level ($p = .012$). Therefore, the researcher rejected hypothesis VII. A comparison of the groups

using the t-test is presented in Table 8.

Table 8

Comparison of the Family History of Cardiovascular Disease Between Black and White Adolescent Males Using the t-Test

Group	N	$\overline{M}$	SD	*t
Black	9	3.33	1.73	-2.75
White	13	1.54	1.33	

* $p < .05$

Additional Findings

To further examine the data, the researcher correlated the risk factors using the Pearson r statistical analysis. The following correlations were found to be statistically significant at the .05 level: (1) Smoking correlated negatively with body fat ($r = -.39$) and body weight ($r = -.36$); (2) Exercise correlated negatively with body fat ($r = -.44$) and body weight ($r = -.41$). These data are presented in Table 9.

The researcher also decided to determine the extent of cardiovascular risk of each group. To test this, the percentage of each group above or below the recommended level for each risk factor was determined. The recommended levels utilized in the study were as follows:

Table 9

Correlation of Cardiovascular Risk Factors

Factors	N	r	p
Smoking and Body Fat	22	-.39*	.03
Smoking and Body Weight	22	-.36*	.05
Exercise and Body Fat	22	-.44*	.02
Exercise and Body Weight	22	-.41*	.03

* p .05

1. Smoking - 0
2. Mean systolic blood pressure < 140 mm Hg.
3. Mean diastolic blood pressure < 90 mm Hg.
4. Mean dietary cholesterol < 300 mg. daily
5. Percentage of body fat < 20
6. Percentage of body weight above maximum allowable weight - 0
7. Mean incidence of aerobic exercise $\geq$ 1
8. Family history of cardiovascular disease - 0

When the incidence of smoking between the 2 groups was compared, it was found that 44.4% of the black subjects smoked whereas only 23.1% of the white subjects smoked. Of the total black subjects 33.3% were above the recommended level for systolic blood pressure and 44.4% were above the recommended level for diastolic

blood pressure. In comparison, only 23.1% of the white group was above the recommended level for systolic blood pressure and only 30.8% were above the recommended level for diastolic blood pressure.

When the mean daily cholesterol intake was compared to the recommended level, 100% of both groups were above the recommended level. In analyzing the percentage of body fat of both groups, 61.6% of the white subjects were above the recommended level compared to 44.4% of the black subjects. Of the total white subjects 61.6% had actual weights which exceeded the maximum allowable weight, whereas only 44.4% of the black subjects were above the maximum allowable weight.

When comparing the mean incidence of aerobic exercise, 61.5% of the white subjects and 44.4% of the black subjects were below the recommended level. In the white group, 77% had a family history of cardiovascular disease in comparison to 88.8% of the black group. The percentage of each group above or below the recommended level of each risk factor is presented in Table 10.

A major problem in this study was the difficulty in obtaining volunteers from 18 and 19 year old adolescents. A total of 90 potential subjects were invited to participate in the study. Of the 38 who volunteered to participate, only 22 followed through in completing the

Table 10

Comparison of the Percentage of Black and White Adolescent Males Above orBelow the Recommended Levels for Cardiovascular Risk Factors

Variable	N	$\overline{M}$	Recommended Level	% Above or Below
Smoking				
Black	9	4.67	0	44.4
White	13	3.31		23.1
Systolic B/P				
Black	9	132.89	< 140 mm Hg.	33.3
White	13	129.23		23.1
Diastolic B/P				
Black	9	86.22	< 90 mm Hg.	44.4
White	13	84.46		30.8
Dietary Cholesterol				
Black	9	592.33	< 300 mg/day	100
White	13	547.46		100
% Body Fat				
Black	9	20.77	< 20	44.4
White	13	23.77		61.6
% Body Weight Max. Allowable Weight				
Black	9	1.00	0	44.4
White	13	10.38		61.6
Aerobic Exercise				
Black	9	1.67	≥ 1	44.4
White	13	1.00		61.5
Family History of CV Disease				
Black	9	3.33	0	88.8
White	13	1.53		77.0

Heart-Health Diary and keeping appointments for the interview and physical measurements. The researcher was able to contact only 8 of the 16 subjects who did not follow through, 4 of which stated they had decided they did not have time to participate. New appointments were made for the other 4 subjects, all failing to follow through the second time. One subject who did follow through stated that most of the subjects who did not complete the study failed to do so because of the stress of upcoming final examinations at the university.

Another problem in obtaining volunteers for the study was that the obese adolescents refused to participate. One potential subject stated, "I already know I'm too fat." Another stated, "I know I eat too many sweets. I don't need you to tell me that."

Approximately 10 of the 22 subjects stated the Heart-Health Diary was too time consuming to complete appropriately. The researcher had to interview these subjects in order to complete and clarify the diary. The primary complaint was with the activity diary. Rather than recording all activities for the 24-hour period, only the aerobic exercises were recorded. Also, the amounts and methods of preparation for many of the foods included in the diet diary were omitted.

CHAPTER VII

Summary, Conclusions, Implications, and Recommendations

Summary

The purpose of this descriptive study was to compare the existence of cardiovascular risk factors between black and white adolescent males within the 18 and 19 year age range. A total of 22 male subjects, 13 white and 9 black, completed a three-day diary of diet, exercise, and smoking activity entitled The Heart Health Profile. Subjects were also interviewed concerning family history of cardiovascular disease, and measurements of blood pressure, percentage of body fat, and body weight were obtained.

The researcher hypothesized that when black and white adolescent males were compared, there would be no significant difference relative to seven cardiovascular risk factors: smoking, blood pressure, dietary cholesterol intake, percentage of body fat, percentage of body weight above maximum allowable weight, aerobic exercise, and family history of cardiovascular disease. When the two groups were compared using the *t*-test, the only hypothesis which was significant at the .05 level was family history of cardiovascular disease. Thus, hypothesis VII was rejected. Since there was no

significant difference at the .05 level between the two groups relative to the other six risk factors, the researcher failed to reject hypotheses I through VI.

Conclusions and Implications

Although this study failed to find a statistically significant difference in the majority of cardiovascular risk factors between black and white adolescent males, the results did confirm that black adolescents are at greater risk due to family history of cardiovascular disease. This is supported by Brunner (1984) and Crittenden (1979) who state that cardiovascular disease is more common in the black race, particularly among those with a positive family history.

The researcher believes that this has significance for the educational efforts of health care providers, particularly the Family Nurse Clinician (FNC). While the literature supports the need for educational programs directed toward the prevention of cardiovascular disease in general (Crittenden, 1979; Krogseng, 1979), the focus of such programs must be upon black adolescents since greater risk exists within this group due to inheritance.

Results of this study also suggest that both black and white male adolescents are at greater risk due to excessive dietary cholesterol. It was found that 100% of both groups were above the

recommended level of dietary cholesterol. Since total serum cholesterol has been consistently correlated, both retrospectively and prospectively, with cardiovascular disease (American Heart Association, 1980), the FNC must educate adolescents in the hazardous effects of excessive cholesterol consumption. Dietary plans which are individualized to the age, economic level, and food preferences of adolescents must also be developed in order to promote the establishment of healthy eating habits.

In evaluating the smoking habits of the adolescents in this study, the researcher found that the incidence of smoking was twice as great in the black group. Although the incidence of smoking relative to race has not been studied, smoking has been found to be directly related to the development of cardiovascular disease (Department of Health, Education, and Welfare, 1975). Previous studies also support the fact that those who quit smoking reduce the risk of developing cardiovascular disease to half that of those who continue to smoke (Gordon, Kannel, & McGee, 1974).

The research believes that this finding should also be considered in establishing priorities for health education among adolescents. Even though all age groups should be educated in the effects of smoking on health in general, black adolescents should be given

highest priority, particularly since this group was also shown to be at greater risk due to family history of cardiovascular disease.

Results of this study also support the fact that hypertension is more prevalent among the black race (American Heart Association, 1980; Brunner, 1984). Both systolic and diastolic readings were consistently higher in the black group. This validates the need for continued efforts directed toward the early detection and control of hypertension, particularly within the black race.

In evaluating the exercise habits of subjects in the study, the researcher found that even though the black subjects were deficient in aerobic exercise activities, the white group was at greater risk with 61.5% falling below the recommended level. This is a major source of concern since physical activity has been shown to have an inverse relationship to increased coronary mortality (Kannel, 1970). Studies have also suggested that physical activity may protect against cardiovascular disease and improve the likelihood of survival from a heart attack (Morris, et. al., 1953; Frank, et. al., 1966).

Another interesting finding relative to physical activity is that the incidence of aerobic exercise correlated negatively with body fat and overall body weight. Since this is consistent with the findings of Crittenden (1979) and Strong (1980), the researcher believes that

the FNC must work closely with adolescents, particularly those of the white race, in establishing a planned exercise program appropriate to age and physical status.

This study also suggests that white adolescents are at greater risk than black adolescents due to excessive body fat and overall weight. Although the research found no literature which correlated race and obesity in relation to cardiovascular disease, the literature did validate the relationship of obesity to increased cardiovascular risk. Kannel & Gordon (1974) found that obesity was directly associated with cardiovascular disease, particularly angina and sudden death, largely as a consequence of the influence on blood pressure, blood lipids, and the risk of precipitating the development of diabetes. According to the American Heart Association (1980), as obesity increases, the coronary risk profile increases. This trend is supported by Brunner (1984) who states that obesity contributes to an increased cardiac workload, increased blood pressure, altered lipid metabolism, and impaired glucose tolerance.

This finding provides further support to the need for education of adolescents, particularly those among the white race, in the benefits of establishing and maintaining diet and exercise habits which will prevent obesity. The researcher agrees with Strong (1980) who recommends intervention early in life in order to prevent the

establishment of diet and exercise habits which precipitate the development of obesity during the adolescent years.

The researcher also supports the American Heart Association (1984) and Strong (1980) who advocate the initiation of screening programs for detection of all cardiovascular risk factors at an early age. Highest priority should be given to those children, particularly of the black race, with a family history of cardiovascular disease. Once high risk children are identified, it would also be of interest to conduct a longitudinal study to determine if cardiovascular disease does ultimately occur, or if the risk status changes with time.

The problems encountered by the researcher in conducting this research have several implications for future related studies. First, the researcher experienced much difficulty in obtaining voluntary participation which resulted in a small sample. The researcher believes this was primarily due to two factors: (1) the subjects received no reward for voluntary participation and (2) data collection began one week prior to final examinations at the university.

Secondly, the researcher found that obese adolescents would not participate in the study. Therefore, if this is true of obese adolescents in general, less data will be available in the future to objectively assess the risk status of this segment of adolescents.

Recommendations

Research:

1. Replication of the study utilizing a larger sample size.

2. Replication of the study offering a reward for voluntary participation.

3. Replication of the study with a less time consuming diary.

4. Replication of the study at a less stressful time during the academic year.

5. Replication of the study comparing different age groups.

6. Replication of the study comparing males to females.

7. Conduction of a longitudinal study to determine if adolescents at risk develop cardiovascular disease.

8. Conduction of a longitudinal study to determine if the cardiovascular risk status of adolescents changes with time.

9. Conduction of an experimental study to determine if teaching relative to cardiovascular risk factors would result in a change in behavior and decreased risk of cardiovascular disease.

Nursing Practice:

1. Establishment of screening programs to detect cardiovascular risk factors among adolescents.

2. Education of all adolescents in risk factors that precipitate cardiovascular disease with priority to individuals with positive

family history, elevated blood pressure, smoking history, and increased dietary cholesterol within the black group; lack of exercise and obesity within the white group.

3. Collaboration by the FNC with adolescents in establishing a dietary regimen appropriate to age, economic status, and food preferences which prevents obesity and hyperlipidemia.

4. Collaboration by the FNC with adolescents to establish a planned exercise regimen appropriate to age and physical status.

APPENDICES

Appendix A

Letter to Provost

March 9, 1984

Nathaniel E. Reed, Provost
Station #25
Livingston University
Liningston, AL 35470

Dear Provost Reed:

In fulfillment of the requirements for a master's degree in nursing from the Mississippi University for Women, I am conducting a research study to compare the extent of cardiovascular risk factors among black and white adolescent males. The results of this study will provide a scientific basis for the development of an educational program in cardiovascular health designed for the adolescent population. The study will also provide insight into whether there is a need to concentrate educational efforts within the black or white race.

I would appreciate the opportunity of obtaining the subjects for the study from the students between the ages of 18 and 19 enrolled in the physical education classes at Livingston University. Data collection would begin April 4, 1984 and would be completed in approximately one week. The study would be conducted only among those students volunteering to participate, with no more than twenty-five in each of the two groups.

I would like to meet with you at your earliest convenience to discuss the details of the study. Thank you for your consideration of my request.

Sincerely,

Sylvia B. Homan, R.N., MSCE

cc: President Green
Dr. Snider
Dr. Hester

Appendix B

Agency's Memorandum of Agreement

Concerning Nursing Study

TITLE OF STUDY: A Comparative Study of Cardiovascular Disease Risk Factors Between Black and White Adolescent Males

NAME OF AGENCY: Livingston University

NAME OF INVESTIGATOR: Sylvia B. Homan, R.N., M.S.

STUDY DISCUSSED AND EXPLAINED TO:

(1) Provost Nathanial E. Reed

(2) Dr. Neil Snider, Chairperson
Human Resources Committee

(3) Dr. Hortense Hester, Chairperson
Division of Health, Physical Education, and Recreation

(4) Dr. James Pate, Dean
College of General Studies

AGENCY INVOLVEMENT IN STUDY: Consent for students enrolled in physical Education classes and The College of General Studies to participate in the study on a voluntary basis.

_____ _____

Date Signature of Agency Representative

_____ _____

Witness Investigator

Appendix C

Letter to Students

Dear Student:

As a graduate student in nursing at the Mississippi University for Women, I am conducting a research study to compare cardiovascular risk factors among black and white adolescent males. The purpose of the study is to determine the extent of cardiovascular risk factors in male adolescents and if the risk is greater in either the black or white race. This information will be beneficial to you in determining if you are "at risk" for developing cardiovascular disease.

Your participation in this study is entirely voluntary. You will be asked to complete a three-day diary of your diet, exercise, and smoking activity. In addition, you will be asked to consent to having the following measurements taken: height, weight, blood pressure, and percentage of body fat measurement. This information, as well as your diary, will be completely confidential. Your name will not appear on any of the materials.

The information obtained will be compiled and analyzed for a master's thesis. You will receive a heart-health profile which will summarize the results of your data, and I will conduct a counseling session advising you of how you can decrease your risk of developing cardiovascular disease. A summary of the findings of the study will also be available to you if desired.

Thank you for your cooperation in this effort to learn more about the extent of cardiovascular risk factors among adolescents.

Sincerely,

Sylvia B. Homan, R.N.

Appendix D

Subject Consent Form

A Comparative Study of Cardiovascular Risk Factors Among Black and White Adolescent Males.

Explanation of Research:

I am Sylvia Homan, a registered nurse and a graduate student at Mississippi University for Women. I am conducting a research study to compare the extent of cardiovascular risk factors among black and white adolescent males. As a participant in this study you will maintain a three-day diary of your diet, exercise, and smoking activity. In addition, you will consent to having the following measurements taken: height, weight, blood pressure and percentage of body fat. All information gathered will be anonymous and confidential. You have the right to withdraw from the study at any time.

I understand the explanation given to me.

Name_____ Date_____

Witness_____ Date_____

Appendix E

Heart Health Diary

WHAT IS THE HEART HEALTH DIARY?

This is a diary of your diet intake, physical activity, and smoking experiences. Each sheet represents one 24-hour period. The period begins at 8:00 a.m. and continues until 7:59 a.m., the next day. This does not mean you must wake up at 8:00 a.m., but keep the diary beginning at 8:00 a.m.

The diary must be kept accurately to be of value. Please complete all parts. There are no right or wrong answers. All information will be kept confidential. No one will know who you are or what you put on your diary.

HOW WILL THE INFORMATION BE KEPT CONFIDENTIAL?

Each individual will be assigned a number. The number will be used for compiling results. Do NOT put your name on any sheets. This information will not be available to anyone.

INSTRUCTION FOR THE DIET DIARY

The diet diary is a record of all foods you ate during the 24-hour period. The diary is divided into breakfast, lunch, dinner and snacks. The type and amount of every food you eat should be placed under the proper heading.

BE SPECIFIC IF THERE IS MORE THAN ONE TYPE

Reg./2%/Skim Milk; Rye/Wheat/White/Raisin Bread; Lean/Fatty Steak; Butter/Margarine; Diet/Regular Pepsi; Chicken Leg/Breast.

REMEMBER EVERYTHING

Sugar in coffee; Mustard on hotdog/ Low cal French dressing on salad; Margarine/Butter on sandwiches; etc.

USE BRAND NAMES

Pepsi; Snickers; Kraft Macaroni and Cheese; Oreos; etc.

LIST ALL PARTS OF COMBINED FOODS SEPARATELY

Salad (lettuce and tomato); Casseroles (noodles and tuna); Sandwiches (bread and peanut butter); Uncommon or unusual foods; Home recipes, etc.

LIST AMOUNTS

Cups; Teaspoons; Tablespoons; Ounces; Cans; Cartons; etc.

REMEMBER, there are no right or wrong answers on the profile.
BE SURE you put all your foods and amounts on the profile.
PLACE your NUMBER on each diary page.

THE ACTIVITY DIARY

The activity diary is a record of all activities participated in during the 24-hour period. The diary is divided into 15-minute blocks.

10 a.m.	10:00-10:14	10:15-10:29	10:30-10:44	10:45-10:49

You are to place a description of the one main activity for each 15-minute block of time, on the profile.

BE SPECIFIC IN LISTING ACTIVITIES:

Sitting: Sit-TV; Sit-Write; Sit-Electric type; Sit-Eat; etc.
Standing: Stand-Talk; Stand-Cook; Stand-Shower; etc.

BE ACCURATE IN DESCRIPTIONS:

Riding/Driving; Walk Slow/Walk Rapidly; Recreational Swim/Hard Swim; etc.

PLACE ONE DESCRIPTION IN EACH BOX

REMEMBER, there are no right or wrong answers on the profile.
BE SURE you put an accurate description in each box.
PLACE your PROFILE NUMBER on each diary page.

THE SMOKING INVENTORY

The smoking inventory is a record of the number of smoking experiences in a 24-hour period. One (1) experience is the smoking of any substance in any amount. If you smoke 1/2 of a cigarette, it counts as 1 experience. Smoking 1 marijuana cigarette counts as 1 experience.

If you did not smoke anything during the 24-hour period, circle the word NONE.

For each smoking experience, cross out one number on the smoking inventory.

REMEMBER, there are no right or wrong answers on the profile. BE SURE you are accurate.

DIET DIARY

BREAKFAST		LUNCH		DINNER		SNACKS	
FOOD	AMT	FOOD	AMT	FOOD	AMT	FOOD	AMT

SMOKING INVENTORY

NONE 1 2 3 4 5 6 7 8 9 10 11 12 13 14

15 16 17 18 19 20 21 22 23 24 25 26 27

28 29 30

PROFILE NUMBER

ACTIVITY DIARY

	:00 - :14	:15 - :29	:30 - :44	:45 - :59
5 A.M.				
6				
7				
8				
9				
10				
11				
12				
1 P.M.				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
1 A.M.				
2				
3				
4				

DATE | | | | PROFILE # | | | | | | | |

Appendix F

Supplemental Data Sheet

Profile Number: Age: Race:

Family history of heart disease:

a. hypertension_____
b. stroke _____
c. heart attack _____
d. rheumatic fever_____
e. diabetes _____

Wt._____

B/P_____

Skinfold measurements:

Tricips_____mm
Biceps_____mm
Subscapular_____mm
Supra-iliac_____mm
Total _____mm
% of body fat_____mm

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