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Knowledge, Attitudes, Behavior, and Decision-Making Orientation Relating to Cardiovascular Health in High School Students

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KNOWLEDGE, ATTITUDES, BEHAVIOR, AND DECISION-MAKING ORIENTATION RELATING TO CARDIOVASCULAR HEALTH IN HIGH SCHOOL STUDENTS

by

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KNOWLEDGE, ATTITUDES, BEHAVIOR, AND DECISION-MAKING ORIENTATION RELATING TO CARDIOVASCULAR HEALTH IN HIGH SCHOOL STUDENTS

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Western Michigan University, 1994

Planning for cardiovascular health (CVH) education for adolescents requires an awareness of students' cardiovascular knowledge and attitudes toward "heart healthy" behavior, and an understanding of the dynamics of health-related decision-making in this age group. This study attempted to measure these parameters using an 81-item survey administered to 93 9th graders (45 females, 46 males, 2 undisclosed) and 107 12th graders (57 females, 47 males, 3 undisclosed). The survey was administered in a suburban high school in southwest Michigan in the spring of 1994.

Results were evaluated descriptively for knowledge, attitudes, and behavior, and for differences across grade and gender. ANOVA's were applied to evaluate associations between knowledge, attitudes, and behavior, and between decision-making directedness and attitudes and behavior.

Major findings of the study were (a) females had more positive CVH attitudes than males, (b) positive family history did not affect knowledge or attitudes, (c) positive CVH attitudes were positively associated with self-directedness and frequency of aerobic exercise, and (d) students reported parent-directedness higher than peer-directedness.

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CHAPTER I

INTRODUCTION

In this country, someone dies from cardiovascular disease every 34 seconds, and more than one in four Americans suffers from some form of cardiovascular disease (CVD). Remarkably, heart and blood vessel diseases claim more lives than nearly all other causes of death combined, and are estimated to have cost $117.4 billion in medical care and lost productivity in 1993 (American Heart Association [AHA], 1992).

Not withstanding these facts, there have been advances in the prevention and treatment of cardiovascular disease over the last few decades. The CVD epidemic reached a peak in the 1960's and has been declining in the United States since then, the death rate decreasing by 26.7% from 1980 to 1990 (AHA, 1992). Insight into lifestyle factors contributing to CVD, public education regarding symptom recognition and early treatment, and advances in medical technology are believed to be responsible for improvements in these statistics.

Obviously, primary prevention of CVD is the most desirable strategy for dealing with these diseases in terms of human suffering and economic cost. Although CVD may not be entirely preventable in a susceptible individual, modification of certain risk factors is believed to lessen the likelihood of disease development. Because the development of lifestyle habits begins in childhood and adolescence, it is reasonable that

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the most effective time to begin prevention is during this time period. In order to plan for a preventive cardiovascular health education program, it is necessary to ascertain the knowledge and attitudes of adolescents towards selected lifestyle factors and to gain an understanding of how health-related decisions are made during this period of development.

Statement of the Problem

Planning for cardiovascular health education for adolescents requires an awareness of students' cardiovascular knowledge and attitudes toward "heart healthy" behavior, and an understanding of the dynamics of health-related decision-making in this age group.

Purpose of the Study

The purpose of the study was to identify adolescent knowledge, attitudes, and behaviors related to cardiovascular health. An integral part of the survey was the examination of adolescent decision-making orientation using a tool previously developed for adolescent AIDS-related decision-making. Information obtained in this study may serve as a theoretical basis for the planning of a program of cardiovascular health education at a high school in southwest Michigan.

Significance of the Study

Because coronary artery disease begins in childhood and health-related behaviors are developed during that time period, the thrust of primary prevention should ideally be targeted at young people. According

to Kolbe and Newman (1984), "...the greatest potential to reduce the current burden of heart, lung, and blood diseases rests in research about factors that influence the primary prevention of such conditions among large populations of children and youth" (p.16). Educational efforts in this direction should be supported by theory based on scientific data, as the following statements suggest:

1."Obtaining information about students' health knowledge, attitudes, and practices is important to serve as a basis for planning instruction which meets the needs of students" (U.S. Department of Health and Human Services & Centers for Disease Control, 1989, p. 130).

2. "Further research is necessary to specify the parameters necessary to allow...[health education programs] to be more potent forces in children's acquisition of wellness-promoting behavior" (Tinsley, 1992, p. 1059).

3. "Through understanding the process by which adolescents make health decisions, money and time may be more effectively spent in the design and implementation of programs that are not confined to a single dimension of information dissemination" (Langer & Warheit, 1992, p. 940).

Delimitations

The subjects in this study were limited to consenting high school freshmen and seniors enrolled in required classes in one suburban Michigan school district.

Limitations

In any survey, it is difficult to assure the honesty and thoughtfulness of answers. However, to minimize this limitation, students were informed of the purpose of the survey, assured of anonymity, and encouraged to answer as honestly as possible. The class teacher and questionnaire administrator did not circulate throughout the room during administration of the survey.

As participation was voluntary, selection could have been biased by a student's and/or parent's degree of interest in the questionnaire subject matter.

Conclusions from this survey can be applied only to the population surveyed.

Basic Assumptions

It was assumed that students would respond as honestly as possible to questions.

Hypotheses

The following hypotheses were tested:

1. There will be no knowledge differences between grades.

2. There will be no knowledge differences between genders.

3. Students whose parents have CVD or risk factors will be more knowledgeable and have more positive attitudes about CVD prevention.

4. Students whose parents have health occupations will be more knowledgeable and have more positive attitudes about CVD prevention.

5. Students whose parent(s) have high cholesterol will be more likely to have had their cholesterol checked.

6. Students with a family history of CVD will have a higher perceived vulnerability to CVD.

7. Students who smoke are more likely to have parents who smoke.

8. Smokers will be more peer-directed and less self-directed than non-smokers.

9. Students with more positive CVH attitudes will be more self-directed than other students and vice versa.

10. Students with more positive CVH attitudes will engage in more aerobic exercise.

11. Students with more positive CVH attitudes will be less likely to smoke.

12. Students with more positive CVH attitudes will choose more healthy alternatives in hypothetical situations.

13. There will be no gender differences in decision-making directedness.

14. Due to maturation, 12th graders will be more self-directed than 9th graders.

Definition of Terms

The following terms are defined to provide clarity to the text:

1. Body mass index (BMI): weight in kilograms/height in meters squared.

2. Cardiovascular disease (CVD): diseases affecting the heart and circulatory system, including heart attack, high blood pressure, stroke, and peripheral vascular disease.

3. Coronary heart disease (CHD): atherosclerotic disease of the coronary arteries, resulting in decreased flow of blood to one or more areas of the heart muscle.

4. Decision-making: choosing between alternative courses of action.

5. Lipoproteins: particles in the blood that contain triglycerides, phospholipids, cholesterol, and protein, and whose function is to transport lipids (fats) throughout the body (Guyton, 1992).

6. Overweight: for people aged 20 and older, defined as body mass index equal to or greater than 27.8 for men and 27.3 for women. For adolescents, overweight is defined as BMI equal to or greater than 23 for males aged 12-14, 24.3 for males aged 15-17, 25.8 for males aged 18-19, 23.4 for females aged 12-14, 24.8 for females aged 15-17, and 25.7 for females aged 18-19 (U.S. Department of Health and Human Services, 1990).

7. Obesity: being 20% or 30% or more over ideal body weight (AHA, 1992; National Institutes of Health Consensus Development Panel on the Health Implications of Obesity, 1985).

8. Premature CHD: the development of coronary heart disease prior to the age of 55 in a male, and 65 in a female.

9. Risk factors: lifestyle habits or biophysiological measurements which increase one's likelihood to develop certain diseases.

10. <u>Smokers:</u> parents who smoked or students who reported smoking 1 or more cigarettes within the last month.

CHAPTER II

LITERATURE REVIEW

Introduction

For this study, it was necessary to review the literature for information on the extent of the cardiovascular disease problem in this country, the presence of modifiable risk factors in the population, and the relative contribution of those risk factors to the problem of CVD. Because this study focused on high school students in particular, it was also necessary to determine what is known about the presence of risk factors in this age group, and what the role of the schools should be in cardiovascular health promotion.

Primary Risk Factors for Cardiovascular Disease

The primary risk factors for cardiovascular disease are cigarette smoking, elevated cholesterol or dyslipidemia, and hypertension.

Smoking

Cigarette smoking is the single most preventable cause of cardiovascular disease. Its influence on the development of CVD is dose-dependent and synergistic with hypertension, diabetes, dyslipidemia, and oral contraceptive use (AHA, 1992; Crittenden, 1979; Harrison & Winston,

1982). Premature coronary heart disease (CHD) occurs almost exclusively among heavy smokers (Harrison & Winston).

It is estimated that 75% of adult smokers started by the age of 18, and 90% by the age of 21, and that young people become smokers at the rate of 3000 per day (AHA, 1992). Investigators in the PDAY (Pathological Determinants of Atherosclerosis in Youth) study found that raised lesions observed on autopsy of young men (aged 15-34) were strongly associated with serum thiocyanate concentration, a marker for cigarette smoking (PDAY Research Group, 1990).

Dyslipidemia

Elevated blood cholesterol levels (dyslipidemia) is a "powerful and independent" risk factor for CHD (U.S. Department of Health and Human Services [DHHS], 1991, p. 9). Undesirable lipid profiles are more prevalent in populations where the incidence of CVD is high. Conversely, populations whose diets are low in saturated fat and cholesterol have a low incidence of CVD (Crittenden, 1979). Between the ages of 25 and 45 years, women tend to have lower total cholesterol levels than men. However, levels of atherogenic lipids (primarily low density lipoproteins, or LDL) tend to plateau as men reach the age of 45 years, while women's LDL levels tend to rise between the ages of 45 and 55 years (AHA, 1989).

In general, children with elevated cholesterol tend to have elevated cholesterol levels as adults (Lauer, Lee, & Clarke, 1988). Because many lifestyle habits form in childhood and because atherosclerosis can begin in childhood, it is important to be aware of the extent of hyperlipidemia in children and what factors influence the eating practices of children.

<u>Evidence of Early Lesions in Children</u>

The PDAY investigators (1990) found that the presence of early arteriosclerotic lesions in the aorta and right coronary artery correlated positively with elevated LDL and VLDL (very low density lipoprotein) levels, and negatively with HDL (high density lipoprotein) levels.

<u>Dietary Influences and Children</u>

The major nutritional factor affecting lipid levels of children and adults is the relative intake of saturated fat. Children ages 12 to 19 consume a diet in which approximately 35% of total calories are derived from fat. In all children (ages 1 to 19), the per cent of calories from saturated fat is estimated at 14%. Current dietary recommendations for children follow guidelines established for adults: (a) an average total fat intake of not more than 30% of total calories, (b) average saturated fat not more than 10% of calories, and (c) cholesterol intake not more than 300 mg per day (DHHS, 1991).

<u>Blood Levels in Childhood and Adolescence</u>

Total cholesterol at birth is approximately 70 mg/dL, half of which is HDL cholesterol. Levels rise to between 100-150/dL during the first few weeks of life, and average 160 -165mg/dL by the age of 2 years. During adolescence, total cholesterol tends to decline, due to lower HDL levels in boys, and lower LDL levels in girls. The mean total cholesterol among American children and adolescents is 160 mg/dL; the mean LDL cholesterol is about 100 mg/dL. Total cholesterol levels equal to or less

than 170 mg/dL or LDL equal to or less than 110 mg/dL are considered acceptable levels for children (DHHS, 1991).

Screening Guidelines

It is estimated that about 25% of the 60.1 million children in the U.S. between the ages of 2-18 have either a family history of premature CVD or have a parent with hypercholesterolemia (total cholesterol of 240 or greater), and therefore would require testing, according to the National Cholesterol Education Program (NCEP) guidelines. Screening of all children is not recommended at this time (DHHS, 1991).

Hypertension (HTN)

One's risk of CVD from hypertension, or high blood pressure, is related to the level of the blood pressure (either systolic or diastolic) and to the presence of other risk factors. High blood pressure in adults is defined as a blood pressure greater than 140 systolic and/or 90 diastolic. Individuals with "high normal" BP are at increased risk for developing HTN and CVD, and treatment of even mild hypertension lowers the risk of CVD. The optimal reading for cardiovascular risk reduction is a blood pressure less than 120/80 (Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure [JNC V], 1993). HTN is the most important risk factor for cerebrovascular disease.

Hypertension is related to body weight and, in some cases, to sodium intake. Elevated diastolic and systolic pressures correlate directly with relative body weight. Excessive salt intake in some individuals

predisposes them to the development of hypertension (Harrison & Winston, 1982).

Forty-six per cent of individuals with high blood pressure are undiagnosed, and approximately 89% of individuals with hypertension are either untreated or under-treated. The prevalence of HTN increases with age. Men have a greater risk of hypertension than women until age 55 years, however, after age 65 years, women are more likely to develop hypertension than men (AHA, 1992).

Hypertension in children is defined as an "average SBP [systolic blood pressure] or DBP [diastolic blood pressure] equal to or greater than the 95th percentile for age on at least three occasions" (JNC V 1993, p. 174). These values are generally lower than what is considered normal for adults.

The prevalence of HTN among children aged 6-17 years is approximately 2.8 million (AHA, 1992). Risk is highest among black and obese children and youngsters who have a hypertensive parent (Weidman, 1979). Children who have mild or periodic hypertension are more likely to have other risk factors for CVD (JNC V, 1993).

HTN in children is almost always asymptomatic (Weidman, 1979). Blood pressure should be measured annually in all well children over the age of 3 years (JNC V, 1993). This is especially important if a child has a family history of hypertension.

Contributing Risk Factors

Additional factors contribute to the risk of developing CVD. These include obesity, diabetes, sedentary lifestyle, family history, and

psychosocial factors including stress. It is also important to consider the relationship between gender and CVD, and how the risk of developing CVD can be affected by certain hormones, such as oral contraceptives and anabolic steroids.

Obesity

Obesity is a condition in which one has an excess of body fat. The National Institutes of Health Consensus Development Conference Statement on the health implications of obesity stated that:

> an increase in body weight of 20% or more above desirable body weight constitutes an established health hazard. Significant health risks at lower levels of obesity can present hazards, especially in the presence of diabetes, hypertension, heart disease, or their associated risk factors" (National Institutes of Health Consensus Development Panel on the Health Implications of Obesity, 1985, p. 1074).

Obesity is also defined in terms of Body Mass Index (BMI), which has been widely used in epidemiologic studies.

The prevalence of obesity in children was determined in four National Health and Nutrition Examination Surveys (NHANES) from 1963 to 1980 using triceps skinfold measurements, which correlated highly with per cent body fat. The criterion for obesity was set at triceps skinfold measurements equal to or greater than the 85th percentile of the children tested in the first two surveys. Having skinfold measurements greater than the 95th percentile was classified as "superobesity." Results revealed that approximately 27% of 6 to 11 year-olds were obese, and 11.7 per cent were superobese. Among 12 to 17 year-olds, 21.9% were found to be obese, and 9% superobese. These figures reflect a 39% and 54% increase in

obesity, and a 64% and 98% increase in superobesity among the 12-17 year-old and 6-11 year-old age groups, respectively, compared with children studied from 1966 to 1970 (Gortmaker, Dietz, Sobol, & Wehler, 1987).

It is believed that fat cell number is fixed by the time adulthood is reached. However, during childhood, fat cells increase in number, especially during periods of accelerated growth, meeting the need for a greater rate of fat storage (Guyton, 1992). The effect of growth on fat cell numbers is mediated during childhood by diet and exercise (Oscai, 1973).

Sedentary Lifestyle

In 1992, the AHA recognized inactivity as an independent risk factor for CHD (Fletcher et al., 1992). Inactivity is related to other risk factors, in that it is associated with impaired glucose tolerance and diabetes, obesity, and hypertension. Individuals who are not physically active tend to develop hypertension at a 30-50% greater rate than active individuals (AHA, 1992).

Aside from its effect on obesity, the importance of physical activity in childhood is linked to the premise that physically active children will continue to be physically active as adults. There is concern that increased television viewing by children and relaxed standards for physical education in the schools may have a negative impact on the development of a physically active lifestyle by young people (Raithel, 1988).

Family History/Genetic Influences

One's family history is usually considered significant for CHD if there is recognized CHD in a first degree relative 55 years of age or younger. Studies of various ethnic groups have suggested a genetic determinant to CHD. In addition, the risk factors of diabetes, dyslipidemia, and hypertension have a genetic component to their etiology. There is some evidence as well, that coronary arteries may have familial or ethnic histological and anatomic characteristics which predispose to CHD (Neufeld & Goldbourt, 1983).

Researchers have found that children whose parents have heart disease tend to have high levels of total and LDL cholesterol (Lee, Lauer, & Clarke, 1986). A small percentage of children (1 in 500) inherit a disorder in metabolism known as familial hypercholesterolemia, which accounts for about 4% of premature CHD (Goldstein, Schrott, Hazzard, Bierman, & Motulsky, 1973). About 11% of cases of premature CHD have a genetic disorder known as familial combined hyperlipidemia. However, elevated lipid levels in the majority of children is probably due to an interplay between several genes and the environment (DHHS, 1991).

Gender

Heart attack is the number 1 killer of both American men and women. In 1989, 51.7% of people in the United States dying from CHD were male, and 48.3% were female (AHA, 1992). Although men tend to develop heart disease earlier than women, once disease is evident in women, their morbidity and mortality tend to be higher (Wenger, 1992).

Diabetes

In the Framingham study, CVD was found to occur two times more frequently in diabetic men and three times more frequently in women with diabetes (Kannel & McGee, 1979).

Psychosocial Factors

Theoretically, the physiological response to short- or long-term stress results in higher risk for CVD through its effect on lipid levels, blood pressure, platelet adhesiveness, and ventricular ectopic threshold. Certain behavioral patterns, such as depression, social isolation, and hostility are also associated with increased incidence of CVD. In addition, stress seems to play a role in the development or management of significant risk factors for CVD, including hypertension, obesity, diabetes, smoking, and dyslipidemia (Eliot, 1987).

Use of Oral Contraceptives and Smoking

According to the American Heart Association (1992), "...women smokers who use oral contraceptives are up to 39 times more likely to have a heart attack and up to 22 times more likely to have a stroke than women who neither smoke nor use birth control pills" (p. 14).

Children and CVD Risk Factors

Evidence exists demonstrating the beginning of the atherogenic process in childhood, with the formation of fatty streaks, some of which go on to develop into fibrous plaque. In some individuals who are especially

susceptible to atherosclerosis, childhood marks a critical phase in the development of disease (McMillan, 1973). The following are conclusions from two studies conducted in New York City investigating the presence of risk factors in children. It should be emphasized that it is not clear what levels of the various risk factors constitute risk in the pediatric population.

An international health education program, the "Know Your Body" (KYB) Project, screened 3600 12-15 year-old children in New York City in 1978, and concluded that between 36% and 60% of U.S. children would have at least one risk factor by the age of 12. Risk was considered present if a child: (a) smoked any cigarettes during the past week; (b) had a cholesterol level equal to or greater than 180 mg/dl; (c) had a blood pressure in the top 5% for their sex and age...; (d) was equal to or greater than 120% of their ideal weight for height, sex, and age; or (e) scored "poor" on the modified Harvard Step Test of cardiovascular exercise tolerance (Williams, Carter, & Wynder, 1981, p. 247).

A more recent study, also conducted in New York City, found that 37% of subjects (ninth and tenth grade boys and girls, N = 249) had one or more risk factors, and 20% had two or more risk factors (Fardy et al., 1994).

Cardiovascular Health Education in the Schools

The Role of Schools in Health Education

In 1990, the United States Public Health Service released a comprehensive report formulating national health promotion and disease prevention objectives for the next decade and beyond. This report, Healthy People 2000, affirmed the effectiveness of health education in the

schools, and called for quality K-12 health education in at least 75% of the nation's schools (DHHS, 1990).

According to Kolbe and Neuman (1984), the role of school health education, to achieve "its greatest effect and most appropriate purpose" (p. 17), is to impact children and the community in the following ways: (a) reduce behavior risks; (b) increase understanding about disease; (c) improve decision-making competencies in the realm of health-related behavior; (d) promote healthful behavior by parental, peer, and media reinforcement; (e) provide the skills, such as the ability to recognize symptoms of disease, necessary to promote secondary prevention; (f) impact on the ability of students to promote health within their families, and as future parents; (g) foster the competence of students to improve the health of their community and environment. The authors added that schools are the most efficient and appropriate setting to educate and inform the population on health issues.

In a review of the multiple factors influencing children's health attitudes and behaviors, Tinsley (1992) proposed that, "The most successful of these [school-based health education] programs appear to emphasize skill change as well as knowledge change, focus on many aspects of children's environment..., utilize intervention provider training, and use multiple measures of outcome or change" (p. 1058).

Critique of Health Education Research

Dennison (1979) reviewed the literature for studies related to health education aimed at adults and youth conducted in the 1970's. Inclusion criteria were: (a) the presence of an intervention with a measurable

impact, (b) self-report and biomedical dependent variables, and (c) intervention aimed at two or more risk factors. He concluded that (a) improvements in knowledge, attitudes, and behaviors do not always coincide with improved biomedical measures; (b) "at risk" or "symptomatic" students may show greater gains in positive behavior change than other students; (c) multiple risk factor intervention is ideal, and a focus on targeted risk factors can have a positive impact on other risk factors as well; and (d) future research on risk factor intervention should ideally include both biomedical and self-report data. Harlan (1989) agreed that outcomes should be measured physiologically, and also recommended that interventions be more frequent and administered over longer periods of time rather than to limited age groups.

Iverson (1984) conducted a comprehensive analysis of school health research methods including study design and measurement issues. Because the present survey does not include an experimental component, the measurement issues are most relevant here. His comments about measurement included (a) few new instruments are tested for validity and reliability, (b) criterion-referenced tests are preferable to norm-referenced tests in the cognitive domain and are also suitable in the affective and behavioral domains, (c) data obtained from self-report questionnaires can be verified by the use of physiological and observational data, (d) methods exist to ensure responses to sensitive questions, and (e) the suitability of data to statistical analysis is improved when quantifiable scales and indices are used.

Another survey was conducted by Lamp, Price, and Desmond (1989), regarding instrument validity and reliability in three health education

journals from 1980 to 1987. The authors found that reliability scores were absent from at least 75% of studies, and validity was present in only one-half to two-thirds of the research articles. The article concluded with 10 psychometric guidelines, including (a) reliability and validity measures should be calculated for the sample to be tested, (b) internal reliability rigor is tied to the complexity of the construct that is measured, (c) readability of instruments must be tested, and (d) measurement of validity (i.e., content, criterion, and construct) depends on the intent of the study.

Specific Studies Relating to Cardiovascular Health Education

In recent years, researchers have investigated various facets of cardiovascular school health education. Areas under study have included (a) curricula development (Holcomb, Carbonari, Ingersoll, Luce, & Nelson, 1984; White, Weinberg, Spiker, & Roush, 1978); (b) risk factor intervention (Killen, Telch, Robinson, Maccoby, Taylor, & Farquhar, 1988), knowledge, attitudes, and behaviors (Adeyanju & Creswell, 1987; Burdine, Shen, Gottlieb, Peterson, & Vacalis, 1984; Fardy et al., 1994; Oaks, Warren, & Harsha, 1986; Oswald, Katz, & Krekeler, 1980; White & Albanese, 1981; White & Klinis-Tavantzis, 1992); and (c) biomedical measures of CV risk (Adenyanju & Creswell, 1987; Fardy et al., 1994). The following is a summary of the above studies.

Cardiovascular School Health Curriculum (CSHC)

The CSHC was developed by health professionals for secondary education (Holcomb et al., 1984). The curriculum, which consisted of a 3

week, multimedia program with self-instructional units, was evaluated in tenth grade health education classes in a central Texas community. Control groups received a 3 week traditional cardiovascular unit. Students in the experimental groups achieved a significantly higher score on cognitive testing, with retention apparent at 6 months. Attitude change regarding ability to control one's risk factors was higher in the experimental group, and was positively related to the degree of cognitive gain.

Cardiovascular Curriculum Education Program (CCEP)

Teachers in Texas secondary schools were asked about actual and desired time spent teaching about cardiovascular diseases and associated risk factors, how adequate their preparation was in these areas, and to what extent self-instructional units were used in health education classes (White, et al, 1978). Teachers replied that (a) the majority of time was spent on the cardiovascular system and its diseases, with less emphasis on risk factors; (b) lack of time, resources, and textbooks prohibited them from devoting more time to individual topics; (c) they were in favor of self-instructional units; and (d) they required a greater background in cardiovascular disease and risk factor information.

Cardiovascular Disease Risk Reduction Trial

Killen et al. (1988) conducted a risk factor intervention trial with 1447 tenth grade students from 4 senior high schools in northern California. Measures included (a) demographics; (b) a test of CV

knowledge; (c) self-reported behavior in the areas of physical activity, nutrition, and smoking; and (d) anthropometric/physiologic measurements (weight, height, BMI, skin folds, resting heart rate, and resting blood pressure). The study design included control schools in the same school districts. The treatment schools received 20 classroom sessions, 50 minutes in length on physical activity, nutrition, cigarette smoking, stress, and personal problem-solving. The purpose of the intervention was to improve knowledge and health-promoting skills, and consequently impact risk factors in a positive way. Results taken 2 months after the intervention revealed that CV risk factor knowledge increased 50%, self-reported physical activity of nonexercisers increased significantly, the quit rate for "experimental" (i.e., not smoking daily) smokers was greater than for those in the control group, resting heart rates were lower in the treatment group, and body fat was lower for girls in the treatment group. Blood pressure was unaffected. This study seems to demonstrate that a relatively intensive educational program including skill acquisition strategies can have positive effects on CVD knowledge and health-promoting practices at least in the short term.

Changes in CVD Knowledge From Childhood to Adulthood

White and Albanese (1981) surveyed students (ages 12-18) and adults (ages 20-60) regarding their cardiovascular health knowledge using the Iowa Cardiovascular Health Knowledge Test. They found that (a) cardiovascular health knowledge increased an average of 3% per year in the student population; (b) health knowledge correlated with extent of education achieved; (c) knowledge of diagnostic tests was highest and of

physiology lowest; (d) personal experience with heart disease or elevated lipid levels did not influence the degree of knowledge attained; (e) none of the population groups scored 90% or higher on the test, which was to evaluate minimum knowledge deemed acceptable; (f) respondents ranked the media as their primary source of cardiovascular health knowledge, followed by schooling, the AHA, friends and relatives, and physicians.

The Relationship Among Attitudes, Behaviors, and Biomedical Measures of "At Risk" Adolescents

Adeyanju and Creswell (1987) surveyed "at risk" students in 9th grade and again in 12th grade regarding cardiovascular health attitudes and behaviors. Risk was assigned depending on biomedical measures of blood pressure, obesity, and resting pulse rate. The authors found that (a) dietary consumption of red meat, fat, and salt increased over the time period; (b) alcohol consumption increased; (c) stress increased slightly, as evidenced by 72.9% of seniors expressing being very nervous and uptight; (d) smoking increased from 18.6% to 30.2%, with 82.6% of smokers indicating a desire to quit; and (e) health-promoting attitudes did not always coincide with behavior.

Knowledge and Health Practices with Respect to CVD Risk Factors

Ninth and 12th grade students were surveyed at a large midwestern high school (Oswald, et al., 1980). Results indicated that (a) 12th graders scored significantly higher than 9th graders, (b) there was no significant difference in knowledge between males and females, and (c) students with

a positive family history or a parent with a medically-oriented profession did not differ from others in risk factor knowledge scores.

Texas Youth Health Awareness Survey

The purpose of this study was to determine the level of knowledge of 7th and 8th graders regarding heart health and healthful eating, and the relationship between ethnicity, sex, father's occupation, knowledge, and television viewing to eating patterns. The authors found that (a) the majority of students did not identify smoking, eating salty foods, and obesity as risk factors for heart disease, and could not define arteriosclerosis and hypertension; (b) TV watching correlated positively with eating sweet and salty foods at home and snack foods at school; (c) knowledge about heart health correlated with healthful food consumption at home, but not at school; (d) Anglos were more likely to eat healthful foods at home and less likely than the other groups (Mexican-Americans and Blacks) to eat them at school (Burdine et al., 1984).

CV Health Knowledge of Children and School Personnel in Louisiana Public Schools

The individuals surveyed in this study included 4th, 6th, and 12th grade students and faculty and administrators from 36 schools in Louisiana. Results indicated that the level of knowledge among students, faculty, and administrators was low, and the school environment was not conducive to optimal cardiovascular health promotion (Oaks et al., 1986).

Dietary Risk Assessment for CVD

Using food records, a food practices instrument, cardiovascular knowledge instrument, and demographic data, the dietary risk for CVD of high school students in central Maine was evaluated (White, & Klimis-Tavantzis, 1992). Among the authors' findings were the conclusions that both males and females consumed a diet with 36% of calories supplied by fat, and respondents knew little about cardiovascular disease and heart-healthy food choices.

Gender Comparison of Risk Factors and Health Behavior

As mentioned earlier in this chapter, Fardy et al. (1994) assessed ninth and tenth grade girls ($\underline{n}$=178) and boys ($\underline{n}$=71) from multi-ethnic, New York City schools for the presence of risk factors, for health attitudes, and for dietary, physical activity, and smoking practices. Of the total group, 37% had one or more risk factors; 20% had two or more, with all risk factors except blood pressure being more prevalent in girls.

Health Education Theory

Models

Health education has been defined as "any combination of learning experiences designed to facilitate voluntary actions conducive to the health of individuals, groups, or communities" (Green, 1990, p. 589). Traditional health education models (i.e., the Health Belief Model, and the

PRECEDE Model) have emphasized the desired behavior as the outcome of the educational process. On the other hand, Kolbe, Iverson, Kreuter, Hochbaum, & Christensen (1981) proposed an alternative paradigm. They suggested that to fulfill the definition of health education, the learning process must consist of two phases. The first phase would involve the participant's decision whether or not to adopt the health-promoting behavior, and the second phase would promote, support, and elicit the desired behavior. In their paradigm, the dependent variable was the quality of the decision-making process rather than the occurrence of the behavior. When consideration is given to the developmental and psychosocial tasks of adolescents, it appears that the decision-making process should be a primary, if not the key competency of concern to health educators. "Thus, as children mature developmentally, we need to move away from training and indoctrinating them via health behavior paradigms, and move toward educating them via decision-making paradigms" (Kolbe et al., 1981, p. 30).

Developmental Considerations

The cognitive and psychosocial development of adolescents profoundly influences their response to health education.

Cognitive Development

According to Piaget (1968), children in early adolescence approach the final level of cognitive thought development, known as the level of formal operations, or the ability to think hypothetically. This level of

thinking makes it possible for the youngster to think abstractly, and hence to problem-solve and to anticipate the consequences of behaviors. The degree of cognitive development also affects the child's concept of personal control, so that at later developmental levels, young people recognize that their actions can influence the development of some diseases (Bibace & Walsh, 1980). Obviously, this concept is necessary in order for the young person to practice preventive medicine and health-promoting behaviors. Considering developmental theory, Curtis (1992), suggested that the presentation of health information to adolescents should focus on the immediate consequences of health behavior for early adolescents, and on future consequences of behavior for older adolescents.

Psychosocial Development

According to Erikson (1968), there are eight developmental stages, or tasks, which take one from birth through old age. The task of adolescent development is the establishment of identity. As the child moves through adolescence, his or her identity is shaped less by parental influence, and progressively more through interaction with peers. Thus, in order to relate to the psychological development of the adolescent, health education should foster autonomy and identity achievement. Examples of such strategies would involve the use of self-monitoring techniques and the encouragement of personal decision-making (Curtis, 1992).

According to Curtis, risk-taking behavior common in adolescence may actually be an attempt to fulfill the developmental tasks of autonomy and identity establishment. She stated that health-promoting behaviors

should ideally be presented in such a way as to serve the same psychosocial functions as the risk-taking behavior.

Socialization and Health Attitudes

In addition to internal biopsychological factors, socialization in the spheres of family, peer groups, school, and the media contribute to the dynamics which affect health attitudes during development. Tinsley (1992) considered such influences in a comprehensive review.

Family

Tinsley (1992) stated "...the family clearly constitutes an important social unit for the production of children's health-related attitudes and behavior, although just as clearly, the relations among these variables have yet to be adequately explored" (p. 1051). Among family influences are (a) parent health values (especially that of the mother), (b) child rearing practices including both authoritarianism and fostering of autonomy and responsibility, and (c) punishment and control, and their effects on self-esteem.

Peers

According to Tinsley (1992), although peer influences on "antisocial" child health behavior have been studied, no studies have been conducted on the effects of peer influences on normative (i.e., non risk-taking) health behavior in young people. She feels that more research

needs to be conducted to determine the relative contribution of peer vs. parent influence on health promoting behavior.

School

Although school-based health education has the potential to contribute positively to health attitudes and behavior, research shows that such programs may be less effective in changing attitudes and behavior than in increasing knowledge (Bartlett, 1981; Langer & Warheit, 1992).

The Media

There is concern that the media may make risky behaviors appear acceptable, and that television commercials may have a negative impact on food selection practices of children (Tinsley, 1992). In spite of these problem areas, television has the potential to affect child health attitudes in a positive way, especially if it is combined with adult reinforcement (Galst, 1980). In addition, it has become well-recognized that television viewing can indirectly affect health behavior by decreasing the time spent in physically active pursuits.

Decision-Making

Kolbe et al. (1981) postulated that the quality of decisions is affected by the following: (a) cognitive development, (b) moral development, (c) relevant knowledge, (d) affective skills relevant to the decision, (e) understanding of quality decision-making, and (f) opportunities to practice decision-making.

Decision-Making Models

Janis and Mann (1979) developed decision-making schema that consider the relative gain and loss a person may experience depending on whether he or she continues with the present course of action or chooses an alternative. This "decisional balance sheet" describes consequences of a decision in terms of perceived gains or losses and approval or disapproval by oneself and significant others. The five stages of decision-making in this model are (1) appraising the challenge, (2) surveying alternatives, (3) weighing alternatives, (4) deliberating about commitment, and (5) adhering despite negative feedback.

Langer and Warheit (1992) developed a decision-making model specifically designed for the adolescent faced with health-related decisions. In this model, they attempted to incorporate the special circumstances of adolescent psychosocial development into a decision-making model, the Pre-Adult Health Decision-making Model (PAHDM). The focus of this model is on "...how reference groups [i.e., peer, parent, or self] associated with decision-making direct and reinforce the attitudes, beliefs, and behaviors related to risk." (p. 933). Inputs in the decision-making process are knowledge and beliefs, and outputs are attitudes and behaviors. Biopsychosocial and environmental factors mediate inputs and outputs such that, "...past, present, and self-perceived future factors are considered by the PAHDM to intervene or mediate adolescent decision-making at the input stage (prior to any cue to action) and/or the decision-making stage" (p. 935).

Directedness and Decision-Making

Using a written questionnaire, Langer, Zimmerman, Warheit, and Duncan (1993) examined the relationship between the decision-making directedness (i.e., self-, peer-, or parent-orientation) of 10th grade students and AIDS-related knowledge, attitudes, beliefs, behaviors, and skills. They found the following:

1. Students who were more self-directed had higher mean scores (i.e., more positive) on HIV-risk attitude and behavior scales, and that peer-directed students scored lowest in these areas. They also found that parent-directed students tended to score higher, but in most cases not as high as self-directed students.

2. Boys were more peer-directed than girls, who were in turn more self-directed than boys.

3. Self-directed students were somewhat less likely to have experienced sex.

4. Directedness tended to have racial-ethnic grouping, with only one fifth of White students identifying themselves as self-directed, and approximately two-fifths of Hispanics and Blacks identified as self-directed.

When examining implications for health education, they postulated that:

> ...when adolescent maturation is viewed by health planners as a temporal and migratory process with individuals at different stages in their development and in the process of changing their orientation over time, developmentally specific, contextually relevant, and consequently more effective interventions can be developed for this group (p. 232).

It is apparent from the above literature review, that an appreciation for the developmental nature of decision-making skills and the promotion of those skills should be an integral and indispensable part of health education planning for adolescents.

CHAPTER III

METHODS AND PROCEDURES

Subject Selection

Subjects comprised 9th and 12th grade male and female students whose parents consented to participation in the survey. Seniors who were 18 years of age or older and consented were also included. Approximately half of the freshmen and senior students in the high school were given the opportunity to participate in the survey, as it was administered during one semester in health and government classes that were required for 9th and 12th grade levels, respectively. In this way, selection bias relating to student interest or aptitude was minimized. A total of 93 ninth graders and 107 twelfth graders participated.

In this school system, health education is a required class for freshmen or transfer students. Because this questionnaire was administered at the end of the school year, both the freshmen and senior students had been exposed to health education, including cardiovascular health components.

Informed Consent

Informed consent was obtained from all students and all parents of participating minor students. Parents and students were notified of the

nature of the questionnaire, including its anonymity and confidentiality, and the voluntary nature of participation.

Guidelines of the institutions involved (Western Michigan University and Portage Public Schools) were followed. Appendix A contains the letter of approval of the Human Subjects Institutional Review Board. Appendix B contains the consent/assent form. Appendix C contains the letter of approval from the school.

Collection of Data

Instrument Development

The intent of this study was to obtain a comprehensive overview of a student population's CVH-related knowledge, attitudes, and behavior, and a measure of their decision-making directedness using a written survey.

The 81-item survey included the following demographics: age, gender, and ethnic background. Family history for CVD, parents' educational level, smoking practices of parents, and whether parents' occupations were health-related were also included. Other areas included (a) CVD knowledge in the areas of risk factors and the pathophysiology of CVD; (b) self-reported behavior relating to activity level, dietary practices, and smoking; (c) attitudes about the various risk factors, susceptibility to CVD, and self-responsibility for health promotion; (d) responses to hypothetical decision-making scenarios; and (e) decision-making directedness. The majority of questions regarding decision-making directedness were obtained with permission from an instrument

developed by Langer, et al. (1993). The majority of the self-report activity, nutrition, and smoking questions were obtained from the National Adolescent Student Health Survey (U.S, Department of Health and Human Services & Centers for Disease Control, 1989).

The following scales were developed using sets of questionnaire items:

1. The Cardiovascular Health Attitude Scale (CVHA Scale) comprised items 55-57, 59-60, and 63-65. This scale attempted to measure attitudes regarding risk factors, perceived susceptibility to disease, and personal health responsibility. Cronbach's alpha for this scale was .63.

2. The Hypothetical Decision-Making Scale (HSDMS) was formulated from responses to the decision-making scenarios, judging whether decisions were based on health considerations. Cronbach's alpha for this scale was .79.

3. The Peer-Directedness Scale (PEERD) comprised items 66-73, which included responses from the decision-making scenarios and three items identifying degree of peer influence. Cronbach's alpha for this scale was .72. This scale differed from that of Langer et al. by including data from the decision-making scenarios. (An abbreviated peer-directedness scale using only Langer et al.'s items 72-73 was used to compare peer-directedness with parent-directedness, item 74.)

3. The Self-Directedness Scale (SD) items (75-81) dealt with how well students felt they considered the personal consequences of a course of action before acting. The Self-Directedness Scale differed from the scale devised by Langer et al. by the additional item, "I act first and think about my actions afterwards." Cronbach's alpha for this scale was .79.

All scale scores were devised by standardizing any dissimilar items, averaging all standardized scores, and fitting scale scores between 0 (low) and 10 (high) for minimum and maximum observed scores.

The questionnaire was reviewed by a cardiologist, registered dietitian, hospital cardiovascular outreach coordinator (registered nurse), and two health educators (high school and college level) for content validity. An educational statistician also reviewed the questionnaire for acceptability for the target population. The survey was trialed by 16 eighth graders of varying reading abilities for readability.

Students were given a form to take home prior to the survey with items regarding family history to help them answer family history questions accurately.

A copy of the questionnaire is found in Appendix D.

Survey Administration

Prior to administration of the questionnaire, students were informed of the purpose of the study and the voluntary nature of participation, assured of anonymity and confidentiality, and requested to respond to the items as thoughtfully as possible. They were also informed that participation or lack thereof would not affect their class grade. Many of the test items could be answered with an "I don't know" response to minimize guessing. Completing the questionnaire took approximately 12 to 30 minutes. The same researcher "proctored" all survey classes.

Statistical Design

Questionnaire data were transferred from the survey booklets to scanning forms by the researcher for computer input. Knowledge scores were tabulated as "number right." Physical activities listed by students were divided into anaerobic, aerobic, and recreational activities by the researcher, and entered into the data accordingly.

The data obtained from the questionnaire were analyzed descriptively, looking at percentage of answers in the various domains for males and females in the two grade levels. The data were also examined for correlations between various domains. The following summarizes the data analysis:

1. Sources of knowledge about CVD were ranked and compared across grade and sex using Analysis of Variance (ANOVA).

2. CVD knowledge was analyzed descriptively, both for total knowledge and for knowledge in specific areas. Differences in knowledge were evaluated using chi-square.

3. Attitude differences across grade and gender and associations with behaviors and decision-making were evaluated by ANOVA.

4. Smoking and exercise behavior were measured by quantitative (and qualitative in the case of exercise) self-report. Eating behavior was measured in a limited quantitative and qualitative manner. Differences between grades or gender were analyzed with chi-square.

5. Decision-making items from Langer et al.'s instrument (1993) were described by assigning directedness to responses. Self- and Peer-Directedness were measured as mentioned previously. Parent-

directedness was measured in item 74. The analysis differed from Langer et al. in that this study did not look at combinations of peer-, parent-, or self-directedness. Differences across grade and gender and in association with other attitudes and behaviors were analyzed with ANOVA.

6. Comparisons of Hypothetical Decision-Making Scale Scores with attitudes and behaviors were analyzed using ANOVA.

7. ANOVA's were applied to family history, parent education and health occupation to assess associations with knowledge, attitude, and behavior.

8. Parent behavior relating to smoking was compared to student behavior using ANOVA.

The statistics were generated by the Statistical Package for the Social Sciences (1988) and Stata Statistical Software (1993).

CHAPTER IV

RESULTS AND DISCUSSION

The results of the compilation and analysis of data will begin with a display and brief discussion of descriptive data. A discussion of differences between groups will follow.

Descriptive Data

Demographics

Table 1 describes the composition of students according to grade and gender. The mean age of all students was 16.4 years.

Mean parent education was 15 years, and the percentage of parents with a health-related occupation was 29%.

Table 2 displays the breakdown of students according to ethnic background.

Responses to Knowledge Items

Percentage of correct answers for each knowledge question was compiled according to gender and grade and can be found in Appendix E. Students had particular difficulty in the following areas:

1. Confusing the benefits of low salt and low fat diets in the prevention of hypertension and hyperlipidemia, respectively.

2. Understanding risk factors, specifically obesity and lack of physical activity, as they relate to diabetes prevention; and the relationship between diabetes and hyperlipidemia/CHD.

Table 1

Student Characteristics

	Females	Males	All
9th Grade	45	46	91
12th Grade	57	47	104
Totals	102	93	195

Table 2

Ethnic Background

Ethnic Group	Number	Percentage
Caucasian	170	89.47
Hispanic	10	5.26
African-American	5	2.63
Native American	2	1.05
Asian/Pacific Islander	3	1.58
Total Respondents	190	100.00

3. Awareness of complications occurring from uncontrolled or unmodified risk factors; such as stroke, kidney disease, or eye damage from hypertension; and peripheral vascular disease from smoking.

4. Identification of foods low in saturated or trans-fatty acids.

5. Susceptibility of women to CHD. This item received 40% correct responses; 30% did not know, and another 30% felt that CHD was not the primary cause of death in women.

Knowledge items were also grouped by domain for analysis. The results are tabulated in Table 3. The highest percentage of correct answers was in the exercise domain. As noted above, the effects of hypertension were a source of difficulty or confusion for many students. Diet and cholesterol received the next lowest percentage of correct responses.

Sources of Cardiovascular Health Knowledge

Students were asked to rank 7 possible sources of cardiovascular knowledge in order of importance to them, with possible rankings from 1 to 7. Results of those rankings are found in Table 4.

Responses to Attitude Items

Responses relating to personal responsibility for one's health and one's attitudes toward lifestyle choices are listed in Table 5.

From selected items, namely questionnaire numbers 55-57, 59-60, and 63-65, a scale was devised to obtain a composite view of students' cardiovascular health attitudes (CVHA Scale). These items examine the perceived importance of a health-promoting lifestyle and the need to be

one's own healthcare advocate. The mean scale value for students as a group was 4.24 on a Likert scale of 1 to 5, with 5 indicating the highest degree of positive attitude.

Table 3

aPercentage Correct Responses by Knowledge Domain

Domain	Grade		Gender		
	9	12	Males	Females	All Students
Diet/Cholesterol	66	62	65	64	64
Obesity	75	76	73	78	76
Smoking Effects	77	73	76	74	75
Hypertension Effects	57	58	61	54	57
Hypertension Causes	78	77	77	78	78
Heart Disease	63	63	65	62	63
Exercise	79	79	80	80	80

aRounded to the nearest 1%

Responses to Behavior Items

In response to specific questions, students reported their behavior in the areas of smoking, diet, and exercise. Their responses are summarized in Tables 6, 7, and 8, respectively.

Table 4

Sources of Cardiovascular Knowledge Ranked
in Order of Importance by Self-Report
(Possible Ranking From 1 to 7)

1. School	2.0
2. Health Care Professionals	3.35
3. Parents	3.56
4. Print Media	3.7
5. Television	3.99
6. Community Programs	5.3
7. Friends	5.87

Student-Reported Cholesterol Screening Data

Students were asked whether they had had their cholesterol measured or whether they knew if their cholesterol had ever been checked. This information was also evaluated in terms of family history and parental occupation. Table 9 summarizes these findings.

Table 5

[a]Mean Responses to Attitude Items

Question #/Topic	Grade		Gender		
	9	12	Males	Females	All Students
86. Importance of lifestyle modifications	4.51	4.70	4.54	4.70	4.61
87. Importance of #86 if family history	4.26	4.43	4.22	4.47	4.35
88. Proactive health attitude	4.23	4.21	4.10	4.32	4.22
89. Perceived difficulty of quitting smoking	3.49	3.23	3.27	3.46	3.35
90. Present diet effect on future health	4.22	4.28	4.05	4.43	4.25
91. One's knowledge of "good" food choices	3.99	3.94	3.91	4.03	3.97
92. Presence of stress vs. one's ability to cope	3.88	3.87	3.91	3.82	3.88
93. Perceived susceptibility to CHD	3.05	3.32	3.09	3.27	3.18
94. Proactive attitude	4.37	4.18	4.18	4.34	4.27
95. Personal importance of physical activity	4.22	4.09	4.24	4.07	4.15
96. Plans for lifetime physical activity	4.12	4.08	4.04	4.18	4.10

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Table 6

Percentage of Students Smoking

Cigarettes Per Month	Grade		Gender		All Students
	9	12	Males	Females	
None	88.17	63.55	75.5	75.7	75.00
1-4	4.30	14.02	13.8	5.8	9.50
5-19	3.23	7.48	2.1	8.7	5.50
20-100	3.23	4.67	3.2	3.9	4.00
101+	1.08	10.28	5.3	5.8	6.00

Table 7

[a]Eating Behaviors

	Grade		Gender		All Students
	9	12	Males	Females	
Source of school lunch					
Home	20.4	25.2	11.7	33.0	22.8
School cafeteria	44.1	29.0	28.2	44.7	36.5
Other	30.1	37.4	30.1	39.4	33.7
No lunch	3.2	7.5	3.6	10.1	5.3

Table 6 - - Continued

	Grade		Gender		
	9	12	Males	Females	All Students
Weekly fast food (times per week)					
0	21.5	17.8	17.0	22.3	19.6
1	29.0	25.2	19.2	34.0	27.1
2	22.6	25.2	27.7	20.4	23.9
3	17.2	10.3	12.8	14.6	13.7
4	2.2	9.4	7.5	3.9	5.8
5+	7.5	12.2	16.0	4.9	9.8
Trimming fat from meat					
Cut off most	65.6	71.0	69.2	68.0	68.3
Cut off some	17.2	8.4	16.0	9.7	12.8
Eat the fat	4.3	11.2	9.6	5.8	7.7
No meat	12.9	9.4	5.3	16.5	11.1
Fried foods					
0 per week	8.6	8.4	3.2	13.6	8.5
1-3 per week	52.7	59.8	53.2	59.2	56.2
4-6 per week	27.0	22.4	30.9	18.5	24.7
1 per day	8.6	4.7	6.4	6.8	6.6
>1 per day	3.2	4.7	6.4	1.9	3.9

Table 6 - - Continued

	Grade		Gender		
	9	12	Males	Females	All Students
Adding salt					
A lot	10.8	15.0	14.9	11.7	12.9
A little	51.6	43.0	44.7	48.5	47.3
No salt	37.6	42.1	40.4	39.8	39.9

[a]Values in percentages

Table 8

Exercise Behavior by Type: Mean Frequency per Week

	Grade		Gender		
Type	9	12	Males	Females	All Students
Aerobic	3.6	2.8	3.0	3.6	3.3
Anaerobic	2.0	1.9	2.9	1.0	1.9

Decision-Making Data

There were 4 components to the decision-making appraisal in this questionnaire: (1) how students make hypothetical decisions relating to their cardiovascular health, (2) to what degree peers influence their

Table 9

aData Related to Whether Students' Cholesterol Was Tested

| | Grade | | Gender | | | Parent(s) | | |
| | | | | | | Health Occupation | | |
	9	12	Males	Females	All	Yes	No	With High Cholesterol
Cholesterol Checked	37.6	23.6	30.8	29.4	30.0	43.1	24.8	31.6
Student knows whether cholesterol was checked	71.0	79.4	81.9	69.9	76.0	86.4	70.9	78.9

aAll figures in percentages

decision-making behavior, (3) to what degree parents influence their decision-making behavior, and (4) how self-directed students are in their decision-making (i.e., how carefully students think about how a particular course of action will affect them personally). A discussion of the construction of the decision-making scales can be found in Chapter III.

Table 10

[a]Mean Scores Related to Decision-Making

Scale	Grade		Gender		All Students
	9	12	Males	Females	
Decision-Making (HSDMS)	6.17	5.01	4.80	6.24	5.57
Peer-Directedness (PEERD)	2.44	1.90	2.37	1.95	2.12
[b]Parent-Directedness (PARD)	6.25	5.90	5.80	6.25	6.0
Self-Directedness (SD)	7.18	6.83	6.80	7.17	6.97

[a]Scores range from a minimum of 0 to a maximum of 10
[b]This is a single item score, unlike the scales listed

Data Analysis

Grade Differences

Ninth and 12th graders differed in their perceived sources of CV information, aerobic exercise frequency, responses to decision-making scenarios, and smoking behavior. As sources of CV information, school ranked higher for 9th graders, (M = 1.49, vs. 2.46 for 12th graders), F (1, 191) = 22.04, p <.05, and television ranked higher for 12th graders, (M = 3.56, vs. 4.49 for 9th graders), F (1, 192) = 15.94, p < .05. Frequency of aerobic workouts was higher among 9th graders, (M = 1.8, vs. 1.4 for 12th graders), F (1, 185) = 4.19, p < .05, as were health-promoting responses to hypothetical decision-making scenarios, (M= 6.17, vs. 5.01 for 12th graders), F (1, 198) = 9.58, p < .05. There was a 25% greater prevalence of smoking in 12th graders (M = .36) than in 9th graders, (M = .12), X^2 (3, N=200) = 17.35, p < .05.

It should be mentioned that 9th graders tended to be more peer-directed in general, but that tendency did not reach the level of significance, (M = 2.44, vs. 1.90 for 12th graders), F (1,198) = 3.48, p = .06.

Gender Differences

Females (M = 3.27) ranked parents higher as a source of CV information than did males (M = 3.88), F (1, 192) = 6.76, p < .05. Females (M = 4.32) scored higher than males (M = 4.16) on the Cardiovascular Health Attitude Scale (CVHAS), F (1, 196) = 6.26, p <.05, and females (M = 6.24) chose health-promoting alternatives more frequently than males (M

= 4.8) on the hypothetical decision-making scenarios, F (1, 195) = 14.43, p < .05.

Weekly participation in anaerobic exercise was higher for males (M = 2.9) than females (M = 1.0), F (1, 195) = 30.79, p < .05.

Interestingly, there were no significant gender differences for knowledge about women's risk of CHD (M = .36 for females, M = .45 for males). There was also no significant gender difference on the Peer Directedness Scale (please see PEERD, Table 10), F (1, 195), p = .147.

Family History

Possible heightened awareness due to having a parent with cardiovascular disease or risk factors did not seem to impact students' knowledge levels or attitudes in a positive way. Knowledge about fat, cholesterol, hypertension, obesity, smoking, and exercise benefits were not significantly higher in students with a positive family history of disease or risk factors. Students with a positive family history of CVD or risk factors (M = 4.2) did not score better or worse than other students (M = 4.26) on the CVHA Scale, nor were they more likely to have had their cholesterol checked, or know if it had been tested than other students. On the other hand, students whose parents had risk factors or disease (M = .33) were more likely to smoke than other students (M = .18), F (1, 197) = 6.39, p < .05, as were their parents, (M = .42, M = .28 for parents without risk factors or disease), F (1, 197) = 4.11, p < .05.

Influence of Parental Health Occupation

There were 2 significant differences with students whose parent(s) had a health occupation:

1. They tended to have non-smoking parents, (M = .40, vs. .22), F (1, 198) = 5.87, p < .05.

2. They were more likely to have had their cholesterol checked, (M = .43) , F (1, 197) = 6.67, p < .05, and to know whether or not it was checked, (M = .86), F (1, 198) = 5.51, p < .05 than other students (M = .25, .71, respectively).

There were no differences in the CVHA or HSDMS scores for students whose parent(s) worked in health-related fields (M = 4.2, -.034 respectively) over other students (M = 4.3, .004, respectively). It should be noted that there was a strong association between parent education and parent health occupation, F (1,197) = 23.76, p < .05.

Level of Parent Education

There was a positive, linear relationship between parent education and the likelihood of a student having had his or her cholesterol checked, F (2, 195) = 4.07, p < .05 (percentages 17%, 28%, and 39% for "low," "medium," "high" education levels).

Relationships Between Positive CV Attitude and Other Measures

For analysis, CVHA Scores were divided into low, medium, and high groups. Means listed in the following data are from low to high CVHA Score groups:

1. Students who scored higher on CVHA Score tended to also score higher on self-directedness, (SD Score $\underline{M}$ = 2.36, 2.7, 2.98), $\underline{F}$(2, 196) = 16.45, $\underline{p}$ .05. They also tended to choose more health-promoting behaviors in response to hypothetical scenarios, (scenarios $\underline{M}$ = -.42, .028, .216), $\underline{F}$ (2,197) = 12.56, $\underline{p}$ < .05.

2. There was a significant positive relationship between CVHA Score and the amount of aerobic exercise students participated in on a weekly basis, (aerobic frequency $\underline{M}$ = 1.0, 1.72, 1.94), $\underline{F}$ (2,184) = 7.50, $\underline{p}$ < .05. This was not true for anaerobic exercise frequency, (anaerobic frequency $\underline{M}$ = .91, .97, 1.0), $\underline{F}$ (2,197) = .09, $\underline{p}$ = .9171.

As mentioned earlier, female students ($\underline{M}$ = 4.32) tended to have a higher CVHA Scores than males, ($\underline{M}$ = 4.16), $\underline{p}$ < .05.

Perceived Risk for CVD

There are many reasons why an individual may or may not feel vulnerable to a disease. Among these are denial, age, life experiences, and the belief that one practices preventive health care. When interpreting responses to a question of vulnerability to CVD, one must understand that students' feelings about this subject may have many possible etiologies. There were significant differences in response to this item between smokers ($\underline{M}$=3.49) and nonsmokers ($\underline{M}$=3.09), $\underline{F}$ (1,178) = 5.03, $\underline{p}$ <.05, indicating somewhat higher perceived vulnerability to CVD among smokers. There were no differences on this item for students with a positive family history of CHD, $\underline{M}$ = .57 ("agree"), $\underline{M}$ = .47 ("undecided"), $\underline{M}$ = .61 ("disagree"), $\underline{F}$ (2, 176) = 1.36, $\underline{p}$ = .26.

Smoking

Grade Difference

As mentioned earlier, there was a 25% greater prevalence of smoking in 12th graders than in 9th graders, $p < .05$.

Parent Smoking Status

Thirty-five per cent of students with smoking parents also smoked, whereas 20% of students with non-smoking parents smoked, a significant difference, $F (1, 198) = 5.47$, $p < .05$.

Peer-Directedness

Smokers in general were not more peer-directed than non-smokers, but by regression analysis, the more 9th graders were influenced by their peers, the more they tended to be smokers, $t (91) = 2.90$, coef. $= .05$, $p < .05$.

Self-Directedness

Smokers averaged about 10% less (57% vs. 67% of maximum scale value) on this scale than non-smokers, $F (1, 197) = 14.89$, $p < .05$. If students are placed in quartiles according to their SD score, there is an orderly decline in smoking from those students who were more self-directed to those who were identified as less self-directed.

Hypothetical Decision-making Choices Related to Smoking

Smokers differed from non-smokers in their stated reasons for choosing whether or not to smoke. Parental, health, and school code reasons for making the decision were all significantly less important to smokers, F (2, 195) = 9.23, p < .05; F (2, 195) = 53.80, p < .05; F (2, 195) = 5.0, p < .05, respectively.

Perceived Ease of Quitting

Ninety-three per cent of all students believed that smoking was at least as addictive as other drugs, however, most students were undecided (3.35 on the Likert 1-5 scale) about their perceived difficulty to quit in the event that they smoked or started smoking in the future.

Smokers did not have a significantly greater or lesser belief in their ability to quit smoking than non-smokers, F (1, 198) = 0.90, p = .3438. Mean attitude score for non-smokers was 3.4 and for smokers 3.2 on a scale of 1 to 5, 1 being "strongly disagree," and 5 being "strongly agree" that it would be difficult to quit.

Discussion

The following is a discussion of the findings and relationships arising from the data analysis.

Cardiovascular Health Knowledge

Without having a control group of students who did not have a health class with a cardiovascular unit, it is not possible to measure the

impact of school health education on the sample group's CV health knowledge. Material students were exposed to in school (which appeared to be their primary source of information) or through other sources seems to have had a leveling effect on their CV health knowledge across the 2 grades. Subject areas that were more difficult have been delineated previously in this chapter.

Relationship Between Knowledge, Attitudes, and Behavior

Having knowledge regarding positive or negative health behavior does not necessarily result in behavior or attitude changes, particularly if the knowledge does not seem personally relevant. The relationships between knowledge and behavior or attitudes in this study were either negative or inconclusive.

Smoking

Students as a whole had high knowledge (93% correct) of the addictiveness of smoking, but scored an average 3.35 on a scale of 1 - 5 regarding their personal perceived ease of quitting, if they were to smoke.

Exercise

Students answered 80% of exercise questions correctly; the average frequency of aerobic exercise was 3.3 times per week for the sample group as a whole. Using regression analysis, there was no knowledge effect on frequency of aerobic exercise, $t (193) = -.71$, $p = .865$.

Diet

Diet and cholesterol questions received an average of 70% correct answers. It is not possible from the limited eating behavior data to draw any definitive conclusions about students' dietary practices relating to CV health. Using detailed food logs to ascertain fat consumption relative to caloric requirements may supply a researcher with the data to answer this question.

Relationship Between Attitudes and Behavior

As mentioned earlier, students who scored higher on the CVHA Scale tended to score higher on SD and HSDMS Scales and to engage in more aerobic exercise than other students. Although it is not possible from a study of this design to know whether exercise or attitudes had a positive effect on each other, it is not surprising that they are associated. It would be interesting to measure CVHA before and after instituting an aerobic fitness program. Conclusions regarding the relationship between the decision-making scale scores and CVHA are below.

Decision-Making Findings

The following conclusions were reached regarding decision-making directedness and responses to decision-making scenarios:

Decision-Making Directedness

To examine parent-directedness with peer-directedness, the means from the Langer et al. 1 and 2 item scores were used. Students reported

parent-directedness ($\underline{M}$ = 2.21) higher than peer-directedness $\underline{M}$ = 1.51) in the total sample, $\underline{t}$ (198) = 12.74, $\underline{p}$ < .05.

The multi-item peer-influence scale (PEERD) was used for the remainder of the peer-directedness data analysis. There was a trend towards more peer-directedness in the 9th than 12th graders, approaching, but not reaching significance ($\underline{p}$ = .06). Students who tended to be more peer-directed did not tend to have lower CVHA scores, however, 9th graders identified as more peer-directed were more likely to smoke than other students ($\underline{t}$= 2.90), $\underline{p}$< .05. Langer et al. (1993) found that adolescents who scored higher on peer-directedness tended to score lower on attitude scales related to high-risk AIDS behavior.

As predicted, students with a high score on the SD Scale tended to score higher on the CVHA Scale. It is reasonable that this association exists, because both scales examine one's personal responsibility for future well-being. This relationship between attitudes and self-directedness parallels the findings of Langer et al. (1993), who found that self-directed students scored highest with regard to attitudes conducive to AIDS prevention. Contrary to the hypothesis regarding maturation effect on self-directedness, 12th graders ($\underline{M}$ = 6.83) were not more self-directed than 9th graders ($\underline{M}$ = 7.18), $\underline{F}$ (1, 197) = 2.53, $\underline{p}$ = .11.

As mentioned earlier, there was a positive relationship between smoking and peer-directedness in 9th graders, $\underline{t}$ (91) = 2.9, coef. = .05, p < .05, and a negative relationship between smoking and self-directedness in smokers as a group, $\underline{F}$ (1, 197) = 14.89, $\underline{p}$ < .05, the latter illustrated by an orderly decline in smoking from the students with higher SD to those with lower SD Scores. This is also similar to the findings of Langer et al.,

who found that students who tended to have higher-risk attitudes or behaviors related to AIDS were less self-directed, and also less parent- and more peer-directed than other students. The association between self-directedness and smoking raises the question whether improved decision-making skills may result in a lower likelihood of tobacco use.

Hypothetical Decision-making (HSDMS)

Females and 9th graders scored higher on health-promoting choices, reflected in the HSDM Scale, as mentioned earlier under gender and grade differences.

Impact of Positive Family History/Risk Factors

Students from families with a positive family history of CV disease or risk factors did not appear to have different attitudes (including perceived vulnerability to CHD) or degrees of knowledge than other students. They also did not have their cholesterol checked more frequently than other students, even if their parent(s) had hypercholesterolemia.

Parental Influence

As mentioned above, students tended to be more parent- than peer-directed, according to their responses on the decision-making tool. Parents were ranked 3rd out of 7 sources of CV information, with females ranking parental source of knowledge higher than males. Looking at behavior, the only parental behavior solicited was smoking, and the impact of parental

smoking on student smoking behavior was both a predictable and unfortunate one: students whose parents smoked were more likely to be smokers than other students.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Cardiovascular disease claims more lives than nearly all other causes of death combined. In the past few decades, research findings have indicated that lifestyle practices play a part in the prevention of CVD. Because the foundation for lifestyle habits is established during childhood and adolescence, it seems prudent to develop effective health-promoting interventions for those age groups.

Health educators believe that the most efficient method to impact young people is in the schools, with health education programs tailored to the developmental needs of the students. There is growing interest in a new paradigm to answer this challenge, focusing on the acquisition of decision-making skills as the primary outcome of the educational process.

The present study attempted to identify knowledge, attitude, behaviors, and decision-making orientations as they relate to cardiovascular health, using an 81-item questionnaire. The survey items comprised (a) demographics, which included family history of cardiovascular disease; (b) CVH knowledge and attitudes; (c) selected behavior questions, most of which were obtained from the National Adolescent Student Health Survey; and (d) a segment on decision-making,

including hypothetical decision-making scenarios and an instrument developed for adolescents by Langer et al. (1993).

Findings

The following statements summarize the results of the data analysis:

1. Knowledge levels related to cardiovascular health were similar across grades and gender. Students had the most difficulty with knowledge items related to food choices, diabetes, CVD complications, and women's susceptibility to heart disease.

2. Students ranked school as the primary source of CVH knowledge.

3. Grade differences existed in perceived sources of CVH information ($\underline{F}$ (1, 191) = 22.04, $\underline{p}$ < .05 for school, and $\underline{F}$ (1, 192) = 15.94, $\underline{p}$ < .05 for TV; aerobic exercise frequency 9>12, $\underline{F}$ (1, 185) = 4.19, $\underline{p}$ < .05; responses to decision-making scenarios 9>12, $\underline{F}$ (1, 198) = 9.58, $\underline{p}$ < .05; and smoking behavior 12>9, $\underline{X}^2$ (3, $\underline{N}$ = 200) = 17.35, $\underline{p}$ < .05.

4. Gender differences existed with CVH attitudes and hypothetical decision-making responses (females more positive than males), $\underline{F}$ (1, 196) = 6.26, $\underline{p}$ < .05; $\underline{F}$ (1, 195) = 14.43, $\underline{p}$ < .05.

5. Family history did not affect knowledge or attitudes.

6. Students who smoked were more likely to have parents who smoked, $\underline{F}$ (1, 198) = 5.47, $\underline{p}$ < .05.

7. Students whose parents had health occupations were more likely to have had their cholesterol checked and to know whether it was checked, $\underline{F}$ (1, 197) = 6.67, $\underline{p}$ < .05; $\underline{F}$ (1, 198) = 5.51, $\underline{p}$ < .05. Parent education

level was also associated positively with whether cholesterol was checked, F (2, 195) = 4.07, p < .05.

8. Students with higher CVH attitude scores tended to be more self-directed and to choose health-promoting behaviors on hypothetical scenarios. They also tended to engage in more frequent aerobic exercise, F (2, 184) = 7.5, p < .05.

9. Smokers tended to have a higher perceived risk of CVD than non-smokers, F (1, 178) = 5.03, p < .05.

10. Ninth graders who smoked tended to be more peer-directed than other students, t (91) = 2.9, coef. = .05, p < .05.

11. Smokers were less self-directed than non-smokers, F (1, 197) = 14.89, p < .05.

12. Even though the vast majority of students (93%) believed that smoking was very addictive, they did not anticipate that it would be very difficult to quit, were they to smoke.

13. Students reported parent-directedness higher than peer-directedness, t (198) = 12.74, p < .05.

14. Twelfth graders (M = 6.83) were not more self-directed than 9th graders, (M = 7.18), F (1, 197) = 2.53, p = .11.

Conclusions

Positive behavior for CVH, i.e., aerobic exercise, was exhibited more in students who were more self-directed. On the other hand, negative behavior for CVH, i.e., smoking, was exhibited more in students who were less self-directed. It would be tempting to speculate that increasing

students' self-directedness would promote the adoption of healthier behaviors and discourage the practice of unhealthy behaviors.

Because they are assumed to be present-oriented and perceive themselves as somewhat invulnerable, it is challenging to raise the consciousness of adolescents regarding their susceptibility to future cardiovascular disease. In light of the significant associations between self-directedness and cardiovascular health attitudes and behaviors, it appears that the phenomenon of directedness in decision-making is worth exploring in the development of the field of adolescent health education.

Recommendations

Education

The following statements summarize the author's recommendations for CVH education, considering the findings of this survey:

1. It is evident from this survey that the majority of those students in this sample whose parents have high cholesterol are not having their cholesterol tested (68.4% of these students not tested), as recommended by NCEP (DHHS, 1991). Education to correct this could occur in the school, through the child's pediatrician, and through the cardiologist or primary physician caring for the parent.

2. Nationally, statistics indicate that children are at higher risk of becoming smokers if their parents smoke. There may be some way to "inoculate" such children against smoking by beginning in the early grades to educate them about the dangers of tobacco use. The American

Heart Association has circulated educational materials attempting to impress upon smoking parents the need to stop smoking for this reason.

3. Adolescents with a positive family history of CVD do not appear to be more aware of their special need to be proactive about their health. These individuals need to be better educated by health care providers and health educators regarding their increased risk and the positive steps they can take to promote their health.

4. Decision-making skills should be promoted in the classroom.

Research

Research in this area could attempt to answer the following questions:

1. Does directedness change with maturation alone? If so, in what ways?

2. Can directedness be changed by intervention?

3. Does a change in directedness result in a change in attitudes?

4. Does a change in directedness result in behavior change?

Appendix A

Letter of Approval From Human Subjects Institutional Review Board

WESTERN MICHIGAN UNIVERSITY

Date: March 28, 1994

To: Patricia Bromfield

From: M. Michele Burnette, Chair *[signature]*

Re: HSIRB Project Number 94-03-07

This letter will serve as confirmation that your research project entitled "Knowledge, attitudes, and decision-making behavior relating to cardiovascular health in high school students" has been **approved** under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: March 28, 1995

xc: Dawson, HPER

WESTERN MICHIGAN UNIVERSITY

Date: November 8, 1994

To: Patricia Bromfield

From: Kevin Hollenbeck, Chair   *T. for R. Wright*

Re: HSIRB Project Number 94-03-07

This letter will serve as confirmation that the requested changes to the title of your research project from "Knowledge, attitudes, and decision-making behavior relating to cardiovascular health in high school students" to "Knowledge, attitudes, behavior, and decision-making orientation relating to cardiovascular health in high school students" has been approved by the Human Subjects Institutional Review Board. This approval applies only if there have been no further changes made to the originally approved protocol. Any changes made to the proposal itself must be submitted to the HSIRB for approval. Other conditions and the duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: March 28, 1995

xc: Dawson, HPER

Appendix B

Consent/Assent Form

INFORMED CONSENT

Western Michigan University
Department of Health, Physical Education and Recreation

Knowledge, Attitudes, and Decision-Making Behavior Relating
to Cardiovascular Health in High School Students

Patricia E. Bromfield
Mary Dawson, PhD

Dear Parent and Student:

Ninth and twelfth grade students in selected classes have been invited to participate in a survey at Portage Central High School to be administered during school hours. Students will be asked to answer written questions about their knowledge of cardiovascular disease, how they feel about behaviors relating to cardiovascular health (such as diet, exercise, smoking) and how students make decisions about those behaviors. They will also be asked some brief questions about their family medical history. Students will not write their names on the surveys or be identified in any way on their survey form, and the survey administrator and teacher will not be circulating among the students during the survey. The questionnaire can be made available for a parent to review upon request.

Although the purpose of this study is to help fulfill the researcher's thesis requirement, it is hoped that the information from the survey may also be used to help health educators plan cardiovascular health education for young people. The researcher will be available to provide information to students who have questions relating to cardiovascular disease, and will provide conclusions of the study to the school administration and any interested faculty.

Participation in this activity is entirely voluntary. Students who do not participate will be given the opportunity to study or work on an alternate assignment, and will not be penalized in any way. Any student may decide not to participate at any time. This form must be signed and returned for the student to participate in the study.

If you have any questions or concerns about this study, you may contact either Patricia Bromfield, at 375-6715, Dr. Mary Dawson, at 387-2711, or the University's Human Subject Institutional Review Board, at 387-8293.

I give permission for my son/daughter_____to participate in
the above survey.   (print name please)

Parent's signature_____Date_____

(If permission is **denied**, please sign here_____)

Appendix C

Letter of Approval From Portage Central High School Administration

Dear School Administrator:

I am a graduate student at Western Michigan University and am requesting your assistance in conducting a survey of high school students regarding their knowledge, attitudes, and behavior relating to cardiovascular health. My intent in conducting this survey is to meet a requirement for my Master's thesis in an area in which I have considerable experience and interest.

I realize that participation in such a survey requires a commitment of time and energy on the part of the students, faculty, and school administrators. Projected class time for the administration of this survey is 25-45 minutes. I have met with Dwight Hodgin to obtain his advice regarding content and administration of the survey. In order to randomly select students, I have asked him if students in required 9th and 12th grade classes (i.e., health and government or economics, respectively) could be surveyed. Of course, participation will be voluntary and will require written parental consent. A copy of the questionnaire is available for your review.

My thesis proposal, the questionnaire, and consent protocol have been scrutinized by the Human Subjects Institutional Review Board (HSIRB) at Western Michigan University. Any questions or concerns regarding this survey can be addressed to myself or to the HSIRB at 387-8293. In order to proceed with the data collection, I will also need your written permission.

I will make the results of this survey available to you when the analysis is completed.

Patricia Bromfield

375-6715 home   1-732-8675 work

I have examined the questionnaire to be used for this study and grant permission for its administration by the above student.

Signed _____ Title _Ass't Principal_ Date _4/22_

Appendix D

Questionnaire

QUESTIONNAIRE

Knowledge, Attitudes, and Decision-making Behavior Relating to Cardiovascular Health in High School Students

Dear Student:

The purpose of this questionnaire is to find out:
(1) what high school students know about the prevention of cardiovascular diseases (diseases of the heart and blood vessels), such as heart attack and stroke,
(2) how students feel about behaviors related to cardiovascular health, and
(3) how students make decisions about those behaviors.

This information may be used to help health educators plan cardiovascular education for young people The information obtained in this questionnaire is entirely confidential and no one will know how you answered the questions. Participation in this survey is entirely voluntary. Students who do not participate will be given the opportunity to study or to work on another assignment in the classroom.

Please answer as honestly as possible in order to make the results of this survey meaningful. If you do not know the answer to a question, please choose "don't know" as a reply, or leave the answer blank. We will be happy to answer any questions you may have. Please raise your hand if you need any assistance. To protect your privacy, do not write your name on the questionnaire.

Thank you for your participation.

1. Your age_____

2. Female_____Male_____

3. Your ethnic background (please circle): Caucasian (white)   Hispanic   African-American
                                            American Indian   Asian or Pacific Islander

Has anyone in your family had the following? (please circle):

4. <u>Heart disease</u>
(heart attack, angina (chest pain),
heart surgery ("bypass"), "balloon"
angioplasty)   Father   Mother   Grandmother Grandfather   Aunt Uncle
                     Stepfather   Stepmother

5. <u>High blood pressure</u> Father   Mother   Grandmother Grandfather   Aunt Uncle
                     Stepfather   Stepmother

6. <u>High cholesterol</u>   Father   Mother   Grandmother Grandfather   Aunt Uncle
                     Stepfather   Stepmother

7. <u>Diabetes</u>   Father   Mother   Grandmother Grandfather   Aunt Uncle
                     Stepfather   Stepmother

8. <u>Stroke</u>   Father   Mother   Grandmother Grandfather   Aunt Uncle
                     Stepfather   Stepmother

9. Do either or both of your parents smoke? (please circle):

         Father   Mother   Stepfather   Stepmother   None smoke

10. Do either of your parents have a job in a health-related field ? (please circle):

         Father   Mother   Stepfather   Stepmother   None

11. Educational level of mother (please circle):

Middle school High school   2 yr College   4 yr College   Graduate
school

12. Educational level of father (please circle):

Middle school   High school   2 yr College   4 yr College   Graduate school

13. How long have you had a driver's license?

         a. less than 1 year
         b. 1-2 years
         c. more than 2 years
         d. I don't have my license yet.

14. Have you ever had your cholesterol level checked? (please circle)

yes   no   don't know

15. Where do you feel you have learned the most about cardiovascular health? Please rank in order, 1= the most, 7= the least:

_____Television
_____Friends
_____School, teachers, coaches
_____Newspaper/ magazines
_____Parents
_____Community programs
_____Health care professionals (doctor, nurse)

CIRCLE THE BEST ANSWER:

16. What is the number 1 killer of Americans?
        a. Cancer
        b. AIDS
        c. Heart attack
        d. Lung disease
        e. Accidents
        f. Don't know

17. Changes in blood vessels that often lead to heart disease can begin to develop:
        a. During infancy and early childhood (up to age 12)
        b. During adolescence (age 13-19)
        c. In one's twenties
        d. In one's thirties
        e. In one's forties
        f. Don't know

18. The body makes most of its cholesterol from what type of food?
        a. Protein
        b. Complex carbohydrate (fruit, vegetables, grains)
        c. Sugar
        d. Saturated fat (fat which tends to remain solid at room temperature).
        e. Don't know

19. If a food is considered "low fat," how many grams of fat would it contain in one serving?
        a. 3 grams or less
        b. 4-10 grams
        c. 11-20 grams
        d. 21-30 grams
        e. Don't know

20. Fats which contribute to high cholesterol levels are found in <u>all but which one</u> of the following?
    a. Meat and dairy products
    b. Olive oil
    c. Chocolate and coconut
    d. Baked goods made with hydrogenated fat
    e. "Tropical" oils such as palm oil

21. What is the <u>maximum</u> desirable blood cholesterol level (total cholesterol) for an adult who does not have heart disease?
    a. 240 or less
    b. 200 or less
    c. 160 or less
    d. Don't know

22. About how many times a WEEK do you exercise or play sports hard enough to make you breathe hard and make your heart beat fast for 20 continuous minutes?
    a. 0 times
    b. 1 time a week
    c. 2 times a week
    d. 3 times a week
    e. 4 times a week
    f. 5 or more times a week

23. Please list the physical activities you participate in:

	activity:	approx. minutes/day:	times per week:
1.			
2.			
3.			
4.			
5.			

24. About how many times a WEEK do you eat fried foods (such as french fries, fried chicken, onion rings, doughnuts)?
    a. 0 times
    b. 1-3 times
    c. 4-6 times
    d. Once a day
    e. More than once a day

25. During the past MONTH, how many cigarettes did you smoke?   (Please place the <u>age</u> you started smoking next to your answer.)
    a. Not even one puff
    b. 1-4 cigarettes
    c. 5-19 cigarettes
    d. 1-5 packs
    e. More than 5 packs

26. How much salt do you usually add to your food?
    a. A lot of salt
    b. A little salt
    c. No salt

27. When you eat meat (such as steak), what do you usually do?
    a. Cut off most of the fat
    b. Cut off some of the fat
    c. Eat the fat with the meat
    d. I don't eat meat

28. During the past WEEK, how many times did you eat food from a fast food restaurant ?
    a. 0 times
    b. 1 time
    c. 2 times
    d. 3 times
    e. 4 times
    f. 5 or more times

29. Which of the following cooking practices increases the amount of fat in foods?
    a. Baking foods
    b. Broiling foods
    c. Frying foods
    d. Don't know

30. During the past WEEK, where did you usually get your lunch on school days?
    a. Brought lunch from home
    b. School cafeteria
    c. Other
    d. I didn't eat lunch on school days

CIRCLE ALL THE ANSWERS THAT APPLY:

31. Cholesterol levels can be affected (either raised or lowered) by which of the following? (circle all that apply):
    a. Age
    b. Gender (male/female)
    c. Diet
    d. Smoking
    e. Diabetes
    f. Heredity
    g. Salt
    h. Stress
    i. Exercise
    j. Puberty and menopause
    k. Steroid use (anabolic steroids used to build muscle)
    l. Don't know

32. Blood pressure can be affected by the following: (circle all that apply)
   a. Weight
   b. Salt intake
   c. Alcohol intake
   d. Caffeine intake
   e. Fat intake
   f. Smoking
   g. Stress
   h. Don't know

33. Which of the following can be damaged by high blood pressure? (circle all that apply)
   a. The eyes
   b. The stomach
   c. The kidneys
   d. The brain
   e. The heart
   f. Don't know

34. Being overweight makes one more likely to develop which of the following? (circle all that apply)
   a. Diabetes (adult onset)
   b. High blood pressure
   c. Heart disease
   d. High cholesterol
   e. Don't know

35. A person's ability to handle stress is affected by: (circle one)
   a. How much control someone feels he/she has over life's events
   b. The support of friends and family
   c. Whether someone views the stressful event as a threat or a challenge
   d. All of the above
   e. Don't know

TRUE FALSE (please circle your response):

<u>When a heart attack occurs:</u>

36. Part of the heart muscle is deprived of its blood supply.
   True   False   Don't know

37. Symptoms can include sweating, indigestion, chest tightness, and nausea.
   True   False   Don't know

38. Once a heart attack is in progress, nothing can be done to prevent damage to the heart muscle.
   True   False   Don't know

TRUE/FALSE: please circle your response:

39. When a heart attack occurs, the chance of sudden death is greatest in the first 2 hours.
     True   False   Don't know

<u>Cigarette smoking:</u>

40. Is the single most preventable cause of heart disease and stroke.
     True   False   Don't know

41. Only causes damage to the lungs.
     True   False   Don't know

42. Is not as addictive as other drugs.
     True   False   Don't know

43. Can contribute to circulatory problems in the legs that can lead to amputation.
     True   False   Don't know

44. Systolic blood pressure is the pressure in the arteries when the heart is contracting.
     True   False   Don't know

45. Diastolic blood pressure is the pressure in the arteries when the heart is relaxed between beats.
     True   False   Don't know

46. Statistics show that in general, the <u>lower the</u> blood pressure, the <u>longer</u> one's lifespan.
     True   False   Don't know

47. Although blood pressure is considered normal if it is below 140/90, a reading less than 120/80 is ideal for prevention of cardiovascular disease.
     True   False   Don't know

<u>Regular exercise:</u>

48. Decreases heart disease risk and improves heart attack survival.
     True   False   Don't know

49. May prevent the development of adult onset diabetes.
     True   False   Don't know

50. Can cause one to develop high blood pressure.
     True   False   Don't know

51. Helps reduce the effects of stress on the body.
     True   False   Don't know

52. Although men in general develop heart disease earlier than women, heart disease is also the number 1 killer of American women.
     True   False   Don't know

53. How we deal with stress over a period of time can affect our risk for developing heart disease.
      True   False   Don't know

54. High levels of HDL cholesterol (the "good" type of cholesterol carried in the blood) help protect a person from developing heart and blood vessel disease.
      True   False   Don't know

PLEASE CIRCLE THE NUMBER THAT APPLIES:

55. A person's risk of developing heart disease and stroke can be lowered by lifestyle choices (diet, exercise, stress reduction).

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

56. If my father or mother had heart disease, I would be more likely to try to decrease my risk of developing heart disease.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

57. I don't need to know my blood pressure or cholesterol level as long as my doctor does.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

58. If I smoked or started smoking cigarettes, I would have trouble quitting.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

59. What I eat now will affect my future health.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

60. I know what food choices are best for me.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

61. My stress level has more to do with how I cope with stressful situations than with the situations themselves.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

62. I am less likely than most people to develop heart disease.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

63. I will do what I can to prevent myself from developing heart disease.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

64. If I was not able to participate in a physical activity such as recreational or competitive sports, or other forms of exercise, I would feel that something was missing from my life.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

65. I plan to participate in a lifetime sport or regular exercise program all of my adult life.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

PLEASE CHECK THE BOX THAT APPLIES:

66. Suppose you are ordering food at a restaurant. How important are each of the following in your food selection?

	Very important	Somewhat important	Not important
a.How the food tastes	☐	☐	☐
b.What my friends are ordering	☐	☐	☐
c.What is good for me in the longrun	☐	☐	☐
d.Price	☐	☐	☐

67. Which ONE of the above would you say is the most important? (please circle)

    a.
    b.
    c.
    d.
    Other_____

68.Suppose you had the choice of going up 1 to 3 flights of stairs or taking an elevator to get to your destination. How important are each of the following in your decision? (please check the appropriate box):

	Very important	Somewhat important	Not important
a. The need to conserve my own energy.	☐	☐	☐
b. The need to use my body to keep it strong.	☐	☐	☐
c. The amount of time it takes to get there.	☐	☐	☐
d. The need to be as physically active as I can throughout my day.	☐	☐	☐
e. What my friends choose to do.	☐	☐	☐

69. Which ONE of the above would you say is the most important? (please circle)
> a.
> b. and/or d.
> c.
> e.
> f. Other_____

70. Suppose you are in a situation in which you are offered a cigarette. How important are the following in your decision of whether to smoke or not (please check the appropriate box):

	Very important	Somewhat important	Not important
a. My parents' attitudes towards smoking	☐	☐	☐
b. The effect of smoking on my health	☐	☐	☐
c. My friends' reactions	☐	☐	☐
d. The school's Code of Conduct	☐	☐	☐

71. Which ONE of the above would you way is most important? (please circle)
> a.
> b.
> c.
> d.
> e. Other_____

Appendix E

Percentage Correct Responses to Knowledge Items

Table 11

Percentage Correct Responses to Knowledge Items

Grade	9	9	12	12	9th	12th	All
Gender	Males	Females	Males	Females	Graders	Graders	Students
Question #/Topic							
18 Mortality/CHD	36.2	52.2	59.6	39.7	44.2	49.7	46.0
19 Atherosclerosis	31.9	28.3	34.0	25.9	30.1	30.0	30.0
20 Cholesterol	76.6	71.7	85.1	81.0	74.2	83.0	79.0
21 Diet/Fat	70.2	76.1	53.2	67.2	73.2	60.2	66.0
22 "	23.4	39.1	34.0	25.9	31.3	30.0	30.0
23 "	40.4	26.1	25.5	29.3	33.3	27.4	29.0
33 "	91.5	93.5	91.5	96.6	92.5	94.1	94.0
35 Cholesterol	74.5	71.7	57.4	46.6	73.1	52.0	62.0
36 "	80.9	56.5	57.4	37.9	68.7	47.7	57.0
37 "	95.7	91.3	85.1	93.1	93.5	89.1	92.0
38 "	63.8	71.7	55.3	63.8	67.8	59.6	64.0
39 "	48.9	50.0	42.6	48.3	49.5	45.6	47.0
40 "	70.2	71.7	72.3	74.1	71.0	73.2	73.0
41 "	19.1	13.0	14.9	19.0	16.1	17.0	17.0
42 "	61.7	58.7	66.0	58.6	60.2	62.3	61.0
43 "	87.2	80.4	72.3	72.4	83.8	72.4	78.0
44 "	29.8	30.4	38.3	31.0	30.1	34.7	33.0
45 "	34.0	47.8	51.1	44.8	40.9	48.0	45.0

Table 11 - - Continued

Grade Gender Question	9 Males	9 Females	12 Males	12 Females	9th Graders	12th Graders	All Students
46 (don't know)	2.1	2.2	6.4	1.7	2.2	4.1	3.2
47 HTN	91.5	89.1	85.1	94.8	90.3	90.0	91.0
48 "	89.4	91.3	89.4	81.0	90.4	85.2	88.0
49 "	85.1	84.8	68.1	67.2	85.0	67.7	77.0
50 "	70.2	69.6	63.8	67.2	69.9	65.5	69.0
51 "	29.8	21.7	21.3	29.3	25.8	25.3	25.5
52 "	76.6	78.3	76.6	74.1	77.5	75.4	77.0
53 "	89.4	80.4	89.4	89.7	84.9	89.6	88.0
54 (don't know)	2.1	6.5	4.3	1.7	4.3	3.0	3.7
55 HTN	10.6	8.7	21.3	15.5	9.7	18.4	14.0
56 "	76.6	82.6	72.3	82.8	79.6	77.6	78.6
57 "	36.2	47.8	46.8	41.4	42.0	44.0	43.0
58 "	44.7	30.4	48.9	29.3	37.6	39.1	38.0
59 "	97.9	84.8	93.6	89.7	91.4	91.7	92.0
60 (don't know)	2.1	17.4	4.3	8.6	9.8	6.3	8.1
61 Obesity	23.4	34.8	25.5	34.5	29.1	30.0	29.0
62 "	87.2	89.1	85.1	89.7	88.2	87.4	89.0
63 "	80.9	80.4	85.1	86.2	80.7	85.7	84.0
64 "	74.5	84.8	76.6	82.8	79.7	79.7	81.0
65 (don't know)	8.5	2.2	2.1	1.7	5.4	1.9	3.7

Table 11 - - Continued

Grade Gender Question #/Topic	9 Males	9 Females	12 Males	12 Females	9th Graders	12th Graders	All Students
66 Stress	80.9	91.3	78.7	89.7	86.1	84.2	86.0
67 Heart Attack	70.2	71.7	76.6	70.7	71.0	73.7	72.0
68 "	91.5	97.8	85.1	91.4	94.7	88.3	92.0
69 "	83.0	67.4	68.1	69.0	75.2	72.6	72.0
70 "	68.1	56.5	74.5	70.7	62.3	72.6	69.0
71 Smoking	61.7	58.7	61.7	56.9	60.2	59.3	60.0
72 "	91.5	95.7	91.5	96.6	93.6	94.1	94.0
73 "	91.5	89.1	93.6	94.8	90.3	94.2	93.0
74 "	68.1	52.2	46.8	43.1	60.2	45.0	52.0
75 HTN	66.0	43.5	53.2	44.8	54.8	49.0	52.0
76 "	63.8	39.1	51.1	46.6	51.5	48.9	51.0
77 "	70.2	65.2	68.1	56.9	67.7	62.5	65.0
78 "	51.1	39.1	46.8	31.0	45.1	38.9	42.0
79 Exercise	95.7	93.5	93.6	93.1	94.6	93.4	94.0
80 "	51.1	45.7	61.7	46.6	48.4	54.2	52.0
81 "	76.6	84.8	83.0	82.8	80.7	82.9	82.0
82 "	85.1	95.7	89.4	91.4	90.4	90.4	91.0
83 Gender/CHD	44.7	50.0	44.7	24.1	47.4	34.4	40.0
84 Stress	85.1	82.6	89.4	93.1	83.9	91.3	89.0
85 Cholesterol	38.3	50.0	42.6	51.7	44.2	47.2	47.0

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