Impact of the American Heart Association's Heart Health in the Young Curriculum on Cardiovascular Knowledge Scores and Behavior Changes in Smoking, Exercise, and Nutrition in Eighth Grade Students

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A Thesis Presented to The Graduate Faculty University of Wisconsin-LaCrosse

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In Partial Fulfillment of the Requirements for the Master of Science Degree

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by Fred Hebert May, 1987
This was a pre-test post-test experimental study. The experimental group received 15 (45 minute) lessons from the AHA curriculum. Pre-test and post-test scores were recorded. The control group attended regular health education classes between the pre-test and the post-test. The Know Your Body Health Questionnaire for grades 6-8 was used as a base instrument to assess knowledge change. The Know Your Body Health Habits Survey instrument was used to assess behavior change in the areas of smoking and exercise. The DINE system, created by Darwin Dennison, was used to measure nutrition change. The data was analyzed using between group T-tests and Pearson product moment correlations. The alpha level was established at the .05 level of significance. Results indicated significant differences in knowledge change scores in the experimental group versus the control group. None of the 46 subjects in the study reported smoking behavior, making it impossible to test for smoking change. Statistical significance was not demonstrated in exercise behavior change in either group. There was not a statistically significant correlation demonstrated in either the experimental or the control group between knowledge change scores and change scores in exercise behavior. Interestingly, statistical significance was demonstrated in diet behavior in a negative direction. Both groups decreased their heart healthy nutritional behavior from pre-test to post-test. The experimental group also demonstrated a statistically significant correlation between knowledge change and diet change, illustrating decreased heart healthy diet with increased knowledge. This was not true in the control group. The study indicates the need for comprehensive long-term health education programs to bring about necessary changes in health habits and skills.
Candidate: Fred F. Hebert

We recommend acceptance of this thesis in partial fulfillment of this candidate's requirements for the degree:

Master of Science - School Health Education

The candidate has completed his/her oral report.

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CHAPTER I
INTRODUCTION

Background

Medicine and disease control of the past depended to a large extent on what a physician did to or for a patient. Whenever people became ill or disabled, they turned to the doctor as their automatic savior or restorer of good health.

Today, however, more people are realizing that they need to work at taking charge of their own self care with the help of knowledge, choices, and consultation with a physician. In the past decade medicine has become far more concerned with attempting to prevent diseases by recognizing some of the causative factors that lead to being at risk. To minimize risk of heart disease an intelligent patient-doctor relationship is necessary.

Over one and a half million people will suffer heart attacks this year and approximately 550,000 people will die from heart and blood vessel diseases (AHA, 1985). Coronary atherosclerosis appears to result from the interaction of multiple factors of civilization with an insidious and silent beginning in early childhood. Certain risk factors have been identified, which are associated with the advancement of coronary atherosclerosis. These include: age, sex, race, genetics, diet, hypertension, smoking and a
sedentary lifestyle (AHA, 1985). While nothing can be done about age, sex, race or genetic endowment, hypertension can be modified with medication. The remainder are under the control of the individual and their modification is dependent on knowledge and motivation. This study will measure the impact of knowledge upon behavior provided by a health curriculum.

**Purpose**

Can education have an impact on behavior? This study will determine the effectiveness of the American Heart Association Heart Health curriculum on students' knowledge of cardiovascular diseases and risk factors and subsequent changes in behavior. Health educators need to determine if we have available a curriculum that is indeed effective in developing knowledge that will encourage adoption of lifestyle change to maintain/improve cardiovascular health. Young people need to realize their roles in maintaining a healthy lifestyle in order to begin their own preventive measures toward the healthiest lifestyle possible to them.

**Statement of the Problem**

The vast majority of behaviors are learned in childhood and are difficult to change in adult life (Kolbe and Newman, 1983). Researchers of cardiovascular diseases have determined that marginal decreases in several cardiovascular risk factors add up to a substantial reduction in total risk
of cardiovascular disease (Kolbe and Newman, 1983). With these findings in mind, the following problem statement generates a good deal of interest: What is the impact of implementing the AHA Heart Health Curriculum on the cardiovascular knowledge scores and behavior changes in the areas of smoking, exercise, and nutrition of eighth grade students at St. Stevens parochial school?

**Hypotheses**

1. The students exposed to the American Heart Association Heart Health in the Young curriculum will not demonstrate a significant increase in cardiovascular knowledge scores when compared to students exposed to the traditional curriculum.

2. The students exposed to the AHA Heart Health in the Young curriculum will not demonstrate a significant reduction in smoking behavior in the area of cigarette smoking when compared to students exposed to the traditional curriculum.

3. The students exposed to the AHA Heart Health in the Young curriculum will not demonstrate a significant increase in Heart Healthy Diet behavior when compared to the students exposed to the traditional curriculum.

4. The students exposed to the AHA Heart Health in the Young curriculum will not demonstrate a significant change in exercise behavior when compared to the students exposed to the traditional curriculum.
5. There is no significant relationship between knowledge change scores and smoking behavior change in the experimental group.

6. There is no significant relationship between knowledge change scores and smoking behavior change in the control group.

7. There is no significant relationship between knowledge change scores and diet behavior change in the experimental group.

8. There is no significant relationship between knowledge change scores and diet behavior change in the control group.

9. There is no significant relationship between knowledge change scores and exercise behavior change in the experimental group.

10. There is no significant relationship between knowledge change scores and exercise behavior change in the control group.

**Assumptions**

1. The two groups of students entering the study have the same degree of motivation to improve health knowledge and intention.

2. The reading levels of the students involved in the study will be the same.

3. The students will fill out all assessment forms honestly and completely.
**Delimitations**

1. The students involved in the study are eighth grade boys and girls from St. Stanislaus and St. Stevens parochial schools in Stevens Point, Wisconsin.

**Limitations**

1. This study is set in a midwestern college community of approximately 25,000 people. Stevens Point as a community and a university has been very active in wellness activities for many years and the results should be extrapolated with this in mind.

2. The curriculum focuses on only the following five areas: nutrition, smoking, exercise, heart physiology, and cardiovascular diseases.

3. The size of the population is quite small (N=46) and any results taken from this study should keep that in mind.

4. The subjects of this study are all members of the Catholic faith.

5. The subjects of this study could be described as members of the middle to upper middle socioeconomic class and results should be extrapolated with this as a consideration.

6. The subjects of this study are in the eighth grade. The results may not be similar in different age groups.
Operational Definitions

Smoking Behavior - determined by response to the following question: How many times a week do you generally smoke cigarettes?

Diet Behavior - determined by recording food intake for a 24 hour time span and then coding this information to arrive at a DINE score, which is based on a 0 to 10 scale, with 0 being very poor and 10 being excellent.

Exercise Behavior - determined by response to the following question: How many times per week do you do strenuous exercise? (heart beats rapidly) LIKE - running, jogging, swimming, baseball, football, basketball, soccer, volleyball, singles tennis, active gymnastics, bicycling up hills or long distances.
CHAPTER II
REVIEW OF RELATED LITERATURE

There have been numerous studies to determine the impact of various curricula on attitudes and behavioral change in a young population. The AHA Heart Health in the Young curriculum has not been analyzed to this degree at this point in time. The curriculum was designed using a modular format rather than a scope and sequential pattern favored by most curricula. The major thrust of the curriculum lies in the following five areas: heart physiology, heart diseases, smoking, nutrition, and exercise.

This section presents a review of pertinent studies that afford background information and a rational basis for the design of the study.

Topical areas reviewed include: (1) severity of the problem, (2) modifiable risk factors, (3) impact of other studies on heart health; and (4) impact of other curricula on heart health in a young population.

Severity of the Problem

The technologic revolution has largely replaced muscle power with machines and computers and has provided a surfeit of rich food at a low energy cost. It has promised indolence, sedentary living habits, and obesity. It has
been estimated that over 43,500,000 Americans have one or more forms of heart or blood vessel disease (AHA, 1985). In the United States approximately 1.5 million people will suffer a heart attack this year, while an estimated 550,000 of these will result in death. High blood pressure afflicts an estimated 37,990,000 people in the United States, with stroke incidence affecting some 1,900,000 people each year (AHA, 1985). If 1986 is like 1985, almost 1 million people will die from a problem of the cardiovascular system. This means that nearly half of the people who die in the United States each year are dying from cardiovascular diseases such as hypertension, stroke, and coronary heart disease. All of this is at an estimated yearly cost of 72.1 billion dollars (AHA, 1985).

The above statistics are both frightening and depressing. However, much has been done to identify risk factors that increase one's chances of being afflicted with some type of cardiovascular disease. Identified living habits and conditions which increase a person's chance of getting heart disease are called risk factors. Seventeen possible risk factors have been identified by researchers, with age, sex, hypertension, cigarette smoking, and a high serum cholesterol level, when grouped together, having been shown to double an individual's risk of cardiovascular disease (Kolbe and Newman, 1983). Weaker contributing risk
factors are heredity, exercise, obesity, and diabetes. Salt intake, use of oral contraceptives, personality type, and environmental stress are of uncertain importance as cardiovascular disease risk factors (Kolbe and Newman, 1983).

Risk factors such as age, sex, and heredity cannot be modified. Although the other risk factors mentioned can be controlled to some extent by health behaviors and lifestyle choices, in some cases, we are still dealing with the unknown when confronted with cardiovascular disease. Kannel and Dawber, in 1972, found that only 25% of heart attack victims had previous symptoms. Watkins (1984) found that although one or more risk factors are usually present in patients with coronary heart disease (CHD), certain individuals with clinical manifestations of CHD have no identifiable risk factors; this suggests the existence of yet unidentifiable etiologic factors (p. 13).

An individual's susceptibility to risk factors is contingent on inherited traits (Wallis, 1984). We cannot control the inherited traits, but need to be able to recognize them to become aware of factors that may make an individual more at risk than others.

**Modifiable Risk Factors**

**Cholesterol**

The research literature indicates a strong link between cardiovascular disease and diet (Weidman, Kwiterovich, Jesse, and Nugent, 1983; American Academy of Pediatrics Committee on Nutrition, 1983; AHA, 1985). The people of
Finland have the highest incidence rate of heart attack and also the highest daily intake of fat and cholesterol. Conversely, the Japanese take in low levels of fat and cholesterol and suffer from a very low incidence of heart attacks (Wallis, 1984).

The United States ranks right behind Finland in the amount of fat and cholesterol in our diet and also in cardiovascular disease incidence rates (Wallis, 1984). Wallis states, "by the time the average American puts down his fork for the day, he has consumed the equivalent of a full stick of butter in fat and cholesterol" (p. 56). Approximately 40% of daily calories are taken in in the form of fat. This is 30% more than 60 years ago and 3 times the Japanese intake (Wallis, 1984).

Cholesterol is not all bad. In fact, our body needs it to survive. Cholesterol is produced in the liver and is used in the body as a building block of the outer cell membrane, a principal ingredient in the digestive juice bile, nerve insulation, and is a component in the sex hormones, estrogen and androgen (Wallis, 1984). Cholesterol is transported in plasma in combination with specific aggregates of lipids and proteins—lipoproteins (Harrison and Winston, 1982). Plasma cholesterol is carried either in low density lipoproteins (LDL) or high density lipoproteins (HDL). It seems that the higher the level of HDL the less an individual would be susceptible to cardiovascular disease
The amount of HDL and LDL within an individual is controlled by genetics and diet (Harrison and Winston). We cannot control our genetics, but we can control our diet. Wallis (1984) stated, "approximately 20-30% of the cholesterol found in our body comes from the food we eat" (p. 56).

The AHA recommends the daily calorie intake of saturated fats to make up 10% of the daily intake of calories (AHA, 1985). Presently the average American is ingesting 15-17% saturated fats in daily caloric intake (Harrison and Winston, 1982). Sources of saturated fats are red meats, dairy products, bakery goods, and some vegetable oils. The AHA recommends replacing saturated fats with unsaturated fats, polyunsaturated fats, or carbohydrates (Harrison and Winston, 1982).

The reasons behind the cholesterol concern center mainly around the development of atherosclerosis. This disorder, which is indicated by a build up of cholesterol on the walls of the blood vessels, causing them to lose their elasticity, starts very young and if unchecked can and does lead to an increased incidence of stroke or heart attack.

As many as 1/3 of all children over age 12 have elevated cholesterol levels (Carey, Hager and Harrison, 1985). The average American child whose cholesterol level reaches 165 mg/100 ml by age 3, is equal to a middle aged man in Japan (Williams and Wynder, 1976). When American
children are compared with Mexican school children, the American children's cholesterol levels are so much higher that the distribution curves of the two populations barely overlap (Williams and Wynder, 1976). Enos, Holmes and Beyer (1953) found in autopsies of 300 American casualties of the Korean War, with a mean age of 22, evidence of coronary atherosclerosis in 77% of these men. A similar study conducted on 105 American soldiers, with a mean age of 22.1, killed in the Vietnam War, confirmed that 45% had some evidence of atherosclerosis (McNamara, Molot, Stremple, and Cutting, 1971).

We can reduce our level of LDL by increasing our intake of polyunsaturated fats, increasing the amount of fiber in our diets, and exercising aerobically 3-4 times/week. Dr. Charles Glueck, director of Cincinnati Lipid Research Center, states, "for every 1% reduction in total cholesterol level, there is a 2% reduction in heart disease risk" (Wallis, 1984, p. 60).

It has been demonstrated that dietary habits in childhood carry over into adult life (Weidman, Kwiterovich, Jesse, and Nugent, 1983). However, it has not been demonstrated directly by controlled studies whether dietary modification in children will alter CHD incidence in later life (Weidman et al., 1983).

The American Academy of Pediatrics Committee on Nutrition (AAPCN) stated in a 1983 publication,
The safety of diets designed to decrease caloric intake, increase consumption of complex carbohydrates, decrease intake of refined sugars, decrease consumption of fat and cholesterol, and limit sodium intake has not been established in growing children (p. 79).

This committee in the same publication in 1983 stated,

Limiting fat and cholesterol intake has been questioned because during the first year of life, breast milk (a cholesterol containing food) is considered the ideal food for infants. In teenagers serum cholesterol consistently decreases from pre-teen levels. In addition, formation of bile acids, hormones, and special tissues may indicate a continuing need for cholesterol during the entire growth period (p. 78).

Weidman et al. (1983) point out that in populations where CHD is low, the mean levels of plasma cholesterol in children range from 100-150 mg/dl, and in populations where CHD is high the mean levels of plasma cholesterol in children range from 150-200 mg/dl. Williams and Wynder (1978) found that almost all children demonstrate fatty streaks in their aortas by 3 years of age. Williams and Wynder (1978) go on to state,

Various studies suggest that atherosclerosis is probably reversible in man until the end of the second decade of life, so that any hope of completely preventing this disease process must begin in childhood (p. 212).

Weidman et al. (1983) states,

There is a general agreement atherosclerosis may begin in youth and undergo progression through young adulthood, even though clinical manifestations usually do not appear until middle age or later (p. 1411A).

Webber, Cresanta, Voors, and Berenson (1983) support that theory by stating, "cardiovascular events generally do not occur until the fourth decade of life" (p. 649).
Well controlled studies demonstrate plasma lipid levels can be changed by changing amounts of saturated and polyunsaturated fat and cholesterol in the diet, but response is variable demonstrating clearly that both external (often nutritional) and internal (inheritable) factors are involved (Weidman et al., 1983). A diet high in saturated fats and cholesterol will tend to raise the level of cholesterol in the blood, whereas a diet lower in saturated fats and cholesterol will tend to lower the level of cholesterol in the blood (AHA, 1985).

**Hypertension**

Blood pressure is the force of the blood against the walls of the arteries of the body. It can be measured by using a machine known as a sphygmomanometer. When measuring blood pressure the maximum pressure produced by the heart is called the systolic pressure, and should measure 120 or less. The least amount of pressure in the artery is shown in the diastolic pressure, and should measure at 80 or less. A normal reading for blood pressure would then be 120/80. Blood pressure becomes a problem when the systolic pressure exceeds 140 and the diastolic pressure exceeds 90 (AHA, 1985). Blood pressure is primarily determined by genetic and lifestyle factors, although age, sex, race, body build, and food intake may have an influence (Fraser, Phillips, and Harris, 1983). High blood pressure may affect as many as 1/3 of the adult population in the United States (Fraser et
al., 1983). It adds to the work load causing the heart to enlarge and become weaker over time (AHA, 1985).

Hypertension is related directly to level of blood pressure and to presence and magnitude of coexistent risk factors (Harrison and Winston, 1982). A relationship to salt intake and overweight has been shown in susceptible people. A reduction of both, salt and weight, usually leads to a reduced systolic and diastolic blood pressure (Harrison and Winston).

Accumulating data indicate clearly that primary hypertension has its origin in childhood (Berenson et al., 1982). A retrospective study (Connolly, Elveback, and Oxman, 1983) found that the presence of hypertension is associated with an increased risk of the development of coronary artery disease. It has been shown that the treatment of hypertension, including mild hypertension, reduces mortality in patients with hypertension (Connolly et al., 1983). Kannel, McGee, and Gordon (1976), in assessing the results of the retrospective Framingham study, found the most useful single factor for detecting persons at high risk of CHD to be blood pressure.

Exercise

Exercise has much in common with both hypertension and cholesterol levels because of the impact that regular exercise has on both. Siscovick, Weiss, Hallstrom, Invi, and Peterson (1982) report that findings suggest that
individuals who engage in high intensity leisure time activities have a reduced risk of primary cardiac arrest.

Fraser et al. (1983) found that for all sex adolescent groupings, for both diastolic and systolic pressures, the more physically fit group had lower blood pressure. The level of physical fitness predicts systolic blood pressure independently of body build measures and age (Fraser et al., 1983). Milhorn (1984) reported that systolic blood pressure in normal persons is unchanged by exercise; however, significant changes in hypertensive persons were observed. Milhorn found the diastolic pressure to remain unchanged in both normal and hypertensive persons with exercise.

In 1984 Milhorn reported that the serum triclyceride level is readily reduced by exercising, but returns to previous levels in three to four days. A triclyceride is formed when three fatty acids combine with glycerol. Serum triclycerides are transported within the blood. Milhorn also found that exercising aerobically three times or more per week reduces triclycerides on a chronic basis as long as the training continues. Aerobic exercise has three main components to it: it must be vigorous, continuous, and regular. Aerobic simply means that the body is using oxygen as its source of energy. Hartung, Foreyt, Mitchell, Ulasek, and Gotto (1980) found in a study of HDL levels in marathon runners, joggers, and inactive men that differences within the three groups were primarily the result of distance run,
not dietary factors. Milhorn (1984) found that cholesterol decreases with exercise only if weight loss also occurs. Although total cholesterol levels may remain unchanged, reduction of LDL and an increase in HDL have been shown to occur.

Greenburg (1984) in a 10 year study of 16,936 Harvard graduates showed exercise to be the single most important indicator of heart disease, showing those who exercised regularly to be at low risk and those with sedentary lifestyles to be at high risk. In a somewhat similar study, Stone (1983), using 21 corporate executives with a mean age of 44.7, measured changes in cardiovascular risk factors after implementing an on-the-job exercise program. Reduction of cardiovascular risk factors ranged from 17-38% on the instruments after six months of exercise program involvement. No modifications in lifestyle were attempted other than exercise.

Benefits can be derived from exercise periods as short at 10 minutes. Ideally sessions should generally be 20-30 minutes long (Milhorn, 1984).

**Smoking**

Cigarette smoking had become a way of life for many Americans until it was determined to be hazardous to health by the Surgeon General in 1964. Harrison and Winston (1982) found that a person's risk of CHD associated with cigarette smoking increases with the number of cigarettes smoked. It
was also determined that the younger an individual was when s/he began smoking, the greater the risk of CHD. The smoking of cigarettes affects platelet adhesiveness, arterial endothelium, susceptibility to ventricular dysrhythmias, oxygen transport and utilization, heart rate, and blood pressure (Harrison and Winston, 1982). Harrison and Winston also found that cigarette smoking appears to depress HDL levels. A cigarette smoker has twice the risk of a heart attack and five times the risk of a stroke than a nonsmoker (AHA, 1985).

Tobacco is one of the most commonly used substances among American adolescents, with 2/3 having tried smoking and 20-25% doing so regularly (Lauer, Ackers, Massey, and Clarke, 1982). Some children begin smoking regularly as early as third grade (Berenson et al., 1982). Baugh, MacDonald-Hunter, Webber, and Berenson (1982) found that half of those starting to smoke do so before the age of 12, and have established the habit by age 14. Baugh et al. also found 60% of children were given their first cigarette and were likely to have smoked it with family members or friends. Children are more likely to begin smoking if they had parents providing a smoking model, had low self esteem, disliked school, and feared failure (Ahlgren, Norem, Hochhauser, and Garvin (1982). Hunter, Baugh, Webber, Sklov, and Berenson (1982) found a positive smoking relationship between brothers' and sisters' smoking
behaviors, and a very strong positive correlation to smoking and peer smoking. In a study by Lauer et al. (1982), 80% of respondents whose parents and friends were nonsmokers indicated they were a nonsmoker, whereas 11% of respondents whose parents and friends were smokers indicated being a nonsmoker. Hunter et al. (1982) found, "the more smokers in a child's environment the more likely s/he will imitate the behavior" (p. 36). Hunter et al. further states,

   Smoking behavior depends not only on the mere presence of users as in trial, but also on the beliefs concerning the social reinforcement consequences associated with continued usage (p. 37).

Adult cigarette smoking has been decreasing since the Surgeon General's report in 1964 (Evans et al., 1981). Cigarette smoking is remaining constant or decreasing in every group except teenage white girls where it is increasing (Evans et al., 1981; Hunter et al., 1982). Teenage girls are now smoking more than teenage boys (Berenson et al., 1982).

There are approximately 33 million Americans who have quit smoking (AHA, 1985). Freidman, Petitti, Banol, and Siegelaub (1981) found that the act of quitting smoking appears to result in a substantial reduction in coronary and total mortality that cannot be explained by the characteristics of quitters before they quit. The AHA (1985) claims that a smoker who quits smoking for 10 years
has the same risk of a heart attack as a person who has never smoked.

**Obesity**

In 1983, Hubert, Manning, McNamera, and Castelli found obesity to be associated with high blood pressure, increased blood lipids, and increased blood glucose. Drawing on the Framingham study, Hubert et al. (1983) point out that obesity is clearly a long-term predictor of CHD incidence particularly in younger members of the cohort, with younger being under 50 years of age. Hubert et al. also found weight to be a very potent risk factor for women, with only age and blood pressure being more powerful predictors. The United States population, particularly men, have been getting heavier over the past few decades (Hubert et al., 1983).

The AAPCN in 1981 found most obese infants do not become obese adults. The AAPCN (1981) stated,

The correlations between obesity in late childhood, adolescence, and adulthood are considerably stronger than those of infancy. As many as 75% of obese adolescents are obese adults (p. 881).

We need to communicate what we know to our children. Kolbe and Newman (1983) estimated that 36-60% of children by age 12 exhibit at least one of the following risk factors: cigarettes smoked, cholesterol level of 180 mg/dl, blood pressure reading in top 5% for sex and age or greater than 140/90, were 120% of ideal weight for height, sex and age,
or scored "poor" on the Harvard step test. Our children are creatures of habit, and we need to begin to give them good sound healthy habits.

Impact of Other Studies on Heart Health

Framingham

The Framingham Study has followed 5,209 men and women residing in Framingham, Massachusetts since 1948, with the first clinical examination conducted in January of 1950. These subjects ranged in age from 30-59, and in order to be considered a subject, a person must have been free of CHD at the beginning of the study. The subjects of the study have undertaken numerous medical tests to determine personal and environmental risk factors to heart health. The personal risk factors assessed were age, sex, blood lipids, blood pressure, impaired carbohydrate tolerance, and ECG abnormalities. The environmental risk factors measured were diet, level of physical activity, obesity, and cigarette smoking (Kannel and Dawber, 1972).

Kannel and Dawber (1972) found,

The development of CHD is not a chance occurrence or merely a consequence of the aging process. It was apparent that certain individuals are highly vulnerable and that the degree of susceptibility could be assessed in asymptomatic persons (p. 798).

Some of these identified risk factors have been mentioned elsewhere within this review in regard to the Framingham Study, but need to be fully tied to this study at this point in time.
When examining the personal risk factors measured within the Framingham Study the following information was discovered. Men are distinctly more prone to CHD than women, although this relative immunity wanes with advancing age (Kannel and Dawber, 1972). Blood lipid content is one of the most potent ingredients of the potential CHD candidate. High blood cholesterol values were the most powerful precursor of CHD. The average value of cholesterol in those who developed coronary attacks was 245 mg per cent (Kannel and Dawber, 1972). Kannel and Dawber (1972) found, the risk of CHD was proportional to the antecedent blood pressure level, systolic or diastolic, casual or basal, at any age in either sex. Even modest elevations of pressure, particularly when associated with lipid abnormalities, were associated with a substantial increase in risk (p. 800).

Risk of coronary events was increased in persons with a tendency to diabetes. These blood lipid abnormalities that accompany diabetes were found present a decade before the appearance of the overt diabetes (Kannel and Dawber, 1972).

Examination of the environmental influences on CHD as measured within the Framingham Study by Kannel and Dawber (1972) leads to the following conclusions. The most sedentary subjects appear to be subjected to substantially higher mortality from CHD. An increased incidence of coronary attacks was observed in the least active persons compared to those who were active. The smoking habits of those in the study were carefully recorded, and inhaled
cigarette smoke was found to be an important contributor to coronary attacks. Risk tended to increase with the number of cigarettes smoked each day. The interpretation of the dietary investigation from this study must be made guardedly. The variation in serum cholesterol level from person to person within the population could not be accounted for by differences in nutrient intake. However, we know that there are many other factors that account for cholesterol levels, and within this population the cholesterol intake was rather high when compared to other populations. Increased weight was associated with an elevation of blood pressure and an increased tendency towards diabetes. Hubert et al. (1983), in a 26 year follow up of the Framingham Study subjects, found obesity, particularly among women, to be a significant independent predictor of CHD. Weight gain after the young adult years conveyed an increased risk of CHD in both sexes that could not be attributed either to the initial weight or the levels of the risk factors that may have resulted from the weight gain (Hubert et al., 1983).

Kannel, McGee, and Gordon (1976) found that in the Framingham Study the chances of developing cardiovascular disease by age 65 are 37% for a man and 18% for a woman. With this in mind, Kannel et al. (1976) developed the risk function to group risk factors together to indicate those
risk factors which are tied closely to a particular cardiovascular disease. Kannel et al. (1976) states,

A single risk factor is neither a logical nor an effective means of detecting persons at high risk of cardiovascular disease. Screening efficiency can be considerably improved if other risk factors are taken into consideration (p. 47).

Kannel et al. (1976) concluded that persons at a high risk of cardiovascular disease could effectively be identified from a measurement of their serum cholesterol and blood pressure, smoking history, an electrocardiogram, and a determination of glucose intolerance.

**North Karelia**

The population of North Karelia, a county in Finland, has a high rate of coronary heart disease. It also has a high prevalence of hypercholesterolemia, but whether this reflects a diet rich in animal fats or is a result of genetic factors is unclear. A number of studies have been done within this county, which will be talked about briefly as they relate to heart health.

Ehnholm et al. (1982), with 52 middle-aged volunteers, significantly reduced total serum cholesterol with a low fat diet and a high ratio of polyunsaturated to saturated fatty acids. These changes reversed when the volunteers returned to their regular diet. This suggests that hypercholesterolemia in this population is due at least in part to dietary factors.
Puska et al. (1982) used the Know Your Body Program (Williams, Carter, and Eng, 1980) in a 2-year study involving 871 13-15 year olds at 3 matched schools, aimed at preventing smoking and influencing dietary habits to reduce serum cholesterol and blood pressure levels. The level of smoking increased in all groups, although not as much in the experimental school as the control schools. The serum cholesterol level dropped in girls, but not boys.

McAlister, Puska, Salonen, Tuomilehto, and Koskela (1982) enacted a health promotion program county wide with the following program objectives: (1) improved preventive services, (2) information to educate people about their health and how to maintain it, (3) persuasion to motivate people to take healthy action, (4) training to increase skills of self-control, environmental management, and social action, (5) community organization for social support and power for social action, and (6) environmental change to create opportunity for health actions and improve various unfavorable conditions. The results of the study were not conclusive, but they were encouraging. The study did bring McAlister et al. (1982) to arriving at the following conclusion:

No matter how effectively a person has been educated, persuaded, and trained to make changes in behavior, it is unlikely that the change will be maintained unless it is reinforced by the social environment (p. 46).
Bogalusa Study

The Bogalusa Study was a major investigation of cardiovascular risk factors in children and adolescents conducted during 1976-1977, involving 3,014 children, ages 8-17 years.

Berenson et al. (1982) found a positive correlation between saturated fat intake and high LDL and very low level lipo-proteins (VLDL) levels, and also that complex carbohydrate intake has an inverse relationship with these levels. In this study Berenson et al. also found obesity of parents and foster parents to be a determinant of childhood obesity.

Hunter, Frerichs, Webber, and Berenson (1979) found that children with a higher socio-economic status had fewer risk factors than their peers. However, the numbers were small and the available methodology for assessing these factors needs to be more precise.

University of Minnesota

Gillum, Taylor, Brozek, Anderson, and Blackburn (1982) reported their findings after following 162 male volunteers for 32 years taking repeated measures of serum cholesterol levels and other variables. The first measurements of the 162 men, with a mean age of 20.5, were taken in 1947. In 1968 it was possible to reexamine 118 subjects and 112 subjects were measured in 1979. The findings of the retrospective study demonstrated that the baseline total
serum cholesterol level was a strong correlate of serum cholesterol levels found 32 years later. This suggests that high cholesterol in middle age may be determined or set early in life (Gillum et al., 1982).

**Seventh-Day Adventist Adolescents**

Cooper et al. (1984) conducted a study on the lifestyle of adolescents attending a Seventh-Day Adventist boarding school and evaluated it as it related to cardiovascular risk factors. The study site was the Broadview Academy, which is located 40 miles west of Chicago. About 200 students boarded at the school full time. The school cafeteria was the only on-site source of food for the students and served a lacto-ovo-vegetarian cuisine in keeping with the Seventh-Day Adventist precepts. Students returned home for a four-day holiday on every fourth weekend and occasionally went out to dinner in local restaurants when their parents came for a visit. There are no vending machines on campus and no commercial centers within walking distance where students could buy food. They were allowed to have pizza and other take-out food delivered about once a month. Virtually all the students were practicing Seventh-Day Adventists and about half maintained a lacto-ovo-vegetarian diet when not at the school. Smoking, alcohol usage, and oral contraceptive use is prohibited by Seventh-Day Adventist Church.
The study involved 43 male/female volunteers from the school with a mean age of 16.3. The total serum cholesterol levels were 138 mg/dl, while the average American youth serum cholesterol level is 170 mg/dl. The blood pressure readings showed an average systolic reading of 104.1 and an average diastolic reading of 65.7 (Cooper et al., 1984). Cooper et al. concluded the following based upon the study results:

Based on current knowledge, these young people enjoy an extremely favorable cardiovascular risk status and, if this lifestyle persists throughout adulthood, they can expect a reduced rate of coronary heart disease relative to the general United States population (p. 476).

Impact of Other Curricula on Heart Health in a Young Population

Health Education Curriculum

As stated by Stone and Rubinson (1979),

Health education is perceived as a process that increases the abilities of people to make informed decisions concerning their personal, family, and community well being (p. 45).

Stone and Rubinson (1979) also stated,

The assumption cannot be made that there is a direct casual relationship between knowledge and behavior. However, it can be assumed that ideally, knowledge is a precursor to appropriate behavior, but correct action is not always based on knowledge (p. 48).
Williams, Carter, and Eng (1980) concluded,

While behavior change may not be demonstrated within 1-2 years, if cognitive and attitudinal changes occur, behavioral change may occur in the future with or without continued education (p. 375).

People, and in particular young children, sometimes fail to distinguish between behaviors and occurrences that may be the outcomes of those behaviors (Ajzen and Fishbein, 1980). Many different behaviors may be responsible for an outcome. McAlister et al. (1982) stated, "it is well known that behavior cannot always be changed simply by providing information" (p. 45). McAlister et al. (1982) went on to list four steps necessary to facilitate the learning of new habits and skills: (1) needs to be modeling of new responses and action patterns, (2) needs to be guided and increasingly independent practice in those thoughts and behaviors, (3) needs to be feedback concerning the appropriateness of responses, and (4) needs to be reinforcement in the form of support. Stone and Rubinson (1979) found that the likelihood of behavioral change is a function of beliefs along four subjective dimensions: (1) personal susceptibility, (2) degree of severity of the consequences, (3) estimation of the benefits of the recommended action, and (4) views of psychological and other cost barriers.

The teaching methodologies incorporated in imparting knowledge to the learner are important for any subject
matter being taught. However, health education because of the material being presented and the potential impact upon the person's life and lifestyle, needs to have learner involvement and participation perhaps more so than any other discipline. Didactic teaching alone has been unsuccessful because children cannot relate information about diseases in adult life to themselves (Williams and Wynder, 1978).

Williams and Wynder (1978) stated, "motivating children to reduce risk for future disease can only be effective within a framework of personal involvement and peer interaction" (p. 212). In regard to heart health education, Williams and Wynder (1978) found the following necessary for motivation: (1) children must be medically screened to become aware of their own risk status; (2) children must receive their own results; (3) children must receive post screening educational materials on risk factor significance; and (4) children must be channeled into active intervention programs within a peer setting so healthy behavior becomes the norm rather than the exception. Williams and Wynder (1978) felt that screening for risk factors provides the "reality factor" which makes health education personal and pertinent. Children are more present oriented than future oriented. When teaching heart health one should stress the immediate effects rather than the long term (Evans et al, 1981).
School Health Curriculum Project

This was developed in 1969 and was designed not only to affect the child, but also classmates, teachers, family, and the community. The focus of the curriculum was to aid the child in realizing that one's body is his/her greatest resource and asset. Studies indicate that students enrolled in the project showed greater health knowledge and preventive health behavior two to five years after being exposed to the curriculum than those not exposed (Stone and Rubinson, 1979).

School Health Education Study

This study, which began in 1961, was concerned with the status and effectiveness of health education programs in the nation's schools. The study involved the development of a conceptual framework for a K-12 curriculum, with 10 major concepts to serve as major organizing elements reflecting scope and sequence of health education. There were three key concepts interweaving everything: growing and developing, interacting, and decision making. Results of field testing indicated that the concept approach used in developing the new curriculum did reveal relationships between ideas which enabled the student to make generalizations and broader applications of their knowledge. In general the experimental classes performed better with respect to health knowledge than did the control classes (Stone and Rubinson, 1979).
Health Activities Project

This project began in 1975 and has developed several learning modules relating to the concept of fitness. Student-centered modules have been developed for use with fifth through eighth grade students. The program is geared toward making children more aware of the control and responsibility that they have concerning their own health and safety. Children develop an awareness that they possess a considerable degree of control over their bodies and can change their health habits in the present and the future. The students involved in the project evaluation indicated a preference for activities relating to certain aspects of health that they could control in some manner. Other findings emphasized the importance of the teacher's role in how s/he relates to the project activities in the classroom and the significance of the role of the home as a source of health information (Stone and Rubinson, 1979).

Body Power

This was developed by the Chicago Heart Association in 1975. The educational strategies of the program stressed that the students are active participants in the learning process, and that teaching learning activities should include value clarification techniques, value grids, role playing, games and experiments. This program appears to develop positive attitudes in children concerning their self-concept and the promotion of preventive health behavior.
at an early age. Also, the use of humanistic education tends to provide students with strategies useful in decision-making skills and value clarification (Stone and Rubinson, 1979).

Know Your Body

The Know Your Body curriculum is designed around a health decision-making framework in which health concepts are taught in relation to lifestyle behavioral patterns (Williams et al., 1980). The Know Your Body program began in 1975 in New York area city schools. It was initially designed to identify major chronic risk factors among a cohort of 11-14 year old children and to intervene to reduce risk (Williams, Carter, Wynder, and Blumenfeld, 1979). It is an action-oriented school health education program with a high degree of personal involvement (Williams et al., 1980). The major intervention goals are directed toward reducing cigarette smoking and dietary modification (reduced intake of saturated fats and cholesterol) (Williams and Wynder, 1976). When it was discovered that many children had already began smoking or had a weight problem at this age, the curriculum was developed for grades K-12. The program provides specific strategies on modifying lifestyles that are designed to reduce risk factors (Stone and Rubinson, 1979).
AHA Heart Health in the Young Curriculum

The AHA began constructing the modular curriculum format in the summer of 1977 with the hiring of Dr. Betty Tevis. A committee was established in the summer of 1978 to include educators and to update materials and films. The modules were then sent out to the AHA affiliates and teacher training centers. The modules were developed with the local community in mind for development of a local curriculum. The theory behind the modules was that they could be used as desired by the education facilitator (Betty Tevis, personal communication, January 29, 1986). The modules were developed for K-2, 3-5, and 6-8. The modules were developed around risk factor areas and were designed for integration into existing school health programs (AHA, 1982).

The review of related literature clearly illustrates the importance of heart health instruction for young people. Making children aware of their bodies and how they can control and maintain a state of wellness within themselves is an important concept to present and a difficult one for most young people to grasp. We are creatures of habit. It is important to begin good healthy habits at an early age. The freedom offered within the AHA curriculum allows for each individual instructor to adapt to his/her particular group of students. Since the curriculum has never truly been tested in an experimental manner, this study is certainly significant in many ways.
CHAPTER III
METHODOLOGY

Subjects

The subjects of the study were male and female members of the eighth grade classes at St. Stanislaus and St. Stevens parochial grade schools in Stevens Point, Wisconsin. Stevens Point is a community of 25,000 people located in Portage County in central Wisconsin.

The eighth grade class at St. Stevens was made up of 14 girls and 11 boys, with a median age of 14.1. This group of students received the AHA Heart Health in the Young curriculum and will be referred to as the experimental group. The eighth grade at St. Stanislaus was made up of 9 girls and 14 boys, with a median age of 13.9. This group of students received their regular health education curriculum and will be referred to as the control group. All of the students within the study were attending parochial schools, meaning their parents pay tuition and are of the Catholic faith.

Instruments

The Know Your Body Health Knowledge Questionnaire for grades 6-8 was used to assess knowledge change scores. The questionnaire was made up of 52 true and false questions. There was a built-in no response column.
for those not knowing the answer to avoid guessing. The test-retest reliability of the instrument is 0.80 for a one-week interval (Williams et al., 1980).

The instrument used to measure a Heart Healthy Diet was the Dennison Inventory of Nutritional Experiences, DINE, created by Darwin Dennison in 1979. The DINE system, now in its sixth edition, is a micro-computer nutritional program with over 3,500 foods coded. Foods eaten over a 24-hour time span were coded and placed into the DINE system. The DINE system rates dietary intake on a scale of 0 to 10, with 0 being the lowest possible score and 10 being the best possible score. The DINE system was compared to two mainframe computers taking the nutrient content of six major dietary components and comparing them by using an analysis of variance (Frank and Pelican, 1986). The DINE system reported a consistently lower level than the Nutrition Coding Center (p=.103) (Frank and Pelican, 1986). Frank and Pelican felt that this modest test of validity revealed close agreement among the three systems for the six dietary components examined.

The instrument used to measure smoking and exercise behavior was taken from the Know Your Body Health Habits Survey (Williams et al., 1978). The test re-test reliability of this instrument was determined by the
researcher to be 0.86 for a three-week interval, which was the time span also used in this study. This was determined by administering the survey to 31 eighth grade students at Ben Franklin Junior High School in Stevens Point, Wisconsin.

**Procedures**

This is a pre-test post-test experimental study. The eighth grade students' knowledge and behavior change scores serve as the dependent variables and the presence or absence of the AHA Heart Health in the Young curriculum acted as the independent variable. The students at both of the schools in the study were attending that school primarily because of religion and location within the community of Stevens Point. Since the students were not assigned to the school through any leveling or tracking system, it was reasonable to assume that any academic differences between the two groups was randomly distributed.

The experimental and control groups took the knowledge test and the behavior change instrument (Appendix A) on Friday, February 28, 1986. Beginning on Monday, March 3, the AHA Heart Health in the Young curriculum (Appendix B) was implemented for the next 15 school days at St. Stevens, while the students at St. Stanislaus attended regular health education classes. On
Monday, March 24, 1986 both the control and experimental groups were again administered the instruments.

In any experimental design there are possible confounding variables that pose a threat to the validity of the study. This study was no exception, and the researcher would like to point those out at this time.

The Hawthorne effect concerning a test-retest situation may have brought about change in both groups due to the attention the subjects received. This could be more noticeable in the areas of behavior change than in knowledge change. The random distribution of the subjects should have eradicated this situation.

Statistical regression as a result of testing the groups two times could also be viewed as a confounding variable. Since the subjects of the study attend separate schools within the city of Stevens Point, intersubject interaction was very low. The researcher guarded against the experimenter effect of allowing personal characteristics and behaviors bias the study. The study was delayed until March in order to avoid any historical inference that possibly may have been brought about by February being National Heart Month.

The data was collected by the researcher at the end of each testing period, with the results being recorded. The researcher was the only person to handle the results of the testing.
Data Analysis

The collected data is presented with descriptive statistics for the following: knowledge change scores of the control group and knowledge change scores of the experimental group, behavioral change scores for both smoking and nutrition of the control group, and behavioral change scores for smoking and nutrition of the experimental group. The change scores for both of the groups were obtained by subtracting the pre-test score from the post-test score.

The inferential parametric statistical analysis of a between groups T-test was used at a significance level of 0.05 to determine the significance of research hypotheses 1-4. This was determined by having the presence or absence of the AHA Heart Health in the Young curriculum, a dichotomous nominal variable, as the independent variable in each one, with knowledge scores and behavior change scores being interval ratio dependent variables. The statistical test employed for hypotheses 5-10 was the Pearson correlation at a significance level of 0.05. The knowledge change scores, an interval ratio variable, act as the independent variable and the behavior change score, also an interval ratio variable, as the dependent variable.
CHAPTER IV
RESULTS

The subjects of this study were male and female members of the eighth grade classes at St. Stanislaus and St. Stevens parochial grade schools in Stevens Point, Wisconsin. The eighth grade class at St. Stevens was made up of 13 girls and 12 boys, with a mean age of 14.1 years. This group of students received the AHA Heart Health in the Young curriculum and will be referred to as the experimental group. The number of subjects dropped from 25 to 23 because one of the girls went on a two-week vacation to Hawaii with her family and one of the boys was pulled from the unit by his parents.

The eighth grade at St. Stanislaus was made up of 9 girls and 14 boys, with a mean age of 13.9 years. This group received regular health education classes and will be referred to as the control group.

This study was designed to determine the impact of the AHA Heart Health in the Young curriculum on knowledge and behavior in the areas of smoking, exercise and nutrition. The collected data along with the stated hypotheses are displayed in the remainder of this chapter.

The first hypothesis was stated as follows: The students exposed to the AHA Heart Health in the Young
curriculum will not demonstrate a significant increase in cardiovascular knowledge scores when compared to students exposed to the traditional curriculum. The students of both groups were administered a 52 question true and false examination as a pre-test, with the experimental group receiving the three-week AHA Heart Health Curriculum, and then both groups were given the same examination as a post-test. The subjects were provided with the opportunity to respond to a question with an alternative "I don't know" response to reduce the guessing. Table 1 illustrates the data on pre-test knowledge scores and Table 2 the post-test knowledge scores.

Table 1 - Knowledge Pre-test Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>24.74</td>
<td>26.35</td>
</tr>
<tr>
<td>S.D.</td>
<td>5.03</td>
<td>6.41</td>
</tr>
<tr>
<td>High Score</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Low Score</td>
<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>
The knowledge change scores were then calculated and the statistical significance was determined by conducting a between groups T-test at a significance level of .05. The results of this test are demonstrated in Table 3.

The data illustrated a clear rejection of the stated null hypothesis. One would expect an increase in knowledge when exposed to a three-week curriculum.

The second hypothesis was stated as follows: The students exposed to the AHA Heart Health in the Young curriculum will not demonstrate a significant reduction in smoking behavior in the area of cigarette smoking when compared to the students exposed to the traditional curriculum. This hypothesis was not stable because none of
Table 3 - Knowledge Change Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>18.30</td>
<td>1.91</td>
</tr>
<tr>
<td>S.D.</td>
<td>4.55</td>
<td>6.32</td>
</tr>
<tr>
<td>T-Value</td>
<td>-9.9939</td>
<td></td>
</tr>
<tr>
<td>One Tailed Probability</td>
<td>0.0001</td>
<td></td>
</tr>
</tbody>
</table>

the respondents to the questionnaire in either the control or experimental groups reported to be a cigarette smoker. A total of 19 subjects, 8 in the control group and 11 in the experimental group, reported to have tried cigarettes, but no one indicated to be a current user of cigarettes. This was encouraging from a health standpoint, but made the hypothesis untestable.

The third hypothesis reads as follows: The students exposed to the AHA Heart Health in the Young curriculum will not demonstrate a significant increase in Heart Healthy Diet behavior when compared to the students exposed to the traditional curriculum. Table 4 displays the pre-test
information for both groups, with Table 5 illustrating the post-test data.

Table 4 - DINE Scores Pre-test

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>3.217</td>
<td>3.239</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.251</td>
<td>1.437</td>
</tr>
<tr>
<td>High Score</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Low Score</td>
<td>0.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 5 - DINE Score Post-test

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>2.978</td>
<td>2.000</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.488</td>
<td>1.390</td>
</tr>
<tr>
<td>High Score</td>
<td>6.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Low Score</td>
<td>1.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
A between groups T-test was implemented to determine the statistical significance at a level of .05 of the DINE change scores from pre-test to post-test. The results of that test are demonstrated in Table 6.

Table 6 - DINE Change Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>-0.239</td>
<td>-1.239</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.802</td>
<td>1.287</td>
</tr>
<tr>
<td>T-Value</td>
<td>-2.1658</td>
<td></td>
</tr>
<tr>
<td>One Tailed</td>
<td>0.0168</td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of this hypothesis indicate statistical significance, but in the opposite direction stated in the hypothesis. Both the experimental and control groups demonstrated a decrease in heart healthy dietary behavior. These results lead to a failure to reject the null hypothesis.

The fourth hypothesis was stated as follows: The students exposed to the AHA Heart Health in the Young
curriculum will not demonstrate a significant change in exercise behavior when compared to the students exposed to the traditional curriculum. The type of exercise that was being surveyed was strenuous aerobic type exercise, with the subjects being asked how many times per week they engaged in this type of exercise. The top answer in the questionnaire was 4 times per week, with 0 times per week being the lowest possible score. Table 7 illustrates the pre-test exercise levels of both groups, with Table 8 demonstrating the post-test exercise levels for both groups.

Table 7 - Exercise Levels Pre-test

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>2.52</td>
<td>2.74</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.34</td>
<td>1.01</td>
</tr>
<tr>
<td>High Score</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Low Score</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

A between groups T-test was implemented to determine the statistical significance of the exercise change scores at a level of .05. Table 9 indicates the results of that test.
Table 8 - Exercise Levels Post-test

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>2.43</td>
<td>2.87</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.20</td>
<td>1.06</td>
</tr>
<tr>
<td>High Score</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Low Score</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 9 - Exercise Change Scores

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>-0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>S.D.</td>
<td>1.20</td>
<td>0.55</td>
</tr>
<tr>
<td>T-Value</td>
<td>0.7888</td>
<td></td>
</tr>
<tr>
<td>One Tailed</td>
<td>0.2210</td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This failed to demonstrate any significance. As seen in Table 9 the exercise level decreased in the experimental
group and increased in the control group. These results led to a failure to reject the null hypothesis.

The fifth and sixth hypotheses were not testable due to the fact that there were no reported cigarette smokers in either the experimental or control groups.

The seventh hypothesis was stated as follows: There is no significant relationship between knowledge change scores and diet behavior change in the experimental group. A Pearson correlation of .4135 indicates a fairly strong relationship between knowledge and diet behavior. Table 10 demonstrates the data.

Table 10 - Correlation Knowledge-Diet Experimental Group

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge Change</th>
<th>DINE Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>18.30</td>
<td>-0.239</td>
</tr>
<tr>
<td>S.D.</td>
<td>4.62</td>
<td>1.802</td>
</tr>
<tr>
<td>Correlation</td>
<td>0.4135</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>0.0237</td>
<td></td>
</tr>
</tbody>
</table>

A significance level of 0.0237 indicates a decision to reject the null hypothesis. As in hypothesis three the significance indicated is in the opposite direction that was
anticipated. As knowledge increased, heart healthy diet decreased in the experimental group.

Hypothesis number eight was stated as follows: There is no significant relationship between knowledge change scores and diet behavior change in the control group. A Pearson correlation of -0.0362 indicates little relationship between knowledge and diet behavior. Table 11 demonstrates the data.

Table 11 - Correlation Knowledge-Diet Control Group

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge Change</th>
<th>DINE Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>1.91</td>
<td>-1.239</td>
</tr>
<tr>
<td>S.D.</td>
<td>6.32</td>
<td>1.287</td>
</tr>
<tr>
<td>Correlation</td>
<td>-0.0362</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>0.4319</td>
<td></td>
</tr>
</tbody>
</table>

A significance level of .4319 indicates a decision to fail to reject the null hypothesis.

The ninth hypothesis states: There is no significant relationship between knowledge change scores and exercise behavior change in the experimental group. A Pearson correlation of .2620 indicates a weak relationship between
knowledge and exercise behavior. The data is displayed in Table 12.

**Table 12 - Correlation Knowledge - Exercise Experimental Group**

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge Change</th>
<th>DINE Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>18.30</td>
<td>-0.09</td>
</tr>
<tr>
<td>S.D.</td>
<td>4.72</td>
<td>1.20</td>
</tr>
<tr>
<td>Correlation</td>
<td>0.2620</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>0.1127</td>
<td></td>
</tr>
</tbody>
</table>

A significance level of .1127 indicates a decision to fail to reject the null hypothesis.

The tenth and last hypothesis was stated as follows: There is no significant relationship between knowledge change scores and exercise behavior change in the control group. A Pearson correlation of .1216 indicates little relationship between knowledge and exercise behavior. The data and results are posted in Table 13. A significance level of .2933 indicates a decision to fail to reject the null hypothesis.
Table 13 - Correlation Knowledge-Exercise Control Group

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge Change</th>
<th>DINE Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>1.91</td>
<td>0.13</td>
</tr>
<tr>
<td>S.D.</td>
<td>6.32</td>
<td>0.55</td>
</tr>
<tr>
<td>correlation</td>
<td>0.1216</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>0.2933</td>
<td></td>
</tr>
</tbody>
</table>

Discussion/Implications

The most exciting finding of the study has to be the significance of the knowledge change scores in the experimental group. However, it is well known, and has been reported earlier within this document, that knowledge alone is insufficient to motivate change. A three-week period of time is not long enough to notice a change in behavior. Diet and exercise patterns are not easily changed and certainly not readily within such a short time frame. The findings of McAlister (1982) demonstrate the need for effective modeling, feedback, and reinforcement of the appropriate choices, as well as the opportunity to make these decisions on an increasingly independent basis.
Consideration has to be made in regard to students' control of choices. How much control does s/he have over the meals being served at home and in school? How much control does s/he have over the type of snack foods afforded him/her at home? How much access does s/he have to exercise facilities and equipment? Most eighth grade students are under the control of their parents and what their parents' choices are in the above areas.

As McAlister stated in 1982,

No matter how effectively a person has been educated, persuaded, and trained to make changes in behavior, it is unlikely that the change will be maintained unless it is reinforced by the social environment (p. 46).

A daily class period of 40 minutes for 15 consecutive class days is probably not going to be enough social reinforcement for most students. Parental involvement and total family education is perhaps the most effective method of bringing about behavior change.

This investigation provides information in regard to the AHA curriculum being capable of bringing about knowledge change, but not behavior change over a short term. The implications for further study are many.
CHAPTER V
CONCLUSIONS

Summary

The purpose of this study was to determine if the AHA Heart Health in the Young curriculum could significantly change cardiovascular knowledge scores and behaviors in the areas of smoking, diet and exercise in an eighth grade population.

The AHA curriculum was implemented for 15 consecutive school days with a pre-test and post-test administered to measure change in knowledge and behavior. The experimental subjects attended St. Stevens parochial school, with the control group attending St. Stanislaus parochial school. Both of the schools are located in Stevens Point, Wisconsin.

The data was analyzed within the framework of a series of between groups T-tests and the Pearson product moment correlations. The alpha level was established at the .05 level of significance.

The first hypothesis dealt with the knowledge change scores within the two groups and how this knowledge change correlated with behavioral change within each group.

On the basis of the results of this investigation, and within the limitations of the population studied, the following conclusions were reached:
1. Statistical significance was demonstrated in knowledge change scores in the experimental group vs. the control group.

2. Of the 46 subjects involved in either the experimental or control groups no one reported to be a smoker of cigarettes, making it impossible to test the hypotheses in regard to smoking behavior.

3. There was statistical significance demonstrated in diet behavior change for both the experimental and control groups. Both groups experienced a reduction in their DINE scores.

4. There was not a statistical significance demonstrated in exercise behavior changes in either the experimental or the control group.

5. There was not a statistically significant correlation demonstrated in the experimental group between knowledge change scores and change scores in exercise.

6. There was a statistically significant correlation demonstrated in the experimental group between the knowledge change scores and heart healthy diet behavior. This relationship was negative. As knowledge increased, diet behavior decreased.

7. There was not a statistically significant correlation demonstrated in the control group between knowledge
change scores and change scores in either diet or exercise.

Conclusions

In conclusion, the results of this study indicated:

1. The AHA curriculum impacted in a statistically significant manner on knowledge.
2. The AHA curriculum did not impact in a statistically significant manner on behavior change scores in the areas of exercise or diet.
3. There was not any statistically significant correlation demonstrated between knowledge change scores and behavior change scores in exercise.
4. Statistical significance was demonstrated in a negative direction in diet behavior.
5. Statistical significance was demonstrated in a correlation between knowledge change and diet change illustrating decreased heart healthy diet with increased knowledge.

Recommendations

As a result of this investigation, the following suggestions for further study have been made:

1. A replication of this study should be conducted, but focus on intent to behave rather than actual behavioral change.
2. A replication of the study should be conducted with the post-test being conducted 6-8 weeks after the unit to
determine if knowledge gained is retained and to see if behavioral change would occur with a longer time span.

3. A replication of the study should be conducted to determine the impact of curriculum on cigarette smoking by choosing a different group of subjects.

4. A replication of the study should be done in a different socio-economic group to determine the impact on a different population.

5. A replication of the study should be done with an attempt made to also include the parents, so the participants would have the necessary social support.

6. A replication of the study should be done focusing upon different age groups.

7. A replication of the study should be done focusing upon gender to determine if there is any difference between the sexes.
REFERENCES


Appendix A

Knowledge, Smoking, and Exercise Inventory

Students fill in the letter "a" for TRUE statements and the letter "b" for FALSE statements. If you DON'T KNOW the answer please fill in the letter "c".

1. All smokers gain weight when they quit smoking.
2. Cholesterol is a fatty substance found in everyone's blood.
3. High blood cholesterol levels are found in only adults.
4. Air pollution causes more cases of lung cancer than cigarettes.
5. Smokers who cough and spit alot probably have bronchitis.
6. Cholesterol buildup in the arteries may interfere with the blood flow in the body.
7. A risk factor is a health condition or habit which increases the chance of developing certain chronic diseases.
8. People with high blood pressure usually feel sick.
9. The first few cigarette puffs contain the most tar and nicotine.
10. The main danger in having clogged arteries is that they lead to heart attacks.
11. High blood pressure may cause damage to the kidneys.
12. When tar and nicotine are removed from cigarettes, there are no other chemicals in tobacco that cause disease.

13. Symptoms of lung cancer usually do not appear until it is too late to cure the disease.

14. People should eat fish and poultry instead of meats to lower their cholesterol levels.

15. Drinking whole milk tends to lower the blood cholesterol levels.

16. People with high blood pressure should avoid all kinds of exercise.

17. Unsaturated fats are mostly oils from plant and vegetable sources, including cottonseed, soybean, and corn.

18. Cholesterol is not necessary to maintain health.

19. Regular physical exercise may help delay or prevent a heart attack.

20. To reduce blood cholesterol, people should eat unsaturated fats.

21. If a person has low blood pressure, less strain is placed on the heart.

22. When people who have been heavy smokers for many years quit smoking, it does not make any difference on their health.
23. A person who is underweight is more likely to have diabetes than an overweight person.

24. Eating "luncheon meats" such as hot dogs, sausage and salami will raise blood cholesterol levels.

25. Foods like chicken, safflower oil and skim milk contain less cholesterol than liver, beef steak, and butter.

26. Fried foods contain less fat than foods that are roasted or broiled.

27. A good blood cholesterol level for persons 10 to 14 years old is 140.

28. Generally, low blood pressure is as serious a condition as high blood pressure.

29. A doctor measures cholesterol by testing the blood.

30. Lung cancer is difficult to detect early.

31. Hardening of the arteries is caused by the buildup of sugar in the walls of the arteries.

32. People who are overweight should go on crash diets to lose weight as quickly as possible.

33. Smoking filter tip cigarettes prevents all the tars from reaching the lungs.

34. Another name for high blood pressure is hypertension.

35. Eating saturated fats tends to raise cholesterol levels in the blood.

36. Most persons with high blood pressure need to lose weight.
37. It is harmful for a non-smoker to breathe in smoke from a burning cigarette.
38. Most high blood pressure is difficult for doctors to treat.
39. Hardening of the arteries can begin in childhood.
40. Blood pressure is the force of the blood against the walls of the arteries.
41. Persons who smoke pipes and cigars are as likely to develop lung cancer as cigarette smokers.
42. Smoking just one cigarette will increase a person's heart rate.
43. Organ meats such as liver are very high in cholesterol.
44. People with high blood pressure may need to take medicine for the condition even though they feel well.
45. Cigarette smoking generally does not affect the tiny hair-like cilia that keep the lungs clean.
46. In most cases, the causes of high blood pressure are unknown.
47. Saturated fats are primarily animal fats such as fat in meat, eggs, and butter.
48. Excess food, whether fat, protein, or carbohydrates, is changed into fat by the body.
49. Emphysema is a lung disease probably caused by cigarette smoking.
50. Vegetables and fruits do not contain cholesterol.
51. High blood pressure is a condition affecting only nervous people.

52. People with high blood pressure need to reduce their salt intake.

HOW MANY TIMES PER WEEK DO YOU DO THE FOLLOWING KINDS OF EXERCISE?

53. STRENUOUS EXERCISE: (heart beats rapidly). Like - running, jogging, swimming, baseball, football, basketball, soccer, volleyball, singles tennis, active gymnastics, bicycling up hills or long distances.
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 times
   e. 4 times or more

54. MODERATE EXERCISE: (not exhausting). Like - brisk walking, dancing, doubles tennis, easy bicycling, easy swimming, housework, bowling, golf.
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 times
   e. 4 times or more
55. MILD EXERCISE: (minimal effort). Like - average walking, quiet play, slow dancing.
   a. 0 times
   b. 1 time
   c. 2 times
   d. 3 times
   e. 4 times or more

56. Whom do you generally exercise with?
   a. alone
   b. with friends
   c. with a brother or sister
   d. with father or mother

HOW MANY OF YOUR BEST FRIENDS CURRENTLY:

57. Smoke cigarettes
   a. 0
   b. 1
   c. 2
   d. 3
   e. 4 or more

58. Smoke marijuana
   a. 0
   b. 1
   c. 2
   d. 3
   e. 4 or more
HAVE YOU EVER TRIED:

59. Cigarettes
   a. yes
   b. no

60. Marijuana
   a. yes
   b. no

HOW MANY TIMES A WEEK DO YOU GENERALLY:

61. Smoke cigarettes
   a. 0
   b. 1-3
   c. 4-6
   d. 7-9
   e. 10 or more times

62. Smoke marijuana
   a. 0
   b. 1-3
   c. 4-6
   d. 7-9
   e. 10 or more times
63. How does your mother feel about whether or not you smoke cigarettes?
   a. Approves
   b. Disapproves
   c. Doesn't care
   d. Doesn't know that I smoke

64. How does your father feel about whether or not you smoke cigarettes?
   a. Approves
   b. Disapproves
   c. Doesn't care
   d. Doesn't know that I smoke

Answer questions 65 to 68 only if you have smoked any cigarettes in the past month.

65. With whom are you usually with when you smoke cigarettes?
   a. family
   b. friends
   c. alone

66. Do you inhale when you smoke cigarettes?
   a. all the time
   b. sometimes
   c. never
67. Do you have a brand of cigarettes that you smoke most of the time?
   a. yes
   b. no

If yes, write brand here

68. How many cigarettes have you smoked in the past 7 days?
   a. 1-5
   b. 6-10
   c. 11-15
   d. 16-20
   e. 21 or more

Which of your relatives has had or presently has what conditions?

69. Diabetes (sugar in the blood
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

70. High blood pressure
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know
71. High cholesterol
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

72. Heart attack before age 50 years
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

73. Heart attack when age 50-64 years
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

74. Heart attack after age 64 years
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know
75. Cancer (write in what kind ________________)
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

76. Stroke
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

77. Obesity
   a. mother
   b. father
   c. grandparents
   d. no one in the family
   e. don't know

Which family members currently smoke cigarettes or smoked in the past?

78. Child's mother
   a. currently smokes cigarettes
   b. smoked, but quit
   c. never smoked
79. Child's father
   a. currently smokes cigarettes
   b. smoked, but quit
   c. never smoked

80. Child's brother
   a. currently smokes cigarettes
   b. smoked, but quit
   c. never smoked

81. Child's sister
   a. currently smokes cigarettes
   b. smoked, but quit
   c. never smoked
Appendix B
AHA Heart Health in the Young Curriculum

Circulation of the Blood

Classroom materials -
Film - Circulation of the Blood - order number P-667-A

Student materials -
Circulatory System Chart - pp. 9-10 HS
Your Heart and How it Works - pp. 13-14 HS
About Your Heart and Bloodstream - pp. 17-20 HS
Work Sheet and Word Find - pp. 21-22 HS

Cardiovascular System Diseases

Classroom materials -
Film - What Goes Up - Blood Pressure
Sphygmomanometer
Stethoscope

Student materials -
About Your Heart and Blood Pressure - pp. 91-92 HS
Blood Pressure Crossword Puzzle - pp. 97-98 HS

Smoking

Classroom materials -
Films - Let's Talk About Smoking
Smoking Lung - Courtesy of the American Cancer Society
Cigarettes
Student Materials

Reasons We Give For Smoking - p. 41 JHS
Pressures to Smoke - p. 49 JHS
Why Smoke? - pp. 51-52 JHS
Why Be a Nonsmoker? p. 53 JHS
Smoking and Me - pp. 59-62 JHS
Advertisements Big Sell - pp. 55-57 JHS

Exercise

Classroom materials -
Films - The Exercise Film

Student materials -

Exercise and Weight Control - pp. 49-50 JHS
Exercise and Weight - p. 52 HS
Exercise Is - p. 52 HS
Voting on Exercise - p. 54 HS
Exercise and You - p. 59 HS
About Your Heart and Exercise - pp. 85-86 JHS
Benefits of Exercise - p. 55 HS
Five Myths of Exercise - pp. 60-61 HS
How Do I Begin an Exercise Program - pp. 52-53 HS
How Hard Should I Exercise - p. 64 HS

Nutrition

Classroom materials -
Film - Body Fuel
Student materials –

Heart Healthy Word Find - pp. 89-90 JHS

Foods I Eat Most Often - pp. 101-102 JHS

Food Diary

Heart Health Snacks

Day-to-day implementation of the AHA Heart Health in the Young curriculum.

Unit Objective

The students will be able to identify their own personal cardiovascular risk factors and list ways of altering their lifestyles to reduce chances of cardiovascular problems.

Each and every day to do our hearts a favor, either before class or at the end for 3-5 minutes, we did an activity to music as a group. At the end we measured our pulse rates and compared them to our target heart rates when we arrived at that point in the curriculum.

Day 1

Objectives

The student will be able to:

1. describe how blood travels through the body
2. differentiate between a vein and an artery
3. conceptualize the simple workings of the heart.

Heart Facts - 1985 - 5-10 minutes
Film - Circulation of the Blood - 10 minutes
Discussion and questions at the end of the film - 10-15 minutes
Teacher will use large chart of the circulatory system to illustrate and explain YOUR HEART AND HOW IT WORKS. The students will receive handouts, while teacher will use the large chart to explain.
Assign - Crossword Puzzle on Heart

Day 2
Objectives
The student will be able to:
1. locate and calculate pulse rate
2. trace movement of blood through the heart
3. define the following vocabulary: artery, capillary, arteriole, pulmonary circulation, vein, venule, aorta, systemic circulation, oxygen, atrium, dilation, inferior vena cava, circulatory system, carbon dioxide, ventricle, contraction, superior vena cava.
Answer crossword puzzle on overhead projector - 5 minutes
Trace blood movements through the heart and understand the vocabulary concerning the heart - 15-20 minutes
Locate pulse and calculate heart rate when sitting, standing, and lying down and explain why there is a difference in pulse rates for each body position. List other possible causes of pulse rate changes - 15 minutes
Assign - Read About Your Heart and Bloodstream. Complete the following handouts: Circulatory System, About Your Heart and Bloodstream, and Word Find - 5 minutes

Day 3
Objectives
The student will be able to:
1. explain what blood pressure is and how it is measured using a sphygmomanometer
2. differentiate between diastolic and systolic blood pressure readings
3. explain what hypertension is.
Correct and review circulatory system and About Your Heart and Bloodstream - 10 minutes
Film - What Goes Up - 10 minutes
Discuss film and ask questions - 10 minutes
What is blood pressure? Diastolic and systolic - 5 minutes
Assign - Blood Pressure Crossword Puzzle

Day 4
Objectives
The students will be able to:
1. demonstrate the proper procedure for taking blood pressure using a sphygmomanometer and a stethoscope
2. write down their own blood pressure
3. list three causes of primary hypertension
4. list three causes of secondary hypertension
5. identify the effects of uncontrolled hypertension.

Review Crossword Puzzle - 5 minutes

Take the blood pressure of the class members using a stethoscope and a sphygmomanometer with the assistance of 4-5 college students - 15-20 minutes

Primary and secondary causes of hypertension - 5-10 minutes

Effects of uncontrolled hypertension - 5 minutes

What can be done to control hypertension? - 5 minutes

Day 5

Objectives

The students will be able to:

1. explain what atherosclerosis is
2. list factors that can possibly cause atherosclerosis to occur and progress
3. list at least five foods high in cholesterol
4. explain what a heart attack is
5. identify the warning signals of a heart attack.

What is atherosclerosis? - 5 minutes

What is cholesterol and where does it come from? - 5 minutes

What foods add cholesterol to the blood? - 5 minutes

Effects of uncontrolled atherosclerosis - 5 minutes

Warning signals of a heart attack - 5-10 minutes

How to reduce the chances of having a heart attack - 5-10 minutes
Day 6

Objectives

The student will be able to:

1. explain what a stroke is and identify the warning signals of a stroke
2. identify the warning signals of a stroke
3. identify what the risk factors are for cardiovascular disease
4. define the following vocabulary: diastolic, atherosclerosis, stroke, collateral circulation, angina pectoris, aneurysm, systolic, hypertension, heart attack, cholesterol, varicose veins, embolism.

What is a stroke? - 5 minutes

Warning signals of a stroke - 5-10 minutes

Other problems of the cardiovascular system - rheumatic fever, congenital heart defects - 10 minutes

Identify risk factors to heart and blood vessel disease and discuss those that are modifiable and those that are not - 15 minutes

Day 7

Objectives

The student will be able to:

1. keep a three-day record of exercise activity beginning today
2. discuss with peer his/her feelings and perception about exercise.

The Exercise Film - 10 minutes
Discussion and questions - 5-10 minutes
Exercise is... alone - small groups - 10 minutes
Start recording daily exercise activities
Handout for student reading - About Your Heart and Exercise
Assign - Scramble Words - Benefits of Exercise

Day 8
Objectives
The student will be able to:
1. calculate calories used during exercise
2. keep a three-day record of their exercise activity
3. decide how to begin an exercise program
4. list the benefits of regular exercise
5. determine and calculate maximal and target heart rates
6. explain the effect excess weight has upon the heart
7. identify exercise intensity, frequency and duration
8. keep a daily log of food intake.

Benefits of exercise - small groups 5-10 minutes
Determine and calculate maximal and target heart rates - 10-15 minutes

How Hard Should I Exercise - 5 minutes
Exercise and Pulse Rates - 5 minutes
Exercise and Weight - 5-10 minutes
Assign - Fitness Likes
Start to Chart Food Intake

Day 9
Objectives
The student will be able to:
1. set up a personal exercise program
2. list some common myths of exercise
3. share with peers personal exercise patterns
4. define the following vocabulary: fitness, static exercise, stroke volume, frequency, intensity, aerobic exercise, cool down, cardiovascular fitness, dynamic exercise, maximal heart rate, target heart rate, duration, aerobic exercise, warm up.

Do through fitness likes and relate them to setting up an exercise program - small groups - 15 minutes

Look at exercise records of the previous two days and discuss - small groups - 10 minutes

Discussion topic - 5 Common Myths About Exercise - 10 minutes

Nutrition Handout - Lifestyle

Day 10
Objectives
The student will be able to:
1. explain the exercise programs available to the employees at Sentry Insurance
2. explain the ideas behind corporate fitness programs.

Field trip to Sentry Insurance - Dealt with exercise programs, exercise prescription, physical examinations given before exercise begins, i.e. stress test, etc.

Day 11
Objectives
The student will be able to:
1. identify foods that are high in calories and fats
2. explain how to cut down on intake of saturated fats
3. identify foods high in sugar and calories
4. identify foods high in sodium
5. list foods considered to be sensible snacks.

Film - Body Fuel - 10 minutes

Film discussion - 10 minutes

Discussion - About Your Heart and Diet - 15-20 minutes

Assign - Heart Health Foods Word Find, Foods I Eat Most Often, In groups of 4-5 bring in a heart healthy snack tomorrow.

Day 12
Objectives
The students will be able to:
1. analyze own diet for heart healthy foods
2. differentiate heart healthy snacks from non-heart healthy snacks.
Review and discuss Word Find and Foods I Eat Most Often – 10 minutes

Review food chart and analyze for heart healthy foods
Heart Healthy Snacks – Make and allow students to sample some heart healthy snacks – 30 minutes

Day 13

Objectives
The students will be able to:
1. identify the effects of nicotine and carbon monoxide on the heart and circulatory system
2. analyze the reasons people give for smoking
3. recognize the benefits of being a non-smoker
4. define the following vocabulary: nicotine, carbon monoxide.

Reasons We Give For Smoking – small group discussion – 5-10 minutes

Films – Let's Talk About Smoking – 10 minutes

Pressures to smoke – 15 minutes

Conduct a smoking experiment using an artificial lung courtesy of the American Cancer Society to demonstrate the effect of cigarette properties on the lungs of the smoker.

Why Be a Non-Smoker? – 10-15 minutes

Assign – The Big Sell, Smoking and Me, Warning Label
Day 14
Objectives
The students will be able to:
1. analyze the effects of cigarette advertising and deduce its impact upon the consumer
2. re-write the warning label on cigarettes in their own words.
Advertisements Big Sell - 20 minutes
Warning Label - 10 minutes
Smoking and Me - 10 minutes

Day 15
Objectives
The student will be able to:
1. list the risk factors associated with CHD
2. participate in Heart Health Squares as a review activity.
Discuss in small groups ways to reduce risk of heart problems
Play Heart Health Squares