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A computer program on nutrition and cardiovascular disease for the junior and senior high level

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A COMPUTER PROGRAM ON NUTRITION AND CARDIOVASCULAR DISEASE FOR THE JUNIOR AND SENIOR HIGH LEVEL

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By

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COMPUTER PROGRAM ON NUTRITION AND CARDIOVASCULAR DISEASE FOR THE JUNIOR AND SENIOR HIGH LEVEL

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Statement of the Problem

Cardiovascular disease is the leading cause of death in the United States today. High serum cholesterol, hypertension, and obesity are risk factors for cardiovascular disease which are affected by our dietary habits. People need to be made aware of how their nutritional habits affect their chance of cardiovascular disease and how they can reduce their risk by making changes in their diet and eating habits.

Procedure

Research has shown that we can reduce our risk of cardiovascular disease by modifying our diet to avoid or limit our consumption of foods which increase our blood cholesterol. Research has also shown that we consume too much sodium (salt) and should cut down expecially if we have hypertension. Recommendations for low-fat, low-cholesterol diet come from the research and other sources which hope to help the American public decrease their risk of cardiovascular disease.

This project was written to educate the public on cardiovascular disease and nutrition. This project is a computer program which can be used inside or outside of the classroom. There are six programs making up the computer program unit. It is written in Basic for the Apple IIe or

Apple IIc. An instructional packet is included which gives a brief outline of each program and suggested activities to follow each program which would enhance learning from the programs.

The first program includes what cardiovascular disease is, what it includes, and why the student should be concerned. Students then figure their own risk of cardiovascular disease. The third program includes information on what foods increase serum cholesterol levels and what foods to avoid in order to decrease the risk of cardiovascular disease. A supermarket shopping game is used to educate students on what to watch for on labels. Students then make meal and snack choices for one day to see if they can meet the Recommended Daily Allowances of nutrients needed and also keep the fat content under thirty percent. The last program acts as a summary and testing program having students apply some of their knowledge.

Results

This writer feels that the computer program unit is a complete educational package on cardiovascular disease and nutrition. It tells the student what cardiovascular disease is, what it includes, why the student should be concerned, and how the student can change his/her diet to reduce the risk factors. This program not only informs but has the student apply his knowledge in different ways so that the student can then apply it in his/her own life situations. The programs explain and show the student what

a low-fat, low-cholesterol diet is and how the student can apply it to his eating habits.

Conclusions and Implications

The computer program unit explains cardiovascular disease and nutrition. It shows the student what a low-fat, low-cholesterol diet is and how the student can apply it in his/her own life. It is this writer's hope that students will make the transition and change some of their eating habits to follow a low-fat, low-cholesterol diet. However, making changes in eating habits are not easy and the student may meet with resistance from peers and parents. That is why additional activities are given in hopes that getting more students and others involved will help in having changes instituted.

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GENERAL INTRODUCTION

Cardiovascular disease is the leading killer of people today. Certain risk factors have been identified, which increase the individual's chance of cardiovascular disease. We can reduce the chance of cardiovascular disease by decreasing our risk factors. Cardiovascular disease is not something that develops overnight. Formation of risk factors begins early. The public needs to be better educated in how they can reduce the risk of cardiovascular disease earlier, such as in their teen years, and act on this information.

Cardiovascular diseases include heart attack, stroke, hypertension (high blood pressure), rheumatic fever, and rheumatic heart disease. Cardiovascular diseases have been and remain today the leading cause of death in the United States, although there has been a slight downward trend in the last ten years. This has possibly come about from better research and education; however, better research and more education is needed if we are going to reduce the chance of death from these diseases.

The underlying cause of most heart attacks is atherosclerosis, which is a buildup of fatty deposits on the walls of the arteries that restricts or blocks the flow of blood to vital organs. Moller reports that the atherosclerotic process begins in childhood and progresses during

adolescence and into adulthood before serious clinical manifestations appear at middle age or later.[1] This can be illustrated by studies conducted during the Korean War. United States Army physicians performed autopsies on three hundred American war casualties and examined their coronary arteries. Gross atherosclerosis was observed in over three-fourths of the men, whose age was around twenty years.[2] Studies done on Korean soldiers killed alongside them showed no such damage. Other studies done during the Vietnamese War showed similar results. Thus, we need to direct our efforts to prevent or retard this process at children before any or many symptoms appear. Prevention should be stressed instead of waiting until it strikes. Teenagers need to know how, why, and what decisions to make that will increase their future health and decrease their risk of cardiovascular disease.

This project dealt with how dietary habits affect the risk factors associated with cardiovascular disease. It examined what we can do nutritionally to decrease some of these risk factors. This information was then used in a

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[1]James H. Moller, "Cardiovascular Risk Reduction, The Problems Facing the School Age Population," Health Education, 13, January-February, 1982, p. 13.

[2]Dr. Jean Mayer, A Diet for Living (New York, 1977), p. 151.

computer program that can be used by Junior and Senior High School students. For, as indicated in the above paragraph, we need to direct our educational efforts at preventing or retarding the process of cardiovascular disease with the help of better research, rather than waiting until it has already progressed to a life- threatening situation.

REVIEW OF THE RELATED LITERATURE

Studies have shown the major risk factors of cardiovascular disease are high serum (blood) cholesterol, high blood pressure (hypertension), smoking, obesity, diabetes, sedentary living, psychosocial tension, and family history of premature cardiovascular disease. It has been shown in many studies that high serum cholesterol, hypertension and obesity are affected by our nutritional habits.

Besides being an independent contributor, psychosocial tension (stress) is closely interwoven with the other risk factors. It affects our digestive system and our nutrition status. It has also been shown to cause increases in serum cholesterol levels.

Research done by the Lipid Research Clinics found that the incidence of cardiovascular disease and death from cardiovascular disease was statistically significantly lowered by the lowering of serum cholesterol levels.[3] Thus, we can lower our chances of cardiovascular disease by lowering our serum cholesterol levels. In another study it was found that in subjects with existing cardiovascular

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[3]Lipid Research Clinics Program, "The Lipid Research Clinics Coronary Primary Prevention Trial Results II. The Relationship of Reduction in Incidence of CHD to Cholesterol Lowering," Journal of American Medical Association, 251 (1984), p. 373.

disease atherosclerotic plaque formation was retarded when serum cholesterol levels were decreased.[4]

Saturated fats in the diet increase the "low-density" lipoproteins (LDL) in the blood. "Low-density" lipoproteins and "high-density" lipoproteins (HDL) carry the cholesterol in the bloodstream. The "low-density" lipoproteins are considered harmful in large amounts. It is these "low-density" lipoproteins that allow for cholesterol buildup as in atherosclerosis and are what are usually referred to when a person has high serum cholesterol. The level of "high-density" lipoproteins should be high, as they carry the cholesterol in the blood away to where it can be safely excreted and are thus considered protective. Although exercise is the best way to increase the level of "high-density" lipoproteins, the addition of foods high in polyunsaturated fats will also tend to increase them.

Factors leading to increased levels of serum cholesterol have been found to be a high consumption of dietary cholesterol, total dietary fat, and saturated fats, particularly animal fats or hydrogenated vegetable fats (industrially hardened fats). One recent study found that the men who died from coronary heart disease had a higher intake of saturated fatty acids and cholesterol and a

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[4]Robert I. Levy, M.D., "Causes of the Decrease in Cardiovascular Mortality," The American Journal of Cardiology, 54, No. 5 (August 27, 1984), p. 11c.

relatively low intake of polyunsaturated fatty acids.[5] Recent studies have shown that an increase in dietary cholesterol will independently increase serum cholesterol regardless of the fat composition of the diet. Other studies have shown that cholesterol absorption is in proportion to dietary cholesterol.

Numerous studies have shown a relationship to a diet high in saturated fat and high serum cholesterol. Saturated fat comes from animal products such as meats, egg yolks, dairy products, and in certain vegetable products such as coconut and palm oil and hydrogenated oils (shortenings). Different saturated fatty acids vary as to the degree of influence they have on serum cholesterol. Studies have shown that palmitic saturated fatty acid, which is abundant in animal food products, dramatically increases serum cholesterol. In a six-year study done in Loma Linda, California, on vegetarians, it was found that they had a lower serum cholesterol level. They also found that the vegetarians had a significant lower rate of cardiovascular disease than did the nonvegetarians after adjustment for each of the other risk factors.[6] In the recent Leiden

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[5]Lawrence H. Kushi and others, "Diet and 20-Year Mortality From Coronary Heart Disease," The New England Journal of Medicine, 312, No. 13 (March 28, 1985), p. 811.

[6]R. L. Phillips and others, "Coronary Heart Disease Mortality Among Seventh-Day Adventists with Differing Dietary Habits," American Journal of Clinical Nutrition, 31 (October 1978), p. S198.

Intervention Trial it was found that serum cholesterol could be lowered by using only a vegetarian diet.[7]

Three recent studies on fish in the diet concluded that fish or fish oils in the diet seem to have a preventive effect against coronary heart disease. One study concluded that eating as little as two fish dishes per week may have a preventive value in relation to coronary heart disease.[8] This study also found fish consumption to be an independent risk factor for coronary heart disease.[9] In one of the other studies it was found that a diet rich in fish oils resulted in lower serum cholesterol and lower triglyceride levels than did a low-fat diet rich in polyunsaturated vegetable oils.[10] In two studies, it was found that changing from butter (saturated fat) to margarine, with

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[7]Alexander C. Arntzenius and others, "Diet, Lipoproteins, and the Progression of Coronary Atherosclerosis," The New England Journal of Medicine, 312, No. 13 (March 28, 1985), p. 805.

[8]Dean Kromhout and others, "The Inverse Relation Between Fish Consumption and 20-Year Mortality From Coronary Heart Disease," The New England Journal of Medicine, 312, No. 19 (May 9, 1985), p. 1205.

[9]Ibid., p. 1207.

[10]Beverly E. Phillipson and others, "Reduction of Plasma Lipids, Lipoproteins, and Apoproteins by Dietary Fish Oils in Patients With Hypertriglyceridemia," The New England Journal of Medicine, 312, No. 19 (May 9, 1985), p. 1215.

other factors remaining the same, resulted in a significant decrease in serum cholesterol.[11, 12] Other studies have shown that saturated fats (such as butter) increase serum cholesterol, while the use of polyunsaturated oils such as safflower, corn, cottonseed, and soybean tend to decrease serum cholesterol. Keys has concluded that polyunsaturated oils have half the effect per gram of decreasing serum cholesterol as saturated fatty acids do in increasing it.[13] In a study done on children, it was found that a diet low in dietary cholesterol and having a high polyunsaturated to saturated fat ratio resulted in a decrease in serum cholesterol.[14] Thus, it can be concluded that we will benefit if we use less saturated fats and replace them with polyunsaturated oils.

However, we must be sure that these polyunsaturated oils are in liquid form. When they are changed to a solid

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[11]Edith Lerner and others, "Effect of Dietary Fat Source on Serum Lipids and Blood Pressure in Men," Circulation, 68, Supp. III (October 1983), p. III-226.

[12]Jef Geboers and others, "Nutrition and CHD Prevention In Belgium," Circulation, 68, Supp. III (October 1983), p. III-226.

[13]Robert S. Goodhart and Maurice E. Shils, Modern Nutrition In Health and Disease, 6th Edition (Philadelphia, 1980), p. 1047.

[14]E. A. Stein and others, "Changes in Plasma Lipid and Lipoprotein Fractions After Alteration in Dietary Cholesterol, Normal and Hypercholesterolemic Children," American Journal of Clinical Nutrition, 35 (June 1982), p. 1388.

form by the process of hydrogenation they then act as saturated fats. In four separate studies it was found that hydrogenated oils produced higher serum cholesterol levels than did unhydrogenated oils.

Some studies have indicated that high fat diets may be related to coronary heart disease. Epidemiologic studies have cited evidence that atherosclerosis varied in different populations correlating positively to their level of fat intake. Studies done in seven countries whose population subsists on low saturated fat diets showed no appreciable amount of heart disease. Whereas, studies done in countries having a high-fat diet had a high incidence of heart disease. Other studies have found that diets low in fat led to a significant decrease in serum cholesterol. In one study the serum cholesterol levels of men rose on a high fat calorie diet and then fell on a low fat calorie diet.[15] In a study done in Finland it was found that a lowfat diet lowered blood pressure and when the normal diet was resumed blood pressure increased.[16] Thus, another risk factor may be reduced on a lowfat diet.

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[15]D. Brunner and others, "Serum Lipid Response to a High-Fat Diet in Agricultural Workers During Twelve Months," American Journal of Clinical Nutrition, 32 (October 1979), p. 1348.

[16]J. M. Iacono and others, "Effect of Dietary Fat on Blood Pressure in Rural Finnish Population," American Journal of Clinical Nutrition 38, No. 6 (1983), p. 860.

A lowfat diet can help in weight reduction if a person is obese. A person is considered obese if he/she is twenty percent or more above the desirable weight as measured by the ideal-weight tables. Numerous studies have found that obese people have a higher death rate from cardiovascular disease than non-obese people. In a 26-year study done on North American men, it was found that body weight mass was a significant independent predictor of heart disease with adjustments made for other factors.[17] Obesity was significantly positively correlated to hypertension, diabetes, and heart disease in a study of women 30-49 years old.[18] Hypertension is a major risk factor of heart disease and in four studies it was found that persons with diabetes have a two times higher occurrence rate of heart disease than the normal person. Thus, an obese person is at a higher risk of heart disease or other diseases that increase their risk of heart disease. It has been found that if the obese person loses weight there is also a reduction of

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[17]S. W. Rabkin and others, "Relation of Body Weight to Development of Ischemic Heart Disease in a Cohort of Young North American Men After a 26 Year Observation Period: The Manitoba Study," American Journal of Cardiology 39 (March 1977), p. 456.

[18]A. A. Rimin and others, "Relationship of Obesity and Disease in 73,532 Weight Conscious Women," Public Health Reports 90 (January 1975), p. 49.

risk factors associated with cardiovascular disease.[19] One study has found that when body weight goes up so does serum cholesterol and when body weight goes down so does serum cholesterol.[20] Thus, avoiding obesity or decreasing your weight if you are obese is important in lowering your risk of heart disease.

Not only has obesity been linked to hypertension but so has the high consumption of sodium (present in salt). Studies are conflicting with some indicating that there is no significant difference in hypertension with restriction of sodium or salt and other studies indicating there is a difference. One study indicates that some people are more responsive to sodium or salt loading than others.[21] It seems from this that in some people (each of us being different), the intake of sodium or salt will affect hypertension while in others it will not. Dr. Henry Blackburn has stated that severe hypertension is usually brought under control by a nearly salt-free diet or by drugs that increase

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[19]Kannel and Schatzkin, "Risk Factor Analysis," Progress in Cardiovascular Diseases 26, No. 4 (January/February 1984), p. 322.

[20]D. Kromhout, "Body Weight, Diet, and Serum Cholesterol in 871 Middle-Aged Men During Ten Years of Follow-Up (The Zutphen Study)," American Journal of Clinical Nutrition 38, No. 4 (1983), p. 591.

[21]A. Takeshita and others, "Characteristics of Responses to Salt Loading and Deprivation in Hypertensive Subjects," Circulation Research 51 (April 1982), p. 464.

the excretion of sodium from the body.[22] Since it has been found that Americans consume an excessive amount of sodium or salt over the sodium their body needs, it would seem to be a good idea to lower or decrease our sodium consumption. Scribner, in "Salt and Hypertension," stated that decreasing salt intake may lessen the risk of cardiovascular diseases and make treatment easier and more effective.[23]

Recent research in the area of hypertension suggests that calcium in the diet may play a role in controlling blood pressure. In one study it was found that calcium may influence salt-induced blood pressure changes.[24] Other studies have found that calcium may exert a protective effect against hypertension.[25]

In studies Yudkin did, it was found that cardiovascular disease patients consumed more sugar than control

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[22]Henry Blackburn, M.D., "Risk Factors and Cardiovascular Disease," American Heart Association Heartbook (New York, 1980), p. 9.

[23]B. H. Scribner, "Salt and Hypertension," Journal of American Medical Association 250, No. 3 (1983), p. 389.

[24]Lawrence Resnick and others, "Calcium Metabolism, Blood Pressure, and Salt Intake in Essential Hypertension," Circulation 70, No. 4, Part II (October 1984), p. II-1.

[25]S. Ackley and others, "Dairy Products, Calcium, and Blood Pressure," American Journal of Clinical Nutrition 38, No. 3 (1983), p. 457.

subjects.[26] Other studies have shown a significant positive correlation between the use of refined sugars and the incidence of cardiovascular disease among various countries. However, this could be questioned as to whether other factors are also involved. Other studies have disputed the connection of sugar to cardiovascular disease. Five recent studies have shown that the substitution of simple sugars for starch in the diet often results in an increase in serum cholesterol, a cardiovascular disease risk factor, although this increase is smaller than with fat. Thus, the controversy of sugar goes on. Many scientists feel that it may be an individualistic variability.

Although it has not been proven whether or not sugar may be linked to cardiovascular disease, most nutritionists agree that Americans consume too much sugar. Sugar contains no nutrients, but does add calories to our diet. In cutting down or limiting sugar consumption we will not suffer any harm and may improve our health.

In one study done in London, it was found that men who had a high intake of dietary fiber from cereals independently had a lower rate of cardiovascular disease.[27] In a

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[26]Goodhart and Shils, Modern Nutrition, p. 1048.

[27]J. N. Morris and others, "Diet and Heart: A Postscript," British Medical Journal 6098 (November 19, 1977), p. 1310.

twenty-year study done in Boston, it was found that a higher fiber intake carried a decreased risk for coronary heart disease although it was not found to be a significant factor.[28] Although other studies have been conflicting, it can probably be said that a high fiber intake is healthy and may lessen the risk of cardiovascular disease but it is not a significant risk factor.

Some recent studies have examined the effect alcohol has on cardiovascular disease. In one study just released it was found that moderate consumption of alcohol seemed to reduce the risk of cardiovascular disease.[29] Other studies have found that alcohol might have a beneficial effect. However, in two studies, one from Japan and the other from Australia, it was found that there was significant positive

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[28]Lawrence H. Kushi and others, "Diet and 20-Year Mortality From Coronary Heart Disease," The New England Journal of Medicine, 312, No. 13 (March 28, 1985), p. 811.

[29]Ronald Kotulak, "Study Links Drinking to Less Heart Disease," The Press-Enterprise, May 17, 1985, p. A-5.

relationship between alcohol intake and blood pressure.[30, 31] Although a moderate amount of alcohol may reduce the risk of cardiovascular disease, blood pressure should be watched. Alcohol consumption above moderate levels should not be increased due to the known dangers of alcohol and possible increase in blood pressure.

Research has indicated that our diet does have an effect on the risk factors associated with cardiovascular disease. Some recent research has dealt with children and their risk of cardiovascular disease. In the Bogalusa, Louisiana, Heart Study[32] and a study on four-year olds[33], it was found that blood pressure was positively correlated with obesity in children. Thus, it is important that children eat properly but not excessively. Moller, in "Cardiovascular Risk Reduction, The Problems Facing the School Age Population," says that children need to develop eating

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[30] H. Ueshima and others, "Alcohol Intake and Hypertension Among Urban and Rural Japanese Populations," Journal of Chronic Diseases, 37, No. 7 (1984), p. 585.

[31] E. Savdie, "Relation of Alcohol and Cigarette Consumption to Blood Pressure and Serum Creatinine Levels," Journal of Chronic Diseases, 37, No. 8, (1984), p. 617.

[32] G. S. Berenson and others, "Cardiovascular Risk Factors in Children. Should They Concern the Pediatrician?" American Journal of Diseases of Children 136 (September 1982), p. 860.

[33] T. J. C. Boulton and O. Johnston, "A Coronary Risk Factor Profile of 4 Year Olds," Australian Paedriatric Journal 14 (April 1978), p. 280.

habits early in life that will promote a diet that is adequate but not excessive in total calories, fat, cholesterol, and salt.[34] Dr. Mayer reports that evidence has shown that a high-fat diet can push the cholesterol levels dangerously upward in even a thirteen or fourteen year old.[35] Young people should be following a diet now that is low in cholesterol, saturated fat, total fat, and salt.

However, many young people do not understand how to change their eating habits or why they should. Wardlaw, in Journal of Nutrition Education, says that students should not see decisions relating to food practices as isolated decisions.[36] They need to know what to look for when shopping, eating out, snacking, and preparing foods. In a study done on high school students and what they did not know about cardiovascular disease, researchers found that students are familiar with terms such as cholesterol but are not able to distinguish what products to avoid in the grocery store or in a restaurant.[37] They need to know how

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[34]Moller, Health Education, p. 14.

[35]Mayer, A Diet For Living, p. 152.

[36]Janet M. Wardlaw, "Preparing the Nutrition Education Professional for the 1980's," Journal of Nutrition Education 13 (January 1981), p. 6.

[37]A. Weinberg and others, "What High School Students Don't Know About Cardiovascular Disease," Journal of School Health 54, No. 3 (March 1984), p. 116.

to check labels and question what practices and habits they have and what they see done around them. They need to be aware that they can make changes now that will reduce their risk factors of cardiovascular disease.

An example of this is in a project done by Dr. McGandy and Dr. Stare at Harvard's Department of Nutrition. They made small changes in the students' diets at two nearby prep schools and cut by nearly fifty percent the rise in serum cholesterol that usually takes place between the ages of fourteen and eighteen.[38] These changes included having just two eggs a week, using polyunsaturated margarine instead of butter, more fish and poultry, and trimming the fat from pork and beef. This is similar to a diet low in cholesterol, saturated fat, and total fat.

It has been found that following a diet low in cholesterol, saturated fat, total fat, and salt may reduce your chance of cardiovascular disease. It can also be said that this diet will decrease some of the risk factors associated with cardiovascular disease. It can also be said that a diet low in cholesterol, saturated fat, total fat, and salt can be healthy if the right food choices are made. This is why the American Medical Association, American Heart Association, Food and Nutrition Board of the National Research Council, and Senate Select Committee on Nutrition

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[38]Mayer, A Diet for Living, p. 152.

and Human Needs have all recommended that Americans lower the cholesterol and saturated fats in their diets.

STATEMENT OF OBJECTIVES

As stated in the Review of Literature, research has shown that we can reduce some risk factors of cardiovascular disease by following a diet low in cholesterol, total fat, saturated fat, and salt. We need to substitute polyunsaturated oils for saturated fats and include two fish meals per week. We may also want to lower our consumption of sugar and increase our consumption of fiber, although these recommendations have not been proven by research yet.

Many students at the Junior and Senior High level have limited knowledge about nutrition. They usually know about the Basic Four Food Groups and what foods they contain. They realize they need so many servings from each group to have a nutritious diet, but many times do not know why or how they should be going about this. Students usually eat what is served to them at home and snack or eat out making choices following their peer group.

Since research has shown that cardiovascular disease starts in childhood or before adulthood, we need to educate young people on how to make food choices that will reduce their risk of cardiovascular disease. It is important that the students understand why they need to be concerned now about cardiovascular disease and what the risk factors are. They need to be aware of how they can easily change their diet to reduce their risk factors. They need to know how to

evaluate labels on food products, restaurant menus and meals, snacks, and other meals as to how they fit the dietary recommendations to reduce risk factors of cardiovascular disease.

In educating young people about cardiovascular disease and how they can reduce their risk factors, we hopefully will reduce their chance of cardiovascular disease. However, in educating we must help the student utilize this knowledge by setting up guidelines and goals that they can follow. We need to help them set up a dietary plan that they can follow that reduces the risk factors associated with cardiovascular disease. We need to help them start to institute changes now, rather than putting them off to sometime in the future. Following a good nutritional diet that includes fish but is low in cholesterol, saturated fats, total fats, salt, and following a regular exercise routine not only will lower their serum cholesterol level and chance of hypertension but will also reduce their risk of cardiovascular disease.

DESIGN OF THE PROPOSED PROJECT

This project is a computer program on nutrition and cardiovascular disease. It is written for the Junior and Senior High student in a middle to upper ability level class. These students have already had a basic nutrition unit covering the Basic Four Food Groups and the servings needed for each group to provide a nutritious diet. Students have written menus for meals during their basic nutrition unit. Students have also done some cooking or preparing of foods.

Included with the computer program is an instructional unit showing where to use the program and what learning activities are needed to back up the program. Two problems are common with software programs. One of the problems with most software is that there are no instructions to the teacher on how to use the programs and what activities are needed to back up the learning that takes place on the computers. The other problem, as stated by the Journal of School Health, is that there is a shortage of appropriate health education software. They feel that the microcomputer could represent the most exciting technological innovation in school health education.[39]

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[39]Moon S. Chen, Jr., "When and What If Microcomputers Invaded School Health Education?" Journal of School Health, V. 53, No. 5, May 1983, p. 324.

This computer unit was written for the Apple IIc or IIe. It is written in Basic language. The first program includes what cardiovascular disease is, what it includes, and why the student should be concerned. Students then figure their own risk of cardiovascular disease. The third program includes what foods increase serum cholesterol levels and what foods to avoid to decrease the risk of cardiovascular disease. A supermarket shopping game is used to educate students on what to watch for on labels. Students then make meal and snack choices for one day to see if they can meet the Recommended Daily Allowances of nutrients needed and also keep the fat content under thirty percent. The last program acts as a summary and testing program having students apply some of their knowledge.

If students are going to implement these changes into their diets, they need to taste and prepare some snack foods and meals so that they will know that the alternatives are delicious. Students need to make up menus following guidelines for a low-fat, low-cholesterol diet. These menus can then be checked, using the computer and available software such as Eat Smart Nutrition Computer Program from the Pillsbury Company; Nutrition Design by S. Pisias and N. Pisias from Nutrition Design; Eats from Pennsylvania State University; or You Are What You Eat! from DDA. These software programs already have the food and their nutrient contents, calories, fats, and cholesterol counts. Most students will also benefit from using the software program

Fast Food Micro-Guide by J. Schrark from The Learning Seed, which evaluates fast-food restaurants' menus.

Besides running the computer unit, preparing menus and foods, students should make dietary goals for themselves now. Students should list foods that they like and will eat that meet the recommendations given in each of the following categories: snacks, at home, and eating out. Students should be challenged to try and follow the goals and lists they have made. They should be encouraged to discuss the information they have learned in class with fellow students, parents, and others. Students might opt to have a heart health fair to provide this information.

The unit varies in length, depending on what suggested activities are used. Changes in teaching methods may need to be made in teaching slow learners or students with low reading levels.

IMPLICATIONS FOR EDUCATION

This computer project is a complete unit about cardiovascular disease and nutrition which the student can work through at their own pace and outside of class time. Programs in the computer unit can be repeated if the student does not understand or needs review. Included in an instructional packet are suggested classroom activities which can enhance the learning from the unit and can help the student to implement changes into his life.

This computer unit can be used in a variety of classes. Since I am a home economics teacher, many of the suggested activities to enhance learning from the computer program unit need a kitchen or cooking facilities. If student are going to implement changes into their diets, they need to know that the low-fat, low-cholesterol diet foods are delicious.

LIMITATIONS

Although I feel this is a complete teaching unit that should help students make changes in their eating habits, it is limited. It may be hard to convince the Junior or Senior High student that he should take action now instead of putting it off. Peer pressure is very strong at this age and influences the student's choices. It may depend upon whether you have most of a peer group of students together in class as to whether this unit will succeed in having students establish the dietary recommendations given in class as part of their eating habits.

INSTRUCTIONAL PACKET FOR COMPUTER PROGRAM

UNIT ON CARDIOVASCULAR DISEASE & NUTRITION

TABLE OF CONTENTS

To: Teacher

Re: Computer Unit on Cardiovascular Disease and Nutrition

The following pages explain the different programs which make up the computer unit on cardiovascular disease and nutrition. Also included are some suggested learning activities which can be used to enhance the learning from each program. There are three handouts made up which can be copied and given to students.

If students are going to implement changes into their diets, it is in this author's opinion that they need to taste and prepare some snack foods and meals so that they will know that the alternatives are delicious. The author feels that it is important that students make up menus which they would eat following the guidelines for a low-fat, low-cholesterol diet and the Basic Four Food Groups. Students need to be encouraged to share the information they have learned with fellow students, parents, and others. The student's success of implementing changes into his/her diet will also depend upon their peer group and parents. Thus, activities in which the student can involve others such as peers and parents may meet with more long term success.

"FACTS" Program

The first program called "FACTS" is a tutorial. It explains what cardiovascular disease is, what it includes, why people should be concerned, and what they can do to decrease their risk factors.

Suggested Activities:

1 - Pictures of atherosclerosis or blocked arteries (check with the American Heart Association for these and other materials.)

2 - Class discussion on life style and eating habit changes may help students understand why cardiovascular disease is more prevalent. Life style changes include sedentary lifestyle versus hard physical labor, more stress now, more mobile society, smaller support group, and sedentary people not following a fitness program. Eating habit changes would include eating out more, more fast food, more sugar and sodium in food, more processed foods, no feast and then famine.

3 - Discuss problems of hypertension. Have the school nurse come and check the student's blood pressure and pulse. You might try a role playing activity showing hypertension problems.

"RISKS" Program

The second program titled "RISKS" allows students to figure their own risk of cardiovascular disease using the "HEART" table developed by Loma Linda University. This program takes into account heredity, exercise, age, tobacco use, and the percentage of fat in the diet. Students need to know their height, weight, exercise level, age, family background in relation to cardiovascular disease, smoking habits, and percentage of fat in the diet. There are self-help routines in the program describing exercise activity and levels of eating fat. Some students may require more explanation on these areas of the program. The program figures the student's total score and gives them an indication of what range they fall into.

Suggested Activities:

1 - Students might find it interesting to exchange what range they fall into.

2 - Discuss ways to improve risk factors - fitness program, diet changes, stop smoking, reduce stress.

3 - Help students plan a lifetime fitness program.

"FATS AND OILS" Program

The third program called "FATS AND OILS" is a tutorial. This program uses charts to try and help students discover what foods have a higher polyunsaturated fat content ratio to saturated fat. This program tries to show students that certain foods should be avoided because of their high saturated fat content. It also gives low-fat foods they can eat when replacing those foods. This program looks at how cooking methods can add fat and calories to foods. It also looks at a margarine label showing where the amount of fat is listed and how it is divided into polyunsaturated and saturated fat.

Suggested Activity:

1 - Have each kitchen or divide students so that they prepare a different serving of food and then pour off the grease into a cup. (Foods such as hamburger, chicken, fish, pork chop, lamb chop, or veal could be used.) Allow the cup to set overnight or in the refrigerator. Compare the saturated fat content (solid at room temperature) of each. Discuss saturated, polyunsaturated and monounsaturated fat and what cholesterol is.

"MARKET" Program

The fourth program is called "MARKET". It contains food product content labels and the student is asked to pick out the ingredient which would raise the individual's blood cholesterol. It contains a variety of different foods divided into five aisles or sections: frozen foods, cereals, candy, crackers, and staple foods. Students may do one or more foods under each section. The program could be adapted or changed so that students could look for other ingredients such as sugar and sugar compounds or salt in foods.

Suggested Activities:

1 - Have students check food labels of foods they eat for ingredients which would raise blood cholesterol.

2 - Have students check food labels for sugar and sugar compounds or salt in foods they eat.

"MENU" Program

The fifth program called "MENU" is a simulation in which students are asked to pick out foods they would eat in one day from a limited menu. The program asks the student for some personal information such as sex, height, age, and activity level. The computer then calculates and tells the student how many calories they would have eaten, what percent of their diet would be fat and protein and whether this diet would meet the Recommended Daily Allowances for eight nutrients. The program then gives an analysis as to whether students would lose or gain weight on this diet using their activity level and ideal weight. Students who have more then thirty percent of the calories coming from fat are asked to replay the programs and try to keep their fat intake at thirty percent or below.

Suggested Activities:

1 - Discussion of fat intake and how lowering fat intake will help lower your total calories.

2 - Have students make a list of low-fat foods they like.

3 - Have a clinician come and do the skinfold test ("fatfold test") on students and explain how this more accurately measures the proportion of fat in the body. Explain that although the terms "obesity" and "overweight" are usually defined referring to

the ideal weight tables, it is actually an excess amount in the percentage of fat in the body compared to the amount of muscle and bone that is the problem. Discuss problems (social, psychological, emotional, and health) these conditions may include. Explain how increasing exercise to reduce risk and body fat along with a low-fat diet may help.

4 - Have students make up menus for a few days or a week using guidelines. Can use computer programs such as Eat Smart Nutrition Computer Program from the Pillsbury Company; Nutrition Design by S. Pisias and N. Pisias from Nutrition Design; Eats from Pennsylvania State University; or You Are What You Eat! from DDA, to check and see if the fat content is under thirty percent and they have met the Recommended Daily Allowances for nutrients. Explain to the student the thirty percent fat content is recommended by American Heart Association, Congressional Committee, American Cancer Society, and others.

"SUMMARY" Program

The last program is called "SUMMARY." It is a testing program. This program sets the student up as a detective and they must make certain decisions based on information from other programs. This program tries to have students apply the knowledge they have learned in other programs to situations which they encounter.

Suggested Activities:

1 - Handout on "Nutrition and Cardiovascular Health"
Handout on "Healthy Snacks" and "Good Eating Guide"

2 - Prepare some Healthy Snacks.

3 - Evaluate restaurant menus - especially fast foods.
The computer program Fast Food Micro-Guide by J. Schrark from The Learning Seed could be used.

4 - Prepare meals using student menus that follows recommendations.

5 - Have students make up dietary goals for themselves now. Challenge them to follow them. Include a fitness program.

6 - Have students make up lists of foods that they like and will eat that meet the recommendations given in each of the following categories: snacks, at home, and eating out.

7 - Make posters to exhibit around school and to take home to discuss with parents and friends.

8 - Have a Heart Health Fair.

NUTRITION AND CARDIOVASCULAR HEALTH

I. Foods that raise your blood cholesterol.
AVOID OR LIMIT THE USE OF THE FOLLOWING FOODS:

Foods high in saturated fats - animal products such as
beef, pork, lamb, beef and pork fat, lard
whole milk and whole milk products including cream, butter, and cheese
whole eggs or egg yolks
hydrogenated or partially hydrogenated oils or shortenings
palm and coconut oil

Foods high in cholesterol - limit whole eggs or egg yolks to 3 per week, limit red meats and shrimp

Avoid high-fat meats - bacon and luncheon meats

Avoid foods deep fried or fried.

Avoid chocolate (contains cocoa butter)

Eat organ meats only occasionally

Avoid obesity or being very overweight

II. It is recommended that we limit our fat intake to 30% or below in our daily diet. Most of us fall into 40% or more.

It is also recommended that we limit our consumption of the following:

Foods high in salt - potato chips, pretzels, pickled foods

Processed foods (usually high in sodium)

Limit use of salt - cook without or use small amount

Limit sugar and sweets

Limit caffeine and alcohol use

III. Follow a low-fat, low-cholesterol diet which includes the Basic Four Groups and servings needed for your age group.

Eat complex carbohydrates

Use low-fat, nonfat, or skim milk. Use lowfat or part skim milk cheeses.

Eat more poultry and fish instead of red meats - Trim fat from meat before cooking.

Eat fish at least twice a week.

Increase your use of polyunsaturated fats - safflower, sunflower, corn, soybean, sesame, cottonseed oils.

Increase intake of high fiber foods.

Cook foods by boiling, broiling, baking, roasting, steaming, and stir-frying.

SUGGESTIONS FOR HEALTHY SNACKS

Fresh Fruit

Fruit Juices (unsweetened)

Nonfat, Lowfat, or Skim Milk

Dried Fruit such raisins, dried apricots

Lowfat Yogurt - no sugar added

Oatmeal Crackers (made with oil and no sugar)

Other Crackers made with whole grains (using oil and no sugar)

Soft Wholewheat Pretzels (baked, low salt)

Unsweetened Fruit Juice Popsicles

Fruit Shake (nonfat milk)

Frozen Lowfat Yogurt

Finger Jello (made with unsweetened fruit juice)

Homemade Granola (without coconut)

Frozen Bananas (covered with toasted wheat germ or peanut butter)

Raw Vegetables

Raw Vegetables with Lowfat or Nonfat Yogurt Dip

Popcorn (low salt, no butter)

GOOD EATING GUIDE

	Choose Frequently	Choose Occasionally	Choose Rarely
Protein	Dried beans & peas Most fish Chicken (w/out skin) Turkey (w/out skin) +Water-packed tuna Egg whites	Pork loin or shoulder* Fried Fish +Oil-packed tuna Lamb leg or loin* Veal* Steaks: flank, round, or lean sirloin* Roasts: rump, arm-bone, or round* Chicken/turkey with skin +Pizza Peanut butter +Nuts	Egg yolk (about 3/week) +Hot dogs Cold cuts +Bacon Ground beef Steaks: porterhouse T-bone, club, or fatty sirloin Roasts: rib or blade Spareribs
Milk Products	Skim milk Lowfat milk (1% milkfat) +Lowfat cottage cheese Lowfat yogurt, Plain nonfat dry milk	+Regular Cottage cheese Lowfat milk (2% milkfat) Part-skim cheeses Ice milk Lowfat yogurt, sweetened Frozen lowfat yogurt	+Hard cheeses Ice cream +Processed cheeses Whole milk Whole milk yogurt
Breads & Cereals	Wholegrain breads & rolls Brown rice Plain popcorn Whole grain cereal Whole grain pasta	White bread or rolls Pasta (except whole wheat) Granola	Presweetened breakfast cereals Doughnuts & sticky buns
Fruits & Vegetables	All fresh fruits & vegetables (except those listed to the right) Potatoes Unsweetened fruit juices Unsalted vegetable juices	Avocado Dried fruit Fruits canned in syrup Cole slaw +French fries +Creamed vegetables	Coconut +Pickles

* Trim all outside fat.
\+ High in sodium

Adopted from: Eating Guide, by Center for Science in the Public Interest

RESOURCE MATERIALS*

American Heart Association, American Heart Association Cookbook, New York, David McKay Company, Inc., 1973

American Heart Association, "Eat Well But Eat Wisely;" "Recipes For Fat Controlled Low Cholesterol Meals;" "Nutrition Labeling;" pamphlets available from local chapter

Bennett, Iva, and Simon, Martha, Prudent Diet, New York, David White, 1973

Bond, Clara-Beth Young; Dobbin, E. Virginia; Gofman, Helen F.; Jones, Helen C.; Lyon, Lenore, The Low Fat Low Cholesterol Diet, Garden City, New York, Doubleday and Compnay, Inc., 1971

Goodhart, Robert S., and Shils, Maurice E., Modern Nutrition In Health and Disease, 6th Edition, Philadelphia, Lea and Febiger, 1980, pp. 895-918

Hamilton, Eva M., and Whitney, Eleanor N., Nutrition Concepts and Controversies, 2nd Edition, St. Paul, Minn., West Publishing Co., 1982, pp. 5-144

Lansky, Vicki, The Taming of the C.A.N.D.Y. Monster, Wayzata, Minn., Meadowbrook Press, 1979

Margie, Joyce Daly, M.S., and Hunt, James C., M.D., Living With High Blood Pressure - The Hypertensive Diet Cookbook, Bloomfield, New Jersey, HLS Press, 1978

Pritikin, Nathan, The Pritikin Program For Diet and Exercise, New York, Grosset & Dunlap, 1979

Shank, Robert E., M.D., and Winston, Mary, "Diet and Nutrition," American Heart Assocation Heartbook, New York, E. P. Dutton, 1980, pp. 42-66

Tevis, Betty, "Have a Heart Health Fair," Health Education, 13, January-February, 1982, pp. 42-44

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*This is only a partial listing of available resources. It includes some cookbooks as well as other sources.

BIBLIOGRAPHY

Ackley, S.; Barrett-Connor, E.; Suarez, L., "Dairy Products, Calcium, and Blood Pressure," American Journal of Clinical Nutrition, 38, No. 3, 1983, pp. 457-461.

Arntzenius, Alexander C.; Kromhout, Daan; Barth, Jacques D.; Reiber, Johan; Bruschke, Albert; Buis, Beert; Van Gent, Coen; Kempsen-Voogd, Noes; Strikwerda, Sipke, and Van der Velde, Edo, "Diet, Lipoproteins, and The Progression of Coronary Atherosclerosis," The New England Journal of Medicine, 312, No. 13, March 28, 1985, p. 805-811.

Berenson, G. S.; Frank, G. C.; Hunter, S. M.; Srinivasan, S. R.; Voors, A. W.; Wegger, L. S., "Cardiovascular Risk Factors In Children. Should They Concern the Pediatrician?" American Journal of Diseases of Children, 136, September 1982, pp. 855-862.

Blackburn, Henry, M.D., "Risk Factors and Cardiovascular Disease," American Heart Association Heartbook, New York, E. P. Dutton, 1980, pp. 2-20.

Boulton, T. J. C.; Johnston, O., "A Coronary Risk-Factor Profile of Four-Year Olds," Australian Paediatric Journal, 14, April 1978, pp. 278-282.

Brunner, D.; Weissbort, J.; Fisher, J.; Bearman, J. E.; Loebl, K.; Schwartz, S.; Levin, S., "Serum Lipid Response To A High-Calorie, High-Fat Diet on Agricultural Workers During 12 Months," American Journal of Clinical Nutrition, 32, October 1979, pp. 1342-1349.

Chen, Moon S., Jr., "When and What If Microcomputers Invaded School Health Education?" Journal of School Health, 53, 5, May 1983, p. 324.

Fitch, James A., "Cardiovascular Health, Not Disease," Health Education, 13, January-February 1982, p. 7.

Geboers, Jef; Joossens, J. V.; Kesteloot, H., "Nutrition and CUD Prevention In Belgium," Circulation, 68, Supp. III, October 1983, p. III-226.

Goodhart, Robert S., and Shils, Maurice E., Modern Nutrition In Health and Disease, 6th Edition, Philadelphia, Lea and Febiger, 1980, pp. 1045-1070.

Harrison, Donald C., and Winston, Mary, "Cardiovascular Risk Reduction, The Problems Facing Our Society," Health Education, 13, January-February 1982, pp. 9-12.

Iacono, J. M.; Puska, P.; Dougherty, R. M.; Pietinen, P.; Vartiainen, E.; Leino, U.; Mutanen, M.; Moisio, S., "Effect of Dietary Fat on Blood Pressure in Rural Finnish Population," American Journal of Clinical Nutrition, 38, No. 6, 1983, pp. 860-869.

Kannel, William B., and Schatzkin, Arthur, "Risk Factor Analysis," Progress in Cardiovascular Diseases, 26, No. 4, January/February 1984, pp. 309-331.

Kotulak, Ronald, "Study Links Drinking to Less Heart Disease," The Press-Enterprise, May 17, 1985, p. A-5.

Kromhout, D., "Body Weight, Diet, and Serum Cholesterol in 871 Middle-Aged Men During Ten Years of Follow-Up (The Zutphen Study)," American Journal of Clinical Nutrition, 38, No. 4, 1983, pp. 591-598.

Kromhout, Daan; Bosschieter, Edward B.; and De Lezenne Coulander, Coe, "The Inverse Relation Between Fish Consumption and 20-Year Mortality From Coronary Heart Disease," New England Journal of Medicine 312, No. 19, May 9, 1985, p. 1205-1209.

Kushi, Lawrence; Lew, Robert; Stare, Fredrick; Ellison, Curtis; El Lozy, Mohamed; Bourke, Geoffre; Daly, Leslie; Graham, Ian; Hickey, Noel; Mulcahy, Risteard; and Kevaney, John, "Diet and 20-Year Mortality From Coronary Heart Disease," The New England Journal of Medicine 312, No. 13, March 28, 1985, p. 811-818.

Lerner, E.; Neville, J. N.; Naito, H. K.; Simpson, R.; Raguso, A.; McClish, D., "Effect of Dietary Fat Source on Serum Lipids and Blood Pressure in Men," Circulation, 68, Supp. III, October 1983, p. III-226.

Levy, Robert I., M.D., "Causes of the Decrease in Cardiovascular Mortality," The American Journal of Cardiology, 54, No. 5, August 27, 1984, pp. 7C-13C.

Lipid Research Clinics Program, "The Lipid Research Clinics Coronary Primary Prevention Trial Results II. The Relationship of Reduction in Incidence of CHD to Cholesterol Lowering," Journal of American Medical Association, 251, 1984, pp. 365-374.

Mayer, Dr. Jean, A Diet for Living, New York, Pocket Books, 1977, pp. 146-162.

Moller, James H., "Cardiovascular Risk Reduction, The Problems Facing the School Age Population," Health Education, 13, January-February, 1982, pp. 13-14.

Morris, J. N.; Marr, J. W.; Clayton, D. G., "Diet and Heart: A Postscript," British Medical Journal, 6098, November 19, 1977, pp. 1307-1314.

Phillips, R. L.; Lemon, F. R.; Beeson, W. L.; Kuzma, J. W., "Coronary Heart Disease Mortality Among Seventh-Day Adventists with Differing Dietary Habits: A Preliminary Report," American Journal of Clinical Nutrition, 31, October 1978, pp. S191-S198.

Phillipson, Beverley; Rothrock, Douglas; Connor, William; Harris, William; Illingworth, D. Roger, "Reduction of Plasma Lipids, Lipoproteins, and Apoproteins by Dietary Fish Oils in Patients with Hypertriglyceridemia," The New England Journal of Medicine, 312, No. 19, May 9, 1985, p. 1210-1216.

Rabkin, S. W.; Mathewson, F. A. L.; Hsu, P. H., "Relation of Body Weight to Development of Ischemic Heart Disease In a Cohort of Young North American Men After a 26 Year Observation Period: The Manitoba Study," American Journal of Cardiology, 39, March 1977, pp. 452-458.

Resnick, Lawrence M.; Nicholson, John P.; Laragh, John H., "Calcium Metabolism, Blood Pressure, and Salt Intake in Essential Hypertension," Circulation, 70, No. 4, Part II, October 1984, p. II-1.

Rimin, A. A.; Werner, L. H.; Yserloo, B. Van; Bernstein, R.A., "Relationship of Obesity and Disease in 73,532 Weight Conscious Women," Public Health Reports, 90, January-February 1975, pp. 44-51.

Savdie, E.; Grosslight, G.M.; Adena, M.A., "Relation of Alcohol and Cigarette Consumption to Blood Pressure and Serum Creatinine Levels," Journal of Chronic Diseases, 1984, 37 (8), pp. 617-623.

Scribner, B. H., "Salt and Hypertension," Journal of American Medical Association 250, No. 3, 1983, pp. 388-389.

Shank, Robert E., M. D., and Winston, Mary, "Diet and Nutrition," American Heart Association Heartbook, New York, E. P. Dutton, 1980, pp. 42-66.

Stein, E. A.; Shapero, J.; McNerney, C.; Glueck, C. J.; Tracy, T.; Gartside, P., "Changes in Plasma Lipid and Lipoprotein Fractions After Alteration in Dietary Cholesterol, Polyunsaturated, Saturated, and Total Fat in Free-Living Normal and Hypercholesterolemic Children," American Journal of Clinical Nutrition, 36, June 1982, pp. 1375-1390.

Takeshita, A.; Smaizumi, T.; Ashihara, T.; Nakamura, M., "Characteristics of Responses to Salt Loading and Deprivation In Hypertensive Subjects," Circulation Research, 51, October 1982, pp. 457-464.

Ueshima, H.; Shimamoto, T.; Iida, M.; Konishi, M.; Tanigaki, M.; Doi, M.; Tsujioka, K.; Nagano, E.; Tsuda, C.; Ozawa, H.; Kojima, S.; Komachi, Y., "Alcohol Intake and Hypertension Among Urban and Rural Japanese Populations," Journal of Chronic Diseases 1984, 37 (7), pp. 585-592.

Wardlaw, Janet M., "Preparing the Nutrition Education Professional for the 1980's," Journal of Nutrition Education, 13, January 1981, pp. 6-8.

Weinberg, Armin D.; Carbonari, Joseph P.; Laufmein, Larry, "What High School Students Don't Know About Cardiovascular Disease," Journal of School Health, 54, No. 3, March 1984, pp. 112-116.