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The Effect of Nutritional Education Programs on Serum Cholesterol Values

Josephine A. Kahler
South Dakota State University

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THE EFFECT OF NUTRITIONAL EDUCATION PROGRAMS

ON SERUM CHOLESTEROL VALUES

by

Josephine A. Kahler

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science, Major in Nursing

South Dakota State University

1986

THE EFFECT OF NUTRITIONAL EDUCATION PROGRAMS

ON SERUM CHOLESTEROL VALUES

This thesis is approved as a creditable and independent investigation by a candidate for the degree Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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With Human Subjects
Graduate Program
College of Nursing
South Dakota State University

Definition of Human Subjects
This term describes any individual who may be at risk as a consequence of
participation as a subject in research, development, or related activities.
Subjects may include patients; outpatients; donors of organs, tissues and
services; and normal individuals, including students or others who are
placed at risk during training in medical, psychological, sociological,
educational, and other types of activities. Of particular concern and
meriting special consideration are those subjects in groups with limited
civil freedom. These include prisoners and residents of clients of
institutions for the mentally ill and mentally retarded. Minors are also of
particular concern. The unborn and the dead will be considered subjects
only under conditions and to the extent permitted by law and regulation.

The proposed master's research project/thesis titled

The Effect of Dietary Education Programs on High Cholesterol Values.

has been discussed regarding whether it involves human subjects. We
(advisor and student) have determined that

A. (Check one)

_____ Human subjects are not involved because_____

_____

   X   Human subjects are involved ~~because~~ but are not at risk._____

_____

B. (Check one)

_____ The student will initiate contact with the University Human Subjects
       Committee and proceed according to established University guidelines.

   X   The student need not forward his/her proposal to the Human Subjects
       Committee.

cc: Advisor
     Student
     Dean of Nursing's Office   ix
     Graduate Program Office

CHAPTER 1

Introduction

This chapter contains an introduction to the problem, the problem statement, the importance of the study, the purpose of the study and definition of terms.

Introduction to the Problem

During the decades 1965-1985, the effect of dietary saturated fatty acids, polyunsaturated fatty acids and the cholesterols on increasing the levels of serum cholesterol in human beings has been well established through experimental studies.[1] Decreasing the proportions of calories obtained from saturated fatty acids, increasing the proportion from polyunsaturated fatty acids and decreasing the amount of dietary cholesterol, will lower the average serum cholesterol by predictable amounts, in a group of persons who are eating, without diet restriction.[2]

A precise definition of hypercholesterolemia (an abnormally high blood cholesterol level), is difficult to establish. A review of available studies suggests that levels above 200 to 230 mg/dl are associated with an increased risk of developing premature coronary heart disease. Coronary heart disease is the major cause of death in the United States and about 50% of the adult population in the United States have blood cholesterol levels of 200-250 mg/dl.[3]

Changing the eating habits of the American public in

order to lower lipid levels presents a challenge. Results of large scale community studies involving free-living Western populations, raises questions about whether a lasting change in diet can be maintained without continuing education and support.[4]

Statement of the Problem

To what extent does the type of nutritional education program effect the hypercholesterol values in college students at a midwestern university?

Significance of the Problem

The epidemiological relationships between dietary cholesterol, plasma cholesterol values and mortality from coronary heart disease has been illustrated in numerous scientific studies, such as the Framingham study. This study and the National Heart and Lung Institute, recommend that both physicians and other medical personnel (nurses, for example), receive special training in dietary education so that they can successfully counsel patients on their therapeutic diets.[5] This study is of importance to nursing in that the information gained from this study could result in closer dietary screening of persons and intense dietary teaching by nurses. Among the population under study, this could mean the establishment of nutritional educational programs by nurses in college health programs to influence student's present and future eating habits.

Objectives of the Study

The three objectives of this study were:

1. To test a simplified nutritional education program and it's effectiveness on lowering serum cholesterol values.

2. To compare the effectiveness of two (partial vs. intense) nutritional education programs on the post serum cholesterol values.

3. To determine which demographic data influences a change in serum cholesterol values in response to a simplified nutritional program.

Definition of Terms

1. Hypercholesterolemia: Any subject with a serum cholesterol level above 200 mg/dl.

2. Type of programs:

    a) Intense educational program: Referral to a nurse educator for an individual or group dietary counseling session which included a review of a packet of printed educational material on low cholesterol diets (30 minutes).

    b) Partial educational program: Referral to a clinic nurse for the purpose of receiving a packet of printed educational material on low cholesterol diets (5 minutes).

3. Clinic nurse: Registered nurse with a B.S.N. working in the student health clinic.

4. Nurse educator: Study researcher. A registered nurse in a masters program in nursing with an educational option.

5. <u>Subjects</u>: College students, females between the ages of 18-35 attending a mid-western university who have been found to have a serum cholesterol value between 200-220 mg/dl.

6. <u>Regular diet</u>: A diet reported by the subjects as their usual dietary intake as described on the dietary questionnaire.

7. <u>Demographic data</u>: Selected characteristics which may contribute to high cholesterol values. These include: level of education, life-style, age, area of study and family health history.

Organization of the Thesis

The remainder of this thesis will be organized as follows:

1. Chapter 2 reviews literature pertinent to the study.

2. Chapter 3 includes the conceptual framework and research hypothesis.

3. Chapter 4 presents the research design and methodology.

4. Chapter 5 reports the data analysis.

5. Chapter 6 summarizes the study, describes the nursing implications, notes the limitations of the study and offers suggestions for further study.

Summary

This chapter directed the reader's attention to the

importance of effective education in lowering serum cholesterol
values and thus decrease the incidence of coronary heart
disease. The chapter also described the definition of terms
used in the study and concludes with the organization of the
study.

CHAPTER 2

Background of the Study

This chapter reviews selected literature to the effect
of diets on serum cholesterol. Studies of the effect of
educational programs and the influence of life-style, and
exercise on serum cholesterol values are also reviewed. A
summary statement concludes this chapter.

Diet and Cholesterol

Results of studies on the effect of high levels of
saturated fat in the diet and the cholesterol level in the blood
serum, have become an accepted fact not only by scientific
investigators and practicing physicians but also by the
general public.[6]

In 1951 Shekelle et al. studied 1900 middle-aged Western
Electric employees and evaluated their normal diets and serum
cholesterol levels. Results showed a positive association
between a diet rich in saturated fats and serum cholesterol
concentration. The study concluded that high lipid
composition of a diet effects serum cholesterol concentration,
the risk of coronary heart disease and death in middle-aged
Americans.[7]

Kato et al. found significant positive correlation
between the percentage of calories from saturated fats and
the level of serum cholesterol among men of Japanese ancestry
who lived in Japan, and Hawaii. Similar associations were

observed in men with same heritage living in California.
In this study the correlation was significantly greater
between saturated and the level of serum cholesterol.[8]

Easty investigated a group of 24 young men on a year
long expedition to Antarctica. The percentage of calories
obtained from fat was positively correlated with the level of
serum cholesterol.[9]

Connor et al. observed a statistically significant
correlation between dietary cholesterol intake and total
plasma cholesterol concentration among the Tarhumare indians
of Mexico.[10]

Ward et al. found that in children 2.5 years of age, a
history of breast feeding and the current ratio of dietary
polyunsaturated fatty acids to saturated fatty acids were
among the variables related in multivariate analyses to the
level of plasma total cholesterol. This study indicated that
hypercholestolemia can occur in young children and that the
diagnosis and treatment in this early age group is important.[11]

Diet and Serum Lipoproteins

Ehnholm, Christian et al. studied the effect of a low
fat diet on serum lipoproteins with a high ratio of
polyunsaturated to saturated fatty acids in 54 middle-aged
male volunteers in North Karelia, Finland. This county in
eastern Finland is characterized by an exceptionally high
rate of coronary heart disease. At the conclusion of this
study, results indicated that a high serum cholesterol could

be effectively lowered by a diet low in saturated fats.[12]

Begun in 1949, a long term study related to the development of coronary heart disease was conducted in Framingham, Massacusetts. At the time of the writing of this paper, the National Heart Institute continues to follow the studies of over 5,000 men and women aged 30-60 years. This study indicated the following factors as being associated with excessive risk: serum cholesterol levels, blood pressure, cigarette smoking and relative weight. Data from this study shows conclusively that the risk of coronary heart disease in persons younger than 50 years of age is strikingly related to the serum total cholesterol level. The contribution of the serum total cholesterol risk has also been found to be determined by it's partition in the various lipo protein fractions. A relatively large amount of cholesterol in the low density lipo protein fraction is atherogenic, whereas in the high density fraction appears to be protective.[13]

A 12 year controlled dietary intervention study was conducted in two mental hospitals near Helsinki, Finland. This study focused on middle aged male and female patients. In one hospital a serum cholesterol lowering diet was introduced and whereas the other hospital served as a control group with no diet. Results showed that in the male subjects, the use of the cholesterol lowering diet was associated with a significantly reduced mortality rate from coronary heart

disease. In women, the mortality from coronary heart disease
also was lower during the diet period, but the differences
were small and not statistically significant.[14]

In the Los Angeles heart study, results from more than
10 years' follow-up of 250 patients revealed a high incidence
of myocardial infarction which was related primarily to high
serum cholesterol levels, hypertension and obesity in middle-
aged subjects. The importance of dietary intervention in this
study was illustrated by the end of the decade when the subjects
showed significant decreases in their serum cholesterol values.
This was especially significant in the male subjects.[15]

The Oslo study selected healthy men aged 40-49 years for
a five year randomized trial study to determine whether the
lowering of serum cholesterol through diet and cessation of
smoking could reduce the incidence of coronary heart disease.
At the end of the observation period, the incidence of
coronary heart disease was shown to be 47% lower in the
intervention group. This study indicated that mortality
reduction through dietary intervention and smoking cessation
can be as effective as drugs.[16]

In the mid 1970's, buttressed with positive results from
previously mentioned intervention trials and acknowledging
the overwhelming biological and epidemiological associations
between serum cholesterol and coronary heart disease, the
American Heart Association mounted a major educational effort
to lower serum cholesterol levels. The strategy was primarily

educational and was directed simultaneously to both the public and to medical providers.[17]

A study to determine whether community health education can reduce the risk of coronary heart disease was conducted in 1972, in three northern California towns. In two of these communities there were extensive mass media campaigns over a two year period. In one of the towns, face to face counseling was also provided for a small subset of high risk subjects. The third community served as a control. The subjects were interviewed and examined to assess knowledge and behavior related to coronary heart disease (i.e. smoking, diet etc.) and also to measure the physiological indicators of risk (e.g. blood pressure, relative weight and serum cholesterol). Results showed that in the control community the risk of coronary heart disease was high. In the treated community there was a substantial and sustained decrease in risk. In the community in which there was some face to face counseling, the initial improvement was greater and health education was most successful in reducing cigarette smoking. These results were some of the first indicators of how effective mass media educational campaigns directed at entire communities can be effective in reducing the risk of coronary heart disease.[18]

Questioning and educating the subject on current dietary intake plays a relevant role in producing changes in dietary habits. The investigator needs to know how people choose their diets and advise them on how food habits can be

improved. If dietary intervention is to be effective, the eating habits of the entire family must be changed.[19]

Investigators have implicated dietary fat in the development of coronary heart disease. The evidence presented is of two types:

a) Observations that the incidence of coronary heart disease is high in populations where fat makes up a major percentage of calories or where the ratio of saturated to certain unsaturated fats is high; and

b) Observations that serum cholesterol is related to the incidence of coronary heart disease and that serum cholesterol can be manipulated by changes in dietary fats.[20]

In a controlled trial, 21 strict vegetarians were studied for eight weeks. During this time the usual vegetarian diet was followed for two weeks, followed by four weeks during which 250 gm of beef was added isocalorically to the vegetarian diet. During the final two weeks the control diet was resumed. A 19% rise in the total plasma serum cholesterol reading was noted at the end of the meat eating period, together with a 3% rise in systolic blood pressure readings. These statistically significant results suggest an adverse effect on consumption of beef on both the blood pressure and plasma serum cholesterol levels.[21]

Substituting polyunsaturated fats for saturated fats is the logical recommendation resulting from numerous studies. The major stumbling block seems to be patient non-compliance

in dietary control. Because physicians may tell their patients to stop eating eggs, red meat and butter, this simplistic approach rarely lowers blood cholesterol and requires constant physician reenforcement. These patients should instead be referred to a dietician or other medical personnel for specific instructions. They should also realize that as with diabetes, the treatment is forever and the good work can easily be undone.[22]

Education

In the 1970's at a school of medicine in New Orleans, a coronary risk screening program was conducted on medical students as part of their nutrition education program. As freshmen, serum cholesterols were collected along with such parameters as blood pressure, dietary and physical activity histories. The students' lipid values were then reevaluated in their senior year. The students' mean cholesterol levels decreased significantly during the four years of medical school. This decrease was felt to be partially attributed to the student awareness created by classroom education and clinical experiences. The decrease in serum cholesterol values was also greater for those students who modified their diet and exercise habits. All the students reported that they would recommend changes in dietary and exercise habits for their future patients.[23]

A 1972 study on different groups of medical students at the same institution suggested that physical inactivity,

rather than increased caloric intake, may be the major factor in the energy imbalance leading to weight accumulation.[24] These two studies support the results of other studies which show that when populations were re-surveyed (i.e., five to 10 years later), following an educational program the serum cholesterols remained lower.[25]

In Minnesota, a coronary screening exercise was conducted on medical students as part of a learning project about preventive medicine. The students completed questionnaires on smoking habits and their measurements were made of their blood pressure, weight and serum cholesterol levels. The students' factor values and class ranking were subsequently posted along with a computed "coronary risk index". A follow-up questionnaire one year later, suggested a change in eating habits (but not in smoking habits) and a marked enthusiasm for the learning experience that has made this exercise a permanent part of the Minnesota second year medical student's curriculum. The education given these students motivated several in the upper limits of serum cholesterol distribution to seek nutritional counseling with consequent lowering of cholesterol levels. Peer pressure was also brought to bear on the cigarette smokers in the class and were effective in reducing their number.[26]

The dietary instructions of the National Heart and Lung Institute recommend that daily cholesterol intake be restricted to 300-500 mg. Each diet should be personalized as much as

possible, taking into account the patient's life-style, work schedule, food likes and dislikes, food allergies and current medical problems such as hypertension. Since the majority of these patients are also overweight, a daily caloric level that would permit a weekly weight loss of 0.45 to 0.95 kg would be beneficial, with alcohol and sugars also restricted. In a study using these above mentioned guidelines, 103 patients received instructions for a therapeutic diet over a two year period. Regular dietary counseling was done by both a physician and a dietician. When compared with 175 patients with the same diagnosis who received similar diets but little diet counseling, the former group showed large declines in serum cholesterol levels and a mean weight loss of 80-84 kg.[27]

Another important dietary measure, food labeling, has also been recommended for observation by many investigators. This should include total calories, fat source and total fat, saturated fat and polyunsaturated fat and cholesterol content as well as other essential nutritional information. Studies indicate that labeling together with simple principles of food selection and preparation have been used successfully in teaching patients self-management dietary skills.[28]

High fiber diets have also been found to be effective in lowering cholesterol values. They do not have protective action per se but emphasize foods that contain a reduced amount of fat and cholesterol.[29]

Studies Related to Demographic and Other Factors

The importance of obtaining demographic data for this study can be supported by previous studies on the incidence of cardiovascular heart disease related to serum cholesterol levels.[30]

Age. The Framingham study found that by using a conservative rule of thumb, a serum cholesterol level should not exceed 200 mg/dl plus the patient's age. This statement remains controversial. Other researchers write opinions to the contrary, emphasizing the importance of maintaining the serum cholesterol level below 200 mg/dl no matter what the patient's age. Greater benefits have been found to accrue if the serum cholesterol level is controlled at a young age rather than at an older age. After age 65, the serum cholesterol level correlates very poorly with coronary heart disease.[31]

Course of study. Studies have shown that the educational level of the student and his/her major course of study may also be influential factors in causing high serum cholesterol levels. The relationship of emotional stress, the personality coping with it, poor handling of hostility and evidence of anxiety, have all been found to be related to the incidence of coronary heart disease or it's precursors.[32]

Personal and genetic factors. The highest risk group among patients are those who are overweight, have high serum cholesterol levels and suffer from high blood pressure.

Other related health problems, such as diabetes mellitus
(insulin therapy), have also been shown to influence high-
density lipoprotein levels (HDL). Low HDL levels (30 mg/dl)
carry a significantly increased risk of coronary heart
disease, while elevated HDL levels are considered
protective.[33]

Epidemiological studies have shown that there is the
possibility of genetic influences, including familial
aggregation of risk factors and familial hyperlipo-proteinemia.
Such studies suggest genetic factors at work, increasing the
propensity to coronary heart disease among siblings.[34]
Scientists are now able to culture amniotic fluid cells from
a fetus at risk for homozyous familial hypercholesterolemia
as early in a pregnancy as 20 weeks. This finding further
supports the influence of genetic risk factors in the
developing fetus when a near-absence of functional LDL
receptors in amniotic cells are cultured.[35]

Life-style. Because the patterns of life-style are
developed in childhood, identifying and treating children
with elevated cholesterol levels is desirably better than
allowing them to mature with high serum cholesterol levels
and bad dietary habits. "Children at risk" should be
identified by carefully obtained family histories which
include parents, grandparents, and all first-degree relatives.
Dietary management of these children should be part of the
total management that includes: regular exercise programs,

maintenance of ideal weight and avoidance of both excess salt and cigarette smoking.[36]

Regular physical activity (i.e. running), has been found to keep fats at levels beneficial to heart health. Studies have shown that vigorous exercising done three times per week significantly lowers total serum cholesterol levels and increases HDL-cholesterol levels.[37]

The hypothesis that exercise elevates HDL-cholesterol levels, resulting in protection from coronary heart disease is described as an attractive, well publicized theory.[38] Investigators have found a significant decrease in total cholesterol levels in runners.[39] Runners have been found to have a statistically slower pulse rate as a result of chronic exercise training. The role of exercise in producing weight loss due to caloric expenditure results in body composition alteration that is a decrease in percentage of body fat.[40]

It has also been postulated that HDL acts as a clearing agent during intense periods of regular exercise, in removing cholesterol from body cells and through to the liver for degration. This process together with the desire for a leaner body mass has been an important motivating factor for those millions of Americans who have taken up either distance running or some equally strenuous physical sport.[41]

Summary of Literature Review

This chapter has reviewed pertinent literature on the

positive correlation between diet and cholesterol levels and their relationship to coronary disease. Studies on the use of a variety of educational methods, the influence of exercise and life-style, and the importance of dietary counseling were also reviewed. Epidemiological studies showed a strong link between increased risk factors and genetic influences.

The researcher found no studies using young upper Midwest college men and women. Studies using medical students as subjects in various universities showed an increased awareness of both personal dietary habits and a desire to help future patients, through dietary counseling.

The need for dietary educational intervention in the general population was emphasized, together with the availability of educational services for patients and professional educational programs for physicians, dieticians and other medical personnel, i.e. nurses.

CHAPTER 3

Conceptual and Theoretical Framework

This chapter describes the conceptual framework of the study and the hypotheses.

Conceptual Framework

The conceptual framework used in this study is a modification of the Health Belief Model which is used for predicting and explaining sick role behaviors. The Health Belief Model deals with two classes of variables based on motivation:

a) It seeks out decreasing the threat by some kind of health action i.e. through dietary education.

b) It works on how much the action will be beneficial in decreasing the threat.

```
┌─────────────────┐        ┌─────────────────┐     ┌──────────────┐
│ Pre treatment   │        │ Post treatment  │     │ Type of      │
│ serum cholesterol│───────>│ serum cholesterol│<───│ educational  │
│ values          │        │ values          │     │ program      │
└─────────────────┘        └─────────────────┘     └──────────────┘
        ▲
┌─────────────────┐
│ Demographic     │
│ data            │
└─────────────────┘
```
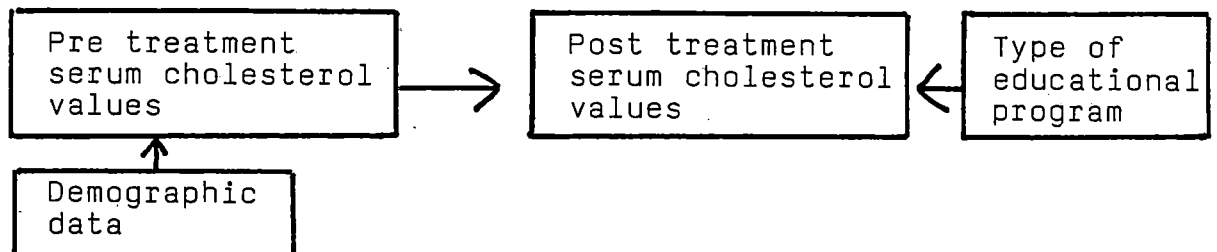
Figure 1

Conceptual Framework

Factors Influencing Serum Cholesterol Values

The serum cholesterol values in the post treatment stages are affected by a variety of factors such as the subject's willingness to accept the recommended diet regime and medical

direction. The type of educational program (and the proposed regimen's efficiency in lowering cholesterol) may also lower the cholesterol.

Nursing action. Consists of providing two methods of patient education. One an intense counseling session and the other a brief information session.

Hypotheses

Hypothesis 1. There will be no significant difference between the simplified nutritional education program and it's effectiveness on lowering serum cholesterol values.

Hypothesis 2. There will be no significant difference between the effectiveness of the two (partial vs. intense) nutritional education programs on the post serum cholesterol values.

Hypothesis 3. There will be no significant difference between the demographic characteristics of the subjects and the influences on changes in serum cholesterol values in response to a simplified nutritional program.

CHAPTER 4

Approach

This chapter presents the methodology, sample population, and collection of data. The study variables, dependent and independent, are described.

Approach

The research approach was quasi-experimental. Manipulation occurred through the differing educational approaches to two student populations. A control group of subjects received a packet of printed educational material on low cholesterol diets. An experimental group received group dietary counseling as well as an identical packet of printed educational material.

Sample

The accessible population for this study consisted of females between the ages of 18-35, attending a Midwestern university who had been found to have a serum cholesterol value of 200-220. They are further defined by the student health service's criteria for initial cholesterol screening comes from one or more of the following categories:

1) Have a blood pressure of >140/95.

2) Have one direct ancestor (father, mother, grandparents or two indirect family members (siblings, cousins, aunts, uncles, great-aunts and uncles) who:

   a) have had serum cholesterol values >200;

b) have suffered from strokes and heart attacks;

c) have died from cardiovascular disease prior to age 60;

3) Subjects exhibiting milky or turbid serums, illustrating the possible presence of hyperlipemia.

4) Patients with a diagnosis of diabetes mellitus, xanthomas, or other diseases associated with hypercholestolemia.

5) Subjects who will begin taking contraceptive medication for the first time.

To be qualified for this study the criteria for acceptance of the sample was:

Students must be tested in the student health center of the research setting and found to have a serum cholesterol value of 200-220 mg/dl. This sample was purposive.

Variables

The dependent variable was the post treatment serum cholesterol value. Data for this value was collected three months post educational treatment. All tests were conducted in the student health service laboratory and the results were determined within one day.

The independent variables were two types of educational programs. All subjects received a packet of printed educational material on low cholesterol diets.

The experimental group also received a half hour session in dietary counseling from a nurse educator.

Data Collection Tools

The demographic data tool (Appendix A) was developed by the researcher. The dietary questionnaire (Appendix D) was one that the staff dietician had prepared and was being used by the clinic before this study began. The form for recording the results was developed by the researcher. This form was evaluated by the medical director and the administrator of the health service prior to it's implementation. The form included results of both the pre and post serum cholesterol blood tests.

Appendix B contains the sample data collection form. An abbreviated example follows:

Pre treatment serum cholesterol results: mg/dl

Post treatment serum cholesterol results: mg/dl

The laboratory collected one blood sample through a peripheal venipuncture on a subject who had been eating a regular diet for at least two weeks. Total serum cholesterol levels were obtained through reflectance photometry, using the Ames Seralyzer. This instrument analyzes the color and intensity of light reflected from a seralyzer reagant strip. In the analyzing process, reflected light from the reacted area of reagent strip is measured electronically and the analyte concentration is displayed in numeric values. A dilution of the serum is required beforehand.

Midway through this study the student health service installed a new machine to measure serum blood cholesterols. This machine called the Ektachem uses colorimetric slides that contain multiple layers of film coated with dry agents, chemicals react with the analyte in the patient sample to form colored substances that are read by the analyzer's reflectance spectrometer. The serum is introduced directly on to the slide, no dilution is required.

Because of the change in the determination method of the serum cholesterol values, 20 split blood samples were tested on both apparatus. The results indicate that the comparative values of the two methods lies consistently within +3 standard deviations of the two machines, (+5.1 mg/dl), showing a linear relationship between the two sets of values (Appendix G).

Funding for these tests came from the student health budget as part of a regularly delivered service to the students. Participation in this study required no additional expense to the subjects.

Method of Collecting Data

Human subjects statements were submitted to both South Dakota State University (SDSU) and the University of South Dakota (USD) human subjects committees prior to data collection (Appendix F).

The subjects were selected in the following manner. A student visiting the student health service who was found to meet the previously stated criteria of a subject, i.e. a

serum cholesterol value of 200-220, received notification of the initial serum cholesterol values by both phone and letter from the clinic nurse. They also received instructions on when to come to the student health service for information on their respective educational programs and appointments were scheduled at that time.

Subjects were the first 32 persons who fulfilled the subject criteria and agreed to participate in the study. Each subject was then given a patient consent form by the clinic nurse and upon assent became a study subject (Appendix C). The subjects were asked to complete a demographic data sheet which included questions on age, sex, level of education, health status, family health status and life-style (Appendix A). Information on current dietary intake (the type of foods that the subjects ate on a regular basis) was also obtained (Appendix D).

Subject data forms were numbered by the clinic nurse. No names were used. Even numbered subjects received a packet of educational material on low cholesterol diets from the clinic nurse. This included a list on the serum cholesterol values of selected foods, a cholesterol control diet plan, some ideas on how to modify a family diet and a pamphlet on the fiber content of different foods (Appendix E). Odd numbered subjects received an intense half hour individual or group (restricted to no more than three subjects at one time), counseling session which included a discussion on the

different food groups and the importance of modifying dietary fat intake as well as the identical packet of educational material on low cholesterol diets, from which the nurse educator/researcher based her teaching and dietary counseling.

Blood cholesterol levels were recorded on the research tool developed by the researcher (Appendix B). Following clinic protocol the results were then given to the medical director for final review.

This study which compared the effectiveness of two educational programs on the post serum cholesterol values of young upper Midwest college women, began in the fall of 1985 and continued for two semesters. Thirty-two subjects were deemed sufficient for the proposed study, methodology and analysis.

Summary

This chapter dealt with the study methodology, the purposive population, a description of the dependent and independent variables and a description of the data collection tool. The method of data collecting has also been described.

CHAPTER 5

Analysis of Research Data

This chapter reports the study data analysis.

Data for the study was obtained through the administration of demographic and dietary questionnaires and measurement of serum cholesterol values.

Description of the Subjects

The 32 college students who participated in the study had the following characteristics:

1. The age range of the subjects was 18 to 32 years with an average age of 21.25 years.

2. Seventy-eight point thirteen percent of the ages ranged from 18-22 years.

3. All participants were Caucasian.

4. Ninety point sixty-two percent of the subjects were undergraduates.

5. The average pre serum cholesterol value was 208.75 mg/dl.

6. Twenty-two subjects in the study (68.74%) had a family history of cardiovascular disease.

7. Forty-six point eighty-seven percent of subjects were enrolled in general courses with no specific major.

8. Three of the subjects (or 9.38%) smoked and 40.63% exercised on a regular basis.

Statistical Analysis of Hypotheses

Statistical analysis will be presented in the following format.

1. The statistical hypothesis will be stated.

2. The statistical test used to test the hypothesis will be stated.

3. The statistical results will be discussed.

Hypothesis 1. There will be no significant difference between the simplified nutritional education program and it's effectiveness on lowering serum cholesterol values.

Hypothesis 1 was tested using a paired T-Test. Hypothesis 1 was rejected. There was a significant difference between the simplified nutritional education program and it's effectiveness on lowering serum cholesterol values. The T ratio and probability of T are summarized in Appendix H.

Hypothesis 2. There will be no significant difference between the effectiveness of the two (partial vs. intense) nutritional education programs on the post serum cholesterol values.

Hypothesis 2 was tested using a paired T-Test. Hypothesis 2 was not rejected. There was no significant difference between the effectiveness of the two nutritional education programs. The results including T value and probability of T are presented in Appendix H.

Hypothesis 3. There will be no significant difference between the demographic characteristics of the subjects and

the influence on changes in serum cholesterol values in response to a simplified nutritional program.

Hypothesis 3 was tested using both analysis of variance and a paired T-Test. Hypothesis 3 was not rejected. There was no significant difference between the demographic characteristics of the subjects and the influence on changes in serum cholesterol values. The results including F and T values and probabilities of F and T are presented in Appendix H.

Summary

Statistical analysis of the data has been presented in this chapter.

CHAPTER 6

Summary, Major Findings, Conclusions, Implications,

Limitations and Recommendations

This chapter presents:

1. A summary of the research problem, objectives and design.

2. A summary of the major findings and conclusions as related to the three objectives of the study.

3. Implications of the findings.

4. Statements of the limitations to the study.

5. Statements of recommendation for further study.

Summary of the Research, Problems, Objectives and Design

The problem under investigation was as follows: To what extent does the type of nutritional education program effect the serum cholesterol values in college students at a Midwestern university?

The objectives of the study were as follows:

1. Test a simplified nutritional education program and it's effectiveness on lowering serum cholesterol values.

2. Compare the effectiveness of two (partial vs. intense) nutritional education programs on the post serum cholesterol values.

3. Determine which demographic data influences a change in serum cholesterol values in response to a simplified nutritional program.

A quasi experimental approach using a purposive sample of 32 subjects was used to test to what extent the type of nutritional education program effects the serum cholesterol values in college students at a Midwestern university.

Statistical analysis of the frequency of selected characteristics and their relationship to the demographic variables of the sample was done.

Major Findings and Conclusions

The summary of major findings and conclusions as related to the three objectives is discussed in this section.

Objective One: Major Findings and Conclusions

Objective one of this study was to test a simplified nutritional education program and it's effectiveness on lowering serum cholesterol values.

A group of 32 female college students with a known elevated serum cholesterol value of between 200-221 mg/dl were exposed to simplified nutritional education program.

Major Findings: Objective One

The general findings for objective one were as follows: 26 students (81.25%) decreased their serum cholesterol values and 6 students (18.75%) increased their serum cholesterol values. Table 8 lists all serum cholesterol values (Appendix I). Table 1 (page 32) demonstrates changes in the serum cholesterol values.

Conclusions: Objective One

1. The simplified nutritional education program is

Table 1

Changes in Serum Cholesterol Values

Average Serum Cholesterol	Total Group n=32	Responders n=26	Non Responders n=6
Pre-intervention	208.75	209.65	204.83
range	(200-221)	(200-221)	(201-208)
Post-intervention	184.25	177.15	215.00
range	(144-234)	(144-213)	(208-234)
Change in percentage	-11.74	-15.5	+4.73

effective for female college students. This hypothesis is statistically significant.

2. The non-responders had only a 2.3% lower serum cholesterol value from the responders which is statistically insignificant.

3. The changes in the non-responders indicates probably unchanged serum cholesterol values, showing that they made no nutritional changes, rather than avoiding the diet completely. This is due to the fact that all but one of the changes fall in the +3 standard deviations of the biomedical method of serum cholesterol determination (one standard deviation or a 200 mg/dl sample on the kodak ectachem 60 is 1.7 mg/dl).

Objective Two: Major Findings and Conclusions

Objective two of this study was to compare the effectiveness of two (partial vs. intense) nutritional education programs on the post serum cholesterol values.

The previously described group of college students who had elevated serum cholesterol values were divided at random into two groups and were exposed to simplified nutritional education programs which were identical in every respect, except that the contact time in one group P (partial) was five minutes and in the other group I (intense) was 30 minutes.

Major Findings: Objective Two

1. A comparison of certain demographic data as well as the serum cholesterol values before intervention indicates

that the two groups were closely identical in composition. (Table 8, Appendix I).

2. Table 2 (page 35) demonstrates that the P group (n=15), had 13 responders who decreased their serum cholesterol values by 16.57%. The two non-responders increased their serum cholesterol values by 4.16%.

3. The group I (n=17) had 13 responders who decreased their serum cholesterol values (14.44%) and four non-responders who increased their serum cholesterol values by 5.37%.

Conclusions: Objective Two

1. The randomly selected groups were nearly identical.

2. The difference between the P and the I groups in response to the differences in the nutritional education programs were not found to be significantly different.

Objective Three: Major Findings and Conclusions

Objective three of this study was to determine which demographic data influences a change in serum cholesterol values in response to a simlified nutritional education program.

The subjects with the following demographic data were extracted from the sample and their change in serum cholesterol values were compared with the group as whole:

Graduate Students (N=3)

Smokers (N=3)

Regular Exercisers (N=12)

Family History of Cardiovascular Disease (N=22)

Table 2

Changes in Serum Cholesterol Values

Average Cholesterol Values	P-Group	I-Group
1. Total Group	N=15	N=17
Pre Intervention	208.33	209.13
Range	(200-221)	(201-221)
Post Intervention	179.47	188.47
Range	(145-213)	(144-234)
%Change	-13.85	-9.87
2. Responders	N=13	N=13
Pre Intervention	208.92	210.38
Range	(200-221)	(201-221)
Post Intervention	174.30	180.00
Range	(145-212)	(144-213)
%Change	-16.57	-14.44
3. Non-Responders	N=2	N=4
Pre Intervention	204.50	205.00
Range	(201-208)	(204-206)
Post Intervention	213.00	216.00
Range	(213)	(208-234)
%Change	+4.16	+5.37

Major Area of Study   (N=28)

    1. General   (N=14)

    2. Business   (N=9)

    3. Health   (N=5)

The total group of subjects (N=32) had an average serum cholesterol value of 208.75 mg/dl before the intervention and an average serum cholesterol value of 184.25 mg/dl after the intervention, which represents a decrease of 11.74%.

Table 3 (page 37) summarizes the relationship of the serum cholesterol values to the selected demographic data.

Major Findings: Objective Three

The general findings for objective three indicate that there were no demographic characteristics which are predictive for the outcome of the simplified nutritional education program. These groups were also closely identical.

Conclusions: Objective Three

The outcome of the simplified nutritional education program could not be predicted by the selected demographic data.

Implications

Implications are generated from an analysis of data. Some major implications may be as follows:

1. The study has shown that simplified nutritional education instruction consisting of the elements of reason and nutritional advice, is effective in causing a reduction in the serum cholesterol values of college students.

Table 3

Demographic Characteristics

Category	Average Serum Cholesterol Values
Graduate Students (N=3)	
Pre Intervention	213.00
Range	(205-220)
Post Intervention	198.33
Range	(180-212)
%Change	-6.89%
Smokers (N=3)	
Pre Intervention	214.33
Range	(206-220)
Post Intervention	187.33
Range	(151-208)
%Change	-12.60%
Exercisers (N=12)	
Pre Intervention	206.50
Range	(220-221)
Post Intervention	187.50
Range	(145-234)
%Change	-9.3
Family History (N=22)	
Pre Intervention	209.50
Range	(200-221)
Post Intervention	185.50
Range	(145-234)
%Change	-11.46
General Studies (N=14)	
Pre Intervention	210.16
Range	(200-220)
Post Intervention	189.00
Range	(164-213)
%Change	-9.48
Business (N=9)	
Pre Intervention	205.33
Range	(201-215)
Post Intervention	177.66
Range	(145-234)
%Change	-13.56

Table 3 (Continued)

Demographic Characteristics

Category	Average Serum Cholesterol Values
Health (N=5)	
Pre Intervention	213.20
Range	(205-221)
Post Intervention	189.40
Range	(151-214)
%Change	-11.16

2. A five minute contact time period (partial) is as effective as a 30 minute (intense) counseling session.

3. There is no demographic data that is predictive of the outcome.

4. The study has economic implications in that the expense of intensive, professional counseling may not be necessary for student learning.

Limitations of the Study

This study had the following limitations:

1. The sample was small (n=32).

2. The study did not control for adherence to the nutritional education program.

3. Group versus individual counseling sessions was not controlled.

4. The 32 subjects were female since they were the accessible population who qualified for the study.

5. Stress and other variables which may have contributed to the difference were not controlled.

6. The effect of researcher acting as the educator counselor was not controlled.

Recommendations for Further Study

The author recommends the following for further research:

1. A replication of this study using a large random sample that would enable one to modify the educational program further.

2. A study using both sexes and minorities.

3. A study of the long term effect of planned education programs on blood serum cholesterol levels of subjects.

4. A study of serum cholesterol levels of high school students.

5. Replication of this study using a population of the same age group who are not in college.

6. A study to measure the effect of the subjects' educational level in understanding and ability to follow directions.

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APPENDIX A

Demographic Data

The following questions are background information.
Please check ONE answer for each question.

1. Age _____

2. Educational Level: Freshman _____

   Sophomore _____   Highest degree held

   (Check one)   Junior   _____

   Senior _____   _____

   Graduate _____

   Major area of study

   _____

3. Sex _____

4. Do you have any existing health problems? Yes ___   No ___
   If "Yes", specify _____

5. Is there a history of high blood pressure, stroke, heart
   attacks or coronary heart disease in your family?

   Yes _____   No _____

   If "Yes", specify _____

6. Is there any other serious health problem in your family?

   Yes _____   No _____

   If "Yes", specify _____

7. Do you smoke? Yes _____   No _____
   If "Yes", how many cigarettes do you smoke per day?
   Please specify _____

   How many years have you smoked?
   Please specify _____

8. Do you chew tobacco? Yes _____   No _____
   If "Yes", how many years?
   Please specify _____

9. Do you exercise on a regular basis? Yes _____   No _____
   (i.e. at least 3 times per week for a 40 minute period)

   Please specify type _____

APPENDIX B

Data Collection Form

Subject #: _____

Date entered into study: _____

Pretreatment serum cholesterol results: _____ mg/dl

Posttreatment serum cholesterol results: _____ mg/dl

Type of education program given: _____ Intense

_____ Partial

APPENDIX C

Patient Consent Form

Dear University Student:

I am a graduate student working on my Masters Degree in
Nursing at South Dakota State University. Presently, I am
conducting a study on the impact of educational programs in
nutrition in reducing high cholesterol values in college
students. The importance of effectiveness and optimum health
is significant to busy college students as well as to a
progressive health system which focuses on preventive medicine.

Because your serum cholesterol value is elevated, I would
appreciate your participation in this study. I am asking you
to allow me to use the results from your blood cholesterol
tests before and after your treatment at the Health Service.
Subjects will be randomly assigned to two different educational
programs. One group of subjects will receive a packet of
educational materials on low cholesterol diets. The other
group will receive a similar packet of materials as well as
a half hour counseling session on low cholesterol diets. The
researcher will be available at the Health Service (677-5292)
to answer any questions concerning this program every Tuesday
and Thursday from 10:00AM - 12 Noon, for the next twelve weeks.
Participation is voluntary and failure to participate will not
effect your treatment at the Health Service.

I would also like you to fill out a brief questionnaire
today which may provide valuable information on other factors
which influence serum cholesterol values. When completed
please give this to the receptionist at the front desk. Your
name will not be known to me. The results will be identified
numerically. Information gathered for me which has your name
on it will be kept in your personal file only, where
confidentiality and privacy will be maintained.

I believe patients and health care providers alike will
benefit from this study. Your participation will be greatly
appreciated. Please sign on hte line provided on the next
page if you consent to participate in this study. If you
would like to know the results of my study, please check the

box below and I will provide copies to the Health Service to share with you.

Thank you so much for your assistance.

Sincerely,

JOSEPHINE KAHLER, R.N., B.A.
Graduate Student

_____
(Signature of Student)

_____ Results requested.

APPENDIX D

Dietary Questionnaire

Dietary Questionnaire for Client

Name _____

Date _____

1. How many times in the past 2 weeks have you eaten the following foods
    (at any meal or between meals)? Circle the appropriate number:

    A.   Bacon .... 01234567>7, specify _____

         Tongue .... 01234567>7, specify _____

         Sausage .... 01234567>7, specify _____

         Luncheon meat .... 01234567>7, specify _____

         Hot dogs .... 01234567>7, specify _____

         Liver-chicken .... 01234567>7, specify _____

         Liver-other .... 01234567>7, specify _____

         Poultry .... 01234567>7, specify _____

         Salt pork .... 01234567>7, specify _____

         Pork or ham .... 01234567>7, specify _____

         Bones (neck or other) .... 01234567>7, specify _____

         Meat in mixtures (stew, tamales,
           casseroles, etc.) .... 01234567>7, specify _____

         Beef or veal .... 01234567>7, specify _____

         Other meat .... 01234567>7, specify _____

         Fish .... 01234567>7, specify _____

    B.   Fruit juice .... 01234567>7, specify _____

         Fruit .... 01234567>7, specify _____

         Cereal-dry .... 01234567>7, specify _____

         Cereal-cooked or instant .... 01234567>7, specify _____

         Eggs .... 01234567>7, specify _____

         Pancakes or waffles .... 01234567>7, specify _____

         Cheese .... 01234567>7, specify _____

         Potato .... 01234567>7, specify _____

         Other cooked vegetables .... 01234567>7, specify _____

         Raw vegetables .... 01234567>7, specify _____

         Dried beans or peas .... 01234567>7, specify _____

Macaroni, spaghetti, rice or noodles.. 01234567>7, specify _____

Ice cream, milk pudding, custard
  or cream soup .... 01234567>7, specify _____

Peanut butter or nuts .... 01234567>7, specify _____

Sweet rolls or doughnuts .... 01234567>7, specify _____

Crackers or pretzels .... 01234567>7, specify _____

Cookies .... 01234567>7, specify _____

Pie, cake, or brownies .... 01234567>7, specify _____

Potato chips or corn chips .... 01234567>7, specify _____

Candy .... 01234567>7, specify _____

Soft drinks, popsicles, or koolaid ... 01234567>7, specify _____

Instant breakfast .... 01234567>7, specify _____

C. Bread (including sandwich), toast,
    rolls, muffins, (1 slice or 1
    piece is 1 serving) .... 01234567>7, specify _____

Milk (including on cereal or in
  other foods) (8 oz. is 1 serving) ... 01234567>7, specify _____

Sugar, jam, jelly, syrup
  (1 tsp. is 1 serving) .... 01234567>7, specify _____

APPENDIX E

Dietary Sources of Fat and Relative Amounts

Of Saturated and Unsaturated Fatty Acids

DIETARY SOURCES OF FAT AND RELATIVE AMOUNTS
OF SATURATED AND UNSATURATED FATTY ACIDS

FOOD	AMOUNT	TOTAL FAT (g)	SATURATED FAT (g)	UNSATURATED FAT	
				OLEIC (g)	LINOLEIC (g)
MEATS					
Sirloin steak, fat and lean, broiled	3 oz	27	13	12	1
Sirloin steak, lean, broiled	3 oz	6	3	3	Trace
Ground beef, regular, broiled	3 oz	17	8	8	Trace
Ground beef, lean, broiled	3 oz	10	5	4	Trace
Ham, fat and lean, roasted	3 oz	19	7	8	2
Lamb, leg roast, fat and lean	3 oz	16	9	6	Trace
Veal, fat and lean, roasted	3 oz	9	5	4	Trace
Chicken, white meat, broiled	3 oz	3	1	1	1
Tuna, oil packed	3 oz	7	2	1	1
DAIRY					
Milk, 3.5% fat	1 cup	9	5	3	Trace
Milk, fortified low fat	1 cup	5	3	2	Trace
Cream, 12%	1 tbsp	3	2	1	Trace
Butter	1 tbsp	12	6	4	Trace
Cheese, cheddar	1 oz	9	5	3	Trace
Cheese, cream	1 oz	11	6	4	Trace
VEGETABLE FATS					
Margarine, regular	1 tbsp	12	2	6	3
Margarine, soft	1 tbsp	11	2	4	4
Margarine, special	1 tbsp	11	2	4	4
Mayonnaise	1 tbsp	11	2	2	6
Oils, safflower	1 tbsp	14	1	2	10
corn	1 tbsp	14	1	4	7
soybean	1 tbsp	14	2	3	7
cottonseed	1 tbsp	14	4	3	7
peanut	1 tbsp	14	3	7	4
olive	1 tbsp	14	2	11	1
coconut	1 tbsp	14	12	1	Trace
Vegetable fat	1 tbsp	13	3	6	3

Cholesterol Value of Selected Foods *
U.S.D. Student Health

Name _____

Food	Cholesterol (mg)
Milk	
Whole, 3.5% fat (1 cup)	34
Nonfat (skim) (1 cup)	5
Low-fat (1 cup)	22
Cheese	
Blue or Roquefort type (1 cu. in.)	15
Camembert (1 wedge)	35
Cheddar (1 cu. in.)	17
Cottage Cheese, creamed (1 pkg)	65
Cottage Cheese, uncreamed (1 pkg)	24
Cream Cheese (1 pkg. 3 oz)	94
Parmesan (1 tbsp)	5
Swiss Cheese (1 cu in.)	15
Processed cheese (1 cu. in.)	16
American pasteurized process cheese food (1 tbsp.)	10
American process cheese spread (1 oz)	18
Cream	
Half-and-half (1 tbsp)	6
Light, coffee or table (1 tbsp)	10
Sour (1 tbsp)	8
Whipped topping (1 cup), pressurized	51
Milk Beverages	
Cocoa, homemade (1 cup)	35
Chocolate-flavored drink (skim milk) 1 cup	20
Milk Deserts	
Custard, baked (1 cup)	278
Ice cream, regular (1 cup)	53
Ice milk, hardened (1 cup)	26
Ice milk, soft serve (1 cup)	36
Yogurt (made from partially skimmed milk) (1 cup)	17
Yogurt (made from whole milk) (1 cup)	30
Yogurt (sweetened with fruit added) (1 cup)	15
Eggs	
Whole, (large size)	252
White of egg	0
Yolk of egg	252
Meat, Poultry, Fish, Shellfish, Related Products	
Bacon (2 slices)	16
Beef (lean only) (2.5 oz)	66
Hamburger, broiled, lean (3 oz)	77
Rib roast, oven cooked, lean and fat (3 oz)	80
Rib roast, oven cooked, lean only (1.8 oz)	46
Steak, broiled, lean and fat (6 oz)	160

Steak, broiled, lean only (6 oz) 153

Corned beef (3 oz) 85

Chicken, flesh only, broiled (3 oz) 74

Chicken, breast, fried (with bone) (3 oz) 75

Chicken, breast, fried (flesh and skin only) (2.7 oz) 68

Chili con carne, canned, with beans (1 cup) 77

Chili con carne, canned, without beans (1 cup) 153

Lamb chop, broiled with bone (1 chop) (4.8 oz) 74

Roast leg of lamb, lean and fat (3 oz) 83

Roast lamb shoulder, lean and fat (3 oz) 83

Beef liver, fried (2 oz) 250

Roast ham, lean and fat (3 oz) 76

Boiled ham, sliced (2 oz) 51

Canned, spiced or unspiced ham (2 oz) 51

Pork chop, thick with bone (1 chop) (3.5 oz) 59

Port chop, lean only (1 chop) (1.7 oz) 42

Bologna (2 slices) 26

Braunschweiger (2 slices) 20

Frankfurter, heated (1 frank) 56

Pork links, cooked (2 links) 26

Salami, dry type (1 oz) 28

Vienna sausage, canned (1 sausage) 16

Veal cutlet (3 oz) 86

Veal roast (3 oz) 86

Bluefish, baked (3 oz) 60

Clams, raw (3 oz) 43

Clams, canned (3 oz) 86

Crabmeat, canned (3 oz) 86

Fishsticks, frozen (2 sticks) 46

Haddock, fried (3 oz) 51

Ocean perch, fried (3 oz) 51

Oysters, raw (1 cup) 120

Salmon, pink, canned (3 oz) 30

Sardines, Atlantic (3 oz) 119

Shrimp, canned (3 oz) 128

Tuna, canned (3 oz) 55

Grain Products

Angel-food cake (whole cake) (1 cake) 0

Devil's-food cake with chocolate icing (1 cake) 531

Cupcake (1) 17

Gingerbread (1 cake) 6

White layer cake with chocolate icing (1 cake) 23

Boston cream pie (1 piece) 33

Fruitcake, dark (1 slice) 7

Pound cake, (1 slice) 30

Sponge cake (1 piece) 162

Yellow cake without icing (1 piece) 26

Yellow cake (1 piece) 36

Brownies with nuts (1 brownie) 17

Doughnuts, cake type (1) 27

Macaroni and cheese, baked (1 cup) 42

Muffins (1) 21

Egg noodles (1 cup) 50

Pancakes (1 cake) 20

Apple pie (1 piece) 0

Custard pie (1 piece)	137
Lemon meringue pie (1 piece)	112
Mince pie (1 piece)	16
Pecan pie (1 piece)	57
Pumpkin pie (1 piece)	79
Spaghetti with meat balls and tomato sauce (1 cup)	75
Spaghetti with meat balls and tomato sauce, canned (1 cup)	39
Waffles (1)	45

Fats and oils
Butter (1 tbsp)	35
Butter (1 pat)	13
Whipped butter (1 tbsp)	22
Whipped butter (1 pat)	10
Lard (1 tbsp)	12
Mayonnaise, regular (1 tbsp)	8

Sugars and Sweets
Chocolate candy, milk, plain (1 oz)	21

Miscellaneous items
Chocolate pudding (1 cup)	30
Vanilla pudding (1 cup)	35
Tapioca cream pudding (1 cup)	159

Recommended Daily Intake_____

* Cholesterol values calculated from R. M. Feeley, et al. Cholesterol content of
foods. J. Am. Diet Assoc. 61:134. 1972.
Cholesterol is only present in food from animals or in prepared foods containing
ingredients of animal origin. Cholesterol is not present in fruits, vegetables
and cereals.
Cholesterol content due to eggs, milks, butter (i.e. animal products) used in
preparation.

CHOLESTEROL CONTROL DIET PLAN for Normal Weight Patients

For _____ Date _____

GENERAL INSTRUCTIONS

Eat regularly as indicated on your sample menu. Servings of margarine and oils, breads and cereals, fruits or vegetables may be added or substracted from the diet plan to adjust the calorie intake.

Choose fish, poultry, and other protein foods in List II (on back) often. Eat less beef, lamb, pork, regular cheese, and other foods in List IV which are extremely high in cholesterol. Limit meat, fish, or poultry servings to 6 oz. per day, as indicated in

your Basic Meal Plan.

Prepare foods with corn, cottonseed, soybean, or safflower oil and choose margarines which are polyunsaturated.

Choose a good source of Vitamin C daily. They are citrus fruits, strawberries, broccoli, brussels sprouts, papaya, and cantaloupe. Choose a good source of Vitamin A every other day. These are dark green or yellow fruits and vegetables.

Basic Meal Plan See substitution lists on back for other allowable foods.	Sample Menu	Calories	Chol. Mg.	Special Instructions
BREAKFAST	**BREAKFAST**			
1 serving fruit or juice	1 grapefruit half	40		
1 serving cereal with	1 cup enriched dry cereal	60		
½ cup nonfat milk	½ cup Carnation Instant Nonfat Milk	40	2.5	
2 servings bread	2 slices white toast	124		
*2 servings margarine	2 tsp. margarine	68		
1 serving sweets	1 Tbsp. jam	54		
Beverage	Coffee without cream	2		
NOON MEAL	**NOON MEAL**			
1 serving cooked vegetable	1 cup vegetable soup	78		
1 serving bread or crackers	4 saltine crackers	47		
1 serving fish or poultry	3 oz. roast turkey, white meat	150	65.5	
2 servings bread	2 slices white bread	124		
*2 servings margarine	2 tsp. margarine	68		
1 serving raw vegetable	3 carrot & 3 celery sticks	19		
1 serving fruit	1 medium apple	87		
1 serving nonfat milk	1 cup Carnation Instant Nonfat Milk	80	5	
Beverage	Tea or coffee without cream	2		
EVENING MEAL	**EVENING MEAL**			
1 serving meat, fish, fowl	3 oz. broiled halibut	154	54	
1 serving starchy vegetable	1 baked potato	188		
1 serving bread	1 slice French bread	43		
*3 servings margarine	3 tsp. margarine	102		
1 serving cooked vegetable	½ cup green beans	17		
2 servings raw vegetables	Large lettuce & tomato salad	23		
2 servings salad dressing	2 Tbsp. Italian dressing	166		
1 serving dessert	½ cup orange sherbet	129		
1 serving nonfat milk	1 cup Carnation Instant Nonfat Milk	80	5	
Beverage	Tea or coffee without cream	2		
BEDTIME	**BEDTIME**			

1 serving Carnation Instant
  Breakfast with
	1 package Carnation Instant Breakfast
	  with
		130	5	

nonfat milk	8 oz. nonfat milk	80	5	
1 serving bread or crackers	2 graham crackers	55		By _____

*Use only a polyunsaturated margarine such as Fleischmann's   Total: 2212   142 mg.

SUBSTITUTION LISTS

LIST I — Foods of plant origin contain no cholesterol. These are fruits, vegetables, cereals, grains, nuts, and vegetable oils. However, choosing liquid or unsaturated vegetable oils, rather than "hydrogenated" (solid) vegetable oil products is sometimes recommended as these oils may have a cholesterol-lowering effect. Exceptions to this rule are coconut and olive oil.

LIST II — These animal-origin foods are low in cholesterol:

	Chol. mg.		Chol. mg.		Chol. mg.
3 oz cottage cheese	8	3 oz haddock	51	1 cup nonfat milk	5
3 oz chicken, white	67	3 oz halibut	51	1 cup buttermilk	5
3 oz cod	48	3 oz salmon	40	1 cup yogurt (low fat)	17
3 oz (bass, whiting, carp,		3 oz trout	47	Egg white	0
sole, pollack,		3 oz tuna	55	¼ cup egg substitute (such as	
pike, perch)	50-70	3 oz turkey, white	65	Fleischmann's "Egg Beaters" which contains	
3 oz flounder	43			less than 1 mg. chol. and approx. 100 calories)	

LIST III — These animal-origin foods are higher in cholesterol, but may still have a cholesterol-lowering effect because of their unsaturated or low-total fat content.

	Chol. mg.		Chol. mg.		Chol. mg.
3 oz chicken, dark	77	3 oz herring	82	3 oz turkey, dark	86
3 oz crab	85	3 oz lobster	72		

LIST IV — These animal-origin foods are high in cholesterol or may have a cholesterol-raising effect. They should be limited.

	Chol. mg.		Chol. mg.		Chol. mg.
3 oz beef	80	3 oz lamb	83	3 oz cheese, cheddar	84
3 oz brains	1,700	3 oz liver	372	3 oz cheese, Swiss	85
3 oz chicken gizzards	166	3 oz pork	76	3 oz cheese, American	77
3 oz heart	233	3 oz sardines	119	*3 oz clams	43
3 oz kidneys	683	3 oz sausage	53	*3 oz oysters	43
3 oz sweetbread	396	3 oz shrimp	128	*3 oz scallops	45
		3 oz veal	86		
1 cup milk, whole	34	1 Tbl. butter	35	1 Tbl. ½ & ½	6
1 egg (50 g), whole	252	1 Tbl. chicken fat	9	1 Tbl. sour cream	8
1 egg yolk (17 g)	252	1 Tbl. cream cheese	16	1 Tbl. whipping cream,	
		1 Tbl. lard	13	unwhipped	20

LIST V — Cholesterol content of products which contain animal-origin foods.

	Chol. mg.		Chol. mg.		Chol. mg.
1 piece angel cake	0	1 muffin (40 g)	21	1 popover	59
1 piece yellow cake (75 g)	33	1 corn muffin (40 g)	28	1 waffle	119
1 piece sponge cake (66 g)	162	½ cup noodles	25	**1 Tbl. mayonnaise	10
1 cream puff (130 g)	188	⅛ apple pie	120		
½ cup custard	139	⅛ lemon pie	117		
½ cup ice cream (10% fat)	27	⅛ pumpkin pie	70		
½ cup ice milk	13	½ cup potato salad	81		
½ cup pudding (mix)	15	½ cup white sauce	17		

*Cholesterol accounts for only 30% of the total sterol in scallops and only 40% in oysters and clams. The other sterols in these shellfish require further study and may have nutritional significance.

**Imitation mayonnaise and mayonnaise made with safflower oil contain less cholesterol.

20 tricks to modify a family diet

1	Broil or roast meats and fish instead of frying or baking. (Fish can also be poached.)
2	Use margarine instead of butter.
3	Use skim milk instead of whole milk or buttermilk. Give children whole milk, but use skim in recipes.
4	Use bran or sesame-seed toppings instead of bread crumbs. If ambitious, make bread crumbs from whole-grain breads.
5	Season with spices, not salt. Use oregano or thyme instead.
6	Use vinegar or lemon juice with spices instead of heavy oil salad dressings.
7	Serve fresh fruits or yogurt instead of puddings and pies.
8	Use fresh fruits to make your shakes, rather than serving sugared sodas.
9	Serve whole wheat breads instead of white refined-flour breads.
10	Buy tuna packed in water, not oil.
11	Don't overcook vegetables. Vitamins are lost in cooking; the fresher vegetables smell, the more nutritious they are.
12	Don't peel potatoes, cucumbers, apples, pears, and so on. The skin is fiber, and the added bulk is good for your digestive tract.
13	Keep nutritious snacks handy. Raisins are advertised as "nature's candy," and other fruits such as pineapple and strawberries would satisfy any sweet tooth.
14	Let children snack on sunflower seeds and nuts rather than on sweet cookies.
15	Remove the sugar bowl. If you must use sugar, buy raw sugar.
16	Don't base meats or other foods with butter; use sesame oil. Dip barbecue brush in it and baste as usual.
17	Use yogurt instead of sour cream in recipes.
18	Before serving chicken, turkey, or duck, remove the skin.
19	Trim all excess fat from beef.
20	Buy kosher brands of hot dogs or bologna; these are made from beef, not pork, and are generally less fatty than other brands; they also have fewer additives.

Adapted from Take Care of Your Heart by Ezra A. Amsterdam and Ann M. Holmes. New York: Grosset & Dunlap, 1981

A Modern Medicine Patient Aid—tear out and photocopy ▶

DIETARY FIBER CONTENT OF FOODS

FRUITS	(g/100)	LEAFY VEGETABLE	(g/100)	BREADS	(g/100)
Apples (flesh only)	2.00	Broccoli tops (boiled)	2.99	White	0.63
(peel only)	0.41	Brussels sprouts	2.00	Brown, Boston	1.79
Bananas	1.75	Cabbage	2.07	Whole meal	1.96
Cherries (flesh and skin)	1.24	Cauliflower	1.13		
Grapefruit (canned)	0.53	Lettuce (raw)	0.84	BREAKFAST CEREALS	
Guavas (canned)	3.64	Onions (raw)	2.10	All Bran	11.20
Mandarin oranges (canned)	0.29			Cornflakes	2.09
Mangoes (canned)	0.83			Grapenuts	5.88
Peaches (flesh and skin)	2.28	LEGUMES		Rice Krispies	0.94
Pears (flesh only)	1.12	Beans (baked) canned	6.18	Puffed Wheat	1.39
(peel only)	0.95	Beans (runner) boiled	1.67	Sugar Puffs	6.08
Plums (flesh and skin)	1.52	Peas, frozen (raw)	5.66	Shredded wheat	2.70
Rhubarb (raw)	1.07	garden (canned)	6.28	Special K	0.65
Strawberries (raw)	2.12	processed (canned)	5.26	Swiss Breakfast	7.41
(canned)	1.00			Weetabox	5.34
Sultanas	4.40	ROOT VEGETABLES			
		Carrots, young (boiled)	2.78	MISCELLANEOUS	
NUTS		Parsnips (raw)	4.90	Choc. digestine ½ coated	3.50
Brazils	2.71	Swedes (raw)	2.40	Choc. fully coated	0.34
Peanuts	0.84	Turnips (raw)	1.89	Crispbread, rye	1.48
				Crispbread, wheat	4.83
PRESERVES		POTATO		Ginger biscuits	0.08
Jam, plum	0.19	Main crop (raw)	3.51	Matzo	0.77
strawberry	0.22	Chips, fried	0.64	Oatcakes	4.00
Lemon curd	0.20	Crisps	11.90	Semisweet	2.31
Marmalade	0.14	Canned (solid and liquid)	2.51	Short-sweet	0.12
Mincemeat	3.19			Wafers (filled vanilla	0.05
Peanut Butter	1.13	PEPPERS (cooked)	0.63		
Pickles	1.53				
		TOMATOES (fresh)	1.40		
DRIED SOUPS		(canned)	1.02		
Minestrone	6.61				
Oxtail	3.84	SWEETCORN cooked (on the cob)	2.37		
Tomato	0.53	canned	4.72		
BEVERAGES		FLOURS			
Cocoa	12.12	White, breadmaking	1.89		
Chocolate drink	2.30	Brown	7.87		
Coffee and chicory essence	.79	Whole meal	6.28		
Instant Coffee	0.33	Bran	13.20		

APPENDIX F

Human Subjects Approval Request

HUMAN SUBJECTS APPROVAL REQUEST

RECEIVED – OFFICE OF RESEARCH: ___/___/___
EXEMPT: _____   EXPEDITED REVIEW: _____   REFER TO COMMITTEE: _____

1. PROJECT DIRECTOR: Josephine A. Kahler (SDSU Graduate Nursing Student)_____
   COLLEGE/SCHOOL: School of Medicine   DEPARTMENT: Student Health Service

2. PROJECT TITLE: The Effect of Dietary Education Programs on High Cholesterol

3. SPONSORING AGENCY: S.D.S.U.   NONE: _____

4. PROJECT PERIOD: FROM 10 / 1 / 85   TO 5 / 12 / 86

5. LOCATION OF STUDY: U.S.D. Health Service

6. NUMBER OF HUMAN SUBJECTS TO BE SELECTED: 60

7. TYPES OF SUBJECTS TO BE SELECTED: (See Instructions)

   _X_ Normal Adults   ____ Minors   ____ Prisoners   ____ Pregnant Women
   ____ Fetuses   ____ Mentally Disabled or Retarded

8. EXEMPTION FROM COMMITTEE REVIEW REQUESTED?   ____ YES   _X_ NO
   If "yes", indicate basis for exemption:

   ____ Common Educational Setting   ____ Educational Tests
   ____ Survey/Interview Research   ____ Observational Research
   ____ Study of Existing Data

9. Are any drugs or chemical or biological agents to be administered to human
   subjects?   ____ YES   _X_ NO

10. Are specimens or samples of tissue, body fluids, or other substances to be
    collected from participants?   ____ YES   _X_ NO

11. RESEARCH PROTOCOL: Complete a description of the proposed study as outlined on
                         the reverse side of this form following instruction sheet.

12. INFORMED CONSENT: Attach copies of all forms which will be used to obtain the
                         legally effective informed consent of human subjects or their
                         legal representatives.

*Three (3) copies of this form and its attachments and one (1) copy of the complete
proposal or application must be submitted for review.*

HSAR041384

RESEARCH PROTOCOL

A. Objective: There are three objectives for this study.   *proper*
1) To determine if there is a difference in a specified nutritional (and cholesterol values. 2) To determine which demographic data influences cholesterol values.
3) To compare the effectiveness of two education programs on the post cholesterol values.

B. Participants: Male and female subjects between the ages of 18 and 35 who have been found to have a cholesterol value between 200 and 220.

C. Time Required: This will include initial health service visit, and the rechecking of the post cholesterol values, three months later.

D. Compensation: None

E. Benefits: Lowering of cholesterol values.

F. Methods: Data will be obtained on the first sixty subjects who fulfill the requirements and agree to participate in the study. Each participant will be given a number. Information will be released to the researcher by number rather name to maintain anonymity. Two educational approaches will be used. The even numbered participants will serve as the control group and will receive only a packet of educational material on low cholesterol diets. The odd numbered participants will serve as the experimental group and will receive an intense half hour counselling session on low cholesterol diets as well as a packet of educational material on low cholesterol diets. A pre and post cholesterol value will done on each participant.

G. Risks: None

H. Risk Reduction: N/A

I. Confidentiality: After all data is obtained and recorded on the research tool by the Health Service staff it will be given to the researcher by the Health Service Administrator. Participants will be identified by number only.

INTRA-UNIVERSITY MEMO

DATE   October 28, 1985

TO   Josephine Kahler, Student Health

FROM   Donna Hahn, Office of Research

SUBJECT   Request for Human Subjects Approval

The revised consent form for your study entitled "The Effect of Dietary
Education Programs on High Cholesterol" has been approved by the Chair
of the Human Subjects Committee.

The Committee also accepts your proviso to offer individual counseling
through the nutritionist to any "control" participants who would benefit
from the treatment at the conclusion of the study.

You may proceed with your study.

dh

UNIVERSITY OF SOUTH DAKOTA HUMAN SUBJECTS COMMITTEE
CERTIFICATION OF REVIEW

The proposal of __Josephine Kahler_____ entitled, _The Effect of Dietary Education_
Programs on High Cholesterol
has been submitted to the USD Office of Research for review.

Date Submitted: __10/4/85__

REVIEW OF THIS PROPOSAL WAS CARRIED OUT UNDER:
____ Exempt Review
XX_ Expedited Review
____ Full Committee Review

IT IS THE DECISION THAT THIS PROPOSAL SHALL BE CONSIDERED:

XX_ Of Minimal Risk   ____Disapproved
                       ____Approved as submitted
                       XX_Approved subject to compliance with the following conditions:
                       __1) modify the consent form according to the attached memo.___
                       __2) if treatment subjects benefit more so than control subjects,_
                           from the nutritional program, the control subjects should
                           be given an opportunity to have the 1/2 hour treatment
                           lecture.
____ Of Significant Risk:____Disapproved
                       ____Approved as submitted
                       ____Approved subject to compliance with the following conditions:

_____
_____
_____
_____

This review has been conducted in accordance with the procedures stipulated by The University of South Dakota's Assurance of Compliance with US DHHS Regulations for Protection of Human Research Subjects. (45 CRF 46)
COMMENTS: _The project has been approved through expedited review procedures as outlined in_
46.110. The study is an experiment involving beneficial nutritional education programs.
The cholestorol counts will be obtained from pre-existing samples (category 8, 46CFR8392)
_Once the consent form is modified, subjects will be provided all essential elements of___
informed consent.
CHANGES/PROBLEMS:

If any changes in procedures are contemplated or problems arise that would increase the risks involved or that would necessitate a change in classification, please discontinue the study and notify the Human Subjects Committee for further approval.

FOLLOWUP REVIEW OF THIS PROPOSAL IS SCHEDULED FOR: _____

CERTIFICATION OF USD HUMAN SUBJECTS COMMITTEE AND/OR EXPEDITED REVIEW ACTION:

Chairperson, USD Human Subjects Committee   Date

CERTIFICATION OF 'EXEMPT' REVIEW ACTION:

USD Office of Research   Date

APPENDIX G

Chart Showing Results of Testing 20 Split Blood

Samples Using Both Machines
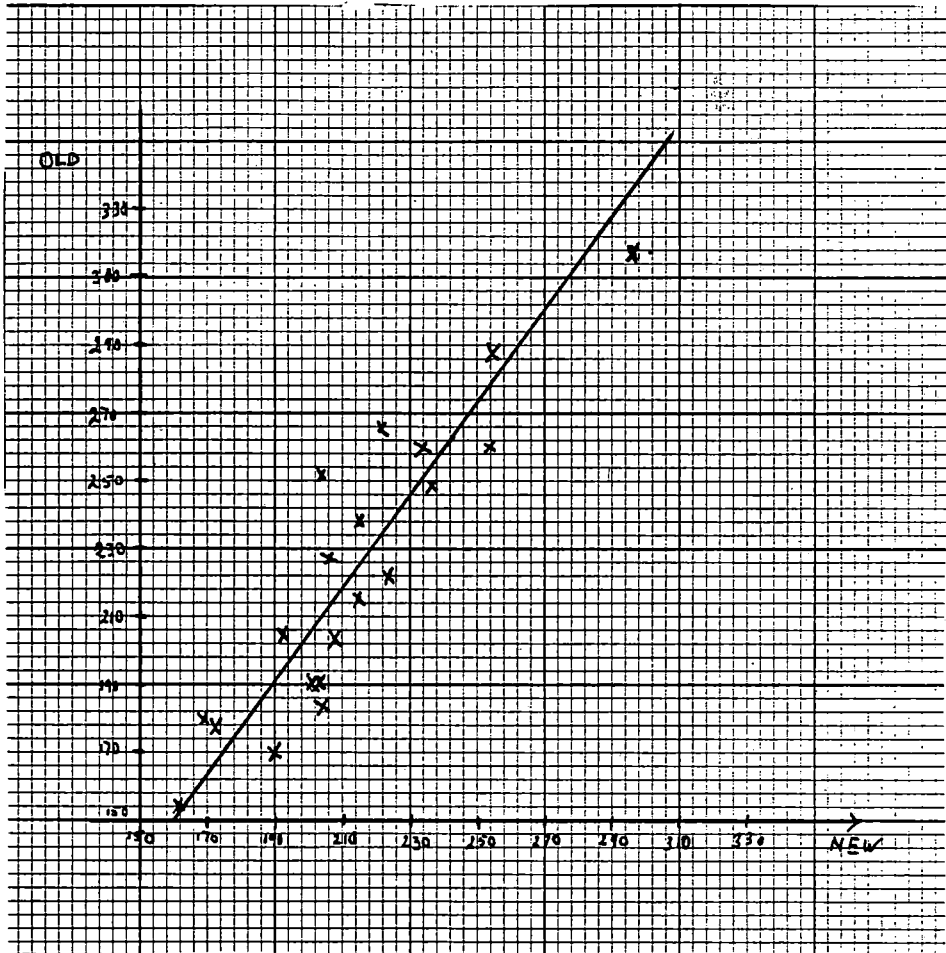
Figure 2

Chart Showing Results of Testing 20 Split Blood
Samples Using Both Machines

APPENDIX H

Analysis Tables

Table 4

Analysis of the Difference in Serum Cholesterol Values

Variable	N	Mean	S.D.	St Error of Mean	T	PR>T
Precholesterol	32	208.75	6.63	1.17		
Postcholesterol	32	184.25	23.59	4.17	-5.58	0.001
Differential		-24.50	24.84	4.39		

Table 5

Analysis of the Difference Between the Two Education Programs

On the Serum Cholesterol Values

Variable	Mean	S.D.	St Error of Mean	T	PR>T
I Group (N=17)					
Precholesterol	209.12	6.3	1.53	0.33	0.74
Postcholesterol	188.47	24.05	5.83		
Differential	-20.65	24.52	5.95		
P Group (N=15)					
Precholesterol	208.33	7.19	1.86		
Postcholesterol	179.47	22.92	5.92	1.08	0.29
Differential	-28.87	25.33	6.54		

*T Value on difference of 2 programs = T=.93 PR>T = .36

Table 6

Analysis of Selected Demographic Characteristics

Variable	Mean	S.D.	St Error of Mean	T	PR>T
Graduate (N=3)					
Precholesterol	213.0	7.55	4.35	1.17	0.39
Postcholesterol	198.0	16.50	9.52	1.08	0.28
Differential	-14.6	11.67	6.74	0.71	0.48
Smokers (N=3)					
Precholesterol	214.3	7.37	4.25	1.56	0.13
Postcholesterol	187.33	31.56	18.22	0.23	0.81
Differential	-27.00	35.08	20.24	-0.18	0.85
Exercisers (N=12)					
Precholesterol	206.5	5.56	1.60	-1.51	0.14
Postcholesterol	187.50	25.14	7.25	0.59	0.55
Differential	-19.00	25.12	7.25	0.96	0.34
Family History (N=22)					
Precholesterol	209.45	6.92	1.47	0.88	0.38
Postcholesterol	185.54	22.41	4.77	0.45	0.65
Differential	-23.90	22.93	4.89	0.19	0.84

Table 7

Areas of Study Using Analysis of Variance

Major	Precholesterol	Postcholesterol	Diff	df	f	PR>F
General (N=14)	210.16	189.00	-27.66	2	0.55	0.58
Business (N=9)	205.33	177.66	-27.66	2	0.55	0.58
Health (N=5)	213.20	189.40	-27.66	2	0.55	0.58

APPENDIX I

Serum Cholesterol Values Before and After

Intervention

Table 8

Serum Cholesterol Values Before and After

Intervention

P Group (N=15)		I Group (N=17)	
Pre Intervention	Post	Pre Intervention	Post
214	212	204	157
204	181	212	183
217	151	201	163
205	180	203	170
209	165	220	203
221	172	221	175
201	168	205	234
200	169	215	200
201	195	209	195
204	145	215	144
201	213	204	208
217	164	208	185
219	189	206	208
208	213	205	214
205	192	212	188
		210	164
		214	213