

SOME BELIEFS, PRACTICES AND PROBLEMS OF A
GROUP OF PREGNANT WOMEN IN STILLWATER,
OKLAHOMA, CONCERNING THEIR DIET

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CHAPTER I

THE PROBLEM

Nutrition as defined by James McLester (46, p. 1) is "... the sum total of those processes by which the living organism receives and utilizes the materials necessary for the maintenance of life." Through the ages man has come to know the true importance of nutrient materials in bringing about better health and in prolonging life.

Accompanying the expanding knowledge about food and its use in the body is the need for better methods of putting the knowledge into action. A point of interest stated by Bogert (5, p. 8) is that "... the general health and vitality of even those persons who appear to be reasonably well nourished could be improved by their having a better diet." She continues (5, p. 8) "It is necessary to appreciate that science has proved that an already adequate diet can be improved and that this course will pay dividends in improved health."

Introduction

During the past two decades important relationships have been established between the nutrition of the expectant mother, her health, and the course and outcome of pregnancy. Several extended studies of nutrition and pregnancy have been made and all agree that nutrition is one of the important environmental factors concerned.

Although pregnancy and lactation are normal processes, they do impose additional stress. One group of investigators feels that it is extremely important to have an early assessment of nutritional status in order to remedy any deficits which could become severe during this period (7). The concern for early medical care is justifiable, for it appears that poor nutritional status is related to increased rates of prematurity, Cesarean section, and perinatal death (52).

Current studies of diet during pregnancy suggest that calcium, niacin, and ascorbic acid consumption may be less than that recommended while protein, iron, thiamine, riboflavin, and vitamin A may also be problems (34, 50, 52). Two points of significance to nutrition educators are: (1) freedom of choice often precipitates dietary problems, and (2) there is a wide-spread tendency to relate food intake to total calories consumed and consequently weight gain, rather than the inclusion of foods of sufficient variety and quantity to remain in optimal health.

Young expectant mothers are at a stage in their lives when they are particularly receptive to nutrition education. Nutrition advice, well presented at this time, may be more likely to be accepted than at any other stage or period in life. Effective nutrition education can start the young family on the road to good nutrition. Unless such advice is adjusted to previous food habits and to the budget, it may not be followed. That is to say, a printed diet or verbal suggestions that are unrelated to the family scheme of living may be disregarded.

Stimulating the mother to follow dietary advice could well be a joint project of physician, nurse, dietitian or nutritionist, and other

allied health workers such as the health educator and social worker. The possibility of such combined action in Stillwater led to the present study.

Purpose of the Study

The primary purpose of this study was to design an interview schedule to be used in the investigation of some beliefs, practices, and problems concerning food intake of a group of pregnant women in Stillwater. It was desired to identify implications from the data which might be used in a program of nutrition education to improve the food habits of this group.

In addition to the above study, it was planned to interview several of the local physicians. This was done to determine the kind and amount of nutrition advice given to patients, the type of dietary supplements commonly recommended, and the local medical views concerning the value of supplemental nutrition instruction in the Stillwater vicinity.

Assumptions

The plan for this study was based on the following assumptions:

- (1) A sample of pregnant women could be identified in Stillwater.
- (2) The health of many pregnant women would be bettered if their diets were improved.
- (3) Pregnant women would be motivated to improve their diets if they were convinced that such improvement would increase the well-being of their offspring and themselves.

(4) Through the use of a carefully devised and pretested interview, a sufficient variety of dietary practices, beliefs, and problems of pregnant women in Stillwater could be obtained for use in determining the need of such an educational program and for guidance in setting up lesson plans to be used in a nutrition class.

CHAPTER II

REVIEW OF LITERATURE

This review of literature includes material relative to the following areas: (1) the interview as a tool in research, (2) normal nutrition, and (3) nutrition during pregnancy.

The Interview

Definition

Acts of communication in which one person requests information and another supplies it are common in all human experience. Almost continuously such interactions are carried on between friends, business associates, and casual acquaintances. The interview is one type of communicative act often employed by persons in such fields as social work, nutrition, and medicine.

Theodore Caplow (8, p. 165) defines the interview in simple terms as: "A two person conversation, conducted by one of the participants in accordance with a definite program."

Bingham, Moore, and Gustad (4, p. 3) state that, "An interview is a conversation directed to a definite purpose other than satisfaction in the conversation itself."

Kahn and Channel (32, p. 16) summarize the interview in more specific terms.

We use the term interview to refer to a specialized pattern of verbal interaction--initiated for a specific purpose, and focused on some specific content area, with consequent elimination of extraneous material. Moreover, the interview is a pattern of interaction in which the role relationship of interviewer and respondent is highly specialized, its specific characteristics depending somewhat on the purpose and character of the interview.

Types of Interviews

Caplow (8) lists two types of interviews, the divisions being based on the objective. The therapeutic interview is held in order to modify the behavior of the respondent. The information interview is used to inform the interrogator on a particular matter.

Kahn and Channel (32) make the same distinctions in types of interviews but use the terms "information-getting interview" and "psychiatric interview". In addition to specifically naming the psychiatric interview as one type, these authors call attention to a class of interviews which have in common the objective of exerting influence or inducing some behavioral change on the part of the respondent. Other interviews which could come under this class are the supervisor-subordinate interview, the teacher-pupil interview, or the political candidate-voter interview.

The line of demarcation among the various types of interviews is difficult to draw. For example, the therapist frequently must play the role of getting information before he can attempt therapeutic actions (32).

Bingham et al. (4) say the interview may have as many as three functions. Added to what other authors have stated, these writers include the function of giving information.

In regard to the specific content area of nutrition the types of interviews as described by Charlotte M. Young (74) are the "clinic interview" and the "field interview". Both types may be of qualitative nature in that they are employed to estimate the usual habits of the respondents. Both may be quantitatively oriented for the purpose of establishing what amounts of food are eaten, or they both may be concerned with knowledge and attitudes of the respondent. The major difference between the clinic and the field interview is the interviewer. The clinical interviewer must be a professional with regard to knowledge of nutrition. It is not necessarily essential for the field interviewer to have a background in nutrition.

Parker et al. (55) compared interview types according to the method of obtaining the information. An interview schedule is intended to obtain specific answers to direct questions while a nonschedule interview is designed to secure the necessary data in a manner in which the freedom is governed by the interviewer. Richardson et al. (58) and many investigators believe that standardization is most effectively achieved with the schedule.

Regardless of its specific purpose, form or context, the interview is essentially a method of collecting information. The purpose for which the information is sought varies with both the seeker and respondent (58).

Personal Qualifications of the Interviewer

Different kinds of interviews dictate many differences in the behavior of the interviewers as they go about their task. Most writers are in agreement, however, concerning the personal qualifications

desirable for persons who conduct interviews. Frequently listed characteristics are: an alert, inquiring mind; relaxed manner; pleasing personality; keen powers of observation; flexibility; absolute sincerity; politeness; unbiased attitude; and a knowledge of the values and habits of the group with which they are to work (6, 20, 32, 74).

Limitations of the Interview

The question has been raised as to whether or not the information gained by the interview technique is valid (6, 26, 55, 68). Huene-mann and Turner (26) state that diet histories obtained by interview only, even though carefully done, have little quantitative value. A diet history, according to these writers, may indicate dietary habits and therefore be of some clinical aid. Its use as dependable data in research of subjects is likely to lead to erroneous conclusions.

B. S. Burke (6) says that in evaluating data, limitations must be appreciated so that conclusions do not extend beyond the limits of their dependability.

Parker et al. (55) point out that the usefulness of the interview depends on the situation involved and the other techniques available. While the interview does not yield 100 percent reliable data, it was supposed that with "loaded" questions, an interviewer might be able to elicit a "truer picture" of the individual than could be gained from answers on a questionnaire. This point of view is not in agreement with the belief of some other writers (8, 32) who feel that the task of the interviewer is to elicit frank and complete answers from the respondent without introducing bias.

Froehlich and Darby as stated by Parker (55) see the value of interview as supplementing information, verifying information, or observing mannerisms and characteristics of the respondent. Fenalson et al. (20) feel that the interview is valuable to gain insight on matters. Adams (1) has made an interesting point that information is collected to reduce the uncertainty about an existing state of affairs.

Phases of the Interview

Statement of the research problem. -- The statement of the problem is logically and necessarily the first step in any well-planned piece of research because the decisions made during later phases are contingent upon it. The problem must be defined before any steps may be taken toward sampling and instrument construction.

Interview construction and pre-testing. -- The core problems in the design of the interview are validity and reliability. Validity refers to whether or not the interview measures what it is intended to measure, while reliability refers to whether or not the same answers are obtained to the same questions on different occasions. Both are frequently assumed rather than demonstrated (1).

According to Adams (1), validity and reliability are largely established by question wording. The results of pre-testing, that is, trying the questions out on people, usually indicate how carefully words have been chosen. Thereafter, this author states, validity and reliability are dependent upon the skill of the interviewer.

Richardson (58) points out that reliability and validity are

relative terms. He states that an extremely high degree of accuracy may be not only unattainable in terms of the investigator's budget but also unnecessary in terms of the study. Richardson (58) also considers the respondent as a possible source of error or distortion. The respondent may have a faulty memory; he may distort unconsciously for a number of reasons; or he may deliberately mislead the interviewer.

Sampling. -- Only rarely are all the members of a specified universe included in a study. Instead, the characteristics of the universe are estimated by a few individuals who are representative. There are many ways of selecting samples which are representative. The primary requirement is that the probability of chance of selecting a particular unit be known. The most popularly known probability sample is the random sample in which all units of the universe have an equal, and therefore known, chance of being selected (1, 39).

Interviewing. -- Interviewing is the process of collecting information from the respondents by the interviewer with or without the aid of a questionnaire. A key concept in interviewing is communication. The interviewer must be able to communicate without changing the question design. He must be able to overcome the obstructions to communication, such as language difficulties, psychological barriers, and problems of motivation. He must also maintain the type of interaction which keeps the communication sharply focused on the topic in which the interviewer is interested (1, 32).

Processing and analyzing the data. -- All data which are collected should

lend itself to analysis and report. In many studies it is impractical for the analyst to deal directly with the data. Frequently, the interview data are reduced into a manageable form by coding. This consists of translating the answers into a set of symbols, usually numbers. These numbers may be transferred to punched cards and quickly tabulated by machine or neatly stored for ready use at any time (1).

Reporting the results. -- A well-planned, carefully conducted study should offer answers to the problem, or insight concerning an approach to solving the problem. When the results of the interview are determined, information useful in the solution of the problem should be available.

Principles of Interviewing

One who wishes to develop skill in interviewing people will find considerable literature of instructions and suggestions, most of which are compilations of interviewing experiences derived from various situations over a long period of time.

Medlen (47) suggests the following: have some extremely simple questions; have some thought provoking questions; set the stage for the questions briefly and adequately; allow time for the respondent to think; then call for a reply.

Adams (1) includes in his manual a systematic outline of principles which are more definite. They are as follows:

- (1) Introduce self and purpose of call
- (2) Make respondent feel the interview situation is permissive
- (3) Make the respondent feel that the survey is important
- (4) Make the respondent feel that his answers are important
- (5) Strive for a neutral or average appearance in dress
- (6) Permit flexibility in the interview approach
- (7) Conduct the interview in a quiet, comfortable place

- (8) Interview the respondent alone
- (9) Ask the questions precisely as stated in the interview tool
- (10) Ask the questions in the order presented in the interview schedule
- (11) Ask every question in the interview
- (12) When questions are not understood, or if they are misinterpreted, repeat as stated originally. Do not paraphrase
- (13) Handle unanswered questions tactfully in order not to destroy rapport
- (14) Maintain rapport throughout the interview
- (15) Make use of probes when: (a) the response is irrelevant to the question asked, (b) an answer is unclear, (c) answer is incomplete, (d) answer is suspected of being untrue
- (16) Make sure that probes do not suggest responses
- (17) Record responses at the time they are made
- (18) Record in the respondent's own words when possible
- (19) Account for non-responses in detail
- (20) Record significant events that occur during the interview
- (21) Record responses clearly and legibly
- (22) Close the interview with thanks and leave the respondent with a feeling that the interview has been a pleasant experience.

Caplow (8) has devised some principles which may be helpful to the inexperienced interviewer. He suggests that: (1) the interviewer not interject his own attitudes or experiences of value judgments, (2) the interview schedule should have the minimum number of questions in the simplest form adaptable to the problem, and (3) the attitude of the interviewer toward the respondent should always be extremely attentive. This writer points out that practice in verbatim recall gives the interviewer a sensitivity to the words and gestures of the respondent. He also mentions that all interview questions and schedules entail certain unpredictable effects, so that it is not possible to predict with assurance which questions will work with a given population.

Normal Nutrition

Food is a contributing factor of great importance to physical, mental, and emotional health (43). Knowledge of how to use food to nourish the human body is the result of many years of research.

Early in the twentieth century research workers in food chemistry and physiology made new advances in the science of nutrition. The need of good quality protein for animal growth was demonstrated. This was quickly followed by a demonstration of the need for certain "accessory food factors" later called vitamins. Studies were made of amino acids, essential fatty acids, hormones, enzymes, and products of digestion and metabolism (12).

Although knowledge of the types of nutrients needed for the proper functioning of the body is one important phase of nutrition, nutrition is also a science of quantity. Ruth Leverton (39, p. 227) states, "Supplying some of any essential nutrient does not insure good nutrition." There must be enough of a supply of each nutrient for the body to meet all its needs all of the time. It is highly desirable to have a reserve supply in the body for use during emergencies (39).

The Food and Nutrition Board

World War II gave impetus to nutrition research in the United States. In 1940 the Food and Nutrition Board was established under the Division of Biology and Agriculture of the National Academy of Sciences - National Research Council, to serve as an advisory body in the field of food and nutrition. The objective of the Board was to develop a dietary guide for the people of the United States that would state the amounts of calories

and certain nutrients needed to keep the population well-nourished and that would be of help in planning nutritionally adequate diets for population groups both at home and abroad (21).

Members of the Board are appointed from among the leaders in the sciences related to food and nutrition on the basis of their experience and judgment. Specific activities of the Board are carried on by committees composed of experts in each field (21).

Recommended Dietary Allowances

Members of the Food and Nutrition Board first studied research reports that contained information on calorie and nutrient requirements. They then set tentative figures for a daily guide. After several changes in the tentative amounts, formulations were published in 1943 which were known as the "Recommended Dietary Allowances". The term "recommended" allowances was used to indicate that the figures were based on the existing knowledge and that they would be revised as new knowledge became available. Revisions were issued in 1945, 1948, 1953, 1958, and 1963 (21).

In 1958 the Food and Nutrition Board adopted the device of a "reference" man and woman for the revisions of that year. The reference subjects were initiated by the Food and Agriculture Organization of the United Nations. The age, weight, environmental temperature, and activity were specified to permit formulation of standard calorie allowances. The reference man is defined as a man 25 years old whose weight is 70 kg. The reference woman is 25 years old and weighs 50 kg. Both are presumed to live in a mean environmental temperature of 20°C., and are considered to be moderately active (21).

The allowances, as they are given in the current 1963 revision, were designed to give a margin of sufficiency above average physiological requirements to cover variation among individuals in the general population. There is also a provision for increased needs during common stresses (21).

Since there is variance in individual requirement for nutrients, one of the considerations of the Food and Nutrition Board in making the 1963 revisions was whether to express the allowances as range values or as a single value for the various age categories. After lengthy consideration the current revision rejected range values on the grounds that confusion would likely result (16).

A detailed discussion of all the revisions made in the Recommended Dietary Allowances for 1963 is beyond the scope of this study. The scientific bases for the allowances are described in full in Publication 1146 published by the Food and Nutrition Board of the National Research Council. For proper use of these allowances, it is strongly recommended that the report be read in its entirety. Attention is drawn, however, to the major differences observed in connection with women in the age group 18 to 35 years. This age range is identified as being the most active child-bearing years.

The 1963 revision made an adjustment in calories for the reference woman. The correction moved downward from 2300 to 2100 calories. The revision was thought to be necessary because the average American reference woman exerts less energy than the reference woman defined by the Food and Agriculture Organization. The Recommended Daily Allowances for the vitamins -- thiamine, niacin, and riboflavin, which were based

on calorie requirements, were also reduced. The iron allowances for women and children were increased about 25 percent. The vitamin C allowance for women in lactation was reduced to equal that for pregnancy (21, 34, 39).

The Food and Nutrition Board summarizes the purpose and intended use of the Recommended Dietary Allowances (21, p. 4) in the following statement:

The allowances recommended are those which, in the opinion of the Food and Nutrition Board, will maintain good nutrition in essentially all healthy persons in the United States under current conditions of living.

The allowances are not intended to be used as a means of assessing the nutritional status of an individual. In order for individual determinations to be made, a knowledge of current and past nutrient intakes must be available, as well as nutrient tissue levels, urinary levels, and clinical signs and symptoms (16, 21). According to Krause (34), they can serve as a helpful criterion to evaluate the nutritional status of the individual.

Popular Guides for Teaching Nutrition

James McLester (46) says that the normal person, guided by appetite and custom, if free to choose, can usually be trusted to select an adequate diet. He further states that this rule does not hold under all conditions.

For many years nutritionists have offered homemakers easy guides for meal planning in an effort to translate scientific facts about nutrition into terms of everyday foods. These plans may differ in wording but give essentially the same advice (12).

The choice of teaching devices should be adjusted to meet the needs of people concerned. Food guides may be based on the distribution of calories among food groups, distribution of money spent for different food groups, distribution of choice of foods to include servings from a stated number of food groups, or the inclusion of definite amounts from certain food groups (5). Guides for daily intake such as the Basic Four Groups developed by the United States Department of Agriculture were first issued in 1930. As the knowledge of food needs and of the nutritive value of food advanced, the food guides were revised.

The scheme of allocating specific numbers of servings in certain food groups is adjustable and from the nutrition point of view, is more likely to achieve the desired results. Nutrition food guides put emphasis on the needed amounts of a variety of foods that some people tend to neglect. Each group performs a special function. No single group provides all of the nutrients needed, but collectively they furnish a major part of the protein, minerals, and vitamins recommended (12).

Nutrition During Pregnancy

Historical Highlights

The diet prescriptions for pregnant women that have evolved over the centuries are of considerable interest. Emma Seifrit has gathered pieces of information dating from ancient times to the 1960's and has presented her findings in an essay for which she was given the Lydia Roberts Award. It is stated in the essay (63, p. 455) that, "Obviously enough women through the ages ate food sufficiently adequate to continue the human race." She continues "Whether they primarily ate their customary

diet or special foods is a question that may forever remain open to speculation."

In making this statement, Seifrit has reference to the peoples of ancient times for whom no records were kept. Part of her search of literature revealed that some primitive tribes at differing stages of history had ideas and rules concerning what foods should be included in the meals of their pregnant women. For example, the Masai of Africa used blood, meat, and milk in their diets while the neighboring Kikuyu dieted on sweet potato, corn, beans, bananas, and a variety of millet (63).

In very early times, as today, reasons were usually given for why pregnant women should follow the prescribed eating practices. During the Chou dynasty (1155 B.C.) it was believed that goat meat would cause a lengthy pregnancy and difficult labor. It is reported that the Pahute mother fasted for weeks before the anticipated date of birth because she felt the fetus remained in the womb voluntarily and consequently must be starved out to the waiting milk supply. The women of Rome were warned not to eat the flesh of a wolf if they wanted to avoid premature birth (63).

In addition to dietary precautions, dietary recommendations were given also. One such recommendation was made by Hippocrates who felt that rather dry food and less diluted drinks were better for the womb and the pregnancy (63).

Medical literature began to give attention to the prenatal diet in the nineteenth century. White, Bachan, Naegele, and Zuckert were men of that century who gave dietary instructions. Their advice and suggestions ranged from rules on "what to eat" to comments on "when to eat". The information was based primarily on supposition (63).

Burnett in 1880, as recorded in the Seifrit essay, believed that nutritional treatment during pregnancy could prevent congenital defects.

One of the first experiments conducted in prenatal feeding was devised by a Russian doctor, Prochownik, in 1889. In this experiment three women with contracted pelves followed a diet of restricted carbohydrate and fluid but high protein content for six weeks before delivery. The infants were of average length but deficient in fat tissue, thus facilitating delivery (63).

Gassner, a German physician, is noted as being the first doctor to advise and practice the routine weighing of pregnant women (63).

Study of medical and hospital records from 1900 to the 1920's brought other comments. At that time women classified as undernourished during pregnancy seemed to experience more stillbirths and premature births. Also an increase in post-natal infant mortality could be seen (63).

During the 1920's some sound research was carried on. A mixed diet was encouraged and the widely practiced meat restriction was discouraged. At this time weighing became a routine part of prenatal care and the disadvantages of excessive weight gain began to be appreciated. Some workers found that women became very interested in their weight once they realized its significance (63).

Attention was given to bones and teeth by some researchers. It was during this time that Toverud formulated his hypothesis that a child is nutritionally nine months old at birth (44). Even though new thinking was advancing rapidly, not all books and articles took up the new ideas. "Restriction of meat in an effort to spare the kidneys was still widely practiced (63, p. 459)."

During the 1930's work on prenatal diets continued but the findings were somewhat controversial. Most studies were small, usually dealing with one factor or a few subjects only. The investigations involved such topics as maternal vitamin and mineral deficiencies, the cumulative effects of frequent pregnancies, and the effects of excessive weight gain (63).

Following the work of the 1930's there was an increased interest in maternal nutrition. Evidence was building that reproductive nutrition begins long before the period of pregnancy. Thompson, in an article by Rust, (61) indicated that the lifetime diet exerts more influence upon the course of pregnancy than the diet taken at the time of pregnancy. This is in agreement with Stearns (65) who indicated that the best provision for well-being in any period of life is to arrive at that point in good nutritional and physical status. She continues (65, p. 1655):

The well-nourished mother can nourish her fetus well; therefore, the best insurance for a healthy infant is a mother who is healthy and well-nourished throughout her entire life, as well as during the period of pregnancy itself.

Aldrich (2) indicated that between 1940 and 1960 the United States slowed its advancement in the science of nutrition by its shift in interest to food packaging, food refinement, and also by shifts in dietary pattern. He further indicated that life cycle studies of human beings have been lacking, partly because of difficulty in following through over a long span of time, and in part because until recently, there was not adequate appreciation of the importance of such studies.

Aldrich's evaluation of the nutrition research in the United States during this period failed to acknowledge the value and accomplishments of

a voluntary coordinated research program in human nutrition. The State Agricultural Experiment Stations of the United States and the Institute of Home Economics of the United States Department of Agriculture were involved in this research. The objective of the study, conducted from 1947 to 1950, was to obtain factual information of the nutritional level of the nation by sampling appreciable numbers of the population with reference to such variables as age, sex, and geographic location (50).

Over 200 professional nutrition investigators took part in the research which revealed that the nutritional status of the United States citizens on the whole was good. The nutrients most often found to be lower than the recommended amounts in the diets of children and adults were vitamins A and C, calcium and iron (50).

Beginning in the latter part of the 1950's, emphasis was once again given to health programs of maternal and infant care. Currently many organizations, groups, and individuals have a part in protecting and advancing health. They work on local, state, national, and international levels, both officially and voluntarily (2, 9, 13, 36).

In Public Health the problems most frequently dealt with may be summarized under three headings: (1) the prevention of disease, (2) the development of healthy bodies and minds, and (3) the extension of longevity (34).

The importance of health to the peoples of the United States is reflected in the numbers of persons working in health services. According to the Health Information Foundation, approximately one out of 30 persons is employed in the health field (34).

The late President Kennedy, in urging the establishment of the

National Institute of Child Health and Human Development (NICHD), was looking for an institute to wage an attack on the unsolved afflictions of childhood. He was interested in exploring the "whole man" and his development, from before conception until death (2).

With the establishment of NICHD, the disciplines ordinarily considered to fall in the field of the biologic, behavioral, and social-cultural sciences were called on. Because of its very nature, nutrition is related most directly to the growth and development part of the program (2).

Recommended Dietary Allowances for Pregnancy

Although the adage that the pregnant woman must "eat for two" is not accurate quantitatively, it does call attention to the increased nutritional demands of the woman during pregnancy (34). The increase in the nutritional requirements for the gravid woman over those of the normally active and healthy non-pregnant woman have been covered by the Recommended Allowances of the Food and Nutrition Board.

These recommendations represent levels of nutrient intake that are considered normally desirable objectives and must be carefully adjusted to the need of the individual; they will vary with the age, the weight, and the activity of the mother. They are not intended to be requirements but levels enough higher to cover substantially the individual variation in the requirements of normal people (34, 43).

The current revision makes a single recommendation to encompass the second and third trimesters. This is a change from the 1959 revision which gave figures for the second half of pregnancy. A comparison follows (21, 39).

Nutrient	1963 RDA for nonpregnant women*	1963 RDA for pregnant women 2nd-3rd trimesters	1959 RDA for pregnant women 2nd half
Calories	2100	+ 200	+ 300
Protein	58 gm	+ 20 gm	+ 20 gm
Calcium	0.8 gm	+ .5 gm	1.5 gm
Iron	15 mg	+ 5 mg	15 mg
Vitamin A	5000 IU	+1000 IU	6000 IU
Thiamine	0.8 mg	+ .2 mg	1.3 mg
Riboflavin	1.3 mg	+ .3 mg	2.0 mg
Niacin equiv.	14 mg	+ 3 mg	+ 3 mg
Ascorbic Acid	70 mg	+ 30 mg	100 mg
Vitamin D		400 IU	400 IU

*Entries represent the 25 year age.

The values for pregnancy and for lactation given in the Recommended Dietary Allowances were based primarily on chemical analysis of human fetuses and placentas of different ages, food consumption records of expectant and nursing mothers, and maternal metabolic data. The recommendations take into account that the pregnant individual becomes less active as she nears term (43).

An evaluation of the food needs during the first part of pregnancy is not included in the Recommended Dietary Allowances due to the great complexity of the physiologic mechanism involved in early gestation and insufficient knowledge of the nutrient needs of that period (43).

Krause (34) points out that the increased amounts recommended for the second and third trimesters of pregnancy assume that the woman is in sound nutritional condition at conception and continues to eat a good diet during the early months of gestation.

McGanity *et al.* (45), in a cooperative study of maternal and infant nutrition among lower income families, observed that dietary intakes greater than the recommended allowances will not give protective benefits during pregnancy.

Nutrient Needs During Pregnancy

Calories.-- Caloric intake is of particular concern during pregnancy because of its relationship to maternal weight gain. The pattern and amount of gain are significant to the well-being of the mother.

There is an extremely wide range in figures recommended for weight gain during pregnancy. One rather generally accepted recommendation is that women of normal weight gain 19 percent of initial weight. This figure will likely fall in the range of 16 to 24 pounds for most women (7, 43).

The approximate composition of the gain is as follows: increased weight of the uterus, breasts, placenta, amniotic fluid, and increased blood volume - 10 to 16 pounds; weight of baby - 6 to 8 pounds (7).

The National Research Council Food and Nutrition Board stated that additional calories are needed to meet the energy costs of pregnancy. These include the building of new tissue and increased work load associated with movement of the mother and increased basal metabolic rate during the second and third trimesters (21).

It is proposed by the Food and Nutrition Board that the daily allowances be increased by 200 calories. It is further mentioned that in general, under any circumstances, the suitability of the allowance for the individual woman should be evaluated at frequent intervals by a physician, nurse, or nutritionist (21).

If weight control is definitely indicated during pregnancy, it is strongly recommended that not less than 1500 calories be prescribed. If insufficient calories are taken, protein may be used for the mother's energy needs instead of for building new tissue (7, 43, 73).

Protein.-- Protein in the diet is necessary to afford sources of nitrogen

and amino acids to be utilized in the synthesis of body proteins and other nitrogen-containing substances. Growth of the fetus and accessory tissues clearly represent an additional protein requirement of the mother (21).

Protein is needed throughout pregnancy, but the demand for additional protein is greatest during the latter half of pregnancy. According to the Food and Nutrition Board (21), an additional allowance of 20 mg per day does not appear unreasonable. Two-thirds of the protein should be of animal origin (34). The Board also points out that normal gestation often occurs with less than this added amount of protein.

Marie Krause (34, p. 418) states in her new book, "If protein needs are met, all other nutrients except ascorbic acid and vitamin D will probably be provided because of their association with protein in food."

Calcium, Phosphorus, and Vitamin D.-- During pregnancy it is particularly important that additional dietary calcium be consumed, despite the evidence of increased efficiency of intestinal absorption which accompanies this physiologic state. Accordingly, the Food and Nutrition Board has added an allowance of 500 mg of calcium for the second and third trimesters of pregnancy to the allowance for nonpregnant women. The demand for calcium is increased because calcium is withdrawn from the maternal pool to provide for the skeletal structures of the fetus (7, 21).

Recommendations for amounts of phosphorus are not made in the National Research Council dietary allowance tables. Phosphorus deficiencies are uncommon and diets which are adequate in calcium from food sources are likely to contain more than the necessary amounts of phosphorus (7).

Vitamin D increases the utilization of calcium and of phosphorus. Adequate amounts of these three nutrients should be supplied early in

pregnancy (7). A recommended daily amount of vitamin D is 400 IU. Recent evidence suggests that excessive vitamin D intake during pregnancy may cause abnormal calcium deposits in the fetus.

Iron.-- Data are lacking on the efficiency of iron absorption during gestation. Normally most of the iron needs occur during the latter months of pregnancy. To compensate for this increased need, an additional allowance of 5 mg per day is recommended (21).

The increased iron helps to perform three functions. It helps to maintain the hemoglobin level of the mother; it supplies a reserve of iron for the mother's use immediately after delivery; and it furnishes the infant's developmental requirements (7).

Iodine.-- In pregnancy added demands are placed upon the thyroid gland. Iodine, therefore, is of special importance in pregnancy. An inadequate intake of iodine may result in goiter in the mother or the child. The use of iodized salt is recommended (34).

Sodium Restriction.-- Pregnancy does not necessarily indicate dietary sodium restriction (7). The level of sodium is decided by the attending physician in accordance with the amount of edema or fluid retention present. Fluid retention is frequently controlled by diuretic compounds rather than by sodium restriction.

Robinson (59) reports a study of salt intake in pregnancy in which the conclusion was that extra salt in the diet was correlated to a lower incidence of toxemia, edema, perinatal death, antepartum hemorrhage, and bleeding during pregnancy. The results of this study are not in agreement with what is commonly held as true.

Vitamins.-- Research continues to point to a definite relationship between normal reproduction and some of the vitamins (34). A diet that will provide the essential vitamins is readily attainable from food sources (34, 45), providing the mother selects the proper foods. There is little or no room in the prenatal diet for foods that contribute only calories.

A resume of the important vitamins and their functions follows (7, 34, 45).

Vitamin A, a fat soluble vitamin, is an essential factor in cell growth and development, in tooth formation, in normal bone growth, and for integrity of epithelial tissues. It has an important role in the chemistry of vision enabling the eye to adapt itself to dark and light. The addition of 1000 IU is recommended for the second and third trimesters of pregnancy.

Thiamine promotes normal growth, is important in tissue respiration, and is necessary for the completion of carbohydrate metabolism. Thiamine needs vary in proportion to caloric intake. The addition of .2 mg of thiamine is recommended for the second and third trimesters of pregnancy.

Riboflavin functions in a number of important enzyme systems in tissue respiration. It assists in the metabolism of carbohydrate and amino acids. The addition of .3 mg is recommended for the second and third trimesters of pregnancy.

Niacin functions in the body as a component of two important enzymes in glycolysis and tissue respiration. The table in the Recommended Dietary Allowance uses the heading - niacin equivalents. Niacin equivalents include dietary sources of the preformed vitamin and precursor,

tryptophan. Sixty mg of tryptophan represents one mg niacin. If the protein in the diet is of good quality and of sufficient amount, niacin intake will be adequate.

Ascorbic acid has multiple functions in the human body. It aids in maintaining the integrity of capillary networks. It is essential for the production of an intercellular cement-like substance which is necessary for the support of cartilage, bone, muscles, and other tissues. It is essential for the health of gums and teeth, and it may greatly increase the absorption of iron. The addition of 30 mg of ascorbic acid is recommended for the second and third trimesters of pregnancy.

Nutrition in Teratological Research

Hundreds of thousands of babies continue to be born yearly with crippling, serious disorders that affect sight, hearing, the heart, and even mentality. In the United States alone it is estimated that more than 250,000 babies are born each year with serious defects. Dr. Donald Harting of the National Institutes of Health reported that the best estimate at this time (1966) for the United States showed one out of four pregnancies that are initiated do not result in a healthy, full-term child born without any malformations or handicaps. Harting indicated that research efforts are just on the threshold of improving this percentage (3, 22).

Birth defects are still one of the most challenging problems to be faced today according to Dr. Virginia Apgar, Director of Congenital Malformations of the National Foundation - March of Dimes (3).

Attention has been focused on animal experiments that result in

deformed offspring because of the increased interest in unanswered questions connected with the origin of human congenital malformations. Many methods are now available that permit production of congenital malformations in mammals. Among these are nutrition experiments.

The early experiments, in which dietary depletion was practiced, were laborious since with this method it was difficult to create borderline deficiencies that would injure the developing embryo without killing it (70).

Following this phase of experimentation, the introduction of anti-metabolites represented a significant step forward. Using this technique, dietary deficiencies could be created in a few days. Compared with the original procedure, the yield of abnormal offspring was doubled (70).

The early investigators who worked in nutrition teratology were searching for an experimental method to produce congenital malformations in mammals. They succeeded in demonstrating that adverse environmental conditions must be considered as a possible cause of prenatal deformity.

Josef Warkany (70) in 1958 declared that the experiments to date established no proof that congenital malformations in man were due to maternal dietary deficiencies. Warkany found that a method which produced a certain malformation in rats would not necessarily be effective in mice. How much more hazardous it is to equate such animal experiments with human conditions.

Animal studies of vitamin deficiencies have produced deformation of both skeletal and soft tissue. Hale, as reported by Warkany, demonstrated in 1933 that pigs fed a diet deficient in vitamin A produced offspring with cleft palate, harelip, and ectopic kidneys. Hale also

induced malformations of the eye, diaphragm, heart, urogenital tract, and aortic arches of rats by maternal vitamin A deficiency (70). Extensive studies of small laboratory animals by Warkany (70) showed a syndrome of skeletal deformity could be induced by maternal riboflavin deficiency.

Animal studies presently in progress under NICHD grants were reported by Aldrich (2). The research included studies of rats, chickens, and sub-human primates, as well as humans.

Dr. Bacon Chow is studying rats to determine growth rate, body composition, ability to withstand cold, and reproductive ability from mothers fed different quantities of food during mating, gestation, and lactation. Dr. Chow has already demonstrated that a 25 percent cut in the amount of the mother's diet will produce irreversible underdevelopment in the offspring. This underdevelopment cannot be corrected by even an unlimited diet after birth, but apparently can be corrected by pituitary growth hormones, implying it is a permanent endocrine derangement caused by congenital malnutrition (2).

Although the experiments cited may not be of practical importance at this time, they have influenced many theories concerned with congenital malformations. The fact that starvation in early pregnancy can cause malformations in the young of some experimental animals cannot be ignored, since anorexia, vomiting, or lack of food might, in rare instances, cause comparable situations in women.

Nutritionally Vulnerable Groups

Some segments of the prenatal population are prone to poor food

practices and may be described as being "nutritionally vulnerable". These expectant mothers may be susceptible to obesity, toxemia, nutritional anemia or to other dietary deficiencies (34). Due to environmental and other factors, nutritionally vulnerable groups may include: women from the lower income families, women who are obese, women who are underweight, girls who become pregnant while they are still in the period of adolescence, expectant mothers from the Negro population, women from certain ethnic and cultural groups, and women obviously lacking a knowledge of nutrition (7, 56). Although not all members of these groups have poor food practices, many of them do and could benefit from special dietary guidance.

In a rural part of Iowa, Jeans and co-workers (31) studied the dietary practices of 404 indigent pregnant women and the incidence of prematurity. Forty-four percent of the mothers were classified as poorly nourished. The increase of prematurity rose sharply with the decrease in nutritional status. The lowest birth weights, and the larger number of deaths in the neonatal period occurred among the infants born to the most poorly nourished mothers.

A review of Baird's (14) studies on pregnant women from different income groups pointed out some characteristics of the low income group as follows: smaller stature, greater risk of premature labor, and greater risk of fetal death. Lifetime nutrition laws were considered to be one of the environmental factors involved.

A study of pregnant women of low income status reported nearly twenty years ago by Trulson et al. (67) disclosed that protein, ascorbic acid-rich foods, and milk were below the recommended allowances for around 75 percent of the subjects. These same nutrients continue to fall

below the recommended allowances in a portion of the prenatal population today (52).

Jeans et al. (30), in reporting a study of pregnant women of low income in a predominantly rural area, indicated that faulty dietary habits were as important in determining food eaten as food costs. This study indicated a need for greater intake of milk and milk products to increase protein, riboflavin, and calcium, the nutrients present in least amounts in the diets of the women of this study.

In 1963 Nutrition Reviews published a report that severe toxemia of pregnancy most frequently occurs among women of lower socio-economic strata, particularly in the southeastern states. Since the diets of these groups are often substandard, the hypothesis has been advanced that malnutrition may be an etiologic factor in the disease process. Although no direct cause and effect relation has been established according to this report, most clinical dietary surveys have found higher incidence of toxemia in women consuming poor diets, low in protein as well as some vitamins and minerals, and in those who were obese or who gained excessive weight in pregnancy.

The customary food selections of the overweight woman are likely to emphasize foods high in fat, carbohydrate, and calories, yet be low in protein, minerals and vitamins. For the overweight expectant mother with food practices of this kind, the prenatal period provides an opportunity to learn better food practices.

Krause (34), in addition to discussing the dangers of obesity in pregnancy to mother and child, pointed to another problem of antepartum weight gain. The problem to which she referred was the development of permanent obesity and the resultant complications.

The obese, pregnant woman can reduce without compromising basic dietary requirements by decreasing the total calorie content through restriction of fats and carbohydrates, if she is careful to maintain her protein, vitamin, and mineral intakes to the prescribed levels by wise food selection. This can be accomplished unless the total calories are below 1500, in which case specific medication supplements may be required (34).

In prenatal care it is important to evaluate the nutritional status of each individual mother-to-be. This applies to the underweight as well as the overweight expectant mother. Frequently, little consideration has been given to the dietary needs of the underweight patient, nor to those patients who fail to gain (7).

Since the underweight woman or girl may have poor food practices, it is recommended that dietary instructions begin early in pregnancy.

The topic of weight gain was of particular concern to Dr. Winslow Tompkins (24). Tompkins found, from an intensive five-year study of pregnant women, that markedly underweight expectant mothers had a greater than average incidence of toxemia and an increased incidence of prematurity of the infant. These same expectant mothers on an adequate nutritional regimen had a 41 percent reduction in the incidence of prematurity over an untreated control group. It was further shown that anemia has a direct effect on the incidence of premature labor; it rose as the hemoglobin level decreased. In those expectant mothers, who were both underweight and anemic, the premature rate was strikingly high.

The national trend toward early marriage and parenthood has resulted in health problems for increasing numbers of teen-age girls. The

magnitude of this problem often is not realized. In 1962, 14 percent of all babies born (38 percent of all first born infants) in the United States had mothers 19 years of age or younger (52). In California approximately one-third of the first babies were born to teen-age mothers (7).

For these girls, the stresses of pregnancy are added to the nutritional needs for body maturation and are often superimposed on a previously existing poor nutritional status. Many studies show that teen-age girls are prone to eat inadequate, bizarre diets, prompted in part by fanatic interest in slenderness and the compulsion to do as the group does (34, 52, 64, 73).

Calcium retention is known to decrease with emotional stress, a well-known problem of this age. It then appears that a pregnancy complicated with poor nutritional status and emotional instability may well show a high incidence of complications and result in defective infants.

Israel and Wortersz (28) made a comparison between 3,996 teen-age obstetric patients and 40,709 patients of whom the teenagers were a part. Among the teen-age patients a distinctly higher incidence was noted in the occurrence of pre-eclampsia and anemia, and labor in excess of 20 hours. These authors found essentially no difference in fetal, neonatal, and perinatal mortality.

The earlier belief that the fetus will obtain everything it requires, regardless of the mother, has fallen into disfavor. The exact relationship is still uncertain (56). Krause (34) is of the opinion that the child takes what it needs only to a degree and after a point some mechanism in the mother spares her of further depletion. This opinion is shared by other writers (63).

Macy and her associates (44) observed trends which indicate lower nutritional status among Negro women in general when compared with corresponding values for the white race. This study gave significance to the study of Moore et al. (49) who found that maternal and infant mortality rates in Louisiana were high when compared to the United States average. These mortality rates increased as the percentage of Negroes in the population rose.

Payton et al. (56) found that in a study of the dietary records kept for 571 pregnant Negro women, faulty dietary habits, based on socioeconomic background and lack of knowledge of nutrition, were the prevalent contributing factors determining nutritional status. In this study the findings were given in terms of mean nutrient intake of the group. In comparing the estimated levels of nutrients with the recommended dietary allowances, it was revealed that vitamin A was the only nutrient with a mean intake that met or exceeded the recommendations. The mean intake of protein, iron, thiamine, and riboflavin represented two-thirds or more of the allowance. Mean intakes of niacin and ascorbic acid were slightly above 50 percent of the standard. Calcium intake for the group was less than one-half of the recommended amounts.

Portions of the United States are composed of many nationality, ethnic, and regional groups. People in these groups bring a variety of dietary practices from their homes. These families may be unfamiliar with many foods available in the markets of the area in which they are settling. They frequently adopt some of the poorer food practices of this country, replacing nutritious foods with ones that contain few nutrients. For example, Mexican-American families are prone to use

refined wheat flour instead of corn that has been soaked in lime solution in making tortillas. The corn tortillas contribute calcium to the diet while the flour tortillas do not (7).

Israel and Woutersz (28) in analyzing the data from their teen-age obstetrical study found the existence of a racial difference rather than a teen-age one when determining fetal and infant losses due to prematurity. There was a sharp preponderance of prematurity and immaturity among the infants delivered to the nonwhite patients; the rates were double those of the white group. These differences were explained on a socio-economic basis, being related to the improved living conditions and better diets of white individuals.

Young and her associates (75, 76, 78, 79), in an effort to explain lower than desirable dietary intakes of individuals and families in New York State, made a study of knowledge of nutrition in Rochester and Syracuse during October and November of 1955 (75).

Data were gathered from homemakers by means of personal interview. From the responses, it was determined that approximately one-quarter of the homemakers had a fair understanding of nutrition. Evidence indicated that they knew more about nutritional values of meat, fish, and poultry, of potatoes, and of fruits and vegetables than about other items in the diet. They did not discriminate between values in different kinds of fruits and vegetables (79).

The greatest need for more nutrition knowledge by the homemaker was in regard to: ascorbic-acid-rich fruits and vegetables; carotene-rich fruits and vegetables; adult need for milk; nutritional value of bread-stuffs and cereals; and of butter and fortified margarine. Formal

educational attainment seemed the most important single factor related to knowledge of nutrition (79).

A more recent study, unrelated to prenatal care but one showing the use of the interview technique, was conducted by Jalso (29). In this study of some relationships between nutritional beliefs and practices and some personal characteristics, Jalso found significant correlation between age, education, opinion scores, and scores on practices. By the manipulation of the data the respondents were characterized as food "faddists" or "non-faddists". Those labeled as faddists were older, had less education, and had more rigid personalities.

A number of studies within the past few years have indicated that the diets of pregnant women can deviate from the recommended allowances without producing any great disturbance either in the course of pregnancy or in the condition of the infant (22).

The problem is how far below recommended allowances can the intake go during this critical period without producing physiological disturbances.

Thomson has reviewed at length the various nutritional studies that have been made over the past thirty years among pregnant women (22). In his opinion the attempts to relate nutrition to the course and outcome of pregnancy have been substantially negative. As Thomson pointed out, physiological adaptation of both mother and child may overcome some of the dietary shortcomings.

Although these studies suggested that the diets of pregnant women can show considerable variation both in quantity and nutritional quality without clinically detectable damage to either mother or child, they do necessarily indicate that nutrition has no impact on pregnancy.

Function of the Nutritionist in Prenatal Care

As concern for maternal and child health expands, new and better prenatal clinics are being established in the more densely populated areas. In spite of basic similarities, each project has a distinct character, shaped by the special needs of the community, resources, and problems, and the special enthusiasms of its planners and staff.

Close (9) indicated that the maternity and infant care programs are essentially medical programs and as such cannot be expected to cure all the ills that accompany poverty. She stated, "What it does for people, rather than what it cannot do, is what counts (9, p. 184)."

A dietitian or nutritionist can greatly strengthen the nutritional aspects of prenatal care. These professionally trained persons can act as consultants to other members of the prenatal care staff or they can participate directly in patient care. Their special knowledge of the nutritional needs of the pregnant woman, cultural food practices, and costs, preparation, and nutritive value of foods makes them especially valuable as consultants.

CHAPTER III

PROCEDURE

Design and Development of the Interview

The first attempt to develop the interview schedule was made early in this study. Questions were formulated to determine specific dietary practices. For example, "Do you eat an egg a day?" This approach was discarded because it would not have been as conducive to obtaining attitudes, values, and feelings of the respondents as desired.

The second approach to develop the interview came several months later. At this time some of the problems of diet during pregnancy, which were encountered in the review of literature, were stated in question form. The questions were formulated without knowledge of the size of the group to be interviewed or the source of the sample. For this reason no restrictions were placed on the questions being stated. As thought was given to the analysis of the data collected, the questions fell into four distinct categories: (1) background material including a brief socio-economic and educational history; (2) a lengthy medical history; (3) knowledge of food and nutrition as applied to feeding self and family; and (4) some food practices during the prenatal period.

A decision was made to have the questions individually typed on small cards for reference during the interview. The answer sheets were to follow the question sequence with typed "possible responses" in so far as could be determined.

A trial pre-test of the interview was administered for a time estimation. The time required was far in excess of one hour which was considered the maximum allowable. It was assumed that the required time could be reduced as the interviewer gained skill in handling the question cards and as she became more familiar with the question sequence.

A second pre-test of the interview gave evidence that there must be an elimination of a portion of the questions. After consideration of the final outcome of the study and a re-evaluation of the type of information needed, it was decided to omit most of the questions related to knowledge of food and nutrition as applied to feeding the family and the questions pertaining to medical history. Approximately one-third of the questions were withdrawn or restated.

A copy of the modified interview was evaluated by a statistician. He recommended that the questions be transferred from cards to the response sheets, thereby lessening the possibility of error in recording the answers. This procedure also allowed the respondent to view the questions as they were asked. A second suggestion was to eliminate those questions which, in analysis of the data, would single out or embarrass the respondents. It was further recommended that the conceivable responses be extended or defined in some instances so that interpretation of meaning would be less difficult and more accurate.

At this stage of development the interview required approximately thirty to forty minutes to administer. Questions were included to obtain information on:

- (1) background related to the current pregnancy, including a physical description
- (2) a brief socio-economic and educational history
- (3) the respondent's belief about the effect of ingestion of food and drink on both mother and child

- (4) the respondent's belief about the effect of food cravings on the child
- (5) frequency of eating
- (6) if meals are skipped, why?
- (7) if meals are skipped, when meal skipping began?
- (8) place of eating
- (9) snack habits and how they relate to food intake
- (10) adequacy of one day's food intake obtained by recall
- (11) change in quantity of food intake as a result of the current pregnancy
- (12) food likes
- (13) food dislikes and how they are handled in menu planning
- (14) interest in nutrition
- (15) respondent's opinion of interest of other women in the proposed nutrition education class for mothers-to-be
- (16) use of food supplements
- (17) use of special health foods
- (18) past and present problems of weight control
- (19) types of diets followed for weight control and the source of the diets
- (20) diet instruction from attending physician
- (21) knowledge of daily food guides
- (22) sources of information on what to eat
- (23) factors which influence menu planning
- (24) problem areas in menu planning

Five additional pre-tests of the interview tool led to minor rewording of a portion of the questions for the sake of clarity.

It was decided that some knowledge of the time allowed for menu planning would give more insight into common problems of the respondents than a knowledge of their place of eating. Therefore, a question related to menu planning replaced a question concerning the place of eating.

The final adjustment made in the interview schedule was the addition of a section which the author hoped would indicate the extremes in the variety of food used by the respondents in the study.

A final test of the interview led to its acceptance. A copy of the interview appears in the appendix, page 99 .

Selection of the Sample

The first plan for defining a sample of pregnant women to take part in this study was unfruitful. Public health officials found it unsuitable to brief their clients about the nature of this study or to, in any other way, make contacts possible. The same situation was true for the local welfare agency.

A third plan to make contact with possible respondents through local physicians met less resistance, but difficulty was encountered. The physicians themselves, because of legal aspects, were not free to disclose names of their patients. Instead, it was proposed by one doctor that a brief outline of the study be made and reproduced in quantity so that the plan could be presented to patients for their voluntary consideration. It was suggested by the same doctor that the availability of free professional dietary counseling be mentioned in the outline as an incentive for the patients to help with the study.

This suggestion was put into immediate action. Sixty-four copies of an outline of the study were distributed among four doctors - three obstetricians and a pediatrician. No response at the end of one week led the author to the conclusion that another approach must be initiated.

At this time friends and acquaintances were contacted for names of expectant parents. Other names were found by inquiring at some of the university business offices. Each possible respondent was contacted in person or by telephone and appointments were made. After the interview of each person, a request for the names of additional expectant parents was made. This method of defining a sample was continued until 23 persons had been interviewed.

To supplement the information obtained in the structured interviews with the pregnant women, three of the four physicians originally contacted were interviewed.

Administration of the Interview

All 23 persons interviewed were between the ages of 18 and 35 and between the second and ninth month of pregnancy.

All interviews, with one exception, were conducted at a predetermined time in the home of the subject. One interview was administered at the time of the first meeting without a previous appointment.

The beginning step of each interview was a self-introduction. A few minutes following the introduction were allowed to establish rapport. Explanations of the study, of the interview form, and the importance of each respondent giving an unbiased answer to the questions were included in the opening remarks.

A copy of the interview was given to each respondent so that she could follow as the questions were asked verbally. The instrument included a combination of closed and open end type of questions. The interviewer recorded responses to these questions as nearly as possible in the words of the respondent.

At the conclusion of each interview, the respondents were offered copies of the food guide published by the National Dairy Council along with some verbal nutrition information. The name, address, and signature of each respondent were written on a postal card used to request for her use a copy of the Home and Garden Bulletin No. 72, Nutritive

Value of Foods, published by the United States Department of Agriculture. Each visit was closed with a statement of appreciation to the respondent.

As previously mentioned, three physicians in Stillwater were interviewed. Some questions were composed before the interview appointments to elicit information from each doctor concerning the following:

- (1) medical impressions of a nutrition education program for expectant mothers
- (2) type and amount of diet instruction commonly presented to normal obstetric patients
- (3) type of prenatal diet supplements recommended, if any.

Other topics, opinions, and information were developed on an individual basis with each doctor.

Appointments for the medical interviews were made at a time convenient for the doctors. One physician was interviewed before the case study interviews, and two were interviewed following them.

As with the women, self-introductions were made, followed by a brief explanation of the study and its purpose. Conversation followed in which some specific data were obtained as well as some opinions and practices of the individual physicians.

Treatment of the Data

Information obtained from individual interview schedules of the women were recorded question by question and summarized on data sheets. These data were not of sufficient quantity to justify extensive statistical analysis. Means, medians, modes, and standard deviations were used to describe the sample. Other data were described in terms of frequency distribution and means. In two instances data was presented in graphic form.

CHAPTER IV

RESULTS AND DISCUSSION

Although the interview schedule designed for the pregnant women was organized into three parts, the findings are presented in five parts: (1) description of the respondents, (2) some beliefs about diet during pregnancy and their origin, (3) dietary practices of the respondents, (4) problems related to food, and (5) sources of information on what to eat. The results of the medical interviews are presented in a separate section.

Description of the Respondents

Part I of the interview (questions I to VII) provided an adequate description of the respondents. This section was designed to secure information concerning physical characteristics of the interviewees, and brief socio-economic and educational backgrounds. Descriptions of this type lead to an appreciation of the differences in individuals and may help educators maintain a high degree of sensitivity toward attitudes, feelings, and perceptions of others - a vital part of their success in doing the job of teaching (17).

The information requested in Part I of the interview was given freely by the respondents with the exception of question IV. A few respondents were hesitant about estimating their annual income either

because they were unsure of the amount or because they were embarrassed about giving the information. This problem was anticipated and therefore only an estimate of the income was requested. No distinctions were made as to net and gross amounts. Each respondent gave an estimate. The validity of these answers is questionable.

The distribution of the following variables - month of pregnancy, height, and body frame - appear in Tables 1, 2, and 3.

Table 1. Month of pregnancy for the respondents

Month of Pregnancy	Number of Respondents
Third	2
Fourth	4
Fifth	4
Sixth	4
Seventh	1
Eighth	4
Ninth	4

There was a minimum of one respondent for each month of pregnancy. The average month of pregnancy was the sixth.

Table 2. Height of the respondents

Height		Number of Respondents
Feet	Inches	
5	2	1
5	3	3
5	4	2
5	4 1/2	1
5	5	4
5	5 1/2	2
5	6	1
5	7	7
5	7 1/2	1
5	8 1/2	1

Height of the respondents ranged from 5 feet 2 inches to 5 feet 8 1/2 inches. The mode value for height was 5 feet 7 inches.

Table 3 Body frame of the respondents

Frame	Number of Respondents
Medium to large	4
Medium	8
Medium to small	7
Small	4

Four women appeared to have small body frames; the remaining 19 were of medium frame. No special significance is attributed to the variables in Tables 1, 2, and 3. They are presented for the purpose of displaying the variety of persons in this study even though the sample was small.

Figures for age and for income were recorded as an approximation because highly accurate figures were not necessary for this investigation. Age determinations were based on high school graduate dates (question V) by assuming that all persons graduated from high school at the age of 18. Age distribution of the respondents is presented in Table 4.

This estimated age, in combination with height and weight before pregnancy, was used to define a desirable weight range for each individual from the height- weight- age tables published by the Metropolitan Life Insurance Company. This table is in the appendix, page 110. As long as body weight was within the desirable range identified for each

Table 4. Age of the respondents

Age	Number of Respondents
19	2
20	3
22	1
23	2
24	1
25	3
26	5
27	2
30	1
31	1
34	2
26	Mean and mode

subject, it was considered satisfactory. When body weight exceeded or fell beneath the extremes of the desirable range, the subject was considered over or under weight.

Acceptable gains were calculated for each respondent at her given stage of pregnancy using the suggested prenatal weight gain of Macy and Kelly (43). The relationship of actual gain to acceptable gain along with related data concerning month of pregnancy, body weight before pregnancy, and weight class before pregnancy are presented for each respondent in Table 5.

The data in Table 5 indicate that eight persons at the time of interview had gained more than the allowable amount for their stage of pregnancy. Fourteen had gained less than the allowable amount for their stage of pregnancy, and one person had gained the amount allowed. These findings, viewed in light of the desirable weight ranges of the women before they became pregnant, indicate that weight gain at the time of interview was a minor problem for the majority of the group.

Table 5 Prenatal weight gain compared to weight class before pregnancy and allowable weight gain

Weight before pregnancy	Weight class ¹	Month of pregnancy	Actual gain in pounds	Allowable gain in pounds ³	Difference
128	U ²	Fifth	3	10	- 7
115	D	Fourth	3	8	- 5
140	D	Eighth	13	20	- 7
118	U	Ninth	22	24	- 2
127	U	Sixth	32	12	+20
124	D	Fifth	9	10	- 1
133	D	Ninth	16	24	- 8
137	D	Seventh	15	16	- 1
121	D	Fourth	3	8	- 5
130	D	Ninth	30	24	+ 6
145	D	Fifth	3	10	- 7
140	O	Eighth	25	20	+ 5
107	D	Eighth	25	20	+ 5
110	U	Sixth	13	12	+ 1
108	U	Third	6	6	0
138	D	Sixth	4	11	- 7
120	U	Eighth	29	20	+ 9
125	D	Fourth	10	8	+ 2
125	D	Ninth	40	24	+16
104	U	Sixth	5	12	- 7
113	D	Third	1	6	- 5
173	O	Fifth	7	10	- 3
117	D	Fourth	5	7	- 2

¹Before pregnancy.

²U = underweight; O = overweight; D = desired weight.

³Allowable gain was accepted as two pounds per month for the first two trimesters; four pounds per month for the last trimester. Total = 24 pounds for nine months.

Description of the respondent's health before pregnancy and at the time of interview is shown in Table 6.

Table 6 Description of respondent's health

Health Classification	Number of replies	
	Health before pregnancy	Health at time of interview
Excellent	15	10
Good	6	12
Fair	2	1
Poor	0	0

This information was obtained from questions II and VI in which the respondents were asked to classify their state of health as excellent, good, fair, or poor. Five respondents changed their rating from excellent to good; one changed from fair to good, and 17 respondents felt there had been no change in their physical status as a result of pregnancy.

Questions II and VI were designed and included in the study to quickly identify past physical ailments that might have an influence on food selection and intake. This procedure eliminated the necessity of a lengthy medical history. The questions proved effective. Two respondents mentioned ulcers of the stomach, two mentioned problems of excessive weight gain, and three persons mentioned morning sickness and nausea. According to the individual respondents, these problems had an influence on their past food intake.

Question III was valuable in extending background knowledge. It was included to determine the type of work in which the respondent had been or currently was involved and to note whether or not such work appeared to have an influence on knowledge of nutrition. It was concluded that at least three persons may have gained some knowledge of nutrition from their work.

Income-occupation relationship of the husbands of respondents are presented in Table 7.

Table 7 Relationship of occupation group of husband to estimated income level

Income level	Occupation Groups			
	Student	Professional	White collar ¹	Semi-skilled ²
2000-3500	4			1
3600-4500	1	1		
4600-5000	4		1	1
5100-5500				
5600-6500	1	1		1
6600-8500		3	1	
8600 or above		2	1	
Total	10	7	3	3

¹Salesmen, managers.

²Service and sales workers.

Knowledge of the husband's occupation expanded the interviewer's understanding of the answers which respondents gave to questions in other parts of the interview. For instance, the irregular eating habits of several persons were explained in terms of the husband's work schedule.

The educational level of the respondents are shown in Table 8.

Table 8 Level of education of the respondents

Education level	Number of respondents
High school diploma	5
High school diploma and additional classwork*	10
B. S. degree	5
M. S. degree	3

*This category includes those persons who have had some college or technical training beyond high school, but who have not received a B. S. or M. S. degree.

Home Economics was a part of the training of five respondents in this study. An additional four persons had science backgrounds that may have included nutrition studies, although this was not established from question response.

It is realized that the nutrition educators in public health work may be confronted with teaching persons whose backgrounds and needs are more extreme than those presented in this study. Nevertheless, guesswork concerning some of the types of persons likely to be encountered has been reduced.

Beliefs About Diet During Pregnancy and Their Origin

The questions in Part II yielded answers which satisfactorily accomplished the objectives of this section. These questions on the ingestion and craving of food during pregnancy were designed to determine the prevalence of correct and incorrect information, the extent of food folk beliefs, and the routes of communication used to circulate

these materials. The questions were worded in such a manner that the respondents were hardly aware that their knowledge of nutrition was being assessed.

Indications were that the majority of the women in this study, as might be expected in a university city, were armed against food folk beliefs about diet during pregnancy. The findings also indicated that a majority of the respondents could benefit from basic nutrition instruction.

While most of the women were aware that there are foods which contribute to the health and well-being of both mother and fetus, their knowledge of the type of foods and their functions are incomplete and in some cases incorrect.

Effect of Food on the Fetus

Questions I a-j and II a-j were analyzed concerning effect of food on the fetus. Nineteen of the respondents had heard of no foods or beverage that would be harmful to the fetus as long as the items were ingested in reasonable amounts. Three of these 19 persons had heard that alcohol and sweets, if eaten in excess amounts, would have a harmful effect. Two of the three respondents agreed with what they had heard. One person did not believe what she had heard.

In contrast to the answers from 19 of the respondents, four persons had heard that alcohol or strong drinks in any amount would be harmful to the fetus. Three of the four agreed with this while one respondent did not agree.

The subjects were asked what effect alcohol and other harmful

foods would have. Their replies came under the following categories: (1) alcohol causes poor development, (2) alcohol "dopes it up" (meaning the fetus), (3) baby does not get what it needs, (4) slow development of the baby, (5) baby is smaller than usual, (6) don't know, and (7) not sure.

The sources of information for the preceding replies came under the following categories: (1) personal background, (2) reading, (3) doctors' books, (4) baby book, (5) doctor, and (6) not sure.

Also in this section, the question was asked, "Have you read, or been told, that there are foods or beverages which, if consumed during pregnancy, will be beneficial to your baby?" Twenty-one persons had heard that there are foods which are good for the baby and all 21 agreed with what they had heard. Table 9 includes a summary of the categories of food named by the respondents. This table also gives the reasons stated by the respondents for including the foods and the source of the information.

Only one person mentioned the Basic Seven Food Groups and one person mentioned a well-rounded diet such as one given by doctors. Further checking indicated that both of these respondents had received home economics training in their backgrounds. Milk was the most frequently mentioned food. Other foods listed in the table were mentioned by five or fewer persons. No respondent listed foods of sufficient variety to be equivalent to the Basic Seven, or Four, Food Groups.

Food information on which the respondents said they had based their replies included various sources. The doctor was the most frequently mentioned source of information and reading was second in importance.

Table 9. Food believed to be beneficial to the baby if consumed during pregnancy

Food	Respondents' reason for eating food	Information source
Basic Seven	general well-being	class, doctor
Diet from doctor	well-being	doctor
Calcium*	good health	not sure
	well-being	doctor
	no reason	doctor
Iron*	body building	reading
Phosphorus*	well-being	doctor
Protein*	well-being	doctor
	body building	reading
	good for baby	father is doctor
	no reason	doctor, reading
	meat, cheese, eggs	reading
High vitamin foods	good health	not sure
Body building foods	nothing specific	doctor
Meat	better baby	reading
	everybody needs it	heard somewhere
	not sure	book
	healthy baby	doctor
Eggs	better baby	reading
	iron	doctor
	good nutrition	class
	bones and teeth	doctor
Milk	better baby	reading
	calcium	heard somewhere
	for bones	reading
	not sure	reading, mother
	good for baby	father is doctor
	good nutrition	class
	no reason given	none
	healthy baby	doctor
	health	class
	protein, bones	doctor
	bones and teeth	doctor
	well-being	class, doctor, magazine
	protein, vitamins	husband, reading
	bones, teeth, calcium	reading
	strong bones	doctor

Table 9 (Continued)

Food	Respondents' reason for eating food	Information source
Concentrated juice	well-being	doctor
Green vegetables	body building, bones good nutrition health	reading class reading, class
Fruit	no reason body building good nutrition regularity	doctor reading class doctor
Fresh fruit	health	magazine
Vegetables	healthy baby no reason	doctor doctor
Liver	iron good for baby	mother father is doctor
Lean meat	protein	reading, class
Cheese	protein, vitamins	husband, reading
Whole wheat bread	health no reason	magazine out-of-state doctor
Ice cream	protein, vitamins	husband, reading

*Although the interviewees were asked to name foods which are beneficial to the baby, they gave certain nutrients instead.

This portion of the interview was valuable for another reason. It revealed that a majority of the respondents had only a vague or incomplete knowledge of why certain foods should be included in the daily food intake. One person, for example, said milk is important because it is "good for the baby". Another response was, "Green vegetables give you good nutrition". A third example was, meat should be included in the diet because "everybody needs it".

None of the respondents believed that a child could be marked if the mother craved a food which she did not get, although almost all had heard this statement somewhere in their past.

Thirteen respondents had experienced what they considered to be a food craving at some period during pregnancy. Craving was not associated with a specific month of the prenatal period but was reported at various intervals through-out the nine months by different individuals.

As might be expected, food cravings listed by individuals in this study were varied. Included were saurkraut, sweets, chocolate cake, sour things, potato chips, cola beverage, dilled okra, tacos, watermelon, oranges, strawberry soda, broccoli, peaches, cantaloupe, spinach, liver, hot dogs, and plums. Raw pork sausage was a bizarre craving discovered during the interview pre-tests. One person said she was not sure if she had a real food craving or if her conscience was guiding her food selection.

Thirteen persons believed there would be no bad effects if a mother ate large amounts of a craved food. One person thought there might be some harm, but was not sure of the consequences. Seven persons qualified their replies. They indicated that eating a large amount of

a craved food might cause the diet to be unbalanced. Two other respondents thought that such a practice might cause excess weight gain.

Effect of Food on the Mother

To a degree, the information derived from questions I k-w in the interview re-affirmed what had been found in the section dealing with the effect of food on the fetus. The foods stated as being good for the fetus were also good for the mother according to the respondents. Milk, once again, was the most frequently listed food. The reasons for eating these foods remained vague and incomplete.

In this study, 21 persons had heard and they believed that the necessity of "eating for two" during pregnancy was merely an old wives tale. Another respondent had heard from a family member that a pregnant woman should eat for two, but she did not agree. The remaining person had not heard any statements related to this saying.

While the foods indicated as beneficial to the baby paralleled those listed as beneficial to the mother, a difference was noted in the listings of harmful foods. Seven persons responded with foods which they definitely considered to be harmful to the mother if she ate them. Presented in Table 10 are the harmful foods, their effect on the mother, and the source of information about them.

Weight gain was the most frequently listed harmful effect. In answer to this question, three other persons mentioned foods such as pie, sweets, and potatoes, if eaten in excessive amounts, would be harmful to the mother. The 13 remaining respondents stated that under normal conditions there are no foods harmful to the mother during pregnancy.

Table 10. Food listed as harmful to the mother if consumed during pregnancy

Food	Effect	Information source
Spicy foods	Upset stomach	reading
Alcohol	weight gain	friend
Starches	excess weight gain	acquaintances
Soft drinks	difficult to control weight	husband
Pizza, pastry, soft drinks, alcohol	gain too fast	doctor (out-of-state)
Salt	retain water	doctor, magazine
Greasy food	gain weight	mother, mother-in-law

In Part II of the interview, designed to investigate some beliefs about diet during pregnancy and the origin of the beliefs, there was indication that an area of respondent preparation for birth could be improved, even though all of the subjects of this study were receiving professional medical care during the prenatal period. The area to be improved concerned the functions of diet during pregnancy.

Dietary Practices of the Respondents

Part III of the interview schedule contained questions which identified dietary practices with regard to: (1) regularity of eating, (2) snack habits, (3) use of food supplements, (4) use of special health foods, and (5) variety of food used. The recall of one day's food intake was a part of the study of dietary practices also.

All but four respondents considered the day prior to the interview to be typical of their usual food intake. Therefore, the day prior to the interview was selected for the food intake recall of 19 respondents. The other four subjects selected another day which they considered typical.

The dietary score card, used to evaluate the recalled food intake for one day, was based on food groups which make important nutritive contributions. A copy of the score card appears in the appendix, page 108.

The diet scores of the respondents are presented in Table 11. The meat group, the potato and other vegetable group, and the cereal group were the only ones in which there were scores for every respondent. Vitamin A foods were the most frequently omitted -- over one-half of the respondents received no points in this part of the evaluation. Nearly one-fourth of the respondents had no food source of vitamin C. Only two persons scored zero in the milk group, although there were eight others who failed to receive the possible 20 points for milk and milk products. Nine respondents in this study received no points for breakfast. This was either because they ate no breakfast or because what they ate did not qualify as a good breakfast according to the standard of the score card.

Figure 1 is a histogram plotted from total scores in Table 11. The interval 50 to 55 included scores of more respondents than any other interval on the scale. It also was the lowest interval of the scale in which scores were made. Nine respondents had scores of 65 or below which gave them a rating of Fair. Eight persons scored between 65 and 80 for a rating of Good. Scores of six persons fell in the range considered Excellent. The mean was 68.98 ± 3.85 . The median score, 65.5, was below the mean.

Presented in Table 12 are the score range, mean, and standard deviation of the mean for the total scores and the component group

Table 11

Diet scores based on recall of food intake for one day

Respon- dents	Milk	Meat	Vitamin A foods	Citrus foods	Potato etc.	Cereal breads	Fat	Breakfast	Total score
1	20	17.5	0	5	10	7.5	5	0	64
2	20	10	0	10	8	10	5	15	78
3	19	10	10	10	10	2.5	5	15	81.5
4	20	15	0	2.5	10	10	5	15	77.5
5	7.5	20	0	0	10	10	5	0	52.5
6	0	20	10	10	5	5	4	0	54
7	20	12.5	0	2.5	10	10	5	15	75
8	20	20	2.5	10	10	2.5	0	0	65
9	7.5	20	0	7.5	10	10	5	15	75
10	20	20	0	10	10	5	2.5	15	82.5
11	20	20	10	10	10	10	2.5	15	97.5
12	12.5	20	0	5	7.5	5	2.5	0	52.5
13	17.5	20	7.5	0	10	10	5	15	85
14	20	10	0	5	10	10	2.5	0	57.5
15	20	17.5	0	2.5	10	10	5	15	80
16	10	15	0	7	6	10	5	15	68
17	10	15	10	5	5	7.5	2.5	0	55
18	20	20	10	2.5	5	5	3	0	65.5
19	20	20	10	0	10	5	5	15	85
20	20	10	10	8	5	7.5	5	0	65.5
21	2.5	15	0	0	10	10	5	15	57.5
22	0	12.5	0	7.5	10	10	0	15	55.0
23	20	15	0	0	7.5	10	5	0	57.5

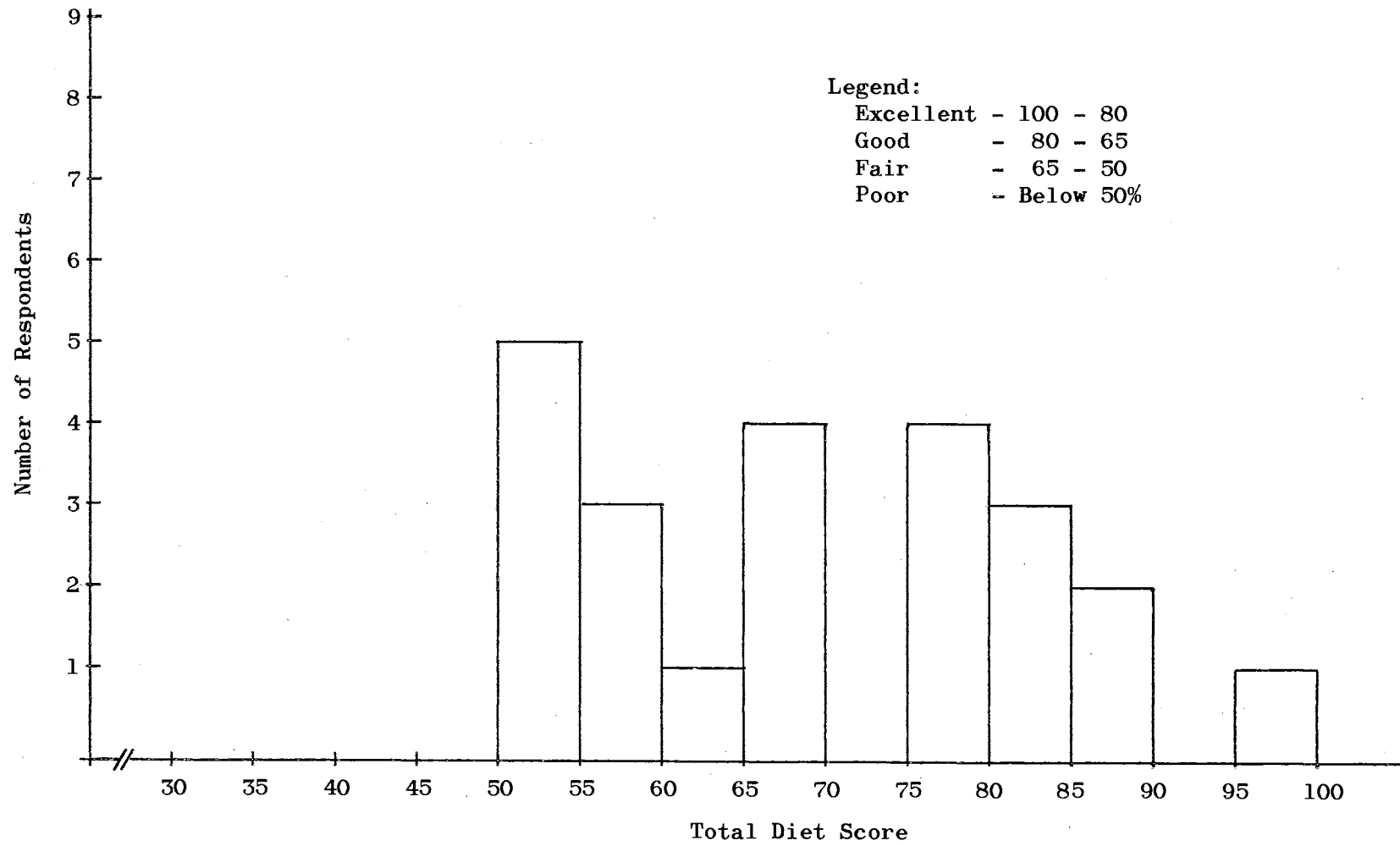


Fig. 1. Dietary scores plotted from Table 11.

Table 12. Range, mean, and standard deviation for components of the total diet scores based on recall of food intake for one day

Score component	Possible score	Range	Mean	Standard deviation
Milk	20	0 - 20	15.06	7.14
Meat	20	10 - 20	16.31	3.9
Vitamin A	10	0 - 10	3.47	4.69
Vitamin C	10	0 - 10	5.2	3.84
Potato and other vegetables	10	5 - 10	8.65	2.03
Cereal	10	5 - 10	7.93	2.68
Fat	5	0 - 5	3.89	1.62
Breakfast	<u>15</u>	<u>0 - 15</u>	<u>8.48</u>	<u>7.6</u>
Total score	100	52.5 - 97.7	68.98	3.85

scores, as compared to the maximum score. In one instance (vitamin A group) the standard deviation value exceeded the mean. This is explained by extreme variation in the score for vitamin A. Over one-half of the respondents received a zero in the vitamin A group. The remainder of the scores ranged from 2.5 points to 10 points.

The "potato and other vegetable group" was the best represented group of the score card as reflected in the standard deviation. The cereal group also had a good group score. The scores for fat showed that over one-half of the respondents received the maximum number of points allowed for fat. Only one person reported eating no fat on the day of food intake recall.

The fact that the highest group scores were made in food groups which are usually considered "calorie carrying food groups" while the poorer group scores appeared in the "protective food groups" may have far-reaching implications.

Since the sample was not a random sample, inferences cannot be drawn for the prenatal population of Stillwater. However, the trends in this study do parallel the findings of Howl, 1965 (25). In her study, the two-day food intake records kept by secretaries who were the wives of Oklahoma State University students revealed that iron, calcium, vitamin A and ascorbic acid were generally low.

The trends of this study also parallel research of the Massachusetts Experiment Station in the Northeast Region nutritional studies of pregnant women (50). They reported protein, as well as calcium, iron, ascorbic acid, and vitamin A to be the nutrients present at critical levels in the diets of a portion of the women.

A limitation of the score card is its failure to give the nutritive contribution of each food completely. Its use in this study was that of a tool for assessing the variety of food in the diets of the respondents. According to Eppright, Pattison, and Barbour (17), variety is recognized as a safeguard against poor nutrition.

Respondents five, sixteen, seven, and eleven were selected on the basis of their diet scores for more detailed dietary study. Table 13 is a comparison of the calculated nutritive intakes from food sources of these respondents with the Recommended Dietary Allowances.

Respondent five was one of the two respondents to score 52.5 -- the lowest score as determined by the score card. The nutrient intake for respondent five, on the day recalled, fell below two-thirds of the recommended amounts for five nutrients: calcium, iron, vitamin A, niacin, and ascorbic acid. Thiamine was the only nutrient that met 100 percent of the recommended allowance.

Respondent 16 had a diet score of 68, which was closest to the mean (68.98) but slightly below the mean. Although this respondent had a total score higher than respondent five, her diet scored below two-thirds of the recommended allowance for six nutrients: protein, calcium, iron, vitamin A, thiamine, and niacin. Calories were also below two-thirds of the recommended amount on the day recalled. No nutrient met 100 percent of the recommended allowance for respondent 16.

Respondent seven had a diet score of 75. This was the first score on the upper side of the group mean. Three nutrients were below two-thirds of the Recommended Dietary Allowances: iron, niacin, and ascorbic acid. Calcium, thiamine, and riboflavin intake exceeded 100 percent of the recommended amounts for these nutrients.

Table 13

Calculated nutrient intake of four respondents for one day

Respondent number	Food energy calories	Protein gm	Calcium mg	Iron mg	Vitamin A IU	Thiamine mg	Ribo-flavin mg	Niacin mg	Ascorbic acid mg
Recommended Dietary Allowance, 1963	2300	78	1300	20	6000	1.0	1.6	17	100
5	2152	67.35	557.9	11.43	3200.5	1.04	1.52	9.57	27.5
%RDA*	94	86	43	57	53	104	95	56	28
16	981	50.7	468.2	6.0	1439	.64	1.09	8.2	68
%RDA*	43	65	36	30	24	64	68	48	68
7	2237	77.4	1416.2	12.12	4987.0	1.03	2.36	10.60	62.3
%RDA*	97	99	109	61	83	103	148	62	62
11	1885	97.5	1653	17.7	23638.5	1.46	2.68	13.65	210
%RDA*	82	125	128	88	394	146	167	80	210

*RDA = Recommended Dietary Allowances, 1963.

Respondent 11 was the highest scoring individual -- 97.5 points. Calculation of the nutrients of one day's food intake showed that no nutrient was less than two-thirds of the Recommended Dietary Allowances. On the contrary, six nutrients exceeded the recommended amounts. They were protein, calcium, vitamin A, thiamine, riboflavin, and ascorbic acid.

Because habits of casual eating as opposed to regular eating do have direct bearing on total nutriture, the practice of meal skipping was investigated in Part III (questions Ia-h). Each respondent classified her meal-skipping practices according to the definitions stated on the interview schedule. One-half of the respondents said that they did not miss meals during pregnancy. Seven persons said they missed meals as often as one time per week. Two persons missed meals as often as once in two weeks, while three subjects stated they probably missed a meal only once in the period of a month.

The frequency of meal skipping as related to diet scores is presented in Table 14. The highest diet score (97.5) was made by a subject who said she missed no meals. The two people with the lowest diet score (52.5) also appeared in this group.

Only three of the seven persons who stated they missed breakfast had husbands who also missed breakfast. Young et al. (76) found that level of education had a pronounced effect on breakfast patterns. Such correlations were beyond the scope of this study, however.

Eleven of the twelve persons who said they missed meals stated that this practice originated before pregnancy. The reasons given for this habit included: (1) time factor, (2) dislike of breakfast food, (3) lack of appetite, (4) nausea, and (5) weight reduction measure.

Table 14 Frequency of meal-skipping as related to diet scores

Respondent number	Diet Scores			
	Meal Skipping Classification			
	Frequently ¹	Occasionally ²	Seldom ³	Do not skip
1	--	--	64	--
2	--	--	--	78
3	81.5	--	--	--
4	--	--	--	77.5
5	--	--	--	52.5
6	--	--	54	--
7	--	--	--	75
8	--	--	--	65
9	75	--	--	--
10	--	--	--	82.5
11	--	--	--	97.5
12	--	--	--	52.5
13	--	85	--	--
14	57.5	--	--	--
15	--	--	--	80
16	--	--	68	--
17	--	--	--	55
18	--	65.5	--	--
19	85	--	--	--
20	--	--	--	65.5
21	57.5	--	--	--
22	55	--	--	--
23	57.5	--	--	--

¹Frequently - once a week or more often.

²Occasionally - at least once in two weeks.

³Seldom - one month interval.

Casual eating encompasses the regularity of the intervals for eating as well as meal skipping. Approximately three-fourths of the respondents of this study said their time of eating was regular. Irregular eating patterns were attributed to such factors as the husband's work schedule, nausea of the respondent, work schedule of the respondent, appetite, and family activity.

According to Eppright, Pattison, and Barbour (17), it is generally assumed, although not proved, that the practice of snacking results in poor diets. In this study a snack was defined as any food or drink consumed between the traditional three meals a day. Three-fourths of the respondents indulged in snacking on a regular basis. Only two persons said they did not snack at all.

The time of day for snacking was also studied. Eight persons said they snacked once a day, seven persons snacked twice a day, and six persons snacked three times a day. Mid-afternoon was mentioned nearly twice as often as morning and about one-third more frequently than evening as a snack time.

Table 15 is a summary of the classification of snacks consumed by the respondents. Fruit and soft drinks (regular and diet type combined) were the two snack items mentioned with highest frequency. No one mentioned protein-rich foods as a snack item.

Approximately one-half of the respondents stated that they had made no change during pregnancy in the amount of snacks eaten. Seven persons said they were snacking more than usual while three persons were eating less.

Milk is an important part of the diet of the pregnant woman, not

Table 15 Classification of snack foods consumed by the respondents

Snack classification	Number of respondents
Milk/ milk products	6
Protein foods	0
Fruit	15
Vegetables	8
Soft drinks, regular	12
Soft drinks, diet type	7
Sweets	1
Fats	0
Bread/cereal foods	7
Sandwich, protein type	1
Sandwich, other type	0

Snacks named by some respondents which did not appear on the interview schedule were coffee, tea, and coolade.

only because of its calcium content, but because it is a source of excellent protein and riboflavin. Although some indication of the respondents' use of milk and milk products was gained from the recall of one day's food intake, question IV-c in Part III of the interview schedule provided additional information on milk consumed as a beverage. Six persons stated that they drank as much as four cups of milk per day. Six other subjects said they drank fewer than two cups per day. The remaining eleven persons consumed between two and four cups per day. A comparison of what the respondents said they drank daily with that which was consumed on the day of recall showed that 13 drank less milk on the

day of recall. No respondent consumed more than three cups of milk as a beverage on the day studied.

Table 16 is a summary of the types of milk consumed. At least one person was not aware of the different varieties of milk. Question probes established that her response of "just milk" referred to homogenized whole milk.

Table 16 Types of milk consumed as a beverage

Types of milk	Number of respondents
Powdered, skim milk	1
Skim milk	2
2 percent fat milk	7
Whole milk	10
Chocolate milk mixed with whole milk	1
Drank no milk	1

Questions (IV h, i) concerning change in amount of food eaten due to pregnancy revealed: 12 persons were eating the same amount at all three meals; five persons had decreased their food intake at all three meals; three persons had increased their food intake at all three meals; two persons were eating more breakfast and the same amount of noon and evening meals; one person was eating less at breakfast and the same at noon and evening meals. This information has no specific bearing on this study except to establish that eating patterns are vulnerable to change during pregnancy.

Question seven of Part III revealed that all but two women were taking a diet supplement. The supplements of the women were either prescribed by their attending physician or approved by him. The number of tablets consumed varied from one per day to nine a day. Few of the respondents knew the content of their diet supplements. One person stated that her supplement contained "everything" she needed. Others commented that they did not need to drink milk because their supplements supplied all of the needed calcium.

The women of this study appeared to be relatively free from the influence of health food faddists. One respondent ate yogurt occasionally because she enjoyed it. Another drank a mixture of honey and cider vinegar as a breakfast beverage because a friend had told her of its "health" benefits. She also had read of its "benefits" in the book Folk Medicine by Jarvis.

A discussion of meal planning practices could properly be presented in the section dealing with problems of the respondents, because in a sense, it is a problem of this group. However, the findings will be presented here. Nine women said that they planned their meals on the same day they were served. Three persons said they thought of the total picture for about a week at a time as they grocery shopped, but decided what they were actually to prepare on the same day it was served. One subject stated that she planned both a day in advance and the same day as served, while another five respondents said they planned a day in advance only. Two respondents planned about three days in advance. Two women wrote menus for a week at a time. These findings agree with the trend identified by Howl, 1965 (25). Her study revealed a higher percentage of women using written menus, however.

Unless a person is experienced in using a food guide, it may be difficult to plan meals which include the recommended nutrients on a meal to meal and day to day basis. In this study, 13 persons had never heard of Food for Fitness - A Daily Food Guide, or of any other food guide based on four food groups. One of these 13 had heard of the Basic Seven Food Groups but could not name them. Of the remaining ten respondents who had heard of food guides based on four food groups, only two could give correct names of the groups. Eight persons had either incorrect names for the groups such as starches, sugars, carbohydrates, and proteins, or the groups they named were incomplete.

Knowledge of meal planning practices was expanded by question XIII of Part III. The respondents ranked -- one, two, three -- from six factors listed, those factors which had strongest influence on their meal planning. In Table 17 the frequency with which each factor was mentioned and the rank it was given are presented.

Table 17 Frequency of mention and rank of factors which influence meal planning

Factors	Number of Respondents			Total
	Rank			
	1	2	3	
Husband's preference	7	7	2	16
Recall of Mother's cooking	--	1	--	1
Convenience	6	3	3	12
Cost	2	5	6	13
Health value	8	6	6	20
Own preference	--	1	6	7

Health received the highest total score and also had the largest number of first place ratings as a basis for meal planning. Second to health was husband's preference. The strong influence of paternal food preferences on family dietary habits is recognized by Eppright, Pattison, and Barbour (17). Cost and convenience were closely matched in total number of times mentioned; however, convenience had a larger number of first place scores. The factor of least importance to the respondents of this study was recall of mother's cooking.

When people refuse to eat many foods, they often fail to obtain some of the needed nutrients (65). This is particularly true for persons not under a doctor's care or persons who are taking no diet supplements. To better understand why some foods were omitted from the food intake of the respondents of this study, an investigation was made of food likes and dislikes and their relationship to menu planning. No restrictive categories were placed on the responses; neither were the answers confined to the prenatal period.

Food likes of the respondents may be classified under the general headings of meats, vegetables, fruits, sweets, and pastry. No respondent mentioned bread, milk, or cheese. Five persons said they could not point out any food which they especially liked.

Food dislikes were named by 16 persons, 14 of whom were leaving the disliked foods out of the meals they planned. The foods omitted from the daily meals were ones rich in vitamin A, iron, vitamin C, and calcium -- nutrients especially important during the prenatal period. The disliked foods were composed of a high percentage of dark green and yellow vegetables such as spinach, mustard greens, broccoli, sweet

potato, carrots, and squash. The most frequently mentioned single item was liver. Dry beans were disliked by several respondents. One person said she did not like eggs. Five persons did not like milk.

These findings suggest that freedom of choice often precipitates dietary problems. It also implies that newly expectant parents may need help in order that they may appreciate the role of good dietary habits of the parents in establishing desirable food habits in the new offspring.

A study of the variety of food used (question XV - Part III) by the respondents over a two-week period was helpful in substantiating trends of individual diet habits as suggested by answers in other parts of the interview. Table 18 includes the food variety scores of the respondents. Out of a possible 100 points, the mean was 38.78 ± 8.08 . Values ranged from 28 to 62. Approximately one-third of the respondents scored less than 35 points. Only two persons scored above 50 points.

Figure 2 is a histogram of score ranges plotted from Table 18.

Table 19 includes a list of foods in the interview that were used by at least 50 percent of the respondents in a two-week period.

Foods from all four groups of the Basic Four are represented in Table 19. This list, however, does not indicate the adequacy of the daily diets of the respondents because use of a food once in a two-week period would allow it to appear in the table. This list does indicate that 50 percent or more of the respondents, for the two-week period studied, limited their food variety to commonly known items.

Problems Related to Food Intake

Problems of weight control may be indicative of problems with dietary habits. Replies to question IX of Part III -- which was

Table 18 Food variety scores of the respondents

Score	Number of respondents
28	2
30	2
30.5	1
32	1
34	1
34.5	1
37	1
37.5	1
38	1
39	2
39.5	1
40.5	2
41	1
41.5	1
43	1
46.5	1
48	1
51.5	1
62	1

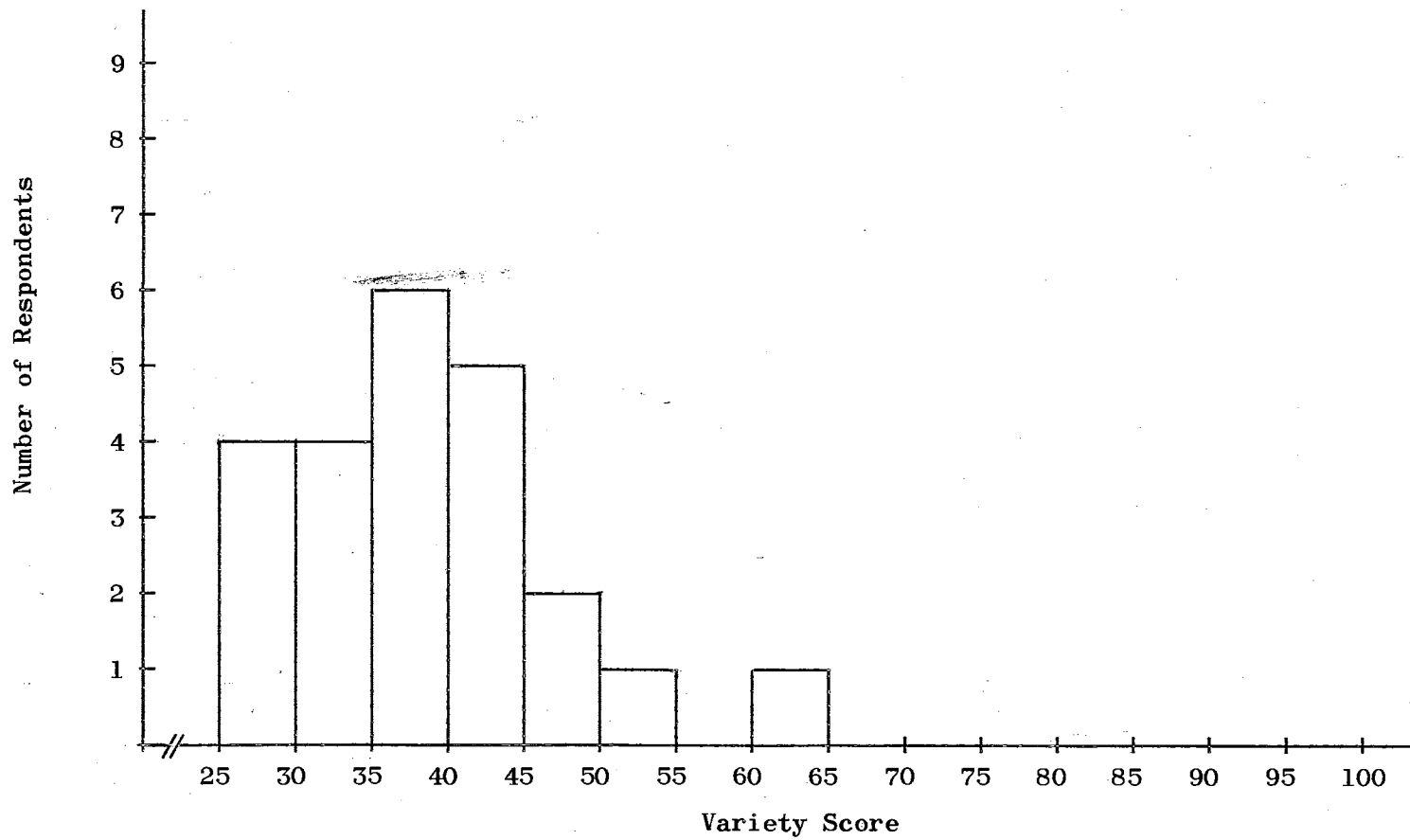


Fig. 2. Food variety scores plotted from Table 18.

Table 19 Variety of food used in a two-week period by fifty percent or more of the respondents

Food	Number of respondents
Milk, whole	18
Cheese	18
Ice cream	16
Egg	23
Beef	22
Pork	15
Fowl	16
Fish	17
Lettuce	23
Green beans	20
Carrots	18
Broccoli	14
Onion	21
Peas, green	21
Corn	20
White potato	20
Banana	15
Cantaloupe	16
Grapes	16
Lemon	13
Peach	20
Pineapple	12
Orange	19
Tomato	19
Enriched cereal	22
Bread	22
Macaroni-spaghetti	17
Sugar	22
Jelly	21
Cookies	16
Soft drinks	21
Gelatin dessert	18
Butter substitute	19
Vegetable oil	14
Bacon	16
Tea	18
Coffee	13

concerned with past problems of weight control -- revealed that seven of the respondents had never been concerned with an effort to gain or to lose weight. Five persons had been concerned primarily with trying to gain weight, and approximately one-half of the subjects had made efforts to lose weight.

Most of the respondents who wanted to lose weight did so in a period of one to three months. There were a few with weight problems who said they worked to lose weight spasmodically for a year or more, but were not as successful as desired.

The methods used for weight control varied. Five persons had diets from doctors. The majority of the respondents said they worked out their own approach, which consisted of "cutting down on everything", "watch sweets", "cut out starches", "use skim milk", and "Mayo Clinic Diet".

Less than one-half of the respondents stated that they were having a weight control problem during pregnancy. Diet instructions from the attending physicians were aimed at restricting weight gain rather than at losing specified amounts.

Question XIV of Part III was planned to determine areas in which the respondents had problems in meal planning. Presented in Table 20 is a summary of the responses to this question. Planning to meet family needs was mentioned as a problem the least number of times. Seven respondents indicated that they had no problems with meal planning at all. The other respondents mentioned from one to five areas in which they had problems.

Table 20 Areas in which respondents had problems in meal planning

Problem	Number of respondents
Use of left overs	6
Getting variety into the meal	9
Planning to meet physical needs	5
Cost	8
Getting the family to eat new foods	9
Other	0

Several of the respondents with incomes below \$5,000 did not mention cost as a problem area, while others with incomes up to \$8,400 did consider cost to be a problem.

Sources of Information on What to Eat

Table 21 contains a summary of the responses to question XII -- a closed question in which the respondents were to indicate the sources from which they received information about what to eat. The sources mentioned most frequently were mother and magazines. The doctor was mentioned by slightly more than one-half of the respondents which is inconsistent with the findings of other questions in this study. Extension bulletins had reached only three of the respondents.

In response to question X in Part III, 12 respondents stated they had received no diet instructions from their doctor. Some of the women attributed this to the fact that they were multiparae patients. Six respondents said they had received diet help from their doctor. Instruction was both written and oral. Five respondents first said they had received no diet help, but later changed their statement or implied that there had been some guidance available. Further questioning

revealed that the instructions were of a general nature. Four persons said that they had been instructed to restrict their caloric intake. No subjects in this study had diets of a special nature.

Table 21 Sources of information about what to eat

Source of information	Number of respondents
Grade school	7
Junior high school	11
High school	13
College	15
Extension class	2
Extension bulletin	3
Doctor	14
Nurse	3
Dietitian	3
Mother	17
Neighbor	7
Club	3
Books	13
Magazines	17
Newspaper	11
Pamphlet	11
Radio	6
Television	7

The respondents were asked to rate their interest in nutrition in comparison to their friends and others in the community. Eleven said they were above average, eleven felt they were average, and one person said she had less than average interest in nutrition. The person with less than average interest scored in the lower one-third on the diet scores based on food intake recall.

The respondents were also asked if they thought other women would attend a class concerning diet during pregnancy if one were established. Sixteen persons replied yes, six said they did not know, and one person stated she would not attend but that others might.

Interview with the Physicians

Analysis of interviews with the three physicians cooperating in this study revealed that the approach to the subject of diet during pregnancy varied from doctor to doctor and from patient to patient. Nutrition instruction, when given to obstetric patients, may be oral, written, or a combination of the two. In some instances no diet instructions were given unless a specific request was made by the patient, or unless a problem arose which warranted diet instructions.

Nutrition instruction by the physician was superficial for the average patient. It usually consisted of a vigorous admonition concerning weight gain, the advisement to read a section on diet in an instruction pamphlet for expectant mothers, or weight control instruction from diet pads which included lists of low caloric foods. Nutrition instruction often was limited to remarks about drinking milk and omitting certain high caloric foods. One doctor stated that he made his instruction brief because he thought patients could not handle large amounts of material.

There were a number of prenatal mineral and vitamin supplements which were recommended or approved by the physicians. No outstanding claims were made for any specific one. In Table 22 an analysis of three commonly used brands of mineral and vitamin supplements are presented and compared to percentage of the Recommended Dietary Allowances they furnished. Brands A and C suggested the administration of one capsule daily. Therefore, the percentage of the Recommended Dietary Allowances met by these two brands was based on the consumption of one capsule per day.

Table 22 Nutrients in daily intake of three mineral and vitamin supplements as compared to the 1963 Recommended Dietary Allowances

Dietary supplement	Dosage per day	Minerals				Vitamins									
		Calcium		Iron		Vit. A		Thiamine		Riboflavin		Niacin		Ascorbic Acid	
		mg	%RDA	mg	%RDA	IU	%RDA	mg	%RDA	mg	%RDA	mg	%RDA	mg	%RDA
Brand A	1	600	46	150	750	4000	67	3.0	300	2.0	125	10	59	400	400
Brand B	2	500	38	60	300	1000	16	.2	20	.3	18	3	18	200	200
Brand C	1	250	19	40	200	6000	100	1.5	150	2.5	156	15	88	100	100
RDA*	1	1300		20		6000		1.0		1.6		17		100	

*1963 Recommended Dietary Allowances for pregnant women in the second and third trimesters.

Direction for use of Brand B suggested the administration of one tablet twice daily, therefore, the percentage of the Recommended Dietary Allowances met by this supplement was based on the consumption of two tablets per day. Vitamin D was the only nutrient which was found in the same amount in all three mineral and vitamin supplements.

Two of the physicians stated that often there is a noticeable drop in hemoglobin around the seventh month of the prenatal period. One of the doctors corrected this situation by initiating an iron supplement for his patients in the amount of six tablets per day (3.4 grains of ferrous gluconate per tablet).

One of the obstetricians stated that, as far as he was concerned, vitamin supplementation was unnecessary. The tablets for his patients were prescribed largely because the patients expected them.

The doctors were in agreement concerning weight gain. "Excellent" was a term used to describe a gain of 15 to 18 pounds. A gain of 18 to 25 pounds was considered "acceptable". Any weight gain over 25 pounds was considered "excessive".

All three physicians stated they liked to see patients as soon as pregnancy was suspected. However, an accurate diagnosis cannot always be made in the first two months. The doctors agreed that the first visit of the patient might be at any stage of pregnancy.

The primary concern of the obstetricians interviewed in this study was the well-being of the patients during the time they were under medical care. The physicians based their evaluation of well-being on such factors as blood pressure, hemoglobin level, and weight gain. Each physician had methods and materials which worked for him and these were

what he used for the protection of the prospective mother and her child. Detailed dietary instruction was not necessarily a part of the methods and materials employed to keep the mother and child in the best possible state of health.

These obstetricians felt that a class concerning diet during pregnancy for expectant mothers might be of value to some patients, but they were not impressed with an urgent need for such a class. One physician said he was not sure the results would be worth the effort expended.

CHAPTER V

SUMMARY AND CONCLUSIONS

A group of 23 gravid women in Stillwater were interviewed during the summer of 1966, using a pretested interview schedule composed of closed and open end questions. The interview was designed to investigate some beliefs, practices, and problems concerning diet during pregnancy. In addition, three obstetricians were also interviewed to determine: (1) whether they prescribed dietary supplements during pregnancy, (2) the kind and amount of dietary instruction given to expectant mothers, and (3) what they thought concerning nutrition classes for pregnant women.

Although the respondents technically were not randomly selected, the women were representative of several groups. They were both primiparae and multiparae. The respondents were varied in month of pregnancy, age, height, and body frame. They also showed deviation from the ideal pregravid and gravid weight. Income levels covered a wide range but no respondent had less than a high school education.

Answers to questions in the interview indicated that the women were aware of some food folk beliefs about diet during pregnancy and were not susceptible to the influence of these beliefs. However, there was evidence of misconception, misinformation, or partial truths regarding the influence of food during the prenatal period.

A study of dietary practices indicated that a majority of the respondents were prone to use certain common foods in their meal patterns and were prone to exclude less popular foods for which they or family members had cultivated a dislike. These habits were reflected in dietary scores determined by the use of a score card based on the Basic Four Food Guide. A typical day's food intake, obtained by recall, was evaluated using this score card. In addition, a variety score, based on food used by the respondents over a two-week period, was indicative of the kind and amount of food used.

On both scoring devices the respondents' greatest need for nutrition education was in regard to the use and value of dark green and deep yellow vegetables and iron-rich food sources such as organ meats and dry beans. The variety scores revealed a limited use of milk products and certain root vegetables. Scores obtained by the score card indicated a need for knowledge in regard to ascorbic acid-rich food and the importance of eating a good breakfast. Question responses showed dietary error in the selection of snack foods and in the regularity of eating for over one-third of the respondents.

Lack of advanced menu planning and little or no knowledge of a daily food guide for menu planning was true for the majority of the respondents. These two factors appear to be important in the omission of certain protective foods from the diets of these women.

All but two of the interviewees were using medically prescribed diet supplements. There was evidence of misconception about what diet supplements do for the respondents. Use of special "health foods" did not appear as a health fad in this study.

The majority of the subjects indicated they had average or above average interest in nutrition. One-third of the respondents said they put health value first in their menu planning. Preference of food by husbands appeared to be an important influence on the food served. Convenience overshadowed the importance of cost for most of the women.

Mass media -- magazines, newspapers, pamphlets, books -- were the most frequently used sources of knowledge about what to eat. Mothers and doctors were the persons who served most often as sources of information although in another question, over one-half of the respondents stated they had received no diet instructions from their physicians for the current pregnancy.

One-fourth of the respondents indicated they had no problems in menu planning. The most common problem, for those who had problems, were related to getting variety into the meals and getting the family to eat new foods.

Interviews with three medical doctors revealed that there were a number of acceptable dietary supplements for use during the prenatal period. These supplements were distributed by various pharmaceutical houses and differed chiefly in the ratio of the mineral and vitamin content.

The physicians interviewed in this study indicated that they did not emphasize diet for their obstetric patients unless there was some abnormal condition present.

Medical opinion about the value of diet instruction in a class for pregnant women ranged from "it may help" to "results may not be worth the effort expended".

An urgent need for a nutrition education class for gravid women in Stillwater was not indicated in this study. It has, however, shown that there are weaknesses in many of the dietary practices of the respondents. Some of their beliefs about the function of food and the function of diet supplements during the period of pregnancy are incorrect.

The writer recommends that a nutrition education class about diet in pregnancy should be established at a future time -- more for prophylactic reasons than for therapeutic reasons. Since young expectant mothers are at a stage in their lives when they are particularly receptive to well presented nutrition information, the establishment of such a nutrition class could correct misconception or false beliefs about food functions. Also, it could capitalize on the opportunity to improve the food habits of the pregnant women who attend the class and indirectly, the food habits of the unborn children.

The writer feels justified in making this recommendation since there was no medical opposition to such a plan. Also, a majority of the respondents in this study felt that many other pregnant women in the future would appreciate and attend such a class.

The writer recommends that:

- (1) the classes be conducted in connection with, or as an extension of, the prenatal classes of the County Public Health Department.
- (2) the classes include lessons on:
 - (a) the amount and the variety of foods needed to keep the body in a good state of health before, during, and after pregnancy
 - (b) use of a daily food guide to help in food selection and menu planning

- (c) a scientific method of weight control
- (d) the importance of a good breakfast
- (e) the importance of wise selection of snacks
- (f) the benefits of regular spacing of meals
- (g) the benefits of pleasant mealtime environment
free from tension
- (h) factors which influence eating behavior

Important factors to consider in planning an effective nutrition education class for pregnant women include: cooperation from local medical people; employment of skillful methods of publicizing the program; simple lesson plans that are easily understood and applied; use of dynamic teaching methods; and an interesting and enthusiastic teacher.

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A P P E N D I X

Memorandum Left in Doctor's Office to Give to Patients

FROM: Mrs. Gloria Martin, Grad. Student Dr. Helen F. Barbour
 808 South Gray Head, Dept. of Food and
 Stillwater, Oklahoma 74074 Nutrition
 Member Am. Dietetic Association Oklahoma State University
 Faculty Advisor

SUBJECT: Maternal Dietary Counseling and Research

During pregnancy food deserves special consideration to make sure that it will not be a limiting factor to the good health of both mother and child.

Additional dietary counseling may be received by participating in an interview in connection with a research project at Oklahoma State University. The research project is concerned with determining some beliefs and practices of pregnant women in the Stillwater area in relation to their food intake during pregnancy.

Information available will include:

- How to use a Daily Food Guide (applicable to all family members as well as the expectant mother).
- How to determine the nutritive value of foods in common house hold measures.
- Help with the selection of food during pregnancy to:
 - obtain a good supply of protein, calcium, iron and vitamins and
 - control weight gain without sacrificing the variety of food needed for health.
- How to evaluate, or score your food intake in comparison with the Recommended Daily Dietary Allowances of the National Research Council, National Academy of Sciences.

The interview will be conducted in the home of the participant at her convenience and all information obtained will be confidential. The time required is approximately one hour.

If you are interested in this professional dietary counseling (at no cost except your time), please telephone Mrs. Gloria Martin for an appointment. She may be reached at FR 2-2486 from 1:00 to 4:30 p.m. on Tuesday, Wednesday and Thursday of the next two weeks.

The Interview Schedule

Part I

I. Determination of weight category:

- a. Month of pregnancy? _____
 b. Height? _____
 c. Weight before pregnancy? _____
 d. Present weight? _____
 e. First pregnancy? Yes _____ No _____ (If yes, skip to II)
 f. What pregnancy is this? _____

II. Description of health before pregnancy:

Excellent _____ Good _____ Fair _____ Poor _____

III. Work History:

- a. Are you working outside of the home now? Yes _____ No _____
 b. Occupation? _____
 c. Husband's occupation? _____ Unemployed _____

IV. Would you estimate your annual income? _____

V. Education level:

Years _____
 H. S. diploma? Yes _____ No _____ Year? _____
 Technical training? Yes _____ No _____ Kind? _____
 College? Yes _____ No _____ Years? _____
 Degrees? _____

VI. Description of health at present:

Excellent _____ Good _____ Fair _____ Poor _____

VII. At what month did you consult a doctor about this pregnancy?

Before pregnancy _____	Fifth _____
First _____	Sixth _____
Second _____	Seventh _____
Third _____	Eighth _____
Fourth _____	Ninth _____

Part II

I. Effect of Food (Ingestion)

- a. Have you read or been told by anyone that there are foods or drinks which, if consumed at any period during pregnancy, will be harmful to baby? Yes _____ No _____ (If no, skip to f)
- b. What foods or drinks?
- c. What will the effect be?
- d. Where did you get this information?

(b) Food and drink	(c) Effect	(d) Information source

- e. Do you agree with what you have been told? Yes _____ No _____ Don't know _____
- f. Have you read or been told that there are foods or drinks which if consumed during pregnancy will be beneficial to your baby? Yes _____ No _____ (If no, skip to k)
- g. What foods or drinks?
- h. What will they do?
- i. Where did you get this information?

(g) Food and drink	(h) Effect	(i) Information source

- j. Do you agree with what you have been told? Yes _____ No _____ Don't know _____
- k. Have you read or been told that you should increase your total food intake considerably because you are eating for two? Yes _____ No _____ (If no, skip to n)
- l. Who told you this? _____
- m. Do you agree? Yes _____ No _____
- n. Have you read or been told by anyone that there are foods or drinks which if consumed during pregnancy will be harmful to you? Yes _____ No _____ (If not, skip to s)
- o. What foods or drinks?
- p. What will be the effect?
- q. Where did you get this information?

(o) Food and drink	(p) Effect	(q) Information source

- r. Do you agree? Yes _____ No _____ Don't know _____
- s. Have you read or been told that there are foods or drinks which if consumed during pregnancy will be beneficial to you? Yes _____ No _____ (If no, skip to II)
- t. What foods or drinks: _____
- u. What will they do? _____
- v. Where did you get this information? _____

(t) Food and drink	(u) Effect	(v) Information source

- w. Do you agree with what you have been told?
Yes _____ No _____ Don't know _____

II. Effect of Food (craving)

- a. Do you think that craving a food or drink which you do not get will have an effect on your baby? For example, strawberry craving causes strawberry mark. Yes _____ No _____ (If no, skip to d)
- b. What foods or drinks? _____
- c. What is the effect? _____
- d. Who told you this? _____

(b) Food and drink	(c) Effect	(d) Information source

- e. Have you had any food cravings? Yes _____ No _____ (If no, skip to g)
- f. What are they? _____
- g. Do you feel that eating a large amount of a craved food will effect your baby? Yes _____ No _____ (If no, skip to Part III) Possible _____ (If possibly, explain) _____
- h. What food? _____
- i. What will be the effect? _____
- j. Where did you get this information? _____

(h) Food and drink	(i) Effect	(j) Information source

Part III

I. Regularity of Eating:

- a. Do you skip meals:
 _____ Frequently? (Once per week or more)
 _____ Occasionally? (At least once in two weeks)
 _____ Seldom? (One month interval)
 _____ Do not skip (Skip to g)
- b. Which meals do you skip?
 breakfast _____ lunch _____ evening meal _____
 (If breakfast, do other members of your family omit breakfast?)
 Yes _____ No _____ (If yes, who?) _____
- c. Why do you miss? _____
- d. Was this habit of skipping meals established before this pregnancy? Yes _____ No _____
- e. When did you begin this practice? _____
- f. Why? _____
- g. Is your time of eating regular? Yes _____ No _____ (If yes, skip to II)
- h. Why is it irregular? _____

II. Planning for Meals:

How far in advance do you usually plan what you are going to serve for meals?

One week or more _____ 2 to 3 days _____ Day before _____
 Same day as served _____

III. Snacks

- a. Do you eat snacks? Yes _____ No _____ (If no, skip to IV)
 Regularly _____ Occasionally _____
- b. When do you eat these foods?
 Before breakfast _____ Mid-a.m. _____ Mid-p.m. _____
 Evening _____
- c. What classification do your snacks come under most of the time?
 Milk/milk products _____ Sweets (pie, cake, candy) _____
 Protein foods _____ Fats _____
 Fruit _____ Bread/cereal _____
 Vegetable _____ Sandwich, protein _____
 Soft drinks, regular _____ Sandwich, non-protein _____
 Soft drinks, diet type _____ Other _____
- d. Is this habit of snacking related to this pregnancy?
 Yes _____ No _____
- e. Are you snacking:
 more? _____ less? _____ about the same? _____ don't know _____

IV. Day's Food Intake by Recall:

- a. Was your activity yesterday:
average? _____ unusual? _____ why? _____
-
- b. Was your food intake yesterday:
usual? _____ unusual? _____ why? _____
-
- c. What amount of milk do you consume each day? _____ Kind? _____
- d. Please recall what you had for your evening meal yesterday.

Include your evening snack if you had one.

Evening Meal

Evening Snack

- e. Please recall what you had for your noon meal yesterday.
Include mid-p.m. snack if you had one.

Lunch

Mid-p.m. Snack

- f. Please recall your breakfast of yesterday and mid-a.m. snack.

Breakfast

Mid-a.m. Snack

- g. Before breakfast nourishment?
- h. Do you feel that you are eating about the same quantity at
each meal that you were before pregnancy? Yes _____ No _____
(If yes, skip to V)
- i. Are you eating more? _____ or less? _____ same _____
B L D B L D B L D

V. Food likes and dis-likes:

- a. What are your favorite foods? _____ none _____
- b. What food dis-likes do you have? _____

(If none, skip to VI)

- d. Are you leaving these dis-liked foods out of the meals you
plan? Yes _____ No _____ Serve infrequently _____

VI. Interest in Nutrition:

- a. Compared to others in the community, how would you rate your interest in nutrition?
 average _____ less than average _____ above average _____
 not interested _____
- b. Do you feel that pregnant women in the future would attend a class concerned with diet during pregnancy and its effect on the well-being of mother and child if it were established?
 Yes _____ No _____ Don't know _____

VII. Use of Food Supplements:

- a. Do you take any of the following:
 vitamins _____ tonics _____ iron _____ calcium _____
 protein supplement _____ cod liver oil _____ Other _____
 No _____ (If no, skip to VIII)
- b. Were they prescribed by a doctor? Yes _____ No _____
 (If yes, skip to VIII)
- c. How did you decide to take them? _____

VIII. Use of Special Health Foods:

- a. Do you use any of these foods?
 wheat germ _____ bonemeal _____
 honey and vinegar _____ organically grown vegetables _____
 yogurt _____ sunflower seed meal _____
 Brewer's yeast _____ other _____
 No _____ (If no, skip to IX)
- b. Why? _____

IX. Weight Control:

- a. Have you ever tried to lose or gain weight? Yes _____ No _____
 (If no skip to f) (Circle one the respondent has tried)
- b. When? _____
- c. How long were you on this diet? _____
- d. Were you successful? Yes _____ No _____ Not to satisfaction _____
- e. What type of diet did you follow? _____
- f. Where did you get the diet? _____
- g. Is weight control a problem for you now? Yes _____ No _____
 (If no skip to X) Respondent
 Yes _____ No _____
 Doctor
- h. What are your needs? Gain _____ Lose _____
- i. What is your approach to this problem? _____

X. Diet Instruction from Physician:

a. Have you been given diet instruction by your doctor or his nurse? Yes _____ No _____ Not for this pregnancy _____
(If no, skip to XI)

b. Were the instructions:

Written _____	General _____
Oral _____	Special _____
Both written and oral _____	restricted calories _____
	low fat _____
	low residue _____
	low salt _____
	high protein _____
	Other _____

c. Did the diet instructions from your doctor include any information about food groups? Yes _____ No _____

Balanced diet? Yes _____ No _____

d. Were the instructions given: during the first visit _____
after a problem arose _____
after request for help _____

XI. A daily Food Guide- The Basic 4

a. Are you familiar with the Basic 4 Food Guide? Yes _____ No _____
(If no, skip to XII)

b. Can you name any of the groups? _____

XII. Sources of Information:

Indicate from the following sources where you have received information about what to eat. (Not restricted to this pregnancy)

grade school _____	mother or relative _____
jr. high school _____	neighbor or friend _____
high school _____	clubs _____
college _____	books _____
evening adult classes _____	magazines _____
extension bulletins _____	newspaper _____
doctor _____	pamphlet _____
nurse _____	radio _____
dietitian _____	T. V. _____

XIII. Factors Influencing Menu Planning:

Please rank one, two, three, the factors which have strongest influence on your menu planning or what you prepare for meals:

_____ husband's preference	_____ cost
_____ recall of mother's cooking	_____ health value
_____ convenience (time and energy)	_____ own preference

XIV. Problem Areas:

Indicate areas in which you have problems in planning food for your family.

- _____ use of left overs
 - _____ getting variety into the meal
 - _____ planning to meet physical needs
 - _____ cost
 - _____ getting the family to eat new foods
 - _____ Others _____
-

XV. Food Use: Indicate foods used in the past two weeks.

Milk and its products:

Raw milk (whole or skim)
 Pasteurized whole milk
 Pasteurized 2% skim milk
 Evaporated milk
 Condensed milk
 Non-fat dry milk solids
 2% dry milk solids
 Buttermilk (whole or skim)
 Cocoa
 Cheese, cream
 Cheese, cheddar type
 Cheese, cottage
 Milk pudding
 Milk soups
 Ice cream
 Ice milk

Eggs:

Meat:

Beef
 Pork or ham
 Liver or organ meat
 Lamb
 Fowl
 Fish

Vegetables:

Green and leafy
 Spinach
 Chard
 Escarole
 Endive
 Dandelion greens
 Lettuce (leaf or head)
 Asparagus
 Green beans
 Peppers
 Turnip greens

Vegetables:

Green and leafy
 Okra
 Mustard (greens)
 Kale
 Yellow type
 Carrots
 Squash
 Sweet potato
 Pumpkin
 Cabbage family
 Cabbage
 Cauliflower
 Brussels sprouts
 Broccoli
 Root vegetable
 Kohlrabi
 Turnips
 Onion
 Rutabagas
 Parsnips
 Seeds
 Peas
 Lima beans
 Navy beans
 Kidney beans
 Corn
 Potatos, white
 Other vegetables

Fruits:

Apricots
 Banana
 Berries
 Cantaloupe
 Cherries
 Dates
 Grapes
 Grapefruit
 Lemon
 Peach
 Pear
 Pineapple
 Plum
 Prunes
 Raisins
 Orange
 Tomato

Cereals (name):

Whole grain
 Refined
 Enriched

Bread:

Whole grain (home or store)
 Refined
 Enriched, homemade
 Enriched, store

Macaroni or spaghetti:

Cornmeal (yellow or white)

Sweets:

Sugar
 Molasses
 Honey
 Jelly
 Pastry
 Cookies
 Cake
 Candy
 Sweet rolls
 Soft drinks
 Doughnuts
 Gelatin desserts

Popcorn:

Nuts:

Fats:

Cream (sweet or sour)
 Butter
 Butter substitute
 Olive oil or vegetable oil
 Oil dressing
 Bacon
 Lard

Fats:

Chicken fat
 Gravy
 Other fats

Alcoholic beverages:

Beer
 Wine
 Distilled liquor
 Other beverages

OKLAHOMA STATE UNIVERSITY
 Division of Home Economics
 Department of Food, Nutrition and Institution Administration
 FNIA 432

Field Work in Nutrition

A DIETARY SCORE CARD - SUMMARY SCORE SHEET

FOODS	AMOUNT SUGGESTED EACH DAY	MAXIMUM SCORE EACH GROUP	YOUR SCORE
			DAY 1
Milk or Milk Products	Adult 2 c (10 points per cup)	20	
Meat, Poultry, Egg, Fish or Meat Alternate (dried bean, peanut butter) First serving animal protein	3 servings 1st serving 10 pts 2nd serving 5 pts 3rd serving 5 pts	20	
Vegetable, dark green leafy or yellow vegetables for Vitamin A	1 serving	10	
Oranges, Grapefruit, Tomato or other Vitamin C rich food	1 serving of a good source or 2 servings of a fair source	10	
Potato, and other vege- tables and fruits	2 servings or more	10	
Cereal, or bread (enriched or whole wheat)	4 servings	10	
Butter or margarine	1 Tbsp. or more	5	
A good breakfast including some form of animal protein, fruit, and cereal or bread	good breakfast daily	15	
	TOTALS	100	
Average for the three days			

Evaluation of your diet. Circle your grade

- Excellent 100-80 If a good breakfast is eaten and body weight is within 10% of desirable weight.
- Good 80-65 If all nutrients are present in 2/3 the amount of Recommended Dietary Allowance.
- Fair 65-50 a) A score of 65-80 or more but with one or more nutrients below 2/3 the Recommended Dietary Allowance.
 b) A score of 50-65 or above and no more two nutrients below 2/3 the Recommended Dietary Allowance.
- Poor Below 50%

FEBRUARY 1964]

New Recommended Allowances

Recommended Dietary Allowances, Revised 1963*—Food and Nutrition Board, National Academy of Sciences— National Research Council												
Designed for the maintenance of good nutrition of practically all healthy persons in the United States (Allowances are intended for persons normally active in a temperate climate.)												
AGE ¹ AND SEX	WEIGHT	HEIGHT	CALORIES ²	PROTEIN	CALCIUM	IRON	VITAMIN A	THIA- MINE	RIBO- FLAVIN	NIACIN EQUIVA- LENTS ³	ASCOR- BIC ACID	VITA- MIN D
	kg. (lb.)	cm. (in.)		gm.	gm.	mg.	I.U.	mg.	mg.	mg.	mg.	I.U.
Men												
18-35 years	70 (154)	175 (69)	2900	70	0.8	10	5000	1.2	1.7	10	70	
35-55 years	70 (154)	175 (69)	2600	70	0.8	10	5000	1.0	1.6	17	70	
55-75 years	70 (154)	175 (69)	2200	70	0.8	10	5000	0.9	1.3	15	70	
Women												
18-35 years	58 (125)	163 (64)	2100	58	0.8	15	5000	0.8	1.3	14	70	
35-55 years	58 (128)	163 (64)	1900	58	0.8	15	5000	0.8	1.2	13	70	
55-75 years	58 (128)	163 (64)	1600	58	0.8	10	5000	0.8	1.2	13	70	
Pregnant (2nd and 3rd trimester)			+ 200	+20	+0.5	+ 5	+1000	+0.3	+0.3	+ 3	+30	400
Lactating			+1000	+40	+0.5	+ 5	+3000	+0.4	+0.6	+ 7	+30	400
Infants, up to 1 year ⁴	8 (18)		kg. X 115 =18	kg. X 2.5 =0.5	0.7	kg. X 1.0	1500	0.4	0.6	6	30	400
Children												
1-3 years	13 (26)	87 (34)	1300	32	0.8	8	2000	0.5	0.8	9	40	400
3-5 years	18 (40)	107 (42)	1600	40	0.8	10	2500	0.6	1.0	11	50	400
6-9 years	24 (53)	124 (49)	2100	52	0.8	12	3500	0.8	1.3	14	60	400
Boys												
9-12 years	33 (72)	140 (55)	2400	60	1.1	15	4500	1.0	1.4	16	70	400
12-15 years	45 (99)	156 (61)	3000	75	1.4	15	5000	1.2	1.8	20	80	400
15-18 years	61 (134)	172 (68)	3400	85	1.4	15	5000	1.4	2.0	22	80	400
Girls												
9-12 years	33 (72)	140 (55)	2200	55	1.1	15	4500	0.9	1.3	15	80	400
12-15 years	47 (103)	158 (62)	2500	62	1.3	15	5000	1.0	1.5	17	80	400
15-18 years	53 (117)	163 (64)	2300	58	1.3	15	5000	0.9	1.3	15	70	400

*The allowance levels are intended to cover individual variations among most normal persons as they live in the United States under usual environmental stresses. The recommended allowances can be attained with a variety of common foods, providing other nutrients for which human requirements have been less well defined. See forthcoming text for more detailed discussion of allowances and of nutrients not tabulated.

¹Entries on lines for age range 18-35 years represent the 25-year age. All other entries represent allowances for the mid-point of the specified age periods, i.e., children 1-3 years is for age 2 years (24 months); 3-5 years is for age 4½ years (54 months); and so on.

²Tables 1 and 2 and Figures 1 and 2 in the forthcoming text will show caloric adjustments for weight and age.

³Niacin equivalents include dietary sources of the preformed vitamin and the precursor, tryptophan (60 mg. tryptophan represent 1 mg. niacin).

⁴The caloric and protein allowances per kilogram for infants are considered to decrease progressively from birth. Allowances for calcium, thiamine, riboflavin, and niacin increase proportionately with calories to the maximum values shown.

Desirable weights for men and women

Weight in Pounds According to Frame (in indoor clothing)

	HEIGHT (with shoes on) 1-in. heels		SMALL FRAME	MEDIUM FRAME	LARGE FRAME
	Feet	Inches			
	5	2	112-120	118-129	126-141
	5	3	115-123	121-133	129-144
	5	4	118-126	124-136	132-148
DESIRABLE	5	5	121-129	127-139	135-152
	5	6	124-133	130-143	138-156
WEIGHTS	5	7	128-137	134-147	142-161
	5	8	132-141	138-152	147-166
FOR MEN	5	9	136-145	142-156	151-170
	5	10	140-150	146-160	155-174
of ages 25	5	11	144-154	150-165	159-179
	6	0	148-158	154-170	164-184
and over	6	1	152-162	158-175	168-189
	6	2	156-167	162-180	173-194
	6	3	160-171	167-185	178-199
	6	4	164-175	172-190	182-204

	HEIGHT (with shoes on) 2-in. heels		SMALL FRAME	MEDIUM FRAME	LARGE FRAME
	Feet	Inches			
	4	10	92-98	96-107	104-119
	4	11	94-101	98-110	106-122
	5	0	96-104	101-113	109-125
DESIRABLE	5	1	99-107	104-116	112-128
	5	2	102-110	107-119	115-131
WEIGHTS	5	3	105-113	110-122	118-134
	5	4	108-116	113-126	121-138
FOR WOMEN	5	5	111-119	116-130	125-142
	5	6	114-123	120-135	129-146
of ages 25	5	7	118-127	124-139	133-150
	5	8	122-131	128-143	137-154
and over	5	9	126-135	132-147	141-158
	5	10	130-140	136-151	145-163
	5	11	134-144	140-155	149-168
	6	0	138-148	144-159	153-173

For girls 18-25, subtract 1 lb for each year under 25.

METROPOLITAN LIFE INSURANCE COMPANY

VITA

Gloria Calfee Martin

Candidate for the Degree of
Master of Science

Thesis: SOME BELIEFS, PRACTICES AND PROBLEMS OF A GROUP OF PREGNANT
WOMEN IN STILLWATER, OKLAHOMA CONCERNING THEIR DIET

Major Field: Food, Nutrition and Institution Administration

Biographical:

Personal Data: Born in Beckley, West Virginia, May 8, 1938, the
daughter of Talmage D. Calfee and Ann Louise Calfee Smith;
married Everett L. Martin, August 19, 1962.

Education: Attended grade, junior, and senior high schools in
Beckley, West Virginia; graduated from Woodrow Wilson High
School in 1956; attended Concord College in Athens, West
Virginia; received the Bachelor of Science degree from Berea
College, Berea, Kentucky, with a major in Home Economics in
May, 1960; completed the Administrative Dietetic Internship
at the Oklahoma State University in August, 1961.

Experience: Employed in Berea College Candy Kitchen as part of
student labor program; summer work in resort hotel kitchen
in Chautauqua, New York; Food Production Manager for Berea
College; Food Production Manager at the Student Union, Okla-
homa State University; Graduate Teaching Assistant in Food,
Nutrition and Institution Administration, Oklahoma State
University, 1965-1966.

Professional Organizations: Member of the American Dietetic
Association, Beta Beta Beta, Kappa Omicron Phi.