

AN ANALYSIS OF THE FOOD AND NUTRIENT INTAKES  
OF PREADOLESCENT GIRLS LIVING IN  
LANGSTON, OKLAHOMA

By

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## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Purpose of the Study . . . . .	1
Objectives of the Study . . . . .	2
Hypotheses . . . . .	2
II. REVIEW OF LITERATURE . . . . .	3
Nutritive Status of Preadolescents . . . . .	3
Nutrition Surveys and Studies . . . . .	6
Factors Influencing Food Intakes . . . . .	10
The Need for Nutrition Education . . . . .	14
Dietary Study Methods to Measure	
Food Intakes . . . . .	15
Development of a Dietary Questionnaire . . . . .	17
Summary Statement . . . . .	18
III. METHOD AND PROCEDURES . . . . .	19
Selection of the Subjects . . . . .	19
Development of the Questionnaire . . . . .	20
Administering the Questionnaire . . . . .	21
Summary Statement . . . . .	22
IV. RESULTS AND DISCUSSION . . . . .	23
Meal Patterns . . . . .	23
Snacks . . . . .	24
Intakes of Basic Four Food Groups . . . . .	26
Nutrient Intakes . . . . .	29
Family Related Characteristics . . . . .	40
V. SUMMARY AND RECOMMENDATIONS . . . . .	44
Recommendations . . . . .	45
BIBLIOGRAPHY . . . . .	46
APPENDIX A - CORRESPONDENCE . . . . .	52

Chapter	Page
APPENDIX B - QUESTIONNAIRES . . . . .	55
APPENDIX C - RAW PUNCH CARD DATA . . . . .	64
APPENDIX D - CHARACTERISTICS OF 16 HOUSEHOLDS . . . . .	66

LIST OF TABLES

Table	Page
I. Distribution of Preadolescent Girls by Age and School Grade . . . . .	20
II. Meals Missed by Preadolescent Subjects . . . . .	24
III. Intake and Mean Caloric Value of Snacks . . . . .	25
IV. Intakes of Food Groups . . . . .	27
V. Mean Nutrient Intake of 16 Subjects as Compared to the 1968 Recommended Dietary Allowances . . . . .	31
VI. Comparison of Levels of Caloric and Nutrient Intakes to the Recommended Dietary Allowances . . . . .	32
VII. Mean Dietary Intakes of Individuals . . . . .	37

LIST OF FIGURES

Figure	Page
1. Mean Intakes of Nutrients as Percentages of 1968 Recommended Dietary Allowances . . . . .	34
2. Income and Food Spendings Per Week . . . . .	43

## CHAPTER I

### INTRODUCTION

Malnutrition, in many forms, has been found to occur in children and youth among all socio-economic levels in America. Individual children in all communities, for one reason or another, do not have the full benefits of good nutrition and may suffer health problems as an outcome. Poor nutrition may be a result of a lack of means to supply an adequate intake in comparison to needs or a gap between nutrition knowledge and its application.

Significant factors in the malnutrition problem include insufficient resources to secure food, poor selection of food and poor food habits. One of the outstanding factors contributing to malnutrition is the lack of knowledge on the part of the parent of the importance of food to health.

In previous nutritional studies, the need to investigate eating behavior of specific age-groups of children have been indicated.

Dietary practices during infancy and early childhood exert a profound influence on growth and development.

#### Purpose of the Study

It was assumed that the nutritional status and dietary practices of preadolescent girls studied by other researchers are similar to those of girls in Langston, Oklahoma. The purpose of this study is



to research the dietary intakes of preadolescent girls.

#### Objectives of the Study

In order to determine if this is actually so, the following objectives were established in this study:

1. Determination of the eating patterns of a group of preadolescent girls.
2. Correlation of information on family's eating practices obtained from mothers of the girls.
3. Comparison of the nutritive intakes within the Basic Four Food Groups and the 1968 Recommended Dietary Daily Allowance.

#### Hypotheses

The following hypotheses were made:

1. The dietary intakes of preadolescent girls are most often deficient in vitamins A and C.
2. The preadolescent girls' diets are adequate in calories and protein.
3. Food preferences will be found to differ among age-groups.

## CHAPTER II

### REVIEW OF LITERATURE

Nutrition studies and surveys relating specifically to pre-adolescent girls' food and nutrient intakes have been reported by several researchers. Physiological, sociological and psychological factors influence food intakes in various ways and therefore are significant in assessing total nutrition. Dietary study methods for determining food intakes and a review of the needs for nutrition education are discussed.

#### Nutritive Status of Preadolescents

Fleck (26) refers to preadolescents as children between the ages of six and twelve and to preadolescence as a period of growth and development characterized by skeletal, muscular and emotional development. During the preadolescence period, the children are in a fast growing period and begin to become socially independent and to expand their contacts and interests. According to Pollack (60), a child needs optimum nutritional intakes at the beginning of life and in preadolescence, in order that he will not only have a long life, but he will grow rapidly, gain weight efficiently, be more vigorous, resist infection and show learning ability.

That this period of life may be one of added stress is shown by Morgan (54) in that, many common nutritional deficiency symptoms

occur during preadolescence. The most common nutritional deficiency symptoms were poor dental health, anemia, bad skin conditions, overweight, obesity, constipation, poor tongue and eye conditions, underweight and poor skeletal development.

Potgieter et al. (61) reported in a study of school age children in Connecticut that girls generally ate better than boys. However, there were differences in specific food intakes. Boys drank more milk and ate more eggs, whereas girls ate more green and yellow vegetables. The study also revealed the ranking of the most neglected foods to the least neglected by both boys and girls: green and yellow vegetables, other vegetables and fruits, butter and fortified margarine, milk, citrus fruits, eggs, potatoes, breads and cereals and meats.

Young et al. (85) showed in a study conducted among school children in New York State that little difference was found in the school children's diets in the spring and in the fall. However, breakfast was found to be the most common meal neglected by preadolescents in both seasons. Sidwell and Eppright (65) showed in a study of boys and girls in Iowa, that girls missed breakfast more often than boys. The most neglected meal shown in the study was breakfast. Also, breakfast was more commonly omitted over the week-end.

In a study performed by Hendel et al. (32) the major socioeconomic factors influencing the diets of school children were income, urbanization, education of the mother and the number of children in the family. The study also revealed that vitamins A and C intakes were proportionately higher among urban children than among farm children and among high income children rather than low-income children. The education of the mother and the income of farm families

were closely and consistently related to the adequacy of vitamins A and C intakes. Children from large families were less likely to have sufficient intakes than children in smaller families. Children from urban, high-income families had a higher consumption of vitamin supplements.

In the Morgan report, there were few differences shown among children in rural, small town, suburban or urban areas, but the economic level of a community was an important factor. For the most part, children coming from homes of high economic levels had the better nutritional status. Improved medical and dental care accompanied the better nutritional status.

Other researchers have conducted studies on nutrient intakes of preadolescents and adolescents in various areas of the United States. One such study was performed by Patterson (59) on the food intakes of 92 boys and girls in the fourth, fifth and sixth grades in the Phoenix area. She reported nearly half of the subjects had dietary intake levels of iron and ascorbic acid below two-thirds of the recommended daily allowance.

In an Oklahoma Food Habit Survey (73) of 6,184 children aged five to 18 years, it was revealed that only about one-third of the students had intakes providing enough calcium and vitamin A when compared with the basic four food groups. Seven per cent of the students had less than one-third of the vitamin A needed. More girls than boys had adequate intakes of specific nutrients, except iron, of the recommended daily allowance in their daily food intake.

Although intakes of certain nutrients have been shown to be deficient among preadolescent diets there have been similar nutrient

intake deficiencies among adolescents. Hampton et al. (31) surveyed nutrient intakes among 122 teen-agers and found iron, calcium and vitamin A intakes to be below two-thirds of the 1968 Recommended Allowances. Edwards et al. (19) showed some nutrients to be deficient in preadolescents and adolescents which was due to the decreased consumption of dark green leafy and yellow vegetables. The study was conducted among 6,200 students in the seventh, ninth, tenth and twelfth grades in North Carolina.

#### Nutrition Surveys and Studies

Several surveys and studies within the last several years have shown food and nutrient intakes of various age groups, including preadolescent girls. One of the first of these was the Cooperative Interregional Study, conducted from 1947 through 1958 (54). The four regions of the United States included in the study were the Northeast, the North Central, the South and the West.

Approximately twelve thousand people from thirty-nine states were surveyed. The age groups included children aged five through 12, adolescents aged 13 to 20, and adults from age 20 to over 80. Nutritional intake data were obtained by seven-day dietary records and clinical and biochemical data were also obtained.

As reported in the study, the nutritional status of the special population groups of the four regions were two-thirds or more of the 1958 Recommended Daily Allowances of nutrients as set by the National Research Council. The average nutrient intakes by both boys and girls under the age of 13 years provided two-thirds or more of the recommended allowances except for children in six states. Diets of children

in New York provided less than two-thirds of the recommended allowances for iron and niacin, in West Virginia and Iowa, calcium, and in Virginia, vitamin A. In the study, 9 to 11 year-old boys and girls in Iowa, Kansas and Ohio, 10 per cent or more of the diets provided less than two-thirds of the recommended allowances for calcium and vitamin A as well as vitamin C. In all six states, the children had diets providing less than two-thirds of vitamin C allowance.

In her summary of more than 200 nutritional studies conducted between 1957 and 1967, Kelsay (42) reported clinical signs of nutritional deficiencies among preadolescents. In the evaluation of nutrient intakes of 2,871 preadolescents, calcium, vitamin A and ascorbic acid were the nutrients most often less than two-thirds of the recommended dietary allowances. Obesity was common among preadolescent and among adolescent Negro girls from low income groups. A high incidence of clinical evidence of anemia was also found among adolescent Negro girls.

Nutrient deficiencies among preadolescent girls have been shown in other studies. In the spring of 1965, a nationwide survey of food consumption was conducted by the U. S. Department of Agriculture. The population surveyed included approximately 8,000 persons from birth to age 19 years. Results in regard to preadolescent girls, aged 9 to 11 years, indicated the iron and calcium intake was 30 per cent below the 1968 Recommended Dietary Allowances. Thiamine intakes of girls aged 9 to 11 were 10 per cent below recommended allowances. Girls coming from families with income levels below \$3,000 per annum also had diets most often below recommended allowances, in addition to calcium and iron, in ascorbic acid and vitamin A.

In 1968, under the direction of Dr. A. E. Schaefer, the United States Public Health Service conducted a Ten State Nutrition Survey (69). The purpose of the survey was to determine the prevalence, magnitude and distribution of malnutrition and related health problems in the United States. The ten states selected for the study were Texas, Louisiana, New York, Kentucky, Michigan, California, Washington, Massachusetts, South Carolina and West Virginia. Methodology for the study was developed by Interdepartmental Committee on Nutrition for National Defense (ICNND). The sample population which was randomly selected from families with income levels of \$3,000 per annum, included 24,000 households and over 86,000 persons. Income levels were expressed in terms of a Poverty Income Ratio (PIR) for each family. The family with an income at the poverty level had a PIR of 1.0; income levels twice the PIR was 2.0; if half the poverty level, the PIR was 0.5. The states were divided into low-income ratio states below poverty level and high income ratio states above poverty level. The low-income states were Kentucky, Louisiana, South Carolina, Texas and West Virginia. The high income ratio states were California, Massachusetts, Michigan, New York and Washington.

In the final report of the study, the following findings were reported for preadolescent 6 through 12 age groups were:

1. In the low income states, less than 10 per cent of the Blacks and whites and more than 40 per cent of the Spanish Americans showed evidence of deficient or low vitamin A levels. However, in the high-income ratio states, less than 10 per cent of the whites showed deficient or low vitamin A levels.

2. Inadequate iron intakes were found among girls in both the high and low-income states. Low hemoglobin and hematocrit values were found throughout all segments of the population.
3. Males generally had lower vitamin C intakes than did females. Vitamin C intakes decreased with an increase in age.
4. Adequate intake of thiamine did not appear to be a problem among any of the groups studied. Riboflavin intakes were poor among blacks and among young people of all ethnic groups.
5. There was no evidence of iodine deficiency and no relationship between the prevalence of goiter and iodine intakes among the groups studied.
6. Evidence of retarded growth and development was prevalent in all states. Despite low income levels, Black children generally were taller than white children and more advanced in skeletal and dental development.
7. School lunch programs apparently supplied more than 30 per cent of the calcium, iron, vitamin A and calories. This was true in regard to all ethnic groups in both high and low income ratio states.
8. Obesity was not prevalent among white and Spanish preadolescent girls. However, as the girls increased in age the incidence of obesity became more prevalent.

In the final report, it was stated that evidence of malnutrition in many persons was a result of the food choices that led to inadequate diets and the use of money available for food. The choice of foods rich in vitamin A and iron were identified most commonly as deficient in the diets of the American people.

Evidence of increased dental cavities and caries was encountered due to improper dental care. In adolescents, it was found that between meal snacks of high carbohydrate food such as candies, soft drinks and pastries were associated with the development of dental caries.



## Factors Influencing Food Intakes

The factors that affect the food intakes of preadolescent girls have been investigated in several studies. Hinton et al. (35) and Eppright (21) point to many factors which influence the food intakes of girls. Among these are family relationships, patterns of eating, family income, maturation, peer relationships and knowledge of nutrition. These factors may be categorized as being related to sociological, physiological and psychological influences.

### Family Relationships

According to Mead (52) the person who is responsible for the family food preparation influences food intakes of other members of the family. Therefore, the wife's or mother's attitudes, beliefs and food preferences are transmitted to the family through her choice of food and meal preparation. Lewin (47) also states that the mother has major influence on the family's food habits because she establishes what is considered "food for us" and influences the family in regard to health, taste, status and cost.

Hinton et al. (34) related in a study of Iowa girls 12 to 14 years of age, that girls who scored best in family relationships, as determined by scores on the Minnesota Counseling Inventory, missed fewer meals. These girls had better diets than the others included in the study. David and Lawton (16) concluded that children who had positive mother-child relationships also tended to select a wider variety of food items.

### Patterns of Eating

In a study by Myers et al. (55) it was shown that of all meals, lunch often was missed most often by fourth, fifth and sixth grade students in Boston. Sixty-nine per cent of the eleven-year old girls had unsatisfactory breakfast scores for four days. With an increase in age, the percentage of girls having unsatisfactory breakfast scores were higher.

Hinton et al. (34) reported in a study of 140 Iowa girls 12, 13, and 14 years of age that the foods most frequently eaten at parties were soft drinks, potato chips, cake and ice cream. The girls snacked more in the afternoon and evening than in the morning. There was no relationship between the number of snacks and the adequacy of the diet. Forty per cent of these girls reported that they were not hungry at breakfast. In contrast, 89 per cent of the girls said they enjoyed the noon meal.

### Family Income

The relationship between low income and eating behavior of families was shown in one study by Ziffer et al. (86) of 642 New York school children. Iron levels were found to be low in the blood of children receiving welfare assistance. The diets of Puerto Rican children were low in vitamin C, nicotinic acid and riboflavin.

Hinton et al. (35) reported that quality of the diet of the girls in the study depended upon social status classification, not on income. The girls with the better diets tended to come from the upper social classes. Conversely, girls with poorer diets tended to come from the

lowest social class. The identification of the social classification used in the study included two components: the prestige ratings of the fathers' occupation and the educational level of the parents. The girls in this study were from middle class families.

According to Hueneman (38), meal regularity tended to increase with rise in socio-economic classification. The girls in the high income group snacked less. However, Hodges and Krehl (36) indicated in a survey of nutritional status on Iowa teen-agers that dietary intake did not necessarily reflect the economic status of their families.

#### Maturation

Maturation, as determined by bone-age estimates and menarche has been shown to be highly relative to food practices. Young et al. (82) found that bone densities and skinfold thickness in girls 9 to 16 years of age were more related to sexual and physiologic development than to the chronological age. There was a high correlation between the total of skinfold thickness as measured and bone density.

In a survey of 200 Iowa preadolescent and adolescent girls, Roderuck (62) reported maximal alkaline phosphatase activity at eleven years of age. In another study, Hinton et al. (35) related that girls who were overweight tended to mature early. The girls also generally had unsatisfactory eating habits in that they had diets lower in food energy than girls of average weight and height.

In general, girls who matured either early or late were also found to have poor eating habits as shown by such factors as meals missed and excess snacking. In early maturing girls, there was a tendency toward overweight. Later maturing girls are not often

overweight for their age group, although their food practices are similar to that of maturing girls. Eppright (21) further found that both extremes of maturation should affect eating behavior similarly if one accepts the possibility of inter-relationships between emotional state and eating. In regard to growth and maturation, food intakes have been shown to be of significance among girls.

#### Peer Relationship

Hinton et al. (35) pointed out in a study of 140 girls, the effects of peer relationship upon eating behaviors. When compared to other girls, those who scored high on the Minnesota Counseling Inventory value test in identification with their sex-role tended to have fairly good relationships with their peers but not with their families. However, the peer group did not seem to have affected the eating behavior of the girls.

#### Knowledge of Nutrition

Hinton et al. (35) showed that the knowledge of nutrition was positively related to good food practices. She related that girls during the preteens needed information on good nutrition and the relationships of food intakes. In the Oklahoma Food Habit Survey (73) it was reported that in the specific nutrients, except iron, a large percentage of students had amounts providing adequate amounts of nutrients in their daily food intakes. This was thought to be an indicator of the result of nutrition education programs and an adequate school lunch program.

## The Need for Nutrition Education

The nutritional status of people in America depends to a marked degree upon the food purchases by families, which in turn are affecting the quality of their nutritional knowledge and practices (78). At the White House Conference on Food, Nutrition and Health, it was stressed that every American should have access to knowledge of nutrition and its relation to health as well as means to assure availability of food to meet his nutritional needs.

Schaefer (63) stated that nutrition education is universally needed regardless of income, geographic location, cultural, social or economic patterns or levels of education. One cause of malnutrition in the United States is ignorance of what will contribute to poor health. The lack of basic food knowledge of food values can cause malnutrition.

In the final report of the 1965 U.S.D.A. Food Consumption Survey the need was indicated for expanded nutrition programs. The survey showed 50 per cent of the diets as rated "good." There was a definite downward trend in quality of diets when the food consumption of the Spring of 1965 was compared to 1955. Decreased consumption of all groups except the meat group is the reason nutrition education is an indication of the need to:

1. Help families choose wisely in restaurants, snack bars, and school lunchrooms.
2. Help low-income families make the best use of less expensive foods.
3. Meet the needs of different age groups.
4. Guide teenagers and others in the selection of snack foods that contribute to the day's diet.

5. Emphasize increased consumption of milk and milk products and fruits and vegetables.
6. Assist homemakers in the selection and the use of convenience foods.

Nutrition education implies action that results in changes of behavior. The choice and the selection is as important as the supply of foods. It has been suggested that nutritional problems may not be always solved by increasing levels of income. Nutrition education affords the greatest opportunity for individuals to control the quality of health and well-being.

#### Dietary Study Methods to Measure

##### Food Intakes

The selection of a dietary study method to obtain food intakes depends upon the aims of the study, according to Beal (7). The time factor involved in a dietary study used to collect food intake information should be limited because human memory is subject to error; therefore, a three-day intake record may be more reliable than a diet history covering a longer period of time.

Adelson (2) conducted a study at the University of Minnesota College of Medical Sciences to determine the period of time needed for a dietary study and the best way for obtaining information. The recall method, using time periods of two weeks and seven-days, were compared to the simultaneous record method using two time periods. In the record method, a trained interviewer instructed one group of professional men and their wives how to weigh, to measure, and to estimate amounts eaten for seven-days, then two weeks. In the simultaneous recall method, a group of professional men reported to the interviewer

what foods had been eaten at meals for seven days, then two weeks. After comparing the results, Adelson concluded that: (a) for total time, one week proved as satisfactory as two consecutive weeks; and (b) the recall method proved as satisfactory as the record method.

Young et al. (81) compared methods of estimating the nutrient intake of individuals and of groups by using the diet history, seven-day record, and 24-hour recall. Data were obtained from three population groups. For the average nutrient intakes of a group, the 24-hour recall and the seven-day record showed approximately the same results. In one group, the diet history and the 24-hour recall gave comparable results. For the mean of the group, the dietary history gave higher food values than did the estimates obtained by the 24-hour recall. For an individual, the 24-hour recall and seven-day record could not be used interchangeably. The diet history proved to be useful for estimating the nutritive values of diets of groups, but proved less useful than the other two methods.

Eppright et al. (22) reported on studied dietary study methods with three groups of school children. The sampling of the days of the week were analyzed. Three-days, five-days, and week-end dietary records were analyzed in several ways: as individual days, as two-day combinations, as three-day averages and as total child days. It was concluded that any combination of the three-days during the week represented a week-day. Week-end food intakes differed from those of school days.

The method to be used apparently depends on the kinds of information desired and the use to be made of it. When applied to population groups under conditions of free choice each method has some

shortcomings as to reliability and the most practical one must often be the one selected.

#### Development of a Dietary Questionnaire

Nisbet and Entwistle (56) state the questionnaire is a form of interview on paper. The questionnaire contains a series of questions used with respondents in order to obtain factual data.

To secure satisfactory results, emphasis is focused upon the construction of the questions. Galfo and Miller (30) listed factors to consider in developing a questionnaire:

1. The content of a questionnaire should deal with biographical data about the respondent.
2. The questionnaire should request the respondent's evaluation of certain conditions.
3. The questionnaire should contain statements of attitudes or opinions which can be obtained from only the respondent.
4. The questionnaire should contain a cover letter that can supply the information to induce the respondent to complete the instrument and return it to the investigator.

The effectiveness of a questionnaire depends upon the requirements of the respondent and the extent of answering questions. There must be a great deal of refinement before the questionnaire can be considered a reliable and valid data gathering instrument. The length of the questions at times determine whether or not the respondent will answer the questions. A short answer has been recommended for less confusion and for clarity.



### Summary Statement

A summary of reports to date covered indicate that preadolescent girls are generally below two-thirds of recommended allowances for calcium, vitamin A, vitamin C and iron. Further, preadolescent girls generally eat a sizable proportion of their total intake as carbohydrate snacks and tend to skip breakfast meals.

Parental and child interrelationships may play an integral part on eating behavior of a child. Family income, as well as other socioeconomic factors, may have a direct effect on the diets of preadolescent girls.

## CHAPTER III

### METHOD AND PROCEDURES

The objectives of this study were to identify the eating practices of a group of preadolescent girls in Langston, Oklahoma and to determine nutrient intakes. Data were obtained by questionnaires and interviews with the girls and with their mothers.

To achieve the foregoing objectives: the subjects were chosen from a specific age group, that is preadolescent; questionnaires were developed; the questionnaires were distributed and information obtained from the preadolescent girls and their mothers; and the responses were analyzed.

#### Selection of the Subjects

Permission was received from the principal of the Langston grade school and the parent of each child to allow subjects to participate in the study. The girls were contacted at school, purposes of the study were explained and cooperation obtained. The subjects were preadolescent girls in the second through the fifth grades in the school, which included girls aged seven through 11 years. The number of girls in each group is presented in Table I.

The subjects comprised the total enrollment of girls in these grades in Langston's Laboratory Elementary School. Sixteen girls and fourteen mothers were participants in the study. One of the mothers

had two daughters who were participants in the study. Another one of the mothers was not in the state during the study.

TABLE I  
DISTRIBUTION OF PREADOLESCENT GIRLS BY  
AGE AND SCHOOL GRADE

Age Group	Number of Girls	School Grade
7 year old	6	2nd
8 year old	2	2nd
9 year old	3	3rd
10 year old	2	4th
11 year old	3	4th

Information about the educational background of the mothers was obtained (Appendix A).

#### Development of the Questionnaire

Two sections were included with the mothers' questionnaires. Section I included the biographical data on the mothers as well as the family in the household, and Section II, specific data as to food purchasing and family eating behaviors (Appendix D).

After the questionnaires were devised they were pre-tested by a group of college girls. Following this, the questionnaires were revised and printed for use.

#### Administering the Questionnaire

On a selected day, the interviewer went to the school and administered the questionnaire to the preadolescent girls. Each question was read aloud by the interviewer and the subjects then checked the column which corresponded with her answer. Questions were noted and answered at the time. The sixteen subjects filled out the questionnaires at the same time. Time required for completion of the questionnaire was approximately thirty minutes.

After completion of the questionnaire, the subjects recorded their previous day's food intake and were instructed in recording the second day's intake.

The mothers were contacted at home and the interviewer made an appointment with each mother. The questionnaire was given at the time of the visit in the home. The interviewer instructed each mother on completing the questionnaire and discussed it with each in detail.

#### Analysis of the Responses

Sixteen questionnaires completed by the preadolescent girls and 14 questionnaires completed by the mothers were analyzed. All of the questionnaire items were totaled by hand except for dietary intake record. The two-day dietary record was compiled and analyzed at the Oklahoma State University Computer Center (Appendix B).

Percentages were used to report the findings of food chosen from the Basic Four Food Groups and the average number of nutrients which met the Recommended Daily Allowances for caloric and nutrient values. The nutrients compared were protein, calcium, iron, vitamin A, thiamine, vitamin C, riboflavin and niacin. Then comparisons were made of the food intakes considering these factors:

1. Age of the students:

Three age groupings were used to compare with the standards of the 1968 Recommended Dietary Allowances.

2. Income levels.
3. Educational background of the mothers.
4. Food purchasing practices of the mothers.
5. Number of meals missed.
6. Percentage of nutrient intakes of Recommended Dietary Allowances for preadolescent girls.
7. Percentage of recommended number of servings from Basic Four Food Groups.

#### Summary Statement

Sixteen preadolescent girls and fourteen mothers were used as subjects in the study. Interviews and questionnaires were administered to the subjects by the researcher. A two-day dietary record was obtained from the girls that was compared with the Basic Four Food Groups and the 1968 Recommended Dietary Allowances.

## CHAPTER IV

### RESULTS AND DISCUSSION

Sixteen preadolescent girls in the Langston public school participated as subjects in the determination of their food and nutrient intakes. Further information on family and food related characteristics was obtained through questionnaires and interviews with the subjects' mothers.

Analysis of the two-day food intakes for nutrient intakes are presented and discussed from the standpoint of their adequacy for preteenagers.

#### Meal Patterns

Twelve of the subjects consumed three meals-a-day during the two-day survey which was on Monday and Tuesday of the week. However, more than half of the subjects stated that they consumed only lunch and dinner on the weekends.

The number of subjects who missed one or more meals during the two days studied is shown in Table II. Four subjects of the group missed at least one meal during the two days, two at dinner and two at breakfast.

Breakfast and dinner meals were largely consumed at home. Twelve subjects ate lunch at school both days. Three subjects ate lunch at home and one subject ate lunch at the Langston's Student Union Coffee

Shop one day.

TABLE II  
MEALS MISSED BY PREADOLESCENT SUBJECTS\*

Ages	Number of Subjects	Number of Subjects Missing Breakfast	Number of Subjects Missing Lunch	Number of Subjects Missing Dinner
7	6	1	0	1
8	2	0	0	0
9	3	0	0	0
10	2	0	0	0
11	3	1	0	1

\*Based on six meals in the two-day period.

### Snacks

As shown in Table III, subjects consumed snacks at various times during the day. More students chose mid-afternoon snacks than at other times during the day or night. This may have been because of the length of the time period between lunch and dinner. The subjects most often selected such foods as potato chips, soft drinks and candy bars for snacks. At night, dessert from the dinner meal was often saved and eaten later.

The mean caloric value of snacks of all subjects is shown in Table III. Seven and ten year old subjects ate the smallest amount of total calorie intakes as snacks, while the eight and 11 year old subjects ate the highest. The proportion of the calories provided by snacks added considerably to the total nutrient and caloric intakes of the subjects.

TABLE III  
INTAKE AND MEAN CALORIC VALUE OF SNACKS

Time of Day	Number of Students	Mean Caloric Value of Snacks
Mid-Morning	6	50
Mid-Afternoon	13	150
Evening	14	100
Night	2	150

The intake of calories through snacks by subjects in this study were similar to those reported in an Iowa study (25). Children between the ages of six and eight ate 13 per cent of their total calories in the form of snacks. The subjects in this study, ages six to eight years, ate 14 per cent of their total calories through snacks while subjects ten to twelve years old ate 20 per cent of their total



calories as snacks.

### Intakes of Basic Four Food Groups

A summary of food intakes within the Basic Four Food Groups is shown in Table IV. In order to show further breakdown of the fruit and vegetable category, three categories were used. These are green leafy and yellow vegetables, citrus fruit and other fruits and vegetables. Throughout the remainder of the discussion, six food groups are referred to and shown.

The subjects have been divided into three age groups in the comparison of intakes and further discussion.

#### Meat Group

All subjects ate at least one serving of meat or meat substitute each day during the two-day intake period. Fourteen subjects consumed two or more servings of meat each day. The usual meat substitutes eaten were macaroni and cheese and cheese lasagna--that is, protein containing entrees. The meats most often consumed were roast beef, chicken, pork chops, ham, sausage, weiners, hamburger, bologna and fish.

#### Milk Group

Fifteen subjects consumed at least two cups of milk and milk products each day for both days. One of the subjects drank no milk. Other beverages consumed were mostly tea and soft and carbonated drinks. Flavored fruit drinks, soda pops and ice tea were the popular drinks.

TABLE IV  
INTAKES OF FOOD GROUPS

Number of Servings	6-8 Age Group Number	8-10 Age Group Number	10-12 Age Group Number	Total Number
MEAT GROUP				
None	0	0	0	0
One to two	1	1	0	2
Three to four	3	4	5	12
Five or more	2	0	0	2
MILK GROUP				
None	1	0	0	1
One to two	2	1	2	5
Three to four	3	4	3	10
Five or more	0	0	0	0
GREEN LEAFY AND YELLOW VEGETABLES				
None	1	4	2	7
One to two	4	1	3	8
Three to four	1	0	0	1
Five or more	0	0	0	0

TABLE IV (Continued)

Number of Servings	6-8 Age Group Number	8-10 Age Group Number	10-12 Age Group Number	Total Number
CITRUS FRUITS				
None	1	1	1	3
One to two	3	1	3	7
Three to four	2	3	1	6
Five or more	0	0	0	0
OTHER FRUITS AND VEGETABLES				
None	0	0	0	0
One to two	2	1	3	6
Three to four	3	4	2	9
Five or more	1	0	0	1
BREADS AND CEREALS				
None	0	0	0	0
One to two	0	0	0	0
Three to four	0	0	0	0
Five to six	4	5	1	10
Seven to eight	2	0	4	6

### Vegetable and Fruit Group

Consumption of green leafy and yellow vegetables and of citrus fruits was very low. Seven subjects ate no leafy green or yellow vegetables on the survey days. Only three subjects of the group reported no intakes of citrus fruits.

In the other fruits and vegetable group, ten subjects had intakes of three or more servings each day. The specific fruits and vegetables most commonly eaten were tomatoes, green beans, apples, oranges, orange juice, potatoes and green salad.

### Bread and Cereal Group

In the bread and cereal group, thirteen of the subjects ate two servings or more. Type of bread consumed included white enriched bread, hot dog buns, hamburger buns, cookies, corn bread and cakes. A large proportion of bread eaten was in sandwiches.

The types of cereals most commonly eaten were dry cereals, such as corn flakes and rice krispies. Cooked cereal was not popular at breakfast. However, rice was occasionally served as an accompaniment with the entree at times with lunch and dinner.

### Nutrient Intakes

The nutrient intakes of all subjects were calculated through a computer program using figures from USDA Handbook 72 (76). Intakes of both days by each subject were keypunched into cards and a printout received. The averages for each subject were then calculated by the researcher to obtain the mean figures.

Three age groups were used for comparison with the age groups in the Recommended Dietary Allowances chart. The three age groups were six to eight; eight to ten and ten to twelve years old.

The mean daily intakes are compared to the 1968 Recommended Dietary Allowances and are shown in Table V. The nutrients considered most critical are discussed in more detail.

### Calories

The comparison of caloric and nutrient intakes is shown in Table VI. The caloric intake ranged from 36 per cent below the Recommended Daily Allowances among the 10 to 12 year olds to 41 per cent among the eight to ten year old subjects. The six to eight year old subjects' caloric intake was 40 per cent below recommended allowances. When compared to the Recommended Dietary Allowances, subjects generally had low caloric intakes. Several of the subjects' diets did not include the recommended number of servings of bread and cereals and of milk and milk products and it was apparent that the calorie shortage was mainly due to low intakes of these foods.

In contrast to these findings, girls aged nine to eleven in the 1965 USDA Food Consumption Survey (74) had diets that were reported to have approached 90 to 100 per cent of the Recommended Dietary Allowances for calories.

TABLE V

MEAN NUTRIENT INTAKE OF 16 SUBJECTS AS COMPARED TO  
THE 1968 RECOMMENDED DIETARY ALLOWANCES

SUBJECTS	AGE	CALORIES	PROTEIN gm	CALCIUM gm	IRON gm	VITAMIN A IU	THIAMINE mg	RIBOFLAVIN mg	NIACIN mg	ASCORBIC ACID mg
RDA		2000	35	.900	10.0	3500	1.0	1.1	13	40
6	6-8	1202	56	.617	9.84	5018	.8	1.5	11	45
% of RDA		60	160	.67	98	143	76	134	85	111
RDA		2200	40	1.000	10.00	3500	1.1	1.2	15	40
5	8-10	1119	50	.602	8.64	1727	.8	1	9.75	47
% of RDA		59	124	60	86	49	72	90	65	117
RDA		2250	50	1.200	18	4500	1.1	1.3	15	40
5	10-12	1426	56.70	.782	8.83	2735	.8	1.3	9.30	49
% of RDA		64	113	65	49	61	74	101	62	122

TABLE VI

COMPARISON OF LEVELS OF CALORIC AND NUTRIENT INTAKES  
TO THE RECOMMENDED DIETARY ALLOWANCES

NUTRIENTS	Intake of 100% or more of Recommended Dietary Allowances	Intake of Two-Thirds of Recommended Dietary Allowances	Intake below One-Third of Recommended Dietary Allowances
	Number of Subjects	Number of Subjects	Number of Subjects
Calories	0	10	6
Protein	16	0	0
Calcium	0	10	6
Iron	0	10	6
Vitamin A	2	11	4
Thiamine	4	4	8
Riboflavin	9	3	4
Niacin	2	9	5
Ascorbic Acid	10	4	2

### Protein

All of the subjects had protein intakes above 100 per cent or more of the Recommended Allowances. The six to eight year old subjects had the highest intakes of proteins, that is, 160 per cent of the Recommended Dietary Allowances. See Figure 1. Protein intakes decreased with the age of the subjects. These subjects were found to have the same amounts of protein intakes as the six to eleven year old subjects in the 1965 USDA Food Consumption Survey (74).

### Calcium

As shown in Table V, calcium intakes ranged from 60 to 67 per cent of the Recommended Dietary Allowances. These findings are consistent with the generally low intake of milk and milk products. The subjects in this study were compared to girls nine to eleven from the South as reported in the USDA Food Consumption Survey of 1965. In the USDA Survey, this age group was shown to have calcium intakes of about two-thirds of the Recommended Dietary Allowances.

### Iron

Iron intakes of the subjects are shown in Table V. When compared to the 1968 Recommended Dietary Allowances, all the subjects fell below the recommended levels. The six to eight year old subjects had iron intakes which were two per cent below Recommended Dietary Allowances but the intakes of the eight to ten year old subjects and ten to twelve year old subjects were 50 per cent below Recommended Dietary Allowances. Only one subject in the 10 to 12 year old group was near the recommended level.



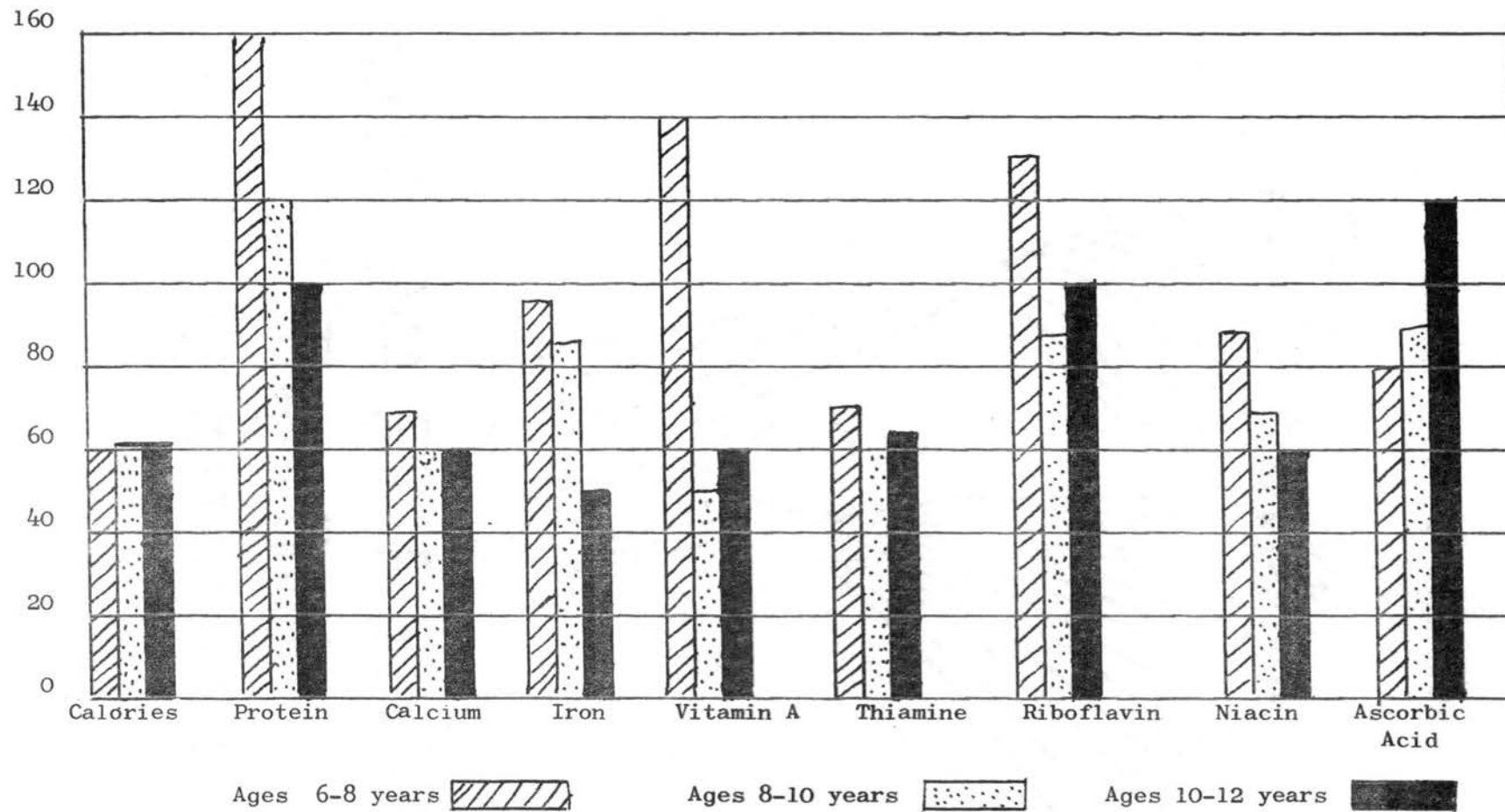


Figure 1. Mean Intakes of Nutrients as Percentages of 1968 Recommended Dietary Allowances

Low iron intakes seem to be due to the limited number of foods available and eaten, which are of appeal to the children of this age.

The iron intakes of the subjects in this study were similar to those of teenagers studied by Hampton et al. (31). The subjects in Hampton's study had iron intake below two-thirds of the Recommended Dietary Allowances and iron was the most deficient of the nutrients for both boys and girls. In contrast the diets of boys and girls ages six to eight and boys nine to eleven years old in the USDA Study supplied iron which was 90 per cent or more of the Recommended Dietary Allowances. The iron intakes of girls nine to 11 years in the North and South were about two-thirds of Recommended Dietary Allowances.

#### Vitamin A

The intakes of vitamin A for all subjects are shown in Table V. The intakes of vitamin A for subjects in the six to eight year old group were above the 1968 Recommended Dietary Allowances. However, the intakes of the eight to ten year old subjects and the ten to twelve year old subjects fell below the two-thirds level of the Recommended Dietary Allowances. These two age groups were similar to those of the Utah preadolescent girls reported by Morgan (54). The children from Utah and the southern children had below two-thirds levels of intakes of vitamin A. In the 1965 USDA study among girls ages nine to eleven years, in families with incomes below \$3,000, living in the rural North, vitamin A values were less than two-thirds of the Recommended Dietary Allowances.

The mean vitamin A intakes of the subjects are shown in Table VII. During the two-day intake period, the six to eight year old subjects had mean intakes of 143 per cent of Vitamin A.

#### Thiamine

The mean intakes of thiamine ranged from .48 milligrams to 1.23 milligrams. See Table VII. Several subjects' average intakes fell below the two-thirds level of 1968 Recommended Dietary Allowances as shown in Table V.

The subjects in the USDA study had adequate intakes of thiamine except for 10 per cent of the girls aged 9 to 11 in families with incomes below \$3,000 who had levels of thiamine below two-thirds level of Recommended Daily Allowance.

#### Riboflavin

The six to eight and the ten to twelve year old subjects ingested recommended or higher than recommended levels for riboflavin. See Table VII. The subjects in the eight to ten year old group had levels of riboflavin that were 10 per cent below recommended allowances. Girls living in the South who were participants in the 1965-66 USDA Food Consumption Survey had diets below the two-thirds level of recommended amounts for riboflavin.

#### Niacin

The mean niacin intakes are shown in Table VII. The mean niacin intakes ranged from 15 per cent to 38 per cent below 1968 Recommended Dietary Allowances. The six to eight year old subjects attained the

TABLE VII

## MEAN DIETARY INTAKES OF INDIVIDUALS

Calories	Protein Gm	Calcium Gm	Iron Mg	Vitamin A IU	Thiamine Mg	Riboflavin Mg	Niacin Mg	Ascorbic Acid Mg
1549	75	1.576	7.85	1548	1.17	2.47	8.70	22.0
1588	57	1.042	8.6	7783	1.10	1.59	9.15	77.0
1435	52	.343	14.65	165	.80	.61	7.85	0.0
1413	45	.617	7.15	885	.87	.92	7.00	84.0
1292	62	.432	10.65	1589	.99	1.11	12.70	22.0
1282	52	.683	8.05	4440	.70	1.14	10.10	87.0
1584	73	1.064	7.10	1495	.63	1.67	7.20	46.0
1429	71	.928	8.95	1759	1.02	1.55	12.25	25.0
858	42	.734	4.85	1950	.67	1.21	8.80	23.0
912	32	.525	11.6	1435	.67	.89	7.05	27.0
976	63	.468	9.4	1375	.48	1.13	11.40	75.0
850	34	.400	17.9	23715	.56	2.79	12.05	28.0
1039	44	.386	7.25	643	.63	.73	12.20	38.0
1560	69	.515	11.15	2265	.92	1.20	14.25	42.0
1335	52	.452	8.45	1120	1.23	.97	10.65	47.0
1147	57	.637	6.95	1259	.92	1.05	8.90	96.0

highest niacin intakes.

Only reformed niacin from food was calculated and the niacin: tryptophan ratio was not taken into account here. This may be a factor in the seemingly low niacin intakes among all age groups.

While the findings of these subjects' average intakes were below the recommended amounts, the mean intakes of niacin for teenagers in Hampton's study were 100 per cent or more of the 1968 Recommended Dietary Allowances. However, the reformed niacin and the niacin equivalent were computed in the Hampton study. In the USDA survey, niacin was not a critical nutrient in the diets of the subjects, being supplied in adequate amounts in all age groups.

#### Ascorbic Acid

Ascorbic acid in the diets of all the subjects except two was well in excess of the recommended amounts. The intakes of all subjects are shown in Table VII. The relatively high ascorbic acid intakes can be attributed to intakes of foods from the other fruits and vegetables in addition to some citrus fruits. The relatively high intakes of vitamin C were surprising in view of other studies which have shown lower than recommended levels of intake. These subjects were similar to those in the 1965 USDA study. However, 10 per cent of boys and girls under six to eight years in families with incomes of \$3,000 and under had intakes two-thirds of Recommended Daily Allowances.

Hampton et al. (31) found that almost one-third of a sample of 122 Berkeley teenagers had intakes of ascorbic acid below two-thirds of the Recommended Dietary Allowances. Also, Patterson (59) found that one-third of a particular sample included in her study of Phoenix

children had intakes below two-thirds of the recommended amounts.

To summarize, a number of diets did not contain enough milk, dark green and yellow vegetables, iron rich foods and vitamin A rich foods. Too many of the diets consisted of soft drinks in the place of milk.

The majority of the preadolescent girls in the study attained two-thirds or more of the 1968 Recommended Daily Allowances for protein, thiamine, riboflavin, and ascorbic acid. The nutrients most often 100 per cent and more of recommended allowances were protein and ascorbic acid. Nutrients below safety margins in two age groups were vitamin A in eight to ten year old group and iron in ten to twelve year old group.

The six to eight year old group had diets that provided 90 per cent or more of Recommended Allowances for protein, iron, vitamin A, niacin, riboflavin and ascorbic acid. Nutrients that were below two-thirds level of Recommended Allowances were calories and calcium.

The eight to ten year old girls had diets 90 per cent or more in protein, riboflavin and ascorbic acid. Nutrients that were below the two-thirds level were calories, calcium and vitamin A.

The ten to twelve year old group had 90 per cent or more of 1968 Recommended Allowances for protein, riboflavin and ascorbic acid. The nutrients that were low were calories, calcium, iron, vitamin A and niacin. However, all of these nutrients were above safety margin level except iron.

Subjects in this study were similar to those included in National surveys. In the USDA 1965-66 Food Consumption Survey, it was revealed that girls living in the South age nine and over had diets below

two-thirds level for calcium, vitamin A value, thiamine, riboflavin and ascorbic acid.

In a compendium of studies on minerals and vitamins summarized by Davis et al. (17) it was stated that a significant proportion of the population examined had intakes below one-half of the Recommended Daily Allowances for seven nutrients: calcium, iron vitamin A, thiamine, riboflavin, niacin and vitamin C. In general, except for vitamin C, there was a higher percentage of females than males whose intakes were less than two-thirds of Recommended Daily Allowances for all nutrients.

#### Family Related Characteristics

Information relating to food intakes and family characteristics was obtained from interviews and questionnaires from the mothers. These included information on the family, the mothers, the meal preparation practices and the food shopping practices.

#### Family Characteristics

Characteristics of the 14 families of the preadolescent girls included in the sample are described in Appendix D. Ten of the families resided on the Langston University campus. They either worked for the University or were students. Four of the families resided in urban areas of the county. The mean family size was five; a typical survey family consisted of two adults from 22 to 35 years of age, one preschool child three to six years, and two school age children six to twelve years. Annual income levels ranged from \$2,000 up to \$19,000 per year.

### Mothers' Characteristics

All of the mothers were high school graduates and eight of the mothers had attended college for one to three years. Five of the mothers had four or more years of college. Some of the mothers were employed as professors, secretaries, librarians and cooks.

### Food Shopping Practices

All of the mothers shopped once a week for major purchases, usually on Friday and Saturday. Reasons most often given for this shopping pattern were sales, specials and payday. Most of the mothers shopped at supermarkets for food. All of the mothers reported that meat expenditures accounted for half of the grocery bill. The older mother with a higher education level appeared to be well organized and more price conscious in food shopping. Decisions about what to buy as well as the actual purchasing of food was largely the responsibility of the mothers. All of the food was purchased. No family were reported obtaining food from other sources, such as donated foods or gardens.

The mothers gave a number of reasons for purchasing choices. Among these were that foods were easy to prepare and foods were on sale.

A written shopping list was followed by all mothers and the mothers stated that the prepared list of food items aided in the shopping decision.



### Meal Preparation Practices

The mother in all of the families did all of the meal planning and preparation. All of the mothers reported that they considered the family's likes and dislikes when preparing meals. However, most of the mothers revealed fragmentary knowledge of the importance of food in the diet. Few of the mothers knew the recommended number of daily servings of specific Basic Four foods necessary for a pre-adolescent girl.

Since most of the women worked, they utilized many short cut methods in preparing meals. Deep-fat frying or pan frying methods were used in preparing many of the dishes. Ready cooked or easy-to-prepare foods were incorporated in many meals.

It was apparent that girls who were from income levels of \$10,000 and above had intake levels of all nutrients above recommended allowances.

As the income increased the amount spent on foods from Basic Four Food Groups increased. See Figure 2.

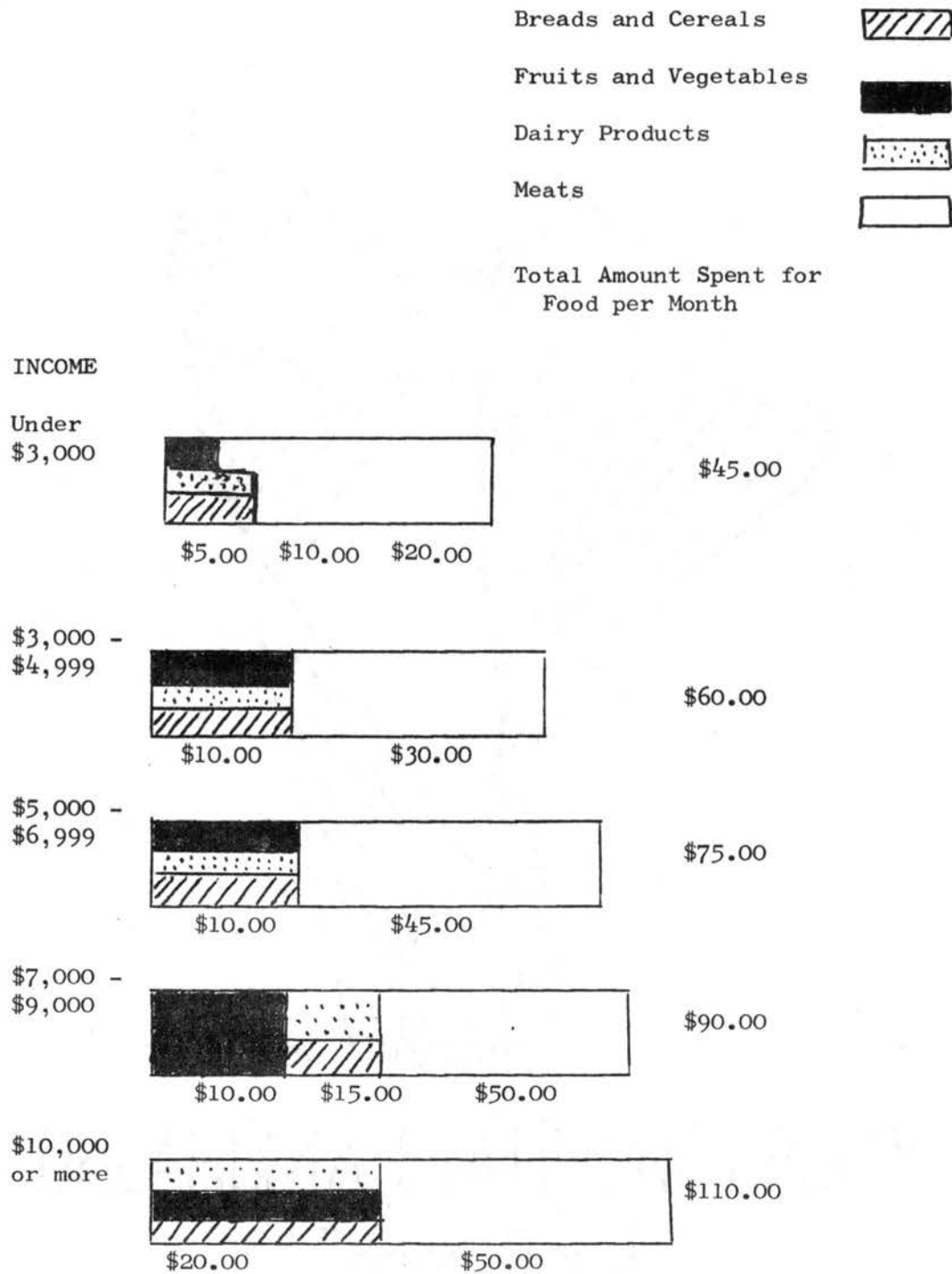


Figure 2. Income and Food Spendings Per Week

## CHAPTER V

### SUMMARY AND RECOMMENDATIONS

Food intakes of preadolescent girls and other food related factors were determined among a group of girls who attended Langston Public School. Questionnaires and a two-day dietary record were obtained from 16 preadolescent girls aged seven through eleven and in grades second through fifth. The group comprised all of the girl students in the elementary school. The mothers of all the girls were also interviewed to obtain family related characteristics.

Most of the students consumed three meals a day on the days surveyed. Breakfast and dinner meals were usually eaten at home, lunch at school or elsewhere. Many of the students stated that they did not eat either breakfast or lunch on weekends.

Many snacks were consumed by the subjects--more frequently in the mid-afternoon and at night. Popular snack food items included candy bars, potato chips and soft drinks.

The choice of foods varied from group to group. More of the subjects consumed recommended servings from the breads and cereals and meat groups.

Nutrients found most often below two-thirds of the 1968 Recommended Dietary Allowances were calories, calcium, iron, thiamine and vitamin A. The six to eight year old girls' intakes had 90 per cent and above recommended for protein, vitamin A, iron and riboflavin.

The eight to ten year subjects had intakes 90 per cent or above the Recommended Allowances for protein, riboflavin and ascorbic acid. This group had lower intakes or more nutrients than either the six to eight year old subjects or the 10 to 12 year old subjects. Among the 10 to 12 year old subjects intakes of 90 per cent and above Recommended Dietary Allowances for protein, riboflavin and ascorbic acid were observed. Critical nutrients in the diets of this group were calories, calcium and iron.

#### Recommendations

Based on the findings that these preadolescent girls had intakes below 1968 Recommended Dietary Allowances in some nutrients, improved nutrition education is indicated. More emphasis should be given to the importance of a good diet among the Langston Elementary School students. Some means of offering a nutrition course to the mothers and teachers would also be advantageous.

For future studies, the author recommends that more subjects, a longer period of study and a comparison of intake of older subjects to younger children be made. Another recommendation is that physical examinations and biochemical tests be included with the dietary intake data to obtain a total picture of the nutritional status for pre-adolescent girls in Langston, Oklahoma.

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APPENDIX A  
CORRESPONDENCE

May 1, 1972

Mrs. Thelma Holly, Principal  
Langston Laboratory School  
Langston, Oklahoma 73050

Dear Mrs. Holly:

As a graduate student in the Department of Food, Nutrition and Institution Administration at Oklahoma State University, I am required to do six hours of thesis research. Therefore, I have chosen to perform my research on the food intakes of preadolescent girls in Langston, Oklahoma.

If at all possible, I would like to monitor a questionnaire and a two-day dietary record to the preadolescent girls in your school. If it is convenient for you, I can give the questionnaire Monday at 10:00 a.m.

Thank you for your cooperation of this request.

Yours truly,

Sharon Hunt  
Graduate Student  
FNIA Department

May 1, 1972

Dear Mothers:

The preadolescent girls and their mothers of Langston, Oklahoma are requested to participate in research which is a part of thesis being carried out in the Department of Food, Nutrition and Institution Administration. Both the girls and their mothers are included in the study in hopes of obtaining a valid record of food intake.

I will interview you at your home, after 5:00 p.m. in order to obtain answers to a questionnaire for mothers and to complete a dietary record for a two-day period for your preadolescent daughter.

Thank you for your cooperation.

Yours truly,

Sharon Hunt  
Graduate Student  
FNIA Department

Dr. Esther Winterfeldt, Chairman  
FNIA Department  
Home Economics East, Room 101  
Oklahoma State University  
Stillwater, Oklahoma 74074

APPENDIX B  
QUESTIONNAIRES

## QUESTIONNAIRE FOR GIRLS

Directions: Please circle the number that describes your answer most correctly.

1. Do you eat three times a day?
  - a. Yes
  - b. No.
2. How many times a week do you eat breakfast?
  - a. 1-3
  - b. 4
  - c. 6-7
3. How many times per week do you eat dinner?
  - a. 1-3
  - b. 2
  - c. 6
4. How many times per week do you eat before going to bed?
  - a. 1
  - b. seldom
  - c. never
5. How many times per week do you have snacks in the mid-morning?
  - a. 1-3
  - b. 6
  - c. seldom
  - d. never
6. How many times per week do you eat snacks in mid-afternoon?
  - a. 1-3
  - b. 6
  - c. seldom
  - d. never
7. How many times per week do you have snacks in the evening?
  - a. 1-3
  - b. 6
  - c. seldom
  - d. never
8. How many times per week do you have snacks during the night?
  - a. 1-4
  - b. 6
  - c. seldom
  - d. never
9. Which meal do you eat usually with your family?
  - a. None
  - b. Breakfast
  - c. Noonmeal
  - d. Evening meal
10. How many times per week do you eat at school:
  - a. Breakfast \_\_\_\_\_
  - b. Lunch \_\_\_\_\_
  - c. Between meals \_\_\_\_\_

11. Do you describe your appetite as being

1. good
2. fair
3. poor

12. At what times are you most hungry

1. morning
2. noon
3. night

13. How many times per week do you eat the following foods  
(at any meal or between meals):

Circle the appropriate number:

Bacon . . . . .	0	1	2	3	4	5	6	7	specify
Tongue . . . . .	0	1	2	3	4	5	6	7	
Sausage . . . . .	0	1	2	3	4	5	6	7	specify
Luncheon meat . . . . .	0	1	2	3	4	5	6	7	specify
Hot Dogs . . . . .	0	1	2	3	4	5	6	7	specify
Liver - chicken . . . . .	0	1	2	3	4	5	6	7	specify
Liver - other . . . . .	0	1	2	3	4	5	6	7	specify
Poultry . . . . .	0	1	2	3	4	5	6	7	specify
Salt Pork . . . . .	0	1	2	3	4	5	6	7	
Bones (neck or other) . . . . .	0	1	2	3	4	5	6	7	
Meat in mixtures . . . . .	0	1	2	3	4	5	6	7	
(stew, tamales, casseroles, etc.)									
Beef or veal . . . . .	0	1	2	3	4	5	6	7	
Other meat . . . . .	0	1	2	3	4	5	6	7	
Fish . . . . .	0	1	2	3	4	5	6	7	
Fruit juices . . . . .	0	1	2	3	4	5	6	7	
Fruit . . . . .	0	1	2	3	4	5	6	7	
Cereal - dry . . . . .	0	1	2	3	4	5	6	7	
Cereal - cooked or instant . . . . .	0	1	2	3	4	5	6	7	
Eggs . . . . .	0	1	2	3	4	5	6	7	
Pancakes or waffles . . . . .	0	1	2	3	4	5	6	7	
Cheese . . . . .	0	1	2	3	4	5	6	7	
Potato . . . . .	0	1	2	3	4	5	6	7	
Other cooked vegetables . . . . .	0	1	2	3	4	5	6	7	
Raw vegetables . . . . .	0	1	2	3	4	5	6	7	
Dried beans and peas . . . . .	0	1	2	3	4	5	6	7	
Macaroni, spaghetti, rice or noodles . . . . .	0	1	2	3	4	5	6	7	



Ice cream, milk pudding . . . . .	0	1	2	3	4	5	6	7
Custard or cream soup . . . . .	0	1	2	3	4	5	6	7
Peanut butter or nuts . . . . .	0	1	2	3	4	5	6	7
Sweet rolls or doughnuts . . . . .	0	1	2	3	4	5	6	7
Crackers or pretzels . . . . .	0	1	2	3	4	5	6	7
Cookies . . . . .	0	1	2	3	4	5	6	7
Pie, cake or brownies . . . . .	0	1	2	3	4	5	6	7
Potato chips or corn chips . . . . .	0	1	2	3	4	5	6	7
Candy . . . . .	0	1	2	3	4	5	6	7
Soft drinks, popsicles or kool-aid	0	1	2	3	4	5	6	7
Instant Breakfast . . . . .	0	1	2	3	4	5	6	7
Bread (including sandwich) . . . . .	0	1	2	3	4	5	6	7
Milk (including on cereal or other foods) . . . . .	0	1	2	3	4	5	6	7
8 ounces equals one serving								
Sugar, jellies, jams, syrup . . . . .	0	1	2	3	4	5	6	7
(1 teaspoon equals one serving)								

Name \_\_\_\_\_

Age \_\_\_\_\_

Grade \_\_\_\_\_

Weight \_\_\_\_\_

## QUESTIONNAIRE FOR MOTHERS

Direction: Please circle the number that applies to your family.

1. How many years did you spend in school?

- |         |                         |
|---------|-------------------------|
| 1. 0    | 6. High School graduate |
| 2. 1-3  | 7. Attended college     |
| 3. 4-6  | 8. College graduate     |
| 4. 7-8  | 9. Don't know           |
| 5. 9-11 |                         |

2. What is your family's average yearly income?

- |                       |                          |
|-----------------------|--------------------------|
| 1. Less than \$1,000  | 8. \$7,000 to \$7,999    |
| 2. \$1,000 to \$1,999 | 9. \$8,000 to \$8,999    |
| 3. \$2,000 to \$2,999 | 10. \$9,000 to \$9,999   |
| 4. \$3,000 to \$3,999 | 11. \$10,000 to \$14,000 |
| 5. \$4,000 to \$4,999 | 12. \$15,000 to \$19,999 |
| 6. \$5,000 to \$5,999 | 13. \$19,000 and over    |
| 7. \$6,000 to \$6,999 |                          |

Be sure to include income from all sources such as:

Wages and salaries	Premium
Social security	Support from others
Welfare payments	Income after expenses from
Insurance payments	business and farm
Veterans benefits	

3. How many people live in your home?

1. One
2. Two or more
3. More than four
4. Other, specify

4. Is family or other members of the family receiving

1. donated food
2. participating in the Food Stamps Program
3. participating in Food programs
4. receiving free or reduced cost lunch, and/or breakfast in school, Headstart or others.

5. Who prepares the meals in the family?
- a. mother                      c. daughter              e. other  
b. father                        d. son
6. Where is the home located:
- a. Urban                         d. Farm  
b. Suburban                    e. Other  
c. Rural nonfarm
7. Does the family do any of the following to obtain part of the food supply?
- a. have a garden  
b. raise chickens  
c. keep a cow  
d. fish

#### FOOD PREPARATION

1. How do you most often prepare eggs?
- a. fried  
b. scrambled  
c. boiled  
d. poached
2. How do you most often prepare beef?
- a. fried                                      d. roasted  
b. boiled  
c. baked
3. How do you most often prepare chicken?
- a. fried                                      e. baked  
b. boiled                                    f. broiled  
c. stewed  
d. roasted
4. Which special preparation of foods do you most often use?
- a. strained                                b. chopped
5. What special kinds of milk do you buy at the grocery store?
- a. whole                                    d. powdered  
b. partially skimmed                  e. chocolate  
c. skimmed                                f. other

6. What kind of vegetables do you most often buy?
- a. canned
  - b. fresh
  - c. frozen
  - d. dried
  - e. other
7. What kind of fruits do you most often buy?
- a. canned
  - b. fresh
  - c. frozen
  - d. dried
8. What kind of fruit juices, fruit drinks or substitute do you most often buy?
- a. canned
  - b. frozen concentrate
  - c. dry powder
9. Do you add butter to \_\_\_\_\_ during preparation?
- a. breads
  - b. vegetables
  - c. potatoes
  - d. rice
  - e. noodles
10. Do you add meat drippings to foods such as:
- a. breads
  - b. vegetables
  - c. jams and jellies
11. Do you use milk for
- a. cereals
  - b. coffee
  - c. tea
  - d. dessert
  - e. other foods
12. How much money per month do you spend on meats?
- a. \$20.00 - \$30.00
  - b. \$45.00 - \$50.00
  - c. \$50.00 - and over
13. How much money per month do you spend on breads and cereals?
- a. \$10.00 to \$15.00
  - b. \$20.00 - and over
  - c. specify

14. How much money do you spend on fruits and vegetables?

- a. \$10.00 to \$15.00 per month
- b. \$18.00 to \$20.00 per month
- c. other, specify

15. How much money do you spend on dairy products?

- a. \$10.00 to \$15.00 per month
- b. \$15.00 to \$20.00 per month
- c. other, specify

16. Do you consider family's likes and dislikes when you plan meals?

- a. Yes
- b. No

17. Do you belong to a Home Demonstration club?

- a. Yes
- b. No

Name \_\_\_\_\_

Age \_\_\_\_\_

RECORD OF FOOD INTAKE FOR TWO DAYS

Day 1			Day 2		
Meal	Amount of Food	Eating Place	Meal	Amount of Food	Eating Place
Breakfast			Breakfast		
Snack			Snack		
Lunch			Lunch		
Snack			Snack		
Dinner			Dinner		
Snack			Snack		

APPENDIX C  
RAW PUNCH CARD DATA

## RAW PUNCH CARD DATA

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Column Number	Information
<b>Card 1</b>	
2, 3	Weight of the Respondent
4, 5	Light activity
6, 7	Heavy activity
8, 9	Sleep
10, 11, 12	Code number
13, 14	Day
15 - 80	Food items
<b>Card 2</b>	
1 - 15	Same as Card 1
14 - 80	Food items



APPENDIX D  
CHARACTERISTICS OF 16 HOUSEHOLDS

## CHARACTERISTICS OF 16 HOUSEHOLDS

Characteristics	Number
Place of residence	
Urban and Urban fringe	1
Rural non-farm	
Rural farm	15
Family Size	
2-3 members	1
4 members	4
7 or more members	9
Reported Monthly Food Expenditures	
I. Dairy Products	
\$10.00 - \$15.00 per month	9
\$15.00 - \$20.00 per month	4
\$20.00 - Above	1
II. Meats	
\$20.00 - \$30.00 per month	5
\$45.00 - \$50.00 per month	6
\$50.00 - and over	3
III. Breads and Cereals	
\$10.00 - \$15.00 per month	11
\$20.00 - and over	3
IV. Fruits and Vegetables	
\$10.00 - \$15.00 per month	5
\$18.00 - \$20.00 per month	9

EMPLOYMENT STATUS OF MOTHERS	NUMBER
Full-time employed	7
Part-time employed	1
Student	5
Housewife, full-time	1

EDUCATION OF MOTHER	
Less than high school	
High School and other	1
1-3 years college	8
4 or more years college	5

AGE OF MOTHER	
22 - 27	6
28 - 30	3
31 - 40	4
50 years and over	1

## INCOME LEVELS OF FAMILIES

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Income	(N = 14)	Number
\$2,000 - \$ 2,999		4
3,000 - 3,999		1
4,000 - 4,999		
5,000 - 5,999		
6,000 - 6,999		1
7,000 - 7,999		1
8,000 - 8,999		1
9,000 - 9,999		
10,000 - 14,000		3
15,000 - 19,000		3
19,000 - and over		

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Total      14

VITA

Candidate for the Degree of  
Master of Science

Thesis: AN ANALYSIS OF THE FOOD AND NUTRIENT INTAKES OF PREADOLESCENT  
GIRLS LIVING IN LANGSTON, OKLAHOMA

Major Field: Food, Nutrition and Institution Administration

Biographical:

Personal Data: Born at Nobletown, Oklahoma, August 13, 1947,  
the daughter of Mr. and Mrs. Dewey Hunt, Sr.

Education: Graduated from Wewoka High School in 1965; received  
Bachelor of Science degree from Oklahoma State University  
with a major in Food Research, August, 1969. Completed  
requirements for the Master of Science degree at Oklahoma  
State University in May, 1973.

Professional Experience: Casework Trainee, Seminole County  
Welfare Department, summer, 1968; Assistant Dietitian,  
St. Luke's and Texas Children's Hospitals, Houston, Texas,  
1970; laboratory technician, Department of Biochemistry,  
Oklahoma State University, Stillwater, Oklahoma, 1971;  
Langston University Research Team, Langston, Oklahoma,  
1971-72; teaching assistant, Langston University, Langston,  
Oklahoma, 1971-72.

Professional Organizations: American Home Economics Association,  
Oklahoma Home Economics Association, Society for Nutrition  
Education.