FOOD INTAKE PATTERNS OF PREGNANT ADOLESCENTS ENROLLED IN A COMPREHENSIVE HEALTH CENTER

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CHAPTER I

INTRODUCTION

Each year, about one million teenagers between the ages of 15 and 19 become pregnant. Although the birth rate is declining for Americans as a whole, between 1960 and 1973 the number of births to mothers under 16 increased by 80 percent; the number of births to mothers aged 16 and 17 increased by one-fourth during the same period. Teenagers now account for nearly one in every five births in the country. The largest increase has been for adolescent girls. Nationwide, in 1975, 13,000 babies were born to adolescents under the age of 15 (8).

It is presently estimated that there are 50 million teenagers in the United States. Youngs, Niebyl, Blake, Shipp, Standley, and King (41) state that each year approximately 600,000 infants are born to adolescent mothers. Births to teenagers comprised 19 percent of all births in 1975, contrasted to 17 percent in 1966. Births by teenagers did not follow the general decline noted for older women--the number of births rose for women aged 15-17, while declining for every older age group--except women 25-29 years. The birth rate of teenage girls aged 15-17 years was 36.6 births per 1,000 in 1975 (18).

Not only have more babies been born to very young mothers, but also these adolescents have accounted for a larger proportion of all births. This means that adolescent pregnancy is a health concern in the United States. In 1977, there was a total of 9,740 births to

mothers under the age of 20 reported for the state of Oklahoma. This accounted for 21.4 percent of all live births occurring in the state. In Tulsa County, there were 881 births to adolescents between the ages of 13-18 years. Of this total, 23 births were to adolescents below 15 years of age (21).

In addition to the social and economic problems these pregnancies bring, teenagers also face greater health risks than women in their 20's. Some of the risks are due to physical immaturity of the mother, some to the fact that many young girls do not seek or receive prenatal care, and some to lack of attention given to nutritional needs.

The most common complications of teenage pregnancies are toxemia and anemia. Toxemia, a condition unique to pregnancy, is the development of high blood pressure after the 24th week; the exact cause is not known, but contributing factors are believed to be emotional stress, poor diet, and poor health care. Iron deficiency anemia is especially related to nutrition and most women need iron supplements during pregnancy; but adolescents, who are more likely to eat an unbalanced diet, are especially vulnerable to iron deficiency.

Other problems involve the babies of these girls. They are two to three times more likely to die in their first year of life than those born to women 20 to 24 years of age. Stillbirths are more than twice as frequent amont mothers under 20 years of age as they are among mothers aged 20 to 24. McAnarney (14), commenting on the risk of teenage pregnancy, stated:

> Adolescents younger than 15 years of age have a greater chance of delivering babies weighing 2,500 g or less, than do 19 year old women or women 20 to 24 years. In 1975, 14.9% of births to mothers younger than 15 years

> old weighed 2,500 g or less, compared with 9.0% of births to 19 year olds and 7.1% of births to women aged 20-24 years (p. 125).

Also, the risk of perinatal mortality and prematurity is increased with each pregnancy before the age of 20. Approximately six percent of all first babies and one percent of second babies born to girls under age 15 die in their first year (8).

Pregnancy is now recognized as a period of nutritional stress during which nutrient requirements are increased. Adolescent pregnancy presents special nutritional problems because teenage girls often begin their pregnancies with poor nutritional resources and dietary habits and because the nutritional requirements for growth of the fetus are in addition to the requirements for the mother's growth. In this situation, unless the diet is fully adequate, both the mother and the infant are likely to suffer nutritionally.

McGanity, Little, Fogelman, Jennings, Calhoun, and Dawson (15) have studied pregnant girls between the ages of 13 and 19 years of age, the majority of whom were black and primigravidas. They have found that the girls had poor intakes of iron, calcium, vitamin A, ascorbic acid, and urinary riboflavin (15). Their findings parallel those of the Ten State Nutrition Survey (42).

Many adolescents are ignorant about health matters, including nutritional needs and how to choose an adequate diet. The diet of a young pregnant girl must be individualized. Her eating habits, economic status, and emotional and social needs should be considered in relation to food and her nutritional needs.

Ballard and Gold (1), writing on adolescent pregnancy, stated that teenage girls generally do not seek early prenatal care and make visits for health care less frequently than older pregnant women. Therefore,

the adolescents' biological immaturity, the amount and frequency of prenatal care, as well as their overall life style, makes them at greater risk than older women.

A special adolescent health program is being conducted at Moton Health Center, a comprehensive health center located in Tulsa, Oklahoma. A multidisciplinary approach to deal with adolescent pregnancies and other health problems is being used. The team includes a physician, social worker, psychologist, public health nurse, clinic nurse, nutritionist, homemaker, health educator, and several community outreach workers.

To assist the nutritionist in the development of an effective counseling program, there is a need to study the food habits of the pregnant teenage girls who attend the adolescent health program. An assessment of their food intake will help to formulate suggestions and recommendations for reducing nutritional deficiencies to enable these adolescents to deliver normal, healthy infants.

Purpose and Objectives

The purpose of this study was to assist the nutritionist in the development of an effective counseling program. This was accomplished by studying the food habits of a group of pregnant adolescents enrolled at the Moton Health Center, Tulsa, Oklahoma.

The objectives were:

1. To determine the adequacy of protein, calcium, iron, vitamin A, and vitamin C in the diets of pregnant adolescents based on the Recommended Daily Allowances (RDA) for 1980.

2. To assess the pregnant adolescent's dietary intake of iron (based on the RDA for 1980) and serum levels of hemoglobin and hematocrit.

3. To assess the adequacy of the adolescent's diets and selected variables such as: age, between meal snacks, breakfast skipping, sources of nutrition information, person responsible for purchasing and preparation of food, use of vitamin and mineral supplements, and use of the foods provided by the Women, Infants, and Children (WIC) Program.

4. To make suggestions and recommendations for a nutrition counseling program designed to improve the diets of pregnant adolescents enrolled at the Moton Health Center.

Hypotheses

The following hypotheses will guide the research:

1. There will be no significant difference between the hemoglobin and hematocrit levels determined in the study and the pregnant adolescents' dietary intake of iron.

2. There will be no significant difference between adequacy of diet and selected variables such as:

   a. age
   b. breakfast skipping
   c. between meal snacks
   d. sources of nutrition information
   e. person responsible for food purchasing and preparation
   f. Use of vitamin, mineral, and iron supplements
   g. use of foods provided by the WIC program

Assumptions

This study will be conducted on the basis of the following assumptions:

1. The pregnant adolescents will have eating habits that include omitting breakfast, skipping meals, and snacking between meals.

2. The subjects' food intake will be more than two-thirds below the RDA's for protein, calcium, iron, vitamin A, and vitamin C.

3. The subjects' hemoglobin and hematocrit levels will be below the recommended 12 g hemoglobin per 100 millimeters and 36 percent hematocrit.

Limitations

This study will be limited to pregnant adolescent girls between the ages of 14 and 18 years who were enrolled at the Moton Health Center in Tulsa, Oklahoma.

Definitions

In this study the following definition of terms are used:

1. Pregnant Adolescents - Female subjects between the ages of 14 and 18 years old.

2. Hemoglobin Levels - A hemoglobin concentration value below 12 g per 100 milliliter will be used as a diagnosis for iron deficiency anemia (36).

3. Hematocrit Levels - A hematocrit concentration value of 36 percent or less will be used as a diagnosis for iron deficiency anemia (36).

4. Recommended Dietary Allowances (RDA) - Estimates of acceptable daily nutrient intakes. Levels of intake of essential nutrients considered, in the judgment of the Committee on Dietary Allowances on the basis of available scientific knowledge, to be adequate to meet the known nutritional needs of healthy persons.

5. Adequate Diet - Provides two-thirds or more of the recommended allowances for all nutrients.

6. Inadequate Diet - Providing less than two-thirds of the recommended allowances for one or more nutrients.

CHAPTER II

REVIEW OF LITERATURE

The need for expanded research in the area of food patterns of pregnant adolescents established the basis for this study. The review of literature includes: (1) the nutritional needs of pregnant adolescents; (2) dietary patterns of adolescents; (3) nutritional status of adolescents; (4) factors influencing the outcome of pregnancy; (5) nutrition education programs; and (6) recommendations for nutrition education programs.

Food Patterns of Pregnant Adolescents

The literature in the area of adolescent pregnancies is extensive. The magnitude of the problem has been stated by many authorities (8), (14), (18), (28). More often than not, researchers have directed their studies at the offspring of these adolescent mothers (6), (22), (23), (38), or at improving the prenatal course of the teenager's pregnancy (19), (32), (41). The studies have been undertaken to reduce the rate of low birth weight infants, prematurity, perinatal death, toxemia, and repeat pregnancies. Far too few studies have been conducted to assess the nutritional status and food habits of adolescent girls, especially during pregnancy.

The National Research Council's (19) working group on nutrition and pregnancy in adolescence found evidence of bizarre dietary habits

in adolescent girls. The nutritional status of the girls indicated that intakes of iron, calcium, vitamin A, and ascorbic acid were particularly inadequate.

Increased risk accompanies pregnancy in adolescents and older women. Worthington, Vermeersch, and Williams (40) summarize this information in the following manner:

> Higher risk is involved at both ends of the age cycle in reproduction. The teenage mother adds to her own growth needs introduced by her pregnancy. The mother brings to her pregnancy all of her previous life experience, including her diet, her food habits, her attitudes. Her general health and fitness and the state of her nutrition at her infant's conception are products of her lifelong habits and possibly those of generations before her (p. 56).

Adolescence is a time of great physical growth and development. To support this growth, increased amounts of food are needed and specific nutritional requirements are related directly to the time and degree of pubertal growth spurt. The character and timing of physical growth and sexual maturation differ greatly among individuals, but generally, the adolescent girl does not complete her linear growth until four years' post menarche. Teenage girls who become pregnant during the four years after menarche are considered to be biological risks because they are anatomically and physiologically immature (40).

What is the relationship between maternal age and pregnancy outcome? If pregnancy occurs before growth has ceased, the biological risk of mortality and morbidity is greater. Fetal and neonatal mortality are more frequent in adolescent pregnancies. The morbidity risks to the mother and her offspring include increased rates of toxemia, prematurity, ceasarean sections, congenital anomalies, spontaneous abortions, and premature labor (15).

Walters (38) offers this information.

> Infant mortality is twice the rate for mothers under age 15 than it is for women aged 20 to 34. Very young mothers frequently have such maternal complications as toxemia, prolonged or precipitate labor, postpartum infection and hemorrhage, and hypertension if they are white and anemia if they are black. Stillbirths are more than twice as frequent among mothers under age 20 as they are among mothers aged 20 to 24. In short, pregnancies of very young mothers place them in high-risk category, as are older mothers, the malnourished, the drug addicts, the ill, and the economically deprived (p. 24).

Recommended Dietary Allowances

The Recommended Dietary Allowances (RDA) of the Food and Nutrition Board, National Academy of Sciences, National Research Council, are accepted generally as dietary standards for the United States. The RDA are the levels of intake of essential nutrients considered, in the judgment of the Food and Nutrition Board on the basis of available scientific knowledge, to be adequate to meet the known nutritional needs of practically all healthy people (20).

RDA are recommendations for the average daily amounts of nutrients that population groups should consume over a period of time. RDA should not be confused with requirements for a specific individual. The RDA, except for energy, are estimated to exceed the requirements of most individuals and thus ensures that the needs of nearly all healthy persons in the population are met.

Estimation of the recommended allowances follows essentially four steps (20):

1. Estimating the average requirements of a population for a given nutrient and the variability of requirements within that population.

2. Increasing the average requirements by an amount sufficient to meet the needs of nearly all members of the population.

3. Increasing the allowance to account for inefficient utilization by the body of the nutrients as consumed (poor absorption, poor conversion of precursor to active forms, etc.).

4. Using judgment in interpreting and extrapolating allowances when information on requirements is limited (p. 3).

The requirement for a nutrient is the minimum intake that will maintain normal function and health. For infants, the requirement may be equated with the amount that will maintain satisfactory growth; for an adult, the amount that will maintain body weight and prevent depletion of the nutrient from the body. For some nutrients, the requirements may be assessed as the amount that will just prevent failure of a specific function or the development of specific deficiency signs. This amount may differ from that required to maintain maximum body stores. There are differences of opinion about the criteria that should be used to establish requirements.

After a review of the scientific evidence of nutrient requirements judged by the Committee on Dietary Allowances to be most reliable, a logical approach in setting a recommended allowance for nutrients other than energy is to select a value above the average requirement by an amount that includes the range of variability observed. For some nutrients there is inadequate information about the variability of individual requirements, and judgments must be made.

With limited information about requirements, about the variability of requirements, and about factors that influence the utilization of

ingested nutrients, allowances for many nutrients cannot be estimated exactly from the available scientific knowledge.

These problems must be recognized in order to understand why recommendations for nutrient allowances may differ from country to country and also to explain why the allowances for some nutrients exceed the presumed requirements by a much greater proportion than those for others.

Energy intake is usually well regulated in response to the amount of energy expended, so long as energy expenditure is adequate to insure that mechanisms regulating food intake are functioning efficiently. Because an excess of energy from any source is stored as fat, the continued excessive intake of energy leads to obesity and may be detrimental to health. Thus, the allowance for energy is treated differently from the allowances for specific nutrients. Recommended allowances for energy are estimates of the average needs of population groups, not recommended intakes for individuals. Energy needs vary from person to person and are not easily predictable without detailed information about physical characteristics and activity of the individual. Because of this, the average energy needs for each age and sex group are provided only as guide lines.

Nutrition in Adolescent Pregnancy

A well-balanced diet during pregnancy is important to the well-being of the mother and the child. Since little information is available on nutritional needs of pregnant adolescents, estimates of needs are typically formulated by adding the pregnancy Recommended Dietary Allowances (RDA) for adult women to the RDA specifications for non-pregnant teenagers 15 to 18 years of age. This method of approximation

may overestimate total pregnancy requirements for some individuals (3). (See Table I for RDAs.)

Pregnancy in the adolescent girl increases her caloric requirement to a level significantly above that of the non-pregnant teenager. It is recommended that energy intake not fail below 36Kcal/kg body weight (40). Pitkins (25) points out that the mother who enters pregnancy already underweight may be at greatest risk. The RDS is 45 Kcal/kg for the pregnant teenager.

Specific Nutrients

Protein. During pregnancy, the adolescent girl's protein needs increase in accordance with the protein requirements of the growing fetus and accessory maternal tissue. The current RDA for protein is an addition of 30 grams to the non-pregnant allowance of 46 grams (14). This amounts to a total allowance of 76 grams, or 1.3 grams per kilogram of body weight in the mature woman. Higher intakes are advised for younger women, 1.5 grams per kilogram for ages 15 to 18, and 1.7 grams per kilogram for girls under 15 years (40).

Iron. The iron requirement during pregnancy is considerable. Blood formation during pregnancy is a major feature and two main nutrients--iron and folate--especially need to be considered. A normal hemoglobin concentration is one of the most essential requisites in pregnancy. Many women enter pregnancy with low iron stores and a low dietary iron intake. Anemia, a very common complication of pregnancy, exists when the maternal and fetal needs for increased hemoglobin synthesis cannot be met because of lack of iron. The absorption of iron is a complex process influenced by the kind and amount of iron in food

TABLE I

RECOMMENDED DAILY DIETARY ALLOWANCES

	Age	Weight		Height		Fat-Soluble Vitamins			Water-Soluble Vitamins			
	(years)	(kg)	(lb)	(cm)	(in)	Protein (g)	Vitamin A (μg RE)[b]	Vitamin D (μg)[c]	Vitamin E (mg α-TE)[d]	Vitamin C (mg)	Thiamin (mg)	Riboflavin (mg)
Infants	0.0-0.5	6	13	60	24	kg x 2.2	420	10	3	35	0.3	0.4
	0.5-1.0	9	20	71	28	kg x 2.0	400	10	4	35	0.5	0.6
Children	1-3	13	29	90	35	23	400	10	5	45	0.7	0.8
	4-6	20	44	112	44	30	500	10	6	45	0.9	1.0
	7-10	28	62	132	52	34	700	10	7	45	1.2	1.4
Males	11-14	45	99	157	62	45	1000	10	8	50	1.4	1.6
	15-18	66	145	176	69	56	1000	10	10	60	1.4	1.7
	19-22	70	154	177	70	56	1000	7.5	10	60	1.5	1.7
	23-50	70	154	178	70	56	1000	5	10	60	1.4	1.6
	51+	70	154	178	70	56	1000	5	10	60	1.2	1.4
Females	11-14	46	101	157	62	46	800	10	8	50	1.1	1.3
	15-18	55	120	163	64	46	800	10	8	60	1.1	1.3
	19-22	55	120	163	64	44	800	7.5	8	60	1.1	1.3
	23-50	55	120	163	64	44	800	5	8	60	1.0	1.2
	51+	55	120	163	64	44	800	5	8	60	1.0	1.2
Pregnant						+30	+200	+5	+2	+20	+0.4	+0.3
Lactating						+20	+400	+5	+3	+40	+0.5	+0.5

	Age	Water Soluble Vitamins				Minerals					
	(years)	Niacin (mg NE)[e]	Vitamin B-6 (mg)	Folacin[f] (μg)	Vitamin B-12 μg)	Calcium (mg)	Phosphorus (mg)	Magnesium (mg)	Iron (mg)	Zinc (mg)	Iodine (μg)
Infants	0.0-0.5	6	0.3	30	0.5[g]	360	240	50	10	3	40
	0.5-1.0	8	0.6	45	1.5	540	360	70	15	5	50
Children	1-3		0.9	100	2.0	800	800	150	15	10	70
	4-6	11	1.3	200	2.5	800	800	200	10	10	90
	7-10	16	1.6	300	3.0	800	800	250	10	10	120
Males	11-14	18	1.8	400	3.0	1200	1200	350	18	15	150
	15-18	18	2.0	400	3.0	1200	1200	400	18	15	150
	19-22	19	2.2	400	3.0	800	800	350	10	15	150
	23-50	18	2.2	400	3.0	800	800	350	10	15	150
	51+	16	2.2	400	3.0	800	800	350	10	15	150
Females	11-14	15	1.8	400	3.0	1200	1200	300	18	15	150
	15-18	14	2.0	400	3.0	1200	1200	300	18	15	150
	19-22	14	2.0	400	3.0	800	800	300	18	15	150
	23-50	13	2.0	400	3.0	800	800	300	18	15	150
	51+	13	2.0	400	3.0	800	800	300	10	15	150
Pregnant		+2	+0.6	+400	+1.0	+400	+400	+150	*h* *	+5	+25
Lactating		+5	+0.5	+100	+1.0	+400	+400	+150	*h* *	+10	+50

Source: Food and Nutrition Board, National Academy of Sciences--National Research Council (Revised 1980).

*The increased requirement during pregnancy cannot be met by the iron content of habitual American diets nor by the existing iron stores of many women; therefore, the use of 30-60 mg of supplemental iron is recommended.

consumed, intestinal mucosa, and dietary factors that increased or decreased the availability of iron for absorption.

It is estimated that 500 milligrams of extra iron are utilized by the bone marrow during pregnancy. If one adds the "fetal and placental requirements" (250-300 mg), 750 mg of extra iron are needed during the course of a normal pregnancy. The amount is difficult, if not impossible, to achieve from the diet and so routine supplementation is recommended. Supplementation will virtually eliminate iron deficiency anemia and should be given in the form of simple ferrous salts and in amounts of 30 to 60 mg of iron daily for prophylaxis (25).

Routine folate supplementation can be justified on the basis of the increased needs of pregnancy, coupled with dietary survey data indicating the usual American diet to be marginal in folate content. If supplementation is not practiced routinely, it should be considered in instances of low intake (such as patients who rarely eat green, leafy vegetables) or unusually high requirements (such as multiple pregnancy or chronic hemolytic anemia). Anticonvulsant drugs, particularly diphenylhydantoin, block the synthesis of a coenzyme involved in folate metabolism and thereby increases requirements. Therefore, supplements should be prescribed for pregnant patients taking these drugs (25).

Calcium. The need for extra calcium during pregnancy relates directly to the development of the fetal skeletal system. Overall, calcium deposition during pregnancy is about 30 grams. Most of the accretion occurs during late pregnancy, especially during the last trimester. The RDA is 1200 mg per day for the pregnant adolescent, an increase of 400 mg over the allowance for the nonpregnant female (40).

Vitamin A. The restricted diets consumed by many adolescents frequently contain inadequate amounts of vitamins and trace minerals. Attention to this problem during pregnancy is important if the maternal and fetal tissues are to receive sufficient amounts of each nutrient to support normal growth. The RDA of vitamin A during pregnancy is 1000 retinol equivalents or 5000 IU, an increase of 25 percent over the allowance for the nonpregnant woman (25).

Vitamin C. The RDA for vitamin C during pregnancy is 60 mg, an increase of one-third over the allowance for the nonpregnant woman. Concern has been expressed by many researchers about the use of excessively large doses of this vitamin by the pregnant woman. The possibility of "conditional" scurvy in infancy as a consequence of maternal hypervitaminosis C during pregnancy has been suggested (25).

Dietary Patterns of Adolescents

By the time a young girl has grown into adolescence, her dietary patterns are well established. Various investigations of adolescents' eating habits have been done. Eating practices are shown to be related to maturation, knowledge of nutrition, weight for age, social status, psychological adjustment, and family relation (16).

Of special interest is a study of the eating habits of 996 pregnant girls, 15 years of age or younger, served by the Maternity and Infants Care Project in Chicago. The diets of 43.6 percent are rated as poor, 26 percent as fair, and 30 percent as good. One-fifth of the girls eat no more than two meals a day. Only 12 percent of the meal skippers are rated as having good diets. Their intake of snack items

and soft drinks was high. A large proportion of the total calories of these girls appears to be derived from snack foods, such as soft drinks, potato chips, french fries, candy, ice-cream, and other sweets. Analysis of individual groups of foods shows that about 40 percent of the diets are low in all areas except the meat and bread groups. Half or more of the intakes are rated as low in vegetables, milk, and milk products (15).

Teenage girls often skip meals, limiting their intake of calcium, iron, vitamin A, and vitamin C in an effort to stay slim (5), (28). A study of girls living in Berkeley, California shows 43 percent of the girls in the ninth grade and 51 percent of the girls in the tenth grade want to lose weight even though only 11 percent are markedly obese (21).

Schorr (26) investigated factors affecting teenage food habits and evaluated the adolescents' intakes of ascorbic acid, vitamin A, calcium, and iron. The percentage of subjects consuming less than two-thirds of their RDA's was reported as follows: 51 percent for vitamin A, 44 percent for calcium, 21 percent for ascorbic acid, and 69 percent for iron. These findings confirm those of other researchers (5), (28), (42).

In a study by Baird (2) of the eating practices of students enrolled in the Oklahoma public schools, findings showed the incidence of skipping breakfast increased as grade level increased and was somewhat more common for girls than boys at all grade levels. Also, this study showed that, overall, about six percent of the students did not eat lunch, but again the high school girls were most lacking, with 16 percent omitting this meal. When the students' food intake was analyzed

by two diet patterns described by Baird in the study as Adequate Diet--Basic 4 and Adequate Diet--Basic 4 + A and C, most students were found to have inadequate diets by either measure. The diets of girls in grades 10-12 were found to be the least adequate.

The 1978 Food Consumption Survey (34) reported that, of the individuals surveyed, 86 percent of the participants had breakfast on the day surveyed. Almost all (over 95 percent) of the children and adults, 65 years and over, ate breakfast. Groups with the smallest fraction reporting eating breakfast were girls 15 to 18 years (77 percent) and girls 19 to 22 years old (71 percent). Also, this survey found 61 percent of the participants had at least one snack. Relatively more children and teenagers (59 to 70 percent) than adults (55 to 64 percent) snacked. It was found that teenagers had snacks with the highest average fat density and that snacks were the source of more of the day's carbohydrate intake than of other nutrients.

These conclusions may be drawn from the investigations of adolescent eating habits as reported by Mounger (16):

1. Teenagers tend to eat more often than three times a day.
2. Teenagers tend to omit meals and to snack frequently.
3. Breakfast is the meal most often missed.
4. The majority of teenagers consume from one to three snacks a day with the consumption of sugar (candy, soft drinks) being high.
5. The protein intake of girls is low.
6. Obese subjects tend to eat less frequently and to exercise less than do lean or average subjects (p. 48).

Nutritional Status

In the United States the overall nutritional status of adolescents is thought to be good (16). However, many studies indicated that large numbers of individuals do not have adequate diets, for a variety of reasons. The Ten State Nutrition Survey (42) indicated findings similar to those found with undernourished groups, such as a high prevalence of anemia, urinary riboflavin, and low levels of serum albumin, vitamin A, and ascorbic acid.

The Ten State Nutrition Survey (42) showed that more than 80 percent of families in the study had iron intakes below the 18 mg per day that is recommended. The dietary data also showed that there were a substantial number of children and adolescents with caloric intakes below the dietary standards. Many adolescents and adult males had low hemoglobin levels that appear to be due largely to nutritional iron deficiency. A relatively large percentage of pregnant and lactating women demonstrated low serum albumin levels, indicating marginal protein intake in this group. Spanish-Americans in the low-income ratio states, mainly Mexican-Americans in Texas, had a serious problem in regard to vitamin A nutriture. Also, the survey found young people in all sub-groups had a high prevalence of low vitamin A levels. Males in the study generally had a higher prevalence of lower vitamin C levels than did females. There seemed to be a decrease in vitamin C levels as age increased. There did not seem to be a problem in relation to the thiamine levels found; however, riboflavin status was poor among Blacks and among young people of all ethnic groups. This survey also reported that adolescents between the ages of 10 and 16 years had the

highest evidence of unsatisfactory nutritional status of any of the age groups surveyed (6).

Haider and Wheeler (10), reporting on Black and Hispanic teenage girls, found the mean iron intake of all teenagers except 19 year old Blacks was approximately 50 percent below the RDA. Vitamin A intake for both Blacks and Hispanics was within or higher than the RDA, and ascorbic acid intake was considerably higher than the RDA for teenagers of both ethnic groups.

The 1978 Food Consumption Survey by the United States Department of Agriculture (34) reported decreased intakes of protein, calcium, vitamin A, and riboflavin when compared with the findings of the 1965 Survey. For individuals ages 9 through 18, the 1978 Food Consumption Survey found calcium intakes were below the 1980 RDA levels. Also, average intakes of iron increased in 1977 over 1965 but were still below the RDA for females between the ages of 21 and 50.

Hampton, Huenemann, Shapiro, and Mitchell (11) stated that teenagers living in Berkeley, California, who kept a seven day dietary record during the summer of 1963, spring and summer of 1964, and spring of 1965, reported similar findings of low calcium intakes. Hampton et al. summarized that from the standpoint of mean nutrient intake levels and percentage of subjects having intakes below two-thirds of the RDA's, the most neglected nutrients were calcium and iron, especially for the girls.

Singleton, Lewis, and Parker (28) studied pregnant teenagers living in or near Lafayette, Louisiana, and receiving prenatal care from a parish unit or a state hospital. Fifty-one girls aged 14 through 18

were interviewed and asked to recall the foods they had eaten in the previous 24 hour period. Based on the subjects' 24 hour diet, intakes of 10 nutrients, protein, vitamins A, B6, B12, niacin, thiamine, riboflavin, ascorbic acid, iron, and calcium were calculated. Two-thirds of the RDA for each nutrient was considered an acceptable level of intake. Categories for each subject were established by computing a dietary classification based on her dietary recall, without supplements, compared with the RDA for each of the 10 nutrients. The categories were: group one - subjects whose diet recall equaled or exceeded two-thirds of the RDA for all 10 nutrients; group two - subjects whose diet recall fell below two-thirds of the RDA for any of the nutrients other than protein, calcium, and iron; and group three, subjects whose diet recall failed to meet two-thirds of the RDA for any one or more of the nutrients, including protein, calcium, and iron. Of the 15 subjects, three subjects were in group one, three were in group two, and 45 were in group three. These researchers concluded that for the pregnant teenagers in this study, diet alone failed to provide two-thirds of the RDA for vitamin A, vitamin B6, calcium, and iron.

Factors Influencing Pregnancy Outcome

Adolescent pregnancy is accompanied by an increased morbidity for the child born to the very young mother. Walters (38) defines the role of home economics as follows:

> Teaching adolescents about pregnancy and parenthood must begin early in their high school career, because--unfortunately--many of our students will need the information soon. For example, the average U.S. woman is married when she is still in her teens, with one chance in two that by the time she celebrates her first wedding anniversary, she will already have had her first baby. If she is a typical young mother, she will know relatively little

> about the effects of her nutrition on the length of her labor or on the health of her baby. She will also know very little about the effects of either drugs or infection or about the long-range consequencies of either on her life or the life of the child. She probably has even less information about the possibility of birth defects, nor will she want to think about them--believing there is nothing she can do to prevent them (p. 26).

Few adolescent girls and boys understand the risks to the unborn child of their becoming parents between the onset of puberty and the full development of their reproductive systems. These defective infants may be born crippled, mentally retarded, deaf, blind, anemic, diabetic, or with many more serious defects. If a girl is pregnant before her 18th birthday, she is more likely than an older mother to suffer from pre-eclampsia, anemia, toxemia, and either excessive or inadequate weight gain (38).

Most observers cite toxemia as a special hazard of pregnancy in young girls, and some investigators note that when pariety and race are held constant, the incidence rises sharply with each year of age under 20 (19). Factors mentioned as contributing to toxemia in these young mothers include: lack of development and balance of the endocrine system, emotional stress or early pregnancy, poor diets, and inadequate prenatal care. Evidence suggests that nutritional reserves may be depleted.

The increased incidence of iron deficiency anemia, pre-eclampsia, prematurity, and neonatal mortality may be related to this depletion. The Alan Guttmacher Institute (33) reports these factors as unique medical problems of teenagers.

> Adolescent mothers are 1.3 times more likely to suffer from nonfatal anemia (11 percent) or toxemia (9 percent) as the result of pregnancy or birth than women 20-24 (8.8 and 6.9 percent) and are also somewhat more likely to have complications during labor or as a result of a premature birth.

> Among other risk factors, pregnancy among very young teenagers depletes nutritional reserves needed for their own growth and thus places them at higher risk for a variety of ills (p. 4).

The underweight obstetric patient (i.e., one who enters pregnancy 10 percent or more under standard weight for height and age) presents many hazards. The risk of a low birth weight infant is significantly greater than that of toxemia, antepartum hemorrhage, and other problems is increased (33).

Similarly, the poorly nourished mother with low weight gain has a higher incidence of toxemia, low birth weight babies, perinatal mortality, and mentally defective offspring (33). A healthy woman can be expected to gain between 22 and 27 pounds in pregnancy. An ideal weight gain pattern is from two to four pounds in the first three months of pregnancy, followed by slightly less than one pound per week during the second and third trimester (40). One of the most significant influences on the size of the newborn infant (and hence of its well-being) is maternal weight gain during pregnancy. Tompkins (in 17) reported a higher incidence of prematurity among underweight pregnant women as well as among patients who failed to gain weight both during the first and second trimester.

Special diets before and during pregnancy may also have adverse consequences. For example, extreme forms of vegetarianism, such as the vegetarian diet in which no animal products are eaten, may result in vitamin B12 deficiency in the pregnant woman and even in her baby (13).

Protein restricting diets may also affect the fetus. Protein restriction in pregnant rats have caused permanent cognitive deficiencies in the progeny. Malnutrition reflected in chronic limitations of amounts of food consumed may result in general stunting of growth

accompanied by reduced brain size, decreased brain cell number, and immature or incomplete biochemical organization of the brain (6).

Anemia, a very common complication of pregnancy, exists when the maternal and fetal needs for increased hemoglobin synthesis cannot be met because of lack of iron. The major clinical effect of iron deficiency is anemia and a hemoglobin level of less than 11 grams per 100 millimeters at term may be expected in a third to half of pregnant women who do not take iron supplements. An anemic patient is less able to tolerate hemorrhage with delivery and are more prone to puerperal infection (25).

Obesity, preconceptional weight 20 percent or more above standard for height and age, is the most common nutritional disease and carries an increased risk of a number of complications, including diabetes mellitus, chronic hypertension, and throembolic disease (25). These complications, rather than the obesity itself, account for the "high risk" nature of pregnancy in the obese woman. The correct management of the obese prenatal patient is extremely controversial. Some advocate moderate to marked restriction of gain so that the patient ends the pregnancy with a net loss. Others argue that the restriction of calories may result in the restriction of other nutrients with detrimental effect (25).

Another consideration is excessive weight gain (a gain of three kilogram or more per month). It has long been thought to predispose to several obstetric complications, notably pre-eclampsia. Some degree of limitation on weight gain is advised but the aim should be to limit excessive accumulation and bring the pattern of gain toward normal, not to severely restrict it (25).

Stress can have a detrimental effect on nutrient metabolism, and this includes the emotional stress that often accompanies a teenage pregnancy. Calcium and nitrogen retention have particularly shown to be adversely affected by stress.

Routine restriction of sodium during pregnancy is unfounded. Placing pregnant women on diets low in sodium put these women and their offspring at a particular disadvantage and unnecessary risk. Combined with the added injury of the routine use of diuretics, such a program places the pregnant woman and her child in double jeopardy. The National Research Council report (19) on maternal nutrition labels such routine use of salt-free diets and diures as potentially dangerous.

When summarizing information related to nutrition during pregnancy, the following recommendations were given: (1) adequate intake of protein should be insured; (2) caloric intake approximately 10 percent above non pregnant requirements is recommended; (3) weight gain during pregnancy normally be attempted, average weight gain being 10 to 12 kg (22 to 27 lbs.); (4) essential nutritional elements (such as sodium) should not be restricted during pregnancy; (5) dietary supplements of iron and iron-containing foods are indicated during pregnancy; other dietary supplements such as vitamins and additional protein sources, may be helpful where deficiencies in nutritional status are determined (38).

Nutrition Education Programs

Many multidiscipline services for school-age pregnant girls now exist. However, only recently did the development of community based comprehensive service programs for school-age pregnant girls arouse

national interest. The Committee on Maternal Nutrition of the Food and Nutrition Board of the National Research Council (6) considered the problems serious enough to establish a working group to explore the biological and social problems related to pregnancy in adolescents. The Committee recommended research to determine effective educational methods for developing good eating habits as one way to improve the nutritional status of children and adolescents.

A study by Wallace, Gold, Goldstein, and Oglesby (37) to identify the services available to and the needs of teenage pregnant girls in the large cities of the United States found, of the 130 cities responding to a questionnaire mailed to the Health Officer or Superintendent of Schools in 1970, 111 (85.4%) reported that they provide a special program of some type for teenage pregnant girls. Generally, the larger the size of the city, the higher the percentage with some type of special program. Two-thirds of the cities report the provision of nutrition services for pregnant teenagers. This service most frequently consisted of nutrition education. Services least frequently available were special feeding in special classes or maternity homes, special school breakfast, and commodity distribution programs. Eighty-three of the 89 cities reporting the provision of special nutrition programs to pregnant teenagers provided nutrition education, and 47 of these programs provided "extra foods."

One such program was evaluated by Stine and Kelley (32) in Baltimore, Maryland. The program was established in 1966 by the Baltimore City Public Schools for school aged mothers to evaluate the effect of the program upon the health of these mothers by studying their infants.

The school provided counseling sessions and student activities designed to permit ventilation of worries or fears and to promote awareness of individual responsibility. The home economics classes demonstrated the selection and preparation of foods to increase the health of the pupils and their children. Milk was distributed three times each day. Hot lunches were served after the second year of operation. The school nurse gave nursing advice or referred the pupils to specific sources of care. Each of these activities was expected to contribute to the health of the mother and her infant. By comparing 224 births to mothers who had attended the special school for teenage mothers with 224 other Baltimore City births; matched on age and race of mother, and sex and birth order of infant; a statistically significant smaller proportion of infants weighing less than 2,501 gm at birth occurred among the mothers of the special school. Further, a statistically significant smaller proportion had gestation periods of less than 37 weeks. Infant mortality was also much lower among the infants of school age mothers attending the special school.

Earlier programs, such as the one reported by Osofsky, Braen, DeFlorio, Hagen, and Wood (24), were established to provide medical, social, psychological, and educational services for pregnant adolescents. This program was set up in the fall of 1965 and sponsored jointly by the Syracuse Board of Education, the Onondaga County Department of Health, and the State University of New York Upstate Medical Center at Syracuse, and evolved as a comprehensive interdisciplinary approach to the overall care of the teenage pregnant female. Unique to this program, titled Y-Med, was the abandonment of the traditional "clinic" concept. Instead, it was operated within the

framework of a medical center program, but the patients were treated as private patients. An attempt was made to provide more effective medical care and to allow the patients to establish meaningful relationships with physicians. Senior residents were assigned as permanent physicians, met the girls at the initial visit, and followed them thoughout the pregnancy, labor, delivery, and postpartal period. The girls were taught facts about their bodies, pregnancy, delivery, and infant care. Contraceptive information was given the patient early in the course of the program.

An evaluation of the Y-Med program after one and one-half years of operation showed more intensive medical care had been achieved, both for mother and infant. Minor medical complications were frequent; however, serious problems were averted and there was not a single prenatal mortality reported. Of the 125 girls enrolled in the program during this period, only seven became pregnant a second time. Thus, the family planning aspect of the program made it possible for the girls to postpone future pregnancy until it would be more desirable.

In the winter of 1976, a teen clinic for pregnant girls was developed to complement the maternity clinical services of the Maternity and Infant Care Project of the Cleveland Metropolitan General Hospital, Cleveland, Ohio. Barrett and Peoples (3) studied this program and reported that the services were individualized with a health care team consisting of a physician, a nurse, a social worker, and a nutritionist assessing each patient during her first clinic visit. The health team met at the end of each clinic session to coordinate their assessments and plans and to determine subsequent interventions. The patient was seen throughout her pregnancy in clinic and was followed in her home

through the first postpartum year with assistance from para-professional personnel. The goal of the program was to provide comprehensive medical, nursing, social, and nutritional services to adolescents during their antepartal and postpartal courses. Principles of patient participation in health care and adolescent group interaction were combined with a traditional clinic format in the program design.

The creation of an adolescent advisory board, composed of clients who agreed to meet and discuss their feelings about the teen clinic and provide suggestions for changes in the format, was a means of increasing patient participation in health care. The advisory board assisted the health team in planning and implementing activities for the teenagers outside the clinic.

A low delinquency attendance rate and client comfort within the clinic setting were factors contributing to more appropriate maternity care for the adolescents. After the end of the first year of operation of the teen clinic plans were made to lengthen the clinic to an all day clinic and to include postpartal teenagers. During the year, an additional teen clinic, based on the same principles, was initiated by another team of health professionals within the project.

St. Louis University offers two specialized teenage pregnancy programs in response to area needs. St. Louis City Hospital caters primarily to an inner city population, and their special program serves predominantly single, middle-class expectant girls referred to the hospital by a social agency. Each patient had previously recognized problems in connection with her pregnancy and had sought help from the referring agency. Klaus, Meurer, and Sullivan (12) reviewed these

programs and reported that the patients receive education for childbirth and support during labor from the nursing and medical staff. Prenatal education in the form of discussion groups was led jointly by a nurse midwife and a social group worker. The groups focus on the physiology of pregnancy, expectations, and feelings related to labor and delivery, and the reactions of families and friends. Following delivery, child care, expectations of sexual behavior, and child spacing for personal and health reasons are discussed. The success of the programs was seen in the decreased rate of missed appointments. The program reported a 1.4 percent rate for missed appointments as compared to a rate of more than 50 percent prior to the initiation of the teenage pregnancy program.

The program's professional staff reported that working with the young, single, expectant parent led to a more realistic appreciation of her difficulties and of the varied multiple etiologies of teenage pregnancy. Insight was also gained into the child-rearing patterns of the extended family when, in case of a very young mother, her mother takes on the mothering role.

Recommendations for Nutrition Education Programs

Working with adolescents demands sensitivity and awareness. The counselors must stay in touch with those clients they are motivated to serve. First, those that are at highest risk and those that are seeking help must be identified. Some adolescents are eager to talk about food. Make use of rap sessions or other motivating forces behind their

food habits. Find out why the adolescent eats as she does and what will influence her to change her habits.

Spindler and Acker (31) reported on a nutrition project in Rock Island County, Illinois, "Teen Time Food Fare," which emphasized improving the nutrition of teenagers. The nutrition project was planned for high school and older boys and girls. Teenage leaders were responsible for working out the details of the project, with minimum adult guidance. The basic plan, subject matter, and suggested themes and demonstrations were prepared by the food and nutrition specialist. At the end of the second year of the project, interviews were conducted to explore the adolescent's attitude toward nutrition, how she might be motivated to improve her nutrition, and how the project could be improved. Attitudes expressed by the teenagers included, "Our activities interfere with eating." Time was a big element in the amount eaten and the regularity of eating. Many of the subjects said that having to eat too early or too late or in too short a time because of congested lunch room conditions was one reason for skipping the noon meal. Omitting breakfast was frequently mentioned, often resulting from the teenager's time schedule not coinciding with the family meal schedule.

Spindler and Acker's (31) study found the second most frequently expressed attitude was that parents and adults should accept responsibility for seeing that their children eat more adequate diets. There was some feeling that if parents set a better example, teens would be more apt to follow suit.

Also, even though the adolescents thought parents were responsible for their eating habits, they recognized that being part of the teen

group was important. "We select what everyone else eats." Snack items are limited in variety because teenagers gather around the vending machine, short order type eating places, or any other public place that will welcome the small spender and long loiterer.

Overweight and complexion problems were of prime concern to these teenagers. Both sexes were critical of the way teenage girls eat. The boys said that high school girls go on "fad diets" or "food kicks" and then get so hungry that they gorge themselves. According to this group of young people, boys eat better than girls because boys, on the whole, are not weight conscious and physical fitness is important to them.

A wise nutritionist must listen and help but not take over and tell the adolescent what she should do. Encourage the teenagers to actively participate in the program. Make use of other teenagers as advisers to help test or react to programs and instructional materials.

Nutritionists can help by emphasizing the importance and role of the selection of foods as the best means of achieving good health for mother and baby. She must find ways to persuade teenagers, particularly those of families with limited income, to apply the principles of nutrition to their own diets. If possible, she must involve the parents of the teenagers in the nutrition programs being presented. She should encourage the parents to allow the teenagers to help plan, shop, and prepare food for the family.

Special Supplemental Food Program for Women, Infants, and Children

The establishment of the Special Food Program for Women, Infants, and Children (WIC Program) was authorized by Public Law 92-433,

approved September 26, 1972, which added to the Child Nutrition Act of 1966, as amended, a new Section 17 (42 U.S.C. 1786). This section authorized a two year pilot program for the fiscal years 1973 and 1974 to provide supplemental foods to pregnant and lactating women, infants, and children up to four years of age who are determined by competent professionals to be "nutritional risks because of inadequate nutrition and inadequate income." Public Law 92-433 stated that the Secretary of Agriculture shall make cash grants to the health department or comparable agency of each state for the purpose of enabling local agencies to carry out this program.

Initial regulations for the WIC Program were issued on July 6, 1973, and published in the Federal Register on July 11, 1973. These regulations discussed the general purpose and scope of the program and outlined program administration, the eligibility of persons and local agencies, the application process by local agencies, and state agency action on these applications. It outlined the selection criteria which would be applied to local agencies, the supplemental food package to be made available, plus program operations such as use of funds, payments to states, records, and reports.

The United States Department of Agriculture was responsible for designing the WIC Program within legislative guidelines and approving WIC applications from local agencies. It continues to be responsible for program administration and the evaluative components of the program, as well as for accountability for federal funds expended by states. The Food and Nutrition Service (FNS) administers the program nationally and provides policy guidance.

The state agencies have the responsibility for food delivery system approval or design. They also recommend local agencies to FNS for funding and the monitoring of approved local agencies.

The local WIC projects are responsible for program operations, including the medical examination and certification of individuals, providing the WIC food package, collecting and tabulating the food, clinic, administrative and fiscal data required by FNS, and reporting this information to the state agency for transmission to FNS. Also, they are responsible for insuring that grocers in project areas who have been authorized to exchange food vouchers for actual food, supply only those items approved for the WIC Program, and submit vouchers for redemption on a timely basis.

Individuals are eligible to participate in the WIC Program if they are in the specific population target group. The target group is defined as pregnant women, all postpartum women up to six weeks, and lactating women up to one year after delivery, infants under one year of age, and children under four years of age.

Eligibility of individuals is determined by competent professionals (physicians, nutritionists, registered nurses, dietitians, and other health officials) on the staff of the local agency to need supplemental food because of: 1) known inadequate nutritional patterns; 2) high incidence of nutritional anemia; 3) inadequate or deficient patterns of growth; and 4) high rates of prematurity or miscarriage. Individuals must also reside in an approved project area and be eligible for free or reduced cost medical treatment by the local agency which serves the project area wherein they reside.

The legislation which established the WIC Program required the provision of supplemental foods containing nutrients known to be lacking in diets of populations at nutritional risk, particularly high quality protein, iron, calcium, vitamin A, and vitamin C. Therefore, the food package was designed to contain foods which provide these nutrients in amounts which meet certain minimum percentages of the 1968 RDA's.

Under the WIC Program, infants may receive iron-fortified infant formula, infant cereal which is high in iron, and fruit juice which is high in vitamin C. Infants six months of age or older may receive fortified milk or evaporated milk in lieu of the infant formula. Participating women and children may receive fortified milk and/or cheese; eggs; hot or cold cereal which is high in iron; and fruit or vegetable juice which is high in vitamin C.

The supplemental food package provides infants with over 100 percent of the 1968 RDA's for protein, calcium, iron, and vitamin C, and about 90 percent of the RDA for vitamin A. Calories will also be fully supplied up to three months of age and will be about three-fourths of the RDA thereafter. Children one to four years of age can receive more than 100 percent of the RDA for protein, iron, calcium, vitamin C, vitamin A, and about two-thirds of the RDA for calories. Pregnant or lactating women can receive about one-fourth of the RDA for calories and between 60 and 100 percent of the RDA for all nutrients mentioned previously. The WIC food package also provides substantial quantities of thiamine, niacin, riboflavin, and vitamin D. The food package was designed to contain foods which are acceptable to most cultural and ethnic groups in the United States.

Summary

The nutritional problems of pregnant adolescents are many. Most adolescents have not reached physical maturity and their body's demand for nutrients to support growth and development are complex. Added to these demands are the nutrient requirements necessary to nurture the fetus.

Most studies have explored the nutritional status and dietary eating habits of teenagers. The researchers have found inadequate intakes mainly of calcium, iron, folacin, vitamin A, vitamin C, and riboflavin. Calories, unless the teenager is "dieting," and protein are reportedly not adequately supplied in these diets.

Eating habits of most of the adolescents differ from those of adults. Frequent between meal snacks, meal skipping, and high consumption of foods from fast food franchises characterize this age group.

Teenage pregnancies are considered to be high risk because of the greater frequency of pre-eclampsia, premature labors, and lower birth weight infants. The pregnant adolescent is at nutritional risk and her nutritional requirements exceed those of adult women. These risk factors may be altered through nutrition intervention programs designed especiall for pregnant adolescents.

CHAPTER III

METHODS AND PROCEDURES

This chapter discusses the method used in conducting the research. It outlines the procedure used to obtain subjects to participate in the study. Further, it discusses the type of instrument used to obtain the data and the statistical treatment employed.

Type of Research

A descriptive study to access the nutritional quality of the food intake and dietary patterns of a group of pregnant adolescents was conducted. In addition, an assessment of the adolescent's dietary intake of iron was correlated with serum levels of hemoglobin and hematocrit. An analysis was made of the adequacy of the adolescent's diet in relation to selected variables. These were: age, between meal snacks, breakfast skipping, sources of nutrition information, person responsible for purchasing and preparation of food, use of vitamin and mineral supplements, and use of the foods provided by the Women, Infants, and Children (WIC) Program. In order to obtain the dietary information, an appointment with each participant was made to solicit the patients' willingness to participate in the study. The researcher conducted a short interview with each patient to explain the purpose of the research. A 24-hour dietary recall and questionnaire was completed by the participants. A review of the medical records provided the laboratory data needed.

Demographic Charactistics of Moton Target Area

The Moton target area is approximately eight square miles in size and includes a major portion of the impoverished North Tulsa area. Of the 12 census tracts involved, nine are classified as low socio-economic and only three as medium (Appendix A). According to the 1970 census, there were 26,427 families with a median family income of $7,590 and a total population of 102,263. Of the 13,638 adolescents (aged 11 to 20) residing in the Moton target area there are approximately 1,600 receiving health services at the Center. Of the 1,600 receiving health care, approximately one-fourth are receiving prenatal care.

Population and Sampling

The subjects who participated in this research were pregnant adolescents between the ages of 14 and 18 years obtaining prenatal care through the Moton Health Center, Tulsa, Oklahoma. Forty-five pregnant teenagers, enrolled in this Center during the months of October and November, 1980, were included in the study. The subjects were selected with consideration being given to their willingness to cooperate in the study.

Instrumentation

A practical and widely used method of dietary assessment is the 24-hour dietary recall. This method was used in combination with a questionnaire to provide information on selected factors which may affect eating patterns and adequacy of diet. The questionnaire was developed by the researcher to determine adolescents' food choices,

snacks, and meal patterns (Appendix B). The researcher referred to questionnaires and interview questions used by Baird (2), Drumm (7), and Finley (9) as a basis for the development of the instrument. Information from the medical records provided clinical data of hemoglobin and hematocrit levels, and the trimester of pregnancy for each participant.

Pre-testing of the instrument was done with 10 postpartum adolescents who delivered prior to the beginning of the study. Pre-testing was done to establish clarity and reliability. No information was available as to validity except for Baird (2), who used a modified questionnaire developed by Nutter (in 2) for Wisconsin where it was used in 1973. The 10 adolescents were asked to respond to questions on the instrument while visiting the Health Center to receive WIC vouchers. They were asked to read the instructions and ask for help if needed. One additional question was added at the suggestion of several of the participants during the pre-test. Also, an additional item was added to the questions requiring a choice of selections as several of the participants wrote in this item in the area designated as "Other."

Collection of Data

The data were collected at the Moton Health Center during the months of October and November of 1980. While visiting the Center for a scheduled prenatal visit each participant was told about the study and asked to return at an arranged time to fill out the questionnaire and the 24-hour dietary recall. The blood sample was taken on the day the participant returned to fill out the questionnaire and the 24-hour dietary recall. The return visits were scheduled for

Tuesday, Wednesday, or Thursday, and the researcher provided transportation if the participant needed this service. Prenatal clinics at the Center are held on Mondays and Fridays, and are usually heavily scheduled so no attempt to administer the questionnaire was made on those days. Also, the researcher's adviser suggested the omission of Mondays as a day for the collection of data, as Sunday's meals may not be representative of the adolescents' usual intake. A Dietetic Assistant trained by the researcher assisted in giving instructions to the subjects for completing the questionnaire and the 24-hour dietary recall.

Analysis of Data

In this study an adequate diet was defined as one providing two-thirds or more of the Recommended Daily Allowances (RDA's) for all nutrients. Adequacy of food intake was obtained from information provided by the 24-hour dietary recall from each subject. This information was key punched on computer cards and analyzed for percentage of the RDA (1980) according to a computer program developed by the Food, Nutrition, and Institution Administration Department, Oklahoma State University, for dietary analysis. The mean intake and percentage of RDA for protein, calcium, iron, vitamin A, and vitamin C was determined for the entire group and for each age group. Statistical analysis was done by means of a second computer program developed by the Statistics Department, Oklahoma State University. The hypotheses of the study were tested for significance of difference by analysis of variance procedure. Duncan's multiple range test for variability was used to test mean differences. The statistical procedures involved in analysis of

variance and Duncan's multiple range test is described by Snedecar and Cochran (30). A scattergram was developed to show the correlation between the adolescents' dietary intake of iron and hemoglobin and hematocrit levels.

Summary

Forty-five pregnant adolescents enrolled in a prenatal clinic in Tulsa, Oklahoma, were the participants of this study. A 24-hour dietary recall record, along with a questionnaire was answered by each participant. Results were analyzed by computer programs to determine the mean intake and the percent of each RDA for five selected nutrients. Statistically, analysis of variance was used to test for significant difference between the adequacy of intake of the five nutrients in the adolescents' diets and selected variables selected variables as: age, skipping of breakfast, between meal snacks, sources of nutrition information, person responsible for food purchasing and preparation, use of vitamin and mineral supplements, and use of the foods provided by the WIC program. Also, a correlation between dietary intakes of iron and hemoglobin and hematocrit levels were shown by a scattergram.

CHAPTER IV

RESULTS AND DISCUSSION

This study was conducted to determine the dietary adequacy of protein, calcium, iron, vitamin A, and vitamin C in the diets of a selected group of pregnant adolescents enrolled in a comprehensive health center. In addition, an assessment of the pregnant adolescent's dietary intake of iron and serum levels of hemoglobin and hematocrit was made and an analyses of the adequacy of the adolescent's diet in relation to selected variables. These variables were age, between meal snacks, breakfast skipping, sources of nutrition information, person responsible for purchasing and preparation of food, use of vitamin and mineral supplements, and use of the foods provided by the WIC program.

Forty-five pregnant adolescents attending a prenatal clinic at the Moton Health Center were the subjects of the study. A 24-hour dietary recall record, along with the responses from a questionnaire, were analyzed. Hemoglobin and hematocrit values were determined from the medical records.

The intake of foods in the diet providing the five nutrients previously mentioned was examined. The Recommended Dietary Allowances (RDA) (1980) for this age group, plus the additional requirements during pregnancy were used as the standards of nutritional adequacy.

Descriptive Data of Participants

Age and Trimester of Pregnancy

The age distribution of the participants in the study is shown in Table II. The participants ranged in age from 14 to 18 years. The largest percentage of the participants, 25 (56%) were in the 16 and 17 year old group. Nine (20%) of the participants were under the age of 16 years. Four (9%) of the participants were 14 years of age and represented the smallest percentage of participants in the study. The average age of the participants was 17.7 years, with one out of three participants being 17 years of age.

TABLE II

FREQUENCY AND PERCENTAGE OF PARTICIPANTS ACCORDING TO AGE

Age of Participants	Number	Percent
14 years	4	8.9
15 years	5	11.1
16 years	10	22.2
17 years	15	33.3
18 years	11	24.4
Total	45	99.9*

*Does not equal 100%, due to rounding.

The trimester of pregnancy of the participants is shown in Table III. Approximately 89 percent, or 40, of the participants were between the second and third trimester of pregnancy. Only five of the participants (11%) were interviewed during the first trimester of pregnancy.

TABLE III

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO TRIMESTER OF PREGNANCY

Trimester of Pregnancy	Number	Percent
First Trimester	5	11.1
Second Trimester	20	44.4
Third Trimester	20	44.4
Total	45	99.9*

*Does not equal 100%, due to rounding.

Nutrient Intake

The 24-hour dietary recalls were analyzed by a computer program for mean intake and percent of RDA for protein, calcium, iron, vitamin A, and vitamin C. Significance of difference for each hypotheses was tested statistically by analysis of variance procedure. Duncan's multiple range test for variability was used to test mean difference.

For this study, adequacy of diet was defined as an intake of two-thirds or more of all five nutrients being studied. The mean daily intake and percentage of RDA for each nutrient is reported in Table IV. The data indicated that 13 (29%) of the participants met the criterion for adequacy.

TABLE IV

RESPONDENTS' MEAN DAILY INTAKE AND PERCENTAGE OF 1980 RECOMMENDED DIETARY ALLOWANCES OF NUTRIENTS (N=45)

Nutrient	RDA	Mean Intake	Range of Intake	% of RDA
Protein g	76	98.6	34.0 - 265.0	119.0
Calcium mg	1600	1113.9	229.0 - 3143.0	69.6
Iron mg	18+	14.3	4.1 - 30.1	79.3
Vitamin A RE	1000	1714.9	139.2 - 13111.2	171.0
Vitamin C mg	80	122.3	11.0 - 448.0	153.0

The data in Table IV showed that three of the mean nutrient intakes (protein, vitamin A, and vitamin C) exceeded 100 percent of the RDA. Adequacy at two-thirds of the RDA level was met and exceeded for iron, 73.9 percent, and for calcium, 69.6 percent. Vitamin A was found to be the nutrient most adequately met in the diets of the pregnant adolescents, with calcium the least adequate nutrient.

A wide range of intake of all nutrients was found as shown in Table IV. Thirteen of the 45 participants (29%) had diets with two-thirds adequacy for the five nutrients. However, eight (18%) of the participants had intakes that fell below two-thirds of the RDA for four of the nutrients studied, while six (13%) had intakes that fell below two-thirds of the RDA for three of the nutrients studied (Appendix C). Thus, 14 (31%) of the participants had inadequate intake of three or four nutrients.

The findings in this study differ somewhat from the findings of the Ten State Nutrition Survey (42) and the Haider and Wheeler (10) study. These researchers found protein intakes were usually adequate and met or exceeded the RDA for this age group. However, iron intakes in both studies were found to be lower than the RDA, with the majority of the subjects consuming less than two-thirds of the RDA for iron.

Another study, the 1978 Food Consumption Survey (34), reported that the nutrient most frequently below the RDA for teenagers was calcium. The mean calcium intake of the teenagers in this survey was 69.6 percent adequate, which showed only a slightly higher intake than the two-thirds percent RDA.

Iron, Hemoglobin, and Hematocrit

The RDA (1980) for iron for pregnant females in this age group is 18+ mg per day. Also, it is recommended that additional iron by supplementation of 30-60 mg daily be used to increase the intake of iron from the diet. Thirty-five (77.8%) of the participants had iron intakes from food below the RDA of 18+ mg. Thus, only 10 (22.2%) of the participants met or exceeded the RDA for iron. However, 30 of the 45

participants (55.7%) met or exceeded two-thirds of the RDA for iron. The two participants with the highest intake levels of iron (29.9 mg and 30.1 mg) reported the consumption of one and a half and two servings, respectively, of iron-fortified cereal on the day of the study. The mean intake of iron for the participants was 14.3 mg with a minimum intake of 4.1 mg and a maximum intake of 30.1 mg (Table V).

TABLE V

FREQUENCY AND PERCENTAGE OF PARTICIPANTS ACCORDING TO INTAKE OF IRON

Percentage of RDA	Number	Range of Intake		Percentage
		Minimum mg	Maximum mg	
Less than 66-2/3	15	4.1	10.7	33.3
66-2/3 - 100	20	12.4	16.7	44.4
Over 100	10	18.4	30.1	22.2
Total	45			99.9*

*Does not equal 100%, due to rounding.

The hemoglobin and hematocrit values of the subjects were recorded and assessed. The criterion for acceptable values of hemoglobin and hematocrit was adopted by the researcher from standards set by the United States Department of Health, Education, and Welfare, as reported in Iron Nutriture in Adolescence (36). Twelve mg/100 ml of hemoglobin and 36 percent hematocrit were used as acceptable standards for this study.

The mean hemoglobin value for the participants was 11.8 g/100 ml. This mean value was found to be only slightly less (0.2 g/100 ml) than the acceptable standard of 12.0 g/100 ml. Twenty-six (57.8%) of the participants had hemoglobin values above the acceptable standard. Nineteen (42.2%) had hemoglobin values below 12.0 g/100 ml. For all participants, hemoglobin values ranged from 9.1 g/100 ml to 13.9 g/100 ml.

Hematocrit values ranged from 27.8 percent to 42.3 percent, with a mean value of 35.6 percent. As with hemoglobin values, the mean hematocrit value of the participants was only slightly less (0.4%) than the acceptable standard of 36 percent. Twenty-two (48.9%) of the participants had hematocrit values above the standard. Twenty-three (51.1%) had hematocrit values below the acceptable standard of 36 percent. Thus, approximately 50 percent of the participants in the study can be assessed as having acceptable hemoglobin and hematocrit values.

The relationship of dietary iron intake to hemoglobin and hematocrit values was determined by a scattergram (Figures 1 and 2). The data identified an inconsistent correlation between low dietary intakes of iron and low hemoglobin and hematocrit values for these participants. It must be noted that the diets of the participants in this study were supplemented with iron. Ferrous sulfate tablets, 325 mg, three times daily were prescribed by the physician.

Beal (4) investigated the correlation between long term iron intake and the level of indexes either in blood or in tissue, and found that girls between 16 and 18 years of age with a median intake of 9 to 10 mg of dietary iron each day had acceptable hemoglobin, hematocrit, and mean corpuscular hemoglobin concentrations despite the seemingly inadequate iron intake. This may be due partially to the use of iron

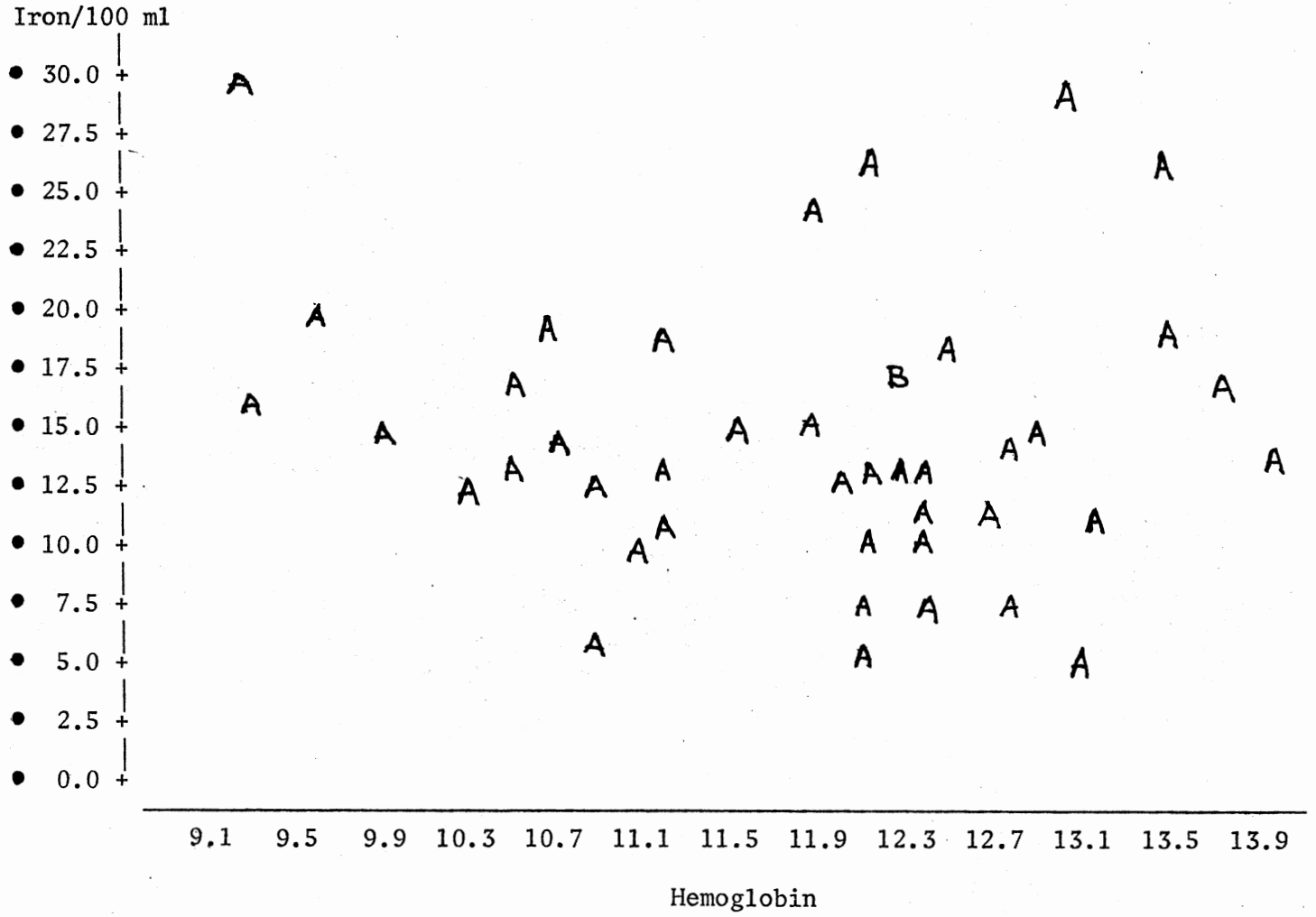

Figure 1. Scattergram Showing Relationship of Hemoglobin Concentration Values to Dietary Intake Levels of Iron

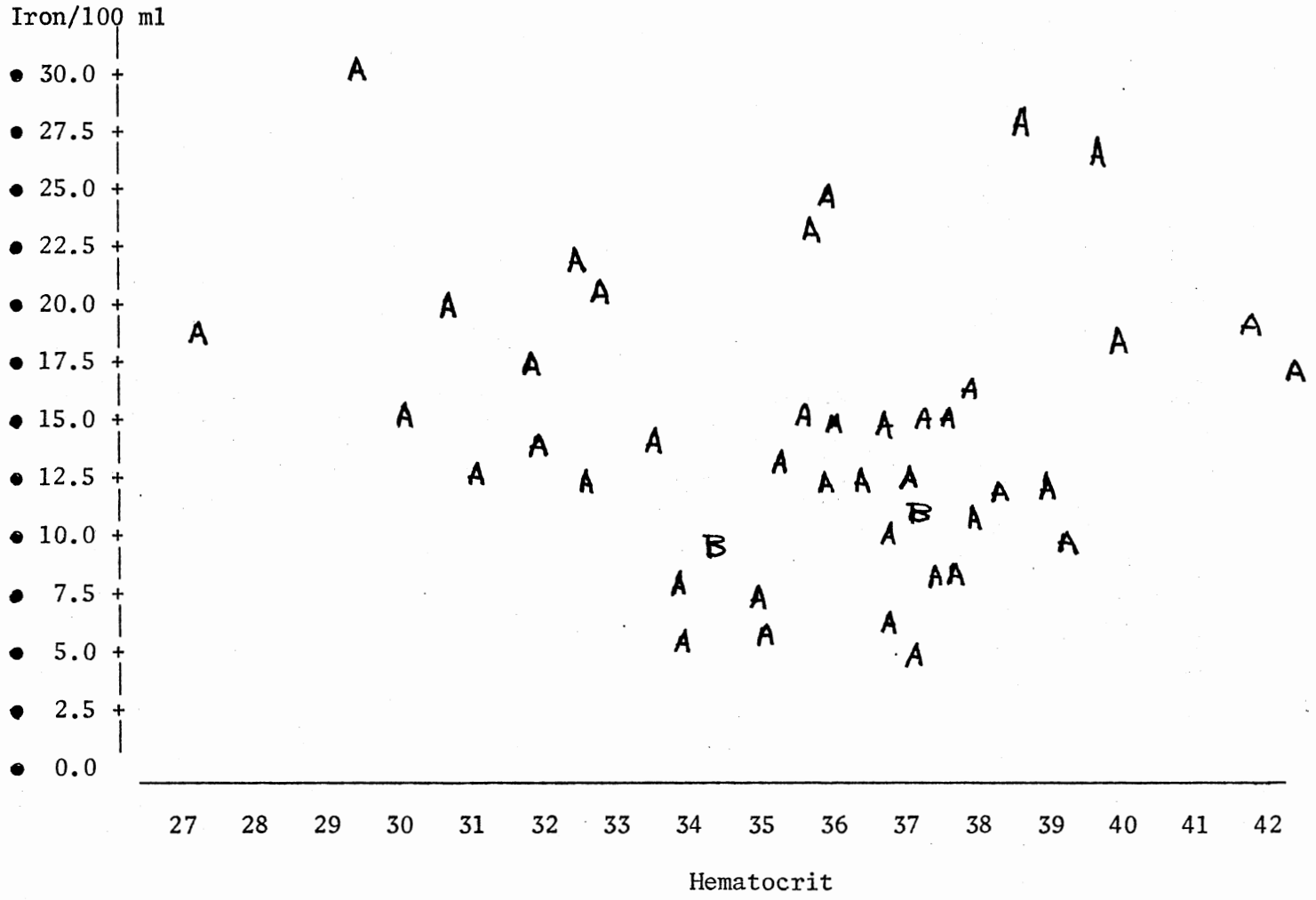

Figure 2. Scattergram Showing Relationship of Hematocrit Concentration Values to Dietary Intake Levels of Iron

supplements by the majority of the participants in this study. A more extensive study with a larger number of subjects is necessary to validate these findings.

Adequacy of Intake and Age

The ages of the participants in the study ranged from 14 to 18 years. The age of the participants in relation to adequate dietary intake of all five nutrients were analyzed by frequency, percentage, and analysis of variance (Tables VI and VII).

TABLE VI

FREQUENCY AND PERCENTAGE OF ADEQUATE DIETARY INTAKE ACCORDING TO AGE OF RESPONDENT

Respondent Groups	Number	Number with Adequate Diet	Percentage with Adequate Diet
14 year olds	4	2	50
15 year olds	5	1	20
16 year olds	10	6	60
17 year olds	15	2	13
18 year olds	11	2	18
Total	45	13	

The 16 year old participants in this study had more adequate diets than any other age group. The majority of them, eight (80%),

had intake levels that exceeded two-thirds of the RDA for four of the five nutrients studied; namely, protein, iron, vitamin A, and vitamin C (Table VII). Six (60%) of the 16 year old participants had calcium intake levels that met or exceeded two-thirds of the RDA. The nutrient consumed in the least quantity for this age group was calcium, 81 percent of the RDA.

TABLE VII

MEAN NUTRIENT INTAKE AS COMPARED TO 1980 RECOMMENDED DIETARY ALLOWANCES ACCORDING TO AGE OF RESPONDENTS (N=15)

Subjects' Age (RDA)	Protein 76g	Calcium 1600 mg	Iron 18+ mg	Vitamin A 1000 RE	Vitamin C 70 mg*
14 year olds N=4	147.0	1754.7	17.5	1785.7	91.5
% of RDA	193	109	97.0	178	130
15 year olds N=5	95.4	1274.6	15.9	6023.6	117.6
% of RDA	119	79.0	89.0	602	196
16 year olds N=10	90.8	1288.3	16.6	1538.0	157.5
% of RDA	119	81.0	92.0	154	263
17 year olds N=5	85.4	997.4	12.3	2992.4	136.3
% of RDA	112	62.0	68.3	187	227
18 year olds N=11	74.8	807.9	13.3	760.7	106.2
% of RDA	98.0	50.0	74.0	76.0	177

*Vitamin C RDA for girls 15-18 years is 80 mg; vitamin C RDA for girls 11-14 years is 70 mg.

Two of the 14 year old participants (50%) had food intakes which were considered inadequate. All four (100%) of these subjects had intake levels that met or exceeded two-thirds of the RDA for protein, calcium, and vitamin A. Three-fourths (75%) of the 14 year olds met or exceeded two-thirds of the RDA for iron, while only two (50%) met or exceeded two-thirds of the RDA for vitamin C. The 14 year old participants were least adequate in vitamin C (Table VII).

By contrast, only two (13%) of the 17 year old participants were considered to have adequate diets. Thirteen (87%) of the participants in this age group met or exceeded two-thirds of the RDA for protein. Ten (66%) met or exceeded two-thirds of the RDA for vitamin A and vitamin C. A smaller number of the 17 year old participants met or exceeded two-thirds of the RDA for iron and calcium than in any of the other age groups. Only eight (53%) met or exceeded two-thirds of the RDA for iron, while only five (33%) met or exceeded two-thirds of the RDA for calcium.

Only one 15 year old respondent (20%) met the criterion for an adequate diet. Four (80%) of the five participants met or exceeded two-thirds of the RDA for four nutrients: protein, iron, vitamin A, and vitamin C. The intake of vitamin A in this age group was reported at 602 percent of the RDA. An investigation of the 24-hour dietary recalls showed liver was eaten by two of the participants on the day of the study. The intake of calcium was lowest of all the nutrients consumed by this age group, 79 percent of the RDA.

Two (18%) of the 18 year olds had an adequate diet on the day of the survey. All the participants, 11 (100%), met or exceeded two-thirds of the RDA for protein. Seven (64%) met or exceeded two-thirds

of the RDA for iron and vitamin C. The intake of vitamin A was lowest for this age group, 76 percent of the RDA.

The analysis of variance statistical technique was used to determine the null hypothesis of no significant difference between adequacy of food intake and age of respondent. The findings are reported in Table VIII.

Table VIII

ANALYSIS OF VARIANCE FOR NUTRIENT INTAKE ACCORDING TO AGE OF RESPONDENT (N=45)

Variable	df	Mean Square	F-Score
Protein	4	6715.6	2.77*
Calcium	4	3416.9	1.94
Iron	4	1299.7	1.13
Vitamin A	4	273945.0	5.49**
Vitamin C	4	11174.2	0.54

*Significant at <.0402 level.

**Significant at <.0013 level.

The data indicated a significant difference at the <.05 level between age and adequacy of protein in the diets (F=2.77). There was a greater degree of significant difference between age and adequacy of vitamin A in the diets of the participants, <.001 level (F=5.49). The

data identified a significant decrease in the intake of protein and vitamin A as age increased. Thus, the null hypothesis was not accepted.

Duncan's multiple range test showed significance of mean intake of protein and vitamin A between the different age groups (Tables IX and X). The data showed the mean intake of protein by the 14 year olds to be significantly higher than that of the other age groups. Also, the mean intake of vitamin A by the 15 year old participants was significantly higher than that of the other age groups.

TABLE IX

DUNCAN'S MULTIPLE RANGE OF SIGNIFICANCE BETWEEN THE MEAN INTAKE OF PROTEIN ACCORDING TO AGE

	Age				
	14	15	16	17	18
Number	4	5	10	15	11
Mean	193.42	125.53	119.47	109.91	101.79
	A		B		

Between Meal Snacks

The majority, 43 (96%), of the participants snack between meals. Only two of the participants (4%) indicated that they never snack between meals (Table XI). This finding paralleled that found by Finley

(9), who reported only 3 of 70 adolescents in her study never snacked between meals.

TABLE X

DUNCAN'S MULTIPLE RANGE OF SIGNIFICANCE BETWEEN THE MEAN INTAKE OF VITAMIN A ACCORDING TO AGE

	Age				
	15	14	16	17	18
Number	5	4	10	15	11
Mean	603.32	178.49	153.73	105.70	78.51
	A	B			

TABLE XI

NUMBER AND PERCENTAGE OF PARTICIPANTS ACCORDING TO FREQUENCY OF SNACKS EATEN (N=45)

	Frequency							
	7 Day/Week		Four or More Days/Week		Less Than 3 Days/Week		Never	
	No.	%	No.	%	No.	%	No.	%
Snacks	16	36	13	29	14	31	2	4

Daily use of snacks was reported by the largest number, 16 (36%) of the participants, while 13 (29%) snack four or more times a week. Thus, 29 (65%) of the total number of participants snack regularly during the week.

The participants were asked to identify the kind of snacks eaten (Table XII). Snack choices included foods from the Basic Four Food Groups as well as other foods: candy, chips, and soft drinks. The foods most frequently eaten in descending order included fruit (76%), milk (62%), sandwiches (60%), soft drinks (58%), chips (53%), fruit juices (49%), meat (44%), and cereal (44%). McGanity et al. (15) found a high intake of snack items and soft drinks. A large proportion of the total intake of calories by the subjects in McGanity's study was derived from snack foods such as soft drinks, potato chips, french fries, candy, ice cream, and other sweets. Hence, high calorie, low nutrient type snacks were most often chosen by adolescents in McGanity's study in contrast to snacks chosen by the participants in this study.

Analysis of variance indicated no significant difference at the <.05 level between the adequacy of the adolescents' diets and the use of snacks (Table XIII). The null hypothesis was accepted.

Meal Skipping

Thirty-one of the participants (69%) indicated they do skip meals. Only 14 (31%) answered that they do not skip meals (Table XIV).

The data indicated that only one of the participants (2%) skipped lunch seven days a week. No one indicated skipping breakfast or dinner seven days a week. Twenty-six (58%) indicated that they skipped

breakfast, but less than seven days a week. Seventeen (38%) skipped lunch, but less than seven days a week, and seven (16%) skipped dinner, but less than seven days a week.

TABLE XII

NUMBER AND PERCENTAGE OF FOOD ITEMS EATEN BY PARTICIPANTS FOR BETWEEN MEAL SNACKS (N=45)

Food Item	No.*	Percent
Fruit	34	76
Milk	28	62
Sandwich	27	60
Soft Drinks	26	58
Chips	24	53
Fruit Juice	22	49
Meat	20	44
Cereal	20	44
Candy	18	40
Crackers	14	31
Cake or Cookies	13	29
Peanut Butter	11	24
Carrots	5	11
Hard Boiled Egg	3	7
Other	2	4
Cottage Cheese	1	2
Celery Stick	1	2

*Subjects could choose more than one response.

TABLE XIII

ANALYSIS OF VARIANCE FOR ADEQUACY OF NUTRIENTS ACCORDING TO BETWEEN MEAL SNACKS (N=45)

Variable	df	Mean Square	F-Score
Protein	4	963.407	0.8622
Calcium	4	940.874	0.7591
Iron	4	313.221	0.9071
Vitamin A	4	45160.5	0.6507
Vitamin C	4	15504.8	0.5523

Note: Probability = <.05.

TABLE XIV

NUMBER AND PERCENTAGE OF PARTICIPANTS ACCORDING TO FREQUENCY OF MEALS SKIPPED (N=45)

	Frequency									
	7 Day/Week		Four or More Days/Week		Less Than 3 Days/Week		Never		Total	
Meal	No.	%	No.	%	No.	%	No.	%	No.	%
Breakfast	0	0	5	11	21	47	19	42	45	100
Lunch	1	2	4	9	13	29	27	60	45	100
Dinner	0	0	0	0	7	16	38	84	45	100

Breakfast Skipping

In this study, 19 of the participants (42%) never skipped breakfast and 21 (47%) skipped breakfast less than three days a week. By contrast, in an Oklahoma Nutrition Needs Assessment, Baird (2) found that skipping breakfast increased as grade level increased and was more common for girls than for boys. Baird's study also found over two-fifths of the girls (44%) in grades 10-12 ate no breakfast.

The data in relation to breakfast skipping were analyzed. Analysis of variance indicated there was no significant difference at the <.05 level between the adequacy of the adolescents' diets and the skipping of breakfast (Table XV). Thus, the null hypothesis was accepted.

TABLE XV

ANALYSIS OF VARIANCE FOR ADEQUATE DIET RELATED TO BREAKFAST SKIPPING (N=45)

Variable	df	Mean Square	F-Score
Protein	1	90.072	0.8604
Calcium	1	62.832	0.8587
Iron		182.15	0.6968
Vitamin A	1	38842.5	0.4636
Vitamin C	1	9781.96	0.4880

Note: Probability = <.05.

Sources of Nutrition Information

The data in Table XVI showed that the participants in this study depended on many sources for nutrition information. The mother was reported as the most frequent source of nutrition information by 19 participants (42%). Other sources of information in descending order of frequency were: dietitian, home economics class, themselves, doctor/nurse, friends, television, newspapers, and magazines. Adolescents in Finley's (9) study also indicated that the mother had the most influence on food habits. Similarly, Baird's (2) study showed students in grades 10-12 selected parents as the most frequent source of "good food" information. Teachers were selected as the second most frequent source, with television selected as the third most frequent source.

TABLE XVI

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO SOURCES OF NUTRITION INFORMATION

Source	Number	Percentage
Mother	19	42
Dietitian	13	29
Home Economics Class	5	11
Self	3	7
Doctor/Nurse	2	5
Friends	1	2
Television	1	2
Newspaper/Magazine	1	2
Total	45	100

The hypothesis that there will be no significant difference between an adequate diet and sources of nutrition information was tested by analysis of variance. The data indicated that there was no significant difference at the <.05 level (Table XVII). Hence, the null hypothesis was accepted.

Food Purchasing and Preparation

The mother was the person who purchased most of the food, as indicated by 32 (71%) of the 45 participants (Table XVIII). Only four of the participants (9%) indicated that they did the majority of the food buying.

TABLE XVII

ANALYSIS OF VARIANCE FOR ADEQUATE DIET ACCORDING TO SOURCES OF NUTRITION INFORMATION (N=45)

Variable	df	Mean Square	F-Score
Protein	7	1387.33	0.8640
Calcium	7	2000.83	0.4117
Iron	7	748.588	0.7485
Vitamin A	7	78542.3	0.3586
Vitamin C	7	12115.1	0.7743

Note: Probability = <.05.

TABLE XVIII

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO PERSON DOING FOOD PURCHASING AND MEAL PREPARATION

	Food Buying		Food Preparation	
	No.	%	No.	%
Mother	32	71.0	26	58.0
Husband	6	13.0	2	4.0
Self	4	9.0	13	29.0
Grandmother	1	2.2	0	0
Father	1	2.2	0	0
Other	1	2.2	4	9.0
Total	45	99.6*	45	100.0

*Does not equal 100%, due to rounding.

In addition, the mother prepared most of the meals, as indicated by 26 (58%) of the participants. Only 13 (29%) of the adolescents indicated that they prepare the family's meals.

Analysis of variance was used to test for significant difference at the <.05 level. The data showing the significant difference between adequate diet and the person preparing the family's meals is shown in Table XIX. No significant difference was found by analysis of variance. Hence, the null hypothesis was accepted.

In addition to food purchasing and preparation practices, the participants were asked how often meals were eaten away from home, and to identify the meal and the place where it is most often eaten.

The largest number of participants, 16 (35%), indicated that they ate away from home one time each week. Twenty-four (53%) of the 45 participants ate away from home two to five times each week. Only two participants (4%) indicated that they never ate away from home (Table XX).

TABLE XIX

ANALYSIS OF VARIANCE ACCORDING TO PERSON DOING FOOD PURCHASING AND MEAL PREPARATION (N=45)

Variable	df	Mean Square	F-Score
Protein	3	1145.42	0.7608
Calcium	3	398.914	0.8979
Iron	3	946.229	0.4988
Vitamin A	3	15279.2	0.8920
Vitamin C	3	35831.2	0.1401

Note: Probability = <.05.

Twenty-two (49%) of the participants identified lunch as the meal most often eaten away from home, while 19 (42%) indicated dinner as the meal most often eaten away from home. Breakfast was eaten away from home less frequently than any other meal (Table XXI).

The school lunch was selected by 14 (31%) of the participants as the place where meals were most often eaten away from home. Twelve of

the participants (27%) selected a restaurant when they ate away from home, while 11 (24%) indicated someone's home (Table XXII).

TABLE XX

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO PARTICIPANTS' EATING OF MEALS AWAY FROM HOME

Frequency of Meals Away from Home	Number	Percentage
Daily	3	6.6
Once a Week	16	35.5
2-3 Times a Week	12	26.6
4-5 Times a Week	12	26.6
Never	2	4.4
Total	45	99.7*

*Does not equal 100%, due to rounding.

TABLE XXI

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO MEAL EATEN AWAY FROM HOME

Meal	Number	Percentage
Breakfast	3	6.6
Lunch	22	48.8
Dinner	19	42.2
No Answer	1	2.2
Total	45	99.8

*Does not equal 100%, due to rounding.

TABLE XXII

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO PLACE OF MEAL EATEN AWAY FROM HOME

Place of Meals	Number	Percentage
School Lunch	14	31.1
Restaurant	12	26.6
Someone's Home	11	24.4
Fast Food Counter	6	13.3
Cafeteria	1	2.2
Other	1	2.2
Total	45	99.8*

*Does not equal 100%, due to rounding.

Use of Vitamin-Mineral and Iron Supplements

The majority of the participants in the study, 40 (89%), reported that they took vitamin-mineral supplements. Forty-three (93%) reported the use of iron supplements. Thus, 91 percent of the participants in this study took vitamin-mineral and iron supplements during the week. Only five of the participants (11%) indicated that they did not take vitamin-mineral supplements, and only three (7%) indicated that they did not take iron supplements (Table XXIII). All of the participants that reported taking vitamin-mineral and iron supplements indicated that the supplements were prescribed by a doctor.

These data were tested for significance of difference by analysis of variance. The findings indicated no significant difference at the

<.05 level between the adequacy of the adolescents' diet and the use of vitamin-mineral and iron supplenents (Tables XXIV and XXV). The null hypothesis was accepted.

TABLE XXIII

FREQUENCY AND PERCENTAGE OF RESPONSES ACCORDING TO USE OF VITAMIN-MINERAL AND IRON SUPPLEMENTS

Frequency of Use	Vitamin-Mineral Supplements		Iron Supplements	
	No.	%	No.	%
More Than Once/Day	9	20	26	58
Once a Day	31	69	14	31
2-3 Times a Week	0	0	0	0
Once a Week	0	0	0	0
None	5	11	3	7
Total	45	100	45	100

Use of Foods Provided by WIC Program

One objective of the WIC Program is to provide supplemental food that is recognized as part of an essential diet for specific nutritionally at-risk population groups. Pregnant adolescents are considered nutritionally at-risk and are given high priority for inclusion in the WIC Program. The frequency of use of the foods provided by the WIC Program was studied. Forty-three (96%) of the participants were

enrolled in the WIC Program. Only two (4%) were not enrolled in the WIC Program at the time of the study.

TABLE XXIV

ANALYSIS OF VARIANCE FOR ADEQUATE DIET ACCORDING TO USE OF VITAMIN-MINERAL SUPPLEMENTS

Variable	df	Mean Square	F-Score
Protein	2	325.217	0.8953
Calcium	2	297.115	0.8619
Iron	2	47.1554	0.9619
Vitamin A	2	43214.6	0.5515

Note: Probability = <.05.

TABLE XXV

ANALYSIS OF VARIANCE FOR ADEQUATE DIET ACCORDING TO USE OF IRON SUPPLEMENTS

Variable	df	Mean Square	F-Score
Protein	3	3194.10	0.3420
Calcium	3	2415.30	0.2919
Iron	3	1919.42	0.1746
Vitamin A	3	62111.7	0.4614
Vitamin C	3	24505.6	0.2998

Note: Probability = <.05.

The WIC foods which the participants ate every day were milk, citrus fruit juice, iron-fortified cereal, cheese, and eggs. The number and percentage of responses to daily use of these items are shown in Table XXVI. Milk was consumed daily by the largest number of participants, 27 (60%). Other WIC foods consumed daily in descending order were: citrus fruit juice, 22 (49%); iron-fortified cereal, 18 (40%); cheese, 14 (32%); and eggs, 12 (27%). Consumption of the WIC foods from four to five times each week included: iron-fortified cereal, 13 (29%); eggs, 9 (20%); milk, 8 (18%); citrus fruit juice, 7 (16%); and cheese, 5 (11%).

TABLE XXVI

FREQUENCY AND PERCENTAGE OF SUBJECTS' USE OF WIC PROGRAM FOOD

	Frequency of Use									
	Daily		Four-Five Times/Week		Two-Three Times/Week		Once/Week		No Answer	
Food Item	Daily No.	%	No.	%	No.	%	No.	%	No.	%
Milk	27	60	8	18	5	11	2	4	3	7
Citrus Fruit Juice	22	49	7	16	10	22	2	4	4	9
Iron-Fortified Cereal	18	40	13	29	9	20	4	9	1	2
Cheese	14	32	5	11	10	23	9	20	6	14
Eggs	12	27	9	20	15	33	7	16	2	4

The significance of difference between adequacy of diet and the use of foods provided by the WIC Program were tested by analysis of variance (Table XXVII). The data indicated that there was a significant difference between adequacy of diet and the use of foods provided by the WIC Program. However, the adequacy of calcium in the diets was significantly related to the intake of milk provided by the WIC Program at the <.03 level. Also, the adequacy of protein in the diets was significantly related to the consumption of cheese provided by the WIC Program at the <.05 level. There was no significant difference between the adequacy of the other three nutrients and the use of foods provided by the WIC Program.

Duncan's multiple range test to show significance between the means of the frequency of use of milk and cheese provided by the WIC Program as related to the adequacy of calcium and protein in the participants' diets is shown in Tables XXVIII and XXXIX. A daily intake of milk by 27 of the participants is shown to have the highest level of significance in relation to the adequacy of calcium in the diet. The consumption of cheese two to three times per week by 10 of the participants is shown to have the highest level of significance in relation to adequacy of protein in the diet.

Change in Eating Habits

The participants' responses to the question regarding a change in eating habits since becoming pregnant are shown in Table XXX. Forty-four (98%) of the participants indicated that they had made a change in their eating habits since the beginning of the pregnancy. The

TABLE XXVII

ANALYSIS OF VARIANCE FOR ADEQUATE DIET
RELATED TO USE OF WIC PROGRAM FOOD

Variable	df	Mean Square	F-Score
Milk			
Protein	4	4580.63	0.1611
Calcium	4	4825.83	0.0306*
Iron	4	1265.47	0.3699
Vitamin A	4	50048.3	0.6019
Vitamin C	4	5999.2	0.8867
Cheese			
Protein	4	6212.62	0.0592*
Calcium	4	3100.13	0.1718
Iron	4	442.963	0.8421
Vitamin A	4	57857.2	0.5376
Vitamin C	4	24742.7	0.3043
Eggs			
Protein	4	1676.87	0.6841
Calcium	4	1349.22	0.6068
Iron	4	1439.73	0.2975
Vitamin A	4	22794.8	0.8746
Vitamin C	4	36208.2	0.1132
Citrus Fruit Juice			
Protein	4	1860.12	0.6377
Calcium	4	659.343	0.8607
Iron	4	453.060	0.8301
Vitamin A	4	33166.2	0.7731
Vitamin C	4	35778.0	0.1176
Iron-Fortified Cereal			
Protein	4	5197.70	0.1105
Calcium	4	2969.91	0.1827
Iron	4	1556.70	0.2554
Vitamin A	4	9341.69	0.9737
Vitamin C	4	11247.1	0.7031

*Significant at <.05 level.

changes made as indicated by the participants' responses showed 58 participants (84%) drank more milk, 35 (78%) ate more cereal and bread, 29 (64%) ate more fruit, 28 (62%) ate more meat, 25 (56%) ate more vegetables, 27 (60%) ate less dessert, and 25 (56%) ate less junk foods.

TABLE XXVIII

DUNCAN'S MULTIPLE RANGE OF SIGNIFICANCE BETWEEN THE MEANS FOR CALCIUM ACCORDING TO INTAKE OF MILK PROVIDED BY THE WIC PROGRAM

	Frequency of Intake of Milk			
	Daily	Once a Week	4-5 Times/ Week	2-3 Times/ Week
Number	27	2	8	3
Mean	84.04	79.13	57.87	33.06
	A			
				B

The participants indicating a change in their eating habits were asked to list the person, persons, or source of information influencing them to eat differently once they were pregnant. The responses to this question are shown in Table XXXI.

The dietitian as the person influencing a change in eating habits was indicated by 23 (51.1%) of the participants. The mother was indicated by the second largest number of participants, 22 (48%). Other

influences in descending order of frequency were: self, doctor/nurse, other, friends, husband, grandmother, home economics class, and television.

TABLE XXIX

DUNCAN'S MULTIPLE RANGE OF SIGNIFICANCE BETWEEN THE MEANS FOR PROTEIN ACCORDING TO CONSUMPTION OF CHEESE PROVIDED BY THE WIC PROGRAM

	Frequency of Consumption of Cheese			
	2-3 Times/ Week	Once a Week	Daily	4-5 Times/ Week
Number	10	9	14	5
Mean	152.76	123.25	116.92	91.32
	A			
			B	

Summary

Information concerning the food intake patterns along with a 24 hour dietary recall was collected from 45 pregnant adolescents attending a prenatal clinic in Tulsa, Oklahoma. The medical records provided clinical data regarding the month of pregnancy and values for hemoglobin and hematocrit concentrations.

TABLE XXX

FREQUENCY AND PERCENTAGE OF RESPONSES
ACCORDING TO CHANGES IN
EATING HABITS

Food Item	Frequency			
	More Often		Less Often	
	No.	%	No.	%
Milk	38	84.4	5	11.1
Cereal & Bread	35	77.7	7	15.5
Fruit	29	64.4	14	31.1
Meat	28	62.2	13	28.8
Vegetables	25	55.5	16	35.5
Junk Foods	16	35.5	25	55.5
Desserts	13	28.8	27	60.0

TABLE XXXI

FREQUENCY AND PERCENTAGE OF RESPONSES
ACCORDING TO WHAT INFLUENCED
CHANGES IN EATING HABITS

Sources	Number	Percentage
Dietitian	23	51.1
Mother	22	48.8
Self	17	37.7
Doctor/Nurse	12	26.6
Other	8	17.7
Friends	6	13.3
Husband	5	11.1
Grandmother	5	11.1
Home Economics Class	3	6.6
Television	3	6.6
Newspaper/Magazine	1	2.2
No One	1	2.2
4-H or Other Clubs	0	0

The participants ranged in age from 14 to 18 years. The largest number of the participants in the study were found to be in the second and third trimester of pregnancy.

The diets of the adolescents were analyzed for five nutrients; protein, calcium, iron, vitamin A, and vitamin C. An analysis of frequency and percentage for adequacy based upon the 1980 Recommended Dietary Allowances for this age group, plus the additional requirements for pregnancy, was done. Adequacy in this study was defined as an intake of two-thirds or more of all five nutrients studied.

The study found that the food intake of 13 of the 45 participants (29%) on the day of the study was considered adequate by this definition. Vitamin A was found to be the nutrient most adequately consumed by all of the adolescents in the study. Calcium was the nutrient found to be most inadequate in all of the adolescents' diets.

Approximately 50 percent of the pregnant adolescents in the study were found to have acceptable hemoglobin and hematocrit levels. Only 10 (4.5%) of the participants met or exceeded the RDA for iron from food intake; however, 43 (93%) reported that they took iron supplements daily.

The relationship of adequacy of diet and selected variables as age, breakfast skippingk between meal snacks, sources of nutrition information, person responsible for food purchasing and preparation, use of vitamin-mineral and iron supplements, and the use of foods provided by the WIC Program was analyzed and reported in detail in Chapter IV.

The analysis of variance statistical technique for significant difference at the <.05 level was used to test for adequacy of diet

and the selected variables previously noted. No significant difference at the <.05 level was found for adequacy of diet and the variables: breakfast skipping, between meal snacks, sources of nutrition information, person responsible for food purchasing and preparation, and use of vitamin-mineral and iron supplements. However, significance at the <.04 level was found between age and adequacy of protein in the diets. Also, significance at the <.001 level was found between age and adequacy of vitamin A in the adolescents' diets. Additionally, significance at the <.03 level was found for adequacy of calcium in the diets and the intake of milk provided by the WIC Program. Also, significance at the <.05 level was found for adequacy of protein in the diets and the consumption of cheese provided by the WIC Program.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of the study was to assist the nutritionist in the development of an effective counseling program by studying the food habits of a group of pregnant adolescents enrolled at the Moton Health Center, Tulsa, Oklahoma. An assessment of their food intake will help to formulate suggestions and recommendations for reducing nutritional deficiencies to enable these adolescents to deliver normal, healthy infants.

The objectives in this study were as follows:

1. To determine the adequacy of protein, calcium, iron, vitamin A, and vitamin C in the diets of pregnant adolescents based on the Recommended Daily Allowances (RDA) for 1980.

2. To assess the pregnant adolescent's dietary intake of iron (based on the RDA for 1980) and serum levels of hemoglobin and hematocrit.

3. To assess the adequacy of the adolescent's diets and selected variables such as: age, between meal snacks, breakfast skipping, sources of nutrition information, person responsible for purchasing and preparation of food, use of vitamin and mineral supplements, and use of the foods provided by the Women, Infants, and Children (WIC) Program.

4. To make suggestions and recommendations for a nutrition counseling program designed to improve the diets of pregnant adolescents enrolled at the Moton Health Center.

During the months of October and November, 1980, 45 pregnant adolescents attending the prenatal clinic were interviewed. Information concerning their food intake patterns, along with a 24-hour dietary recall, was collected. The medical records provided clinical data regarding the month of pregnancy and values for hemoglobin and hematocrit concentrations. Selection of subjects was made according to their willingness to participate in the study.

The participants ranged in age from 14 to 18 years. The largest percentage of the participants, 25 (56%), were in the 16 and 17 year old group. The 14 year old participants comprised the smallest percentage of the participants, totaling only nine percent of the entire group.

Approximately 89 percent of the participants in the study were found to be in the second and third trimester of pregnancy. Only five of the participants (11%), were interviewed during the first trimester of pregnancy.

The diets of the participants were analyzed by frequency and percentage for adequacy based upon the 1980 Recommended Dietary Allowances for this age group, plus the additional requirements during pregnancy. Nutrients analyzed for adequacy were: protein, calcium, iron, vitamin A, and vitamin C. Adequacy in this study was defined as an intake of two-thirds or more of all five nutrients studied.

It was found that 13 of the 45 pregnant adolescents (29%) studied had food intake which met two-thirds or more of the RDA for these five nutrients. Vitamin A was found to be the nutrient most adequately consumed by all of the adolescents in the study, 171 percent of the RDA. Both protein and vitamin C intake levels exceeded 100 percent of the

RDA, 119 percent and 153 percent, respectively. Calcium was the nutrient found to be most inadequate in all of the adolescents' diets, 69.6 percent of the RDA.

Approximately 50 percent of the participants in the study were assessed as having acceptable hemoglobin and hematocrit values. Yet, the researcher found only 10 participants met or exceeded the RDA for iron. The relationship of dietary iron intake levels to hemoglobin and hematocrit values was plotted on a scattergram. Low dietary intakes of iron did not correlate consistently with low hemoglobin and hematocrit values for these participants. A more extensive study regarding this relationship is recommended.

The relationship of adequacy of diet to age of the participants was studied. It was found that the 14 and 16 year old subjects had the largest percentage of participants with diets rated as adequate. Fifty percent of the 14 year olds and 60 percent of the 16 year olds had intakes that were rated as adequate for all nutrients studied. The 17 and 18 year olds had intakes with the smallest percent rated as adequate.

Between meal snacks do make a contribution to the total nutrient intake of adolescents and can be used to provide a good source of valuable nutrients. The relationship of adequacy of diet and between meal snacks was studied. It was found that 65 percent of the participants in this study snack regularly during the week. Fruit, milk, and sandwiches were identified as the snacks most often selected by these adolescents. The adolescents should be encouraged to continue to select these food items. Also, other good snack choices such as

cheese, whole grain crackers, nuts, fresh and dried fruits, fruit juices, and raw vegetables should be emphasized.

Skipping breakfast was another variable studied in relation to adequacy of all five nutrients in the adolescents' diets. In this study it was found that 19 (42%) of the participants never skip breakfast. By contrast, it was found that only five participants (11%) skipped breakfast four or more days each week. Teachers in the classroom need to stress earlier the importance of three meals a day and the contribution of breakfast to the total day's intake.

Sources of nutrition information was studied in relation to adequacy of diet. The mother, as the most frequent source of nutrition information, was indicated by 42 percent of the participants in the study. A dietitian was selected by the second largest percentage (29%), and a home economics class was selected by the third largest percentage (11%). Thus, it may be concluded that these adolescents look to adults and professionals for guidance. These individuals contribute significantly to the development of the adolescent's food habits. The parents should be included in the planning of and assistance with the implementation of nutrition education programs. Nutritionists and home economics teachers can help by emphasizing the important role of the selection of foods as the best means of achieving good health for the mother and baby.

Additionally, a total of 71 percent of the participants in the study indicated that the mother purchased the food for the home. Also, 58 percent indicated that the mother prepared most of the meals in the home. Again, the mothers of the adolescents are shown to have the major influence over what these subjects consume. Efforts to improve the diet must include the mothers. Nutrition programs must be geared

to reach the mothers through Extension and Food Stamp Programs, television, and magazine and newspaper articles. Professionals should coordinate efforts to help educate these mothers.

In this study the use of vitamin-mineral and iron supplements in relation to adequacy of the adolescents' diets showed that the majority of the participants (91%) were taking these supplements. Forty (89%) of the adolescents reported that they take vitamin-mineral supplements, while 43 (93%) reported taking iron supplements. All of the participants indicating that they were taking vitamin-mineral and iron supplements reported that the supplements were prescribed by the doctor.

Routine supplementation of the diets of pregnant women and adolescents is a regular practice in most prenatal clinics. If the pregnant adolescent's diet is found to prove an abundance of the necessary nutrients, the prescribing of supplements routinely might require modification.

Use of foods provided by the Women, Infants, and Children's (WIC) Program, when analyzed in relation to adequacy of diet, showed that 43 (96%) of the adolescents in the study were participating in the WIC Program. All of the foods provided by the WIC Program were being consumed by the majority of the participants each day. It was found that milk was the food item being consumed daily by the largest percentage of the participants, 60 percent.

The results of the analysis of variance statistical technique identified no significant difference at the $<.05$ level for adequacy of diet and the variables: breakfast skipping, between meal snacks, sources of nutrition information, person responsible for food purchasing

and preparation, and use of vitamin, mineral, and iron supplements. Significance at the <.04 level was found between age and the adequacy of protein in the diets. Also, significance at the <.001 level was found between age and adequacy of vitamin A in the adolescents' diets. The data identified a significant decrease in the intake of protein and vitamin A as age increased. Additionally, there was a significant difference found between adequacy of diet and use of foods provided by the WIC Program. Significance at the <.03 level was found for the adequacy of calcium in the diets and the intake of milk provided by the WIC Program. Also, significance at the <.05 level was found for the adequacy of protein in the diets and the consumption of cheese provided by the WIC Program. Eggs were identified as the food item consumed each day by the smallest percentage of the participants, 27 percent. The study showed that the foods provided by the WIC Program made a significant contribution to the adequacy of protein and calcium in the diets of the participants.

Recommendations for a Nutrition Education Program

Based upon the findings from this study and a review of the literature, the following suggestions are made for a nutrition counseling program designed to improve the diets of pregnant adolescents enrolled at the Moton Health Center:

1. To reinforce the good eating habits presently existing among the pregnant adolescents.

2. To emphasize the importance of including foods in the diet each day that provide good sources of calcium and iron.

3. To emphasize for the 17 and 18 year old adolescents the importance of including foods in the diet each day that provide food sources of calcium and vitamin A.

4. To stress the importance of eating breakfast daily and what foods should be included.

5. To include knowledge about the contribution of snacks to our daily nutrient intake. To promote the use of high nutrient density snacks.

6. To encourage the continued use of vitamin-mineral and iron supplements.

7. To emphasize the importance of the proper use of the foods provided by the WIC Program.

8. To provide nutrition education for the parents of the pregnant adolescents.

9. To coordinate nutrition education programs with other professionals that educate adolescents.

10. To emphasize nutrition for pregnant adolescents in the Foods and Nutrition College Curricula and In-Service Education Programs for dietitians.

Recommendations for Further Study

This study was conducted with a limited number of participants in one prenatal clinic setting. For comparison, further studies are needed in other clinics with a larger number of participants.

1. In this study, the food intake record was limited to 24 hours. Further studies should increase the number of days used to report food

intake. Two 24 hour or a three-day food intake record may prove to be more meaningful.

2. A longitudinal study to access the relationship of the influence of dietary iron intake to the serum level concentrations of hemoglobin and hematocrit would help to validate the findings of this and other research.

3. Since income is a factor in determining the amount and kind of food purchased for the family, a study to research the relationship between income and amount of money spent for food as a factor affecting adequacy of the diets of pregnant adolescents is recommended.

4. The adolescents in this study were interviewed during the months of October and November. Nearly all of the participants were enrolled in a school which provided a school lunch. Time of year as a factor influencing adequacy of diet of pregnant adolescents is recommended for further research.

5. The majority of the participants in this study were enrolled in the WIC Program. A study to compare the diets of pregnant adolescents enrolled in a WIC Program to the diets of pregnant adolescents not participating in a WIC Program is recommended.

6. A study is recommended to evaluate the relationship between self concept of pregnant adolescents and their selection of food.

7. A follow-up study is recommended to evaluate the health and nutritional status of the infants born to pregnant adolescents.

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APPENDIXES

APPENDIX A

TULSA CITY MAP

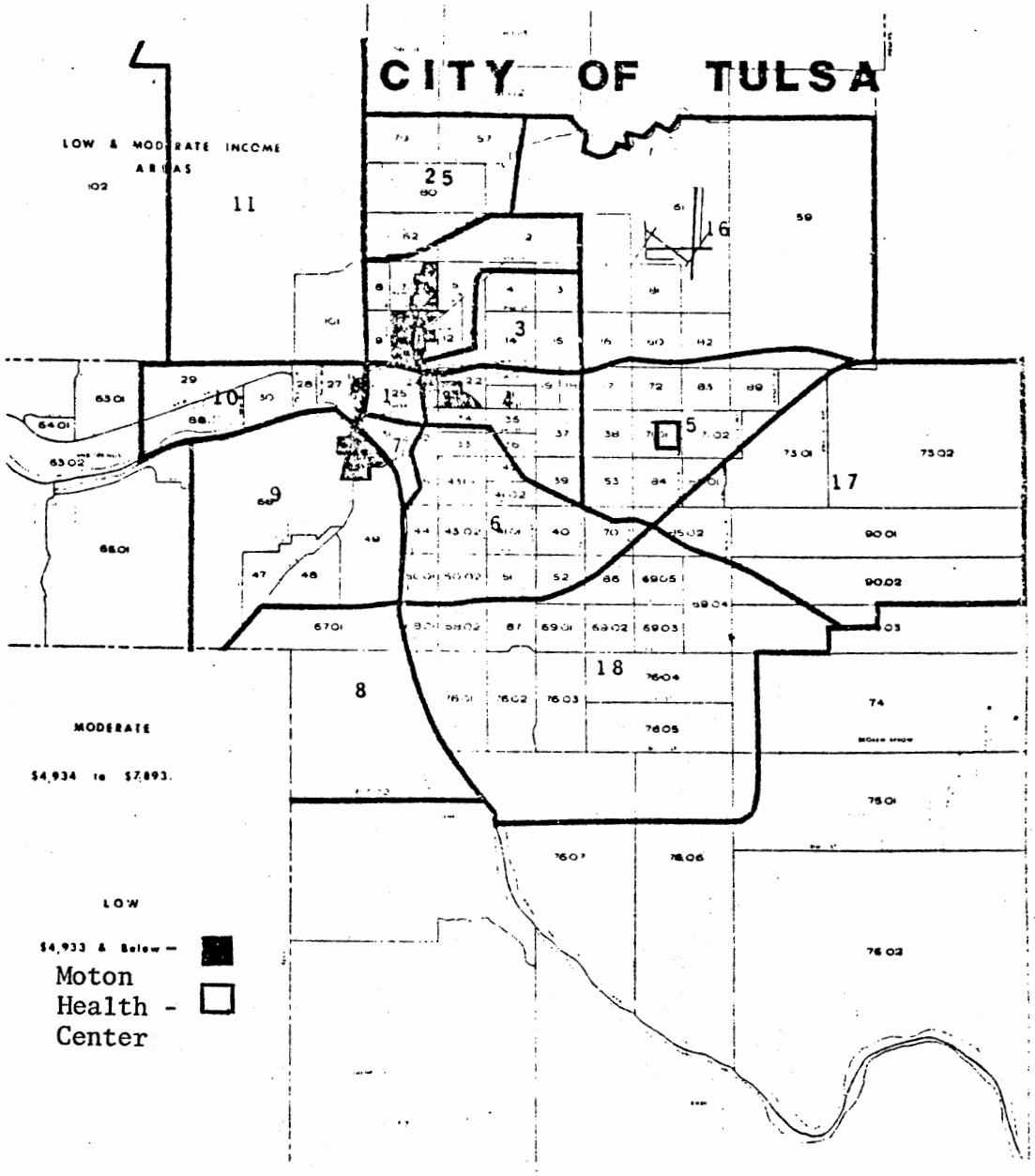

Figure 3. Map of the City of Tulsa

APPENDIX B

24-HOUR DIETARY RECALL AND QUESTIONNAIRE

24-HOUR DIETARY RECALL

Please record all the food you have eaten in the past 24 hours. Tell me everything you ate and drank at home, work, or away from home.

1. Start with the last food you ate before starting to fill out this questionnaire. Write the name of the food eaten, the time it was eaten, and the amount.
2. Think back to the hour before the food you just wrote on the 24-hour recall sheet in step one. Write the name of the food eaten, the time it was eaten, and the amount.
3. Continue to think back hour by hour writing all food eaten, the time it was eaten, and the amount until you have written all foods eaten back to this time yesterday.

Begin with the last thing you ate or drank before beginning this questionnaire. Example: If you begin this dietary recall at 10:00 a.m. and your last intake of food was at 8:00 a.m., list all foods and beverages eaten then. Now think back to the hour before, listing any food or beverages taken. Continue to think backwards and list all food, beverages, and snacks eaten for an entire 24 hour period, stopping with 10:00 a.m. the day before the dietary recall was started.

In the column marked TIME: record the approximate time each food was eaten.

In the column marked FOOD & PREPARATION: list all food and beverages including bread, butter, sugar, cream, salad dressing, candy, tea, coffee, other drinks, nuts, catsup, gravy, potato chips, etc. Also, describe the method used to prepare the food. Example: chicked, fried, boiled, baked; potatoes, boiled, baked, scalloped, or fried; eggs, boiled, deviled, or scrambled.

In the column marked SIZE OF SERVING: indicate the amount you ate or drank in common household measures or weights. Example: milk, 1 cup; bread, 1 slice; butter, 1 teaspoon; fried chicken, 1 leg (medium); potato chips, 10; cake, 1 slice (large); gum, 1 stick; cheese sandwich, 2 slices of bread, 2 slices of cheese with 1 teaspoon of mayonnaise.

--- Please ask for assistance if needed.

TIME	FOOD & PREPARATION	SIZE OF SERVING
EXAMPLE:		
8:00 a.m.	fried egg	1
	white bread, toasted	1 slice
	with butter	1 tsp
	coffee	1 cup
	with cream	1 tbsp.

QUESTIONNAIRE

Please answer ALL of the following questions (ask for assistance if needed):

Name_____ Address_____

Birthdate_____ Marital Status: Married ( ); Single, Never Married ( ); Single, Divorced ( ); Married, Separated ( )

1. Indicate by a check (√) the frequency that you eat each of the following meals and snacks. Check only one frequency for each meal.

	7 Days/ Week	4 or More Times/Week	Less Than 3 Times/Week	Never
Breakfast	_____	_____	_____	_____
Lunch	_____	_____	_____	_____
Dinner	_____	_____	_____	_____
Between Meal Snacks	_____	_____	_____	_____

2. Who does the majority of food buying in your place of residence? Check (√) only one:

_____ Mother
_____ Grandmother
_____ Father
_____ Husband
_____ Boyfriend
_____ Self
_____ Other, Indicate

3. Do you help plan the family's meals? Check (√) only one.

_____ Frequently _____Sometimes _____Never

4. Who usually prepares the food in your place of residence? Check (√) only one:

_____Mother
_____Grandmother
_____Father
_____Husband
_____Boyfriend
_____Self
_____Other, Indicate

5. Do you skip meals? ___Yes ___No. If yes, identify below the frequency you skip the following meals by checking only one of the frequencies for each meal.

	Daily	4 or More Times/Week	Less Than 3 Times/Week	Never
I skip breakfast	_____	_____	_____	_____
I skip lunch	_____	_____	_____	_____
I skip dinner	_____	_____	_____	_____

6. What are your usual between meal snacks? Check (√) all that apply.

___Cake or Cookies
___Candy
___Chips
___Carrots
___Cereal
___Crackers
___Fruit
___Milk
___Cottage Cheese
___Celery Sticks
___Soft Drinks such as: Coke, Kool-Aid
___Hard Boiled Egg
___Peanut Butter
___Meat, such as: Luncheon/ Weiners
___Sandwich (Kind):_____
___Fruit Juice
___Other, Indicate
_____
_____

7. How often do you eat meals away from home?

___Daily
___Once a Week
___2-3 Times a Week
___4-5 Times a Week
___Never

8. If you eat out, which meal(s) do you most frequently eat away from home? ___Breakfast ___Lunch ___Dinner

9. Where are these meals most often eaten?

___School Lunch
___Fast Food Counter
___Restaurant
___Cafeteria
___Someone's Home
___Some Other Place, Indicate
_____

10. Are you currently enrolled in the WIC Program? If yes, answer question 11, if no, proceed to question 12. ___Yes ___No

11. Check how often you eat each of the following foods provided by the WIC Program:

Food	4-5 Times/ Week	2-3 Times/ Week	Once a Week
Milk	_____	_____	_____
Cheese	_____	_____	_____
Eggs	_____	_____	_____
Citrus Juice	_____	_____	_____
Iron-Fortified Cereal	_____	_____	_____

12. Where do you receive most of your information about food? Check (✓) only one.

___Home Economics Class
___4-H or Other Such Club
___Newspapers, Magazines
___Television
___Mother
___Grandmother
___Husband
___Friends
___Dietitian
___Doctor, Nurse
___Self
___Other, Indicate

13. Do you think you overeat? ___Yes ___No

14. Do you eat differently now than before this pregnancy? ___Yes ___No. If yes, check (✓) the frequency you eat each of the following foods.

	Frequency	
	Less Often	More Often
Meat	_____	_____
Milk	_____	_____
Fruits	_____	_____
Vegetables	_____	_____
Cereals & Breads	_____	_____
Desserts	_____	_____
Junk Foods: Chips	_____	_____
Honey Buns	_____	_____

15. If you are eating differently now, who or what (which person or persons, or source of information) influenced you to make a change in your eating habits? Check (√) all that apply.

___Home Economics Class
___4-H or Other Such Club
___Mother
___Grandmother
___Dietitian
___Self
___Newspapers & Magazines
___Television
___Doctor, Nurse
___Husband
___Friends
___Other, Indicate
___No One

16. Do you take multiple vitamins and minerals? ___Yes ___No
If yes, how often? Check (√) only one.

___Once a day
___More than Once a Day
___Once a Week
___Two to Three Times/Week
___Other, Indicate how Often

17. Were the multiple vitamins and minerals prescribed by your doctor?

___Yes ___No. If no, indicate why you take them_____

_____

18. Do you take an iron supplement? ___Yes ___No. If yes, how often? Check (√) only one.

___Once a Day
___More than Once a Day
___Once a Week
___Two to Three Times/Week
___Other, Indicate

19. Were the iron supplements prescribed by your doctor?

___Yes ___No. If no, indicate why you take them_____

_____

20. Do you have any additional questions concerning nutrition?

APPENDIX C

TABLE OF NUTRIENT INTAKE AND PERCENTAGE OF RECOMMENDED DIETARY ALLOWANCES

TABLE XXXII

NUTRIENT INTAKE AND PERCENTAGE OF RECOMMENDED DIETARY ALLOWANCES BY AGE GROUP AND NUMBER OF SUBJECTS

Age and No. of Subjects	Nutrients									
14 Years	Protein g	% of RDA	Calcium mg	% of RDA	Iron mg	% of RDA	Vitamin A RE	% of RDA	Vitamin C mg	% of RDA
1	129	169	1824	114	15.1	0.84	2129	213	129	184
2	111	146	1239	0.77	16.3	0.90	1996	199	26	0.37
3	83	109	1176	0.73	10.6	0.59	1177	117	36	0.51
4	265	348	2780	173	28.0	156	1841	184	175	250
15 Years										
1	122	160	1944	121	13.0	0.72	2412	241	23	0.29
2	83	109	1040	0.65	24.6	137	12645	1265	294	367
3	129	169	1985	124	19.7	109	13121	1312	100	125
4	47	0.61	850	0.51	7.7	0.43	240	0.24	67	0.83
5	96	126	554	0.34	14.7	0.82	1700	170	104	130

TABLE XXXII (Continued)

Age and No. of Subjects	Nutrients									
16 Years	Protein g	% of RDA	Calcium mg	% of RDA	Iron mg	% of RDA	Vitamin A RE	% of RDA	Vitamin C mg	% of RDA
1	77	101	1375	0.86	14.9	0.83	5618	561	125	156
2	113	148	1184	0.74	14.9	0.83	721	0.72	373	466
3	128	168	2388	149	13.2	0.73	1231	123	135	168
4	38	0.50	431	0.27	6.5	0.36	786	0.79	26	0.33
5	34	0.44	277	0.17	5.8	0.32	389	0.39	83	103
6	98	128	1077	0.67	29.9	166	831	0.83	234	292
7	112	147	1218	0.76	19.2	107	3825	382	366	457
8	71	0.93	975	0.60	14.2	0.79		0.18	11	0.14
9	138	181	3143	196	30.1	167	1108	111	93	116
10	99	130	815	0.50	12.9	0.72	696	0.69	254	317
17 Years										
1	121	159	2043	1.27	13.4	0.75	1729	172	36	0.45
2	45	0.59	325	0.20	10.4	0.58	1806	180	49	0.61
3	128	168	1865	1.16	14.6	0.81	1645	164	278	3.47
4	118	155	756	0.47	15.1	0.84	318	0.32	33	0.41
5	77	101	1531	0.95	9.2	0.51	3248	3.24	30	0.67
6	50	0.65	229	0.14	9.4	0.52	355	0.36	140	175
7	66	0.85	632	0.39	9.8	0.55	463	0.46	23	0.28

TABLE XXXII (Continued)

Age and No. of Subjects	Nutrients									
17 Years	Protein g	% of RDA	Calcium mg	% of RDA	Iron mg	% of RDA	Vitamin A RE	% of RDA	Vitamin C mg	% of RDA
8	37	0.48	598	0.37	6.0	0.33	1423	142	139	173
9	145	190	2365	147	18.4	102	1569	156	152	190
10	69	0.90	445	0.27	12.4	0.69	1932	193	395	493
11	66	0.86	588	0.36	9.7	0.53	5139	514	128	160
12	89	117	1690	105	7.7	0.43	3104	310	24	0.30
13	118	155	513	0.32	18.9	105	1887	188	90	112
14	83	109	801	0.50	16.7	0.93	877	0.87	448	0.80
15	69	0.90	581	0.36	13.2	0.73	139	0.13	80	100
18 Years										
1	56	0.73	905	0.56	7.2	0.40	509	0.51	43	0.54
2	120	157	835	0.52	14.9	0.83	608	0.61	149	186
3	79	103	1252	0.78	13.0	0.72	2128	213	314	392
4	53	0.69	314	0.19	10.7	0.59	139	0.14	34	0.43
5	68	0.89	659	0.41	16.1	0.89	539	0.54	68	0.85
6	75	0.98	1548	0.96	24.8	138	1151	115	316	395
7	51	0.67	502	0.31	4.1	0.23	890	0.89	38	0.48
8	102	134	676	0.42	19.8	110	630	0.63	63	0.78
9	53	0.69	421	0.26	9.0	0.50	760	0.76	16	0.20

TABLE XXXII (Continued)

Age and No. of Subjects	Nutrients									
18 Years	Protein g	% of RDA	Calcium mg	% of RDA	Iron mg	% of RDA	Vitamin A RE	% of RDA	Vitamin C mg	% of RDA
10	76	100	837	0.52	12.4	0.69	413	0.41	16	0.20
11	90	118	938	0.58	14.8	0.82	601	0.60	60	0.75

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VITA

Delores Griffin Thomas

Candidate for the Degree of

Master of Science

Thesis: FOOD INTAKE PATTERNS OF PREGNANT ADOLESCENTS ENROLLED IN A COMPREHENSIVE HEALTH CENTER

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