DIETARY INTAKES OF TWENTY-SIX PREADOLESCENT GIRLS

by

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Chapter I

INTRODUCTION

In recent years great advancements have been made in developing the present scientific understanding of food nutrients. Less is known of how some of these nutrients function in the body, and even less progress has been made in the study of food habits (1).

Since the reactions of the human body always are involved in food habits, to understand food practices, the body with its organized processes of metabolism must be considered. A scientific investigation of food habits can never be an abstract study but must be undertaken as an integral part of the understanding of the complex nature of foods and the effects on the individuals eating these foods. Thorough and continous research on the food habits of the American culture and its subgroups is fundamental in order that the nutrition of the people may benefit from the scientific developments in related fields (2). The need for fundamental research in human nutrition is recognized. Present day knowledge of nutrition and food habits is far from being adequate to answer many scientific questions and to solve many practical problems.

In general there is considerably more available published information on the dietary habits and metabolic patterns in pre-school children, adolescents, and adults than for the age group seven to nine years.

Purpose

This experiment is a study of the self-selected dietary intakes and some of the food practices of 26 preadolescent girls (ages seven to nine

years) as determined from two-week records and the calculated, self-selected intakes compared with recommended dietary allowances (3). Certain available and related nutritional and clinical data will be presented to facilitate the interpretation of the dietary data.

This study is a part of a larger three-year metabolism experiment using preadolescent girls which is now in progress at the Virginia Agricultural Experiment Station, Virginia Polytechnic Institute, Blacksburg.

Chapter II

REVIEW OF LITERATURE

Preadolescent Nutritional Status

Adolescence is the most demanding age upon the physical resources of individuals other than pregnancy and lactation. Recommended dietary allowances are greatest for the adolescent (3). Attention to nutritional needs and the establishment of good food habits that will carry over into adolescence are of importance to those responsible for the preadolescent. "His great activity requires a disproportionately large calorie intake, his rapid growth calls for an abundance of good protein and mineral salts and his need for vitamins is even more imperative than that of the adult" (4). The rate of growth begins to be accelerated about the eighth year, reaches a maximum during the years of adolescence, then gradually declines until growth ceases (5).

The Food and Nutrition Board of the National Research Council recommends that children age seven to nine with an average weight of 59 pounds, an average height of 51 inches need the following:

> calories 2000, protein 60 gms., iron 10 mg., vitamin A 3500 I.U., thiamine 1.0 mg., riboflavin 1.5 mg., niacin 10 mg., ascorbic acid 60 mg., vitamin D 400 I.U. (3).

Every mother is anxious to have the assurance that she is giving her child the right kinds and amounts of food, yet few have the ability, time, or inclination to keep an accurate record of what the child eats, calculate its intake, and compare this with the estimated amount (5).

Cooperative efforts of home, school, and community can bring about changes in diet that will promote better health (6). Children themselves need to be convinced that food of suitable kind and amount is a prime factor in nutrition and health and it is pleasant to eat food with variety in appearance and flavor (7). "By reaching children before adolescence and helping them form good food habits, the health of the next generation should be improved" (6).

Dietary Survey Methods

To understand the mores or customs of a people sociologists have for years gathered data concerning their food habits (8). "With each advance in discovering the nature and function of individual nutrients, scientists are in a better position to appraise the significance of differences in food practices. It is highly probable therefore that surveys will have increasing value in public health reports and education in the years ahead" (3).

The nutritional needs of the child of school age for many reasons demand special consideration. The growing period in life is of vital importance to the health of individuals throughout life. "By reaching children before adolescence and helping them improve their food habits we can affect the health of the next generation" (6). To add to information concerning needs of the preadolescent further studies of food habits of this age are indicated.

Studies of food consumption are a part of the appraisal of the nutritional status of all individuals. One purpose is "to find through long periods of time the degree of condition that exists between health records of individuals and their dietary habits " (2).

A study of food habits may be defined as the study of the way in which individuals or groups of individuals in response to social and cultural pressures select, consume, and utilize portions of the available food supply (8). Several findings indicate that carefully taken individual records are of value in nutrition surveys; they seem to permit reasonably good characterization of the dietary habits of people (9). Knowledge of human requirements although far from complete is needed in interpreting food practices.

Dietary surveys help give a better understanding of body needs and how these needs can be met. They provide presumptive evidence and give data which can assist in the interpretation of the results of more direct measures. They serve in the appraisal of the state of nutrition of individuals, families, and other groups through a comparison of data obtained with some standard or yardstick of adequacy. The use of appropriate sampling methods to attain a representative picture of the population is fundamental. In addition, the use of appropriate statistical methods in assessing significance of the results is basic (2).

Surveys should be systematically organized. The group to be surveyed must be defined so that the results will be significant. The distribution may be limited to geographical divisions, special population groups, or general population appraisals limited by age, sex, race, occupation, economic levels, groupings according to customs or taboos, or those including persons under similar types of stress (9).

Experimental information is necessarily regarded objectively and data must be gathered carefully; statistical treatment of data must be

accurate. Factors that could color results such as any deviation from normal state of health must be eliminated.

Experimental surveys are directed to specific problems and are set up to control one or more of the investigational conditions; observational surveys study existing conditions and conclusions are drawn from facts observed (10).

Several methods are used for securing information in individual studies: laboratory analysis of duplicate meals, recording food intakes by weight, recording it by measure, interview concerning general food practices, and one-day dietary recall records. In making family or institutional surveys family food accounts of amounts of food bought or produced, food records of inventories before and after the test period, food lists estimating the quantities used for a seven-day period are used. The physiological consumption compared to the garbage or waste is sometimes calculated. The total food consumption by family members and the distribution among family members is reckoned (9).

Laboratory analysis of duplicate meals, though probably the most accurate, is not applicable in most cases. In asking the cooperation of persons to record food intake it is easier to obtain records by ordinary household measurements than by weight. The more detailed methods often get less cooperation in recording data and are less representative samples; often there is a conscious or unconscious change in self-selected diets. Much depends upon the skill of the interviewer obtaining dietary histories by that method; the amount of time required for individual interviews is generally not warranted by the results obtained. Diets are easily scored

for adequacy by questionnaires concerning food groups but this is too general for individual calculations. One-day dietary recall information and analysis of records of food money spent for classes of food are easy to obtain and useful for the study of the general food pattern of a large group of people but do not give a true picture of individual variance in typical eating practices (9).

In addition to the size and representative character of the sample used in a dietary survey the time period for the study must be considered. Seasonal differences in food intake and consequent nutrition (especially vitamin C blood levels) have been noted at different times of the year. To get an annual or even a complete seasonal picture the collection of data should be spread through the year or season.

Day by day and week by week variability of individual intake influences findings. Researchers have found that there will be fewer extremes when data are based on seven days rather than on one or two days. The function of the dietary study is a factor in determining the time period of the survey, whether the purpose is to get an estimate of the dietary of an individual or to portray the nutrient intake of a group. One-, two-, or three-day records are more easily gathered because subjects cooperate more readily. Many investigators feel that short-time records are more accurate for characterizing a group and these are generally used for large numbers of people (9,11,12). Certain population groups, such as college students tend to vary considerably on Sundays and holidays but any other day or days can be considered typical (10). Records taken over a longer period of time present a truer picture of

individual food habits. Young et al. (13) in commenting upon the length of survey time when working on weekly variation in nutrient intake of young adults in 1953 said: "As an estimate of average nutrient intake for a group, a seven-day record was easily adequate". For an individual except as an approximate indication of intake, they felt that the observation period should exceed seven days for most subjects. A two-week sample may be considered fairly representative of a subject's diet. One investigator (McClelland) who studied the protein and calcium intake of two children for six weeks found that no two-week period deviated from the mean intake of the entire observation period as much as five percent (13).

The first question to decide in planning an analysis of the diet record for individuals or for families is which to include of the many nutrients needed by the body. Some nutrients are so widely distributed among foods or are so closely associated with others that it is not necessary to consider them separately. The nature of the diet, the availibility of food composition data, the yardstick to be used for interpreting data influence the selection of nutrients to be included in the study. The likelihood of deficiency or excess of a given nutrient would also indicate the need for its calculation. The intercorrelation of nutrients would further determine the desirability of separate calculation. "Many studies have shown that it is safe to assume that if calcium and protein are adequately supplied, phosphorus will be provided in sufficient quantity" (3,9,13,14). Although calories might never be low, it may be of interest to calculate the energy value of diets because of the relationship between energy metabolism or carbohydrate intake and the

requirement for thiamine and other B vitamins. Figures obtained for riboflavin will always increase with milk consumption (15), and if protein content of the diet is adequate, niacin will be synthesized in the body from the amino acid tryptophane (16,17). "The intercorrelation of nutrients in diets is a subject which warrants further exploration. Any feasible reduction in the number of nutrients for which calculations are needed will aid in cutting the cost of analysis. It should be realized, however, that the omission of some nutrients may limit the possibilities for re-interpretation in the light of additional knowledge of interrelationships among nutrients" (9).

After actual food intake has been recorded the investigator must determine its value by chemical analysis or calculate its value from tables giving average composition. One must bear in mind that average composition is not necessarily actual nutrient value. Many factors cause deviation from average: production, processing, storage, and home preparation (2).

Grouping foods of similar composition and calculating by use of mean values is a short method which was developed by Donelson and Leichsenring (18,19,20). Similar groupings have been made by others (21,22) that seem satisfactory for large groups and save considerable time (9). This type of calculation seems most satisfactory when a varied diet is used. This technique is not always considered accurate enough for individual studies (9).

Recommended Dietary Allowances

Numerous dietary standards have been formulated by national and international groups for use in planning and evaluating diets and food supplies for individual and population groups. Recommended Dietary Allowances of the National Research Council are the accepted standard for comparison in the United States. They are higher than actual need "to cover substantially all individual variations in the requirements of normal people" (3). Since they were adopted by the Food and Nutrition Board in 1941 they have been revised in 1945, in 1948, and again in 1953. "If these allowances are used in dietary evaluation, it is essential to appreciate that, while most persons whose consumption equals or exceeds the goals are presumably adequately nourished, not all persons who fail to reach these goals are malnourished . . . . The Recommended Dietary Allowances can be attained with a variety of common foods which will also provide other minerals and vitamins for which requirements are less well known" (3).

Chapter III

PROCEDURE

Purpose

The purpose of this experiment was to study the self-selected dietary intakes and some of the food practices of preadolescent girls as determined from two-week dietary records and to compare the calculated self-selected intakes with the Recommended Dietary Allowances of the National Research Council (3).

Subjects

The subjects for this study were twenty-six preadolescent girls (seven to nine years) participating in a metabolism experiment at the Virginia Polytechnic Institute, Blacksburg, Virginia. Twelve of the subjects participated in a metabolism experiment in 1956 and two-week records were kept for each subject. Nine of these same subjects participated in metabolism work in 1957. In addition one other preadolescent girl joined the experiment in 1957. In 1958 fourteen preadolescent girls were used in metabolism work and only one of these subjects (18 M.M.) had been in a previous experiment, she (18 M.M.) had participated in 1956. In the study reported here two-week dietaries from twenty-six different subjects have been used.

All of these children were in the weight range of forty-eight to ninety-three and a quarter pounds, which is considered to be the normal weight range for this sex-age group. Each subject passed a physical

examination by a pediatrician to insure four health requirements: (1) normal state of health and development for age, (2) freedom from intestinal parasites, (3) basal metabolism within the normal range, and (4) no food allergies.

The investigator asked the cooperation of the mother of each subject included in this study in recording, (1) the self-selected amount of all kinds of food consumed by each subject for 14 consecutive days in the early summer; and (2) a record of the previous health, medical, daily routines, and dietary habits of importance in interpretation of the dietaries.

In 1958 for subjects 24-MA, 28-SK, 30-RB, 31-VK, 32-SW, and 35-SJR less than 14 days were included. Eleven complete days were included for 24-MA, 12 days for 28-SK, 13 days for 30-RB, 13 days for 31-VK, 13 days for 32-SW, and 12 days for 35-SJR. For subject 24-MA, three of the 14 days included in the dietary were incomplete, so they were omitted. For the other five subjects, the families were away on vacation, so dietary information was not included, since it might have been considered atypical.

Immediately after the completion of the 14-day dietary records the subjects participated in a two-month balance experiment. The balance experiment was not a part of the study reported here but is a part of the total preadolescent metabolism experiment in progress at Virginia Polytechnic Institute.

Intermittent anthropometric measurements, hemoglobin content of the blood, and other pertinent nutritional and clinical data on the subjects were available for study in relation to dietary intake and food habits.

Calculation of Nutrients

Dietaries of each subject were calculated using United States Department of Agriculture Handbook Number 8 (23) as reference.

Chapter IV

DISCUSSION OF RESULTS

Dietaries of each subject were calculated using United States Department of Agriculture Handbook No. 8 (23) as reference. The results of the calculated daily nutrient intakes for each subject are included in the appendix.

Using the 1953 revision of Recommended Dietary Allowances of the National Research Council (3) some interpolations have been made to determine the calorie and nutrient allowances for each year, seven through nine, instead of using the range. A summary of the recommended dietary allowances and the interpolations are given in Table I. In the comparisons used in this study the interpolated values have been used instead of the range values.

Seven-Year-Old Subjects

Table II shows the calculated mean dietary intakes for the five seven-year-old subjects participating in this study in comparison with recommended allowances of the National Research Council. Intakes and allowances for nutrients were:

1. Calorie intake 2103, allowance 1866
2. Protein intake 74.4 grams, allowance 56 grams
3. Calcium intake 1173 milligrams, allowance 1000 milligrams
4. Iron intake 10.6 milligrams, allowance 9.4 milligrams
5. Vitamin A intake 6118 International Units, allowance 3166 International Units

TABLE I

Daily Dietary Allowances for Preadolescent Girls Interpolated From the Recommended Dietary Allowances of the National Research Council, Revised 1953

Age in Years	Ht. in.	Wt. lb.	Calories	Protein gms.	Calcium mg.	Iron mg.	Vit. A I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.
Values: Recommended Dietary Allowances, Revised 1953, page 22											
4-6 (5)	43	40	1600	50	1000	8	2500	0.8	1.2	8	50
7-9 (8)	51	59	2000	60	1000	10	3500	1.0	1.5	10	60
10-12 (11)	57	79	2300	70	1200	12	4500	1.2	1.8	12	75
Interpolated Values: Recommended Dietary Allowances, Revised 1953											
6	45	46	1733	53	1000	8.7	2833	0.9	1.3	9	53
7	48	52	1866	56	1000	9.4	3166	0.9	1.4	9	56
8	51	59	2000	60	1000	10.0	3500	1.0	1.5	10	60
9	53	66	2100	63	1067	10.7	3833	1.1	1.6	11	65

TABLE II

Mean Dietary Intakes of Five Seven-Year-Old Subjects Compared With Recommended Dietary Allowances

Subject and Number	Year	Age	Height ins.	Weight lbs.	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.
18-M.M.	1956	7	48.25	66.00	2206	92.3	96.7	242.6	1847	1805	10.4	11324	1.38	4.71	12.4	164
24-M.A.	1958	7	47.50	48.00	2017	83.3	102.6	196.3	1322	1450	10.0	5575	1.26	2.38	11.5	95
26-B.D.	1958	7	48.00	52.25	2292	78.7	106.0	260.9	1072	1364	12.1	6802	1.27	2.80	12.7	75
27-B.A.O.	1958	7	50.25	54.25	2154	74.9	77.2	297.2	902	1268	12.0	3508	1.22	1.67	14.4	72
36-B.L.	1958	7	48.75	48.00	1847	57.7	71.9	246.2	723	921	8.4	3381	0.96	1.39	9.2	80
Average			48.55	53.70	2103	77.4	90.9	248.4	1173	1361	10.6	6118	1.22	2.59	12.0	97
N.R.C. Allowance			48.00	52.00	1866	56.0			1000		9.4	3166	0.90	1.40	9.0	56

6. Thiamine intake 1.22 milligrams, allowance 0.9 milligram
7. Riboflavin intake 2.59 milligrams, allowance 1.4 milligrams
8. Niacin intake 12 milligrams, allowance 9 milligrams
9. Ascorbic acid intake 97 milligrams, allowance 56 milligrams

Eight-Year-Old Subjects

Table III shows the calculated mean dietary intakes for twelve eight-year-old subjects participating in this study in comparison with recommended allowances of the National Research Council. Intakes and allowances for nutrients were:

1. Calorie intake 1958, allowance 2000
2. Protein intake 74.3 grams, allowance 60 grams
3. Calcium intake 1092 milligrams, allowance 1000 milligrams
4. Iron intake 9.8 milligrams, allowance 10.0 milligrams
5. Vitamin A intake 6041 International Units, allowance 3500 International Units
6. Thiamine intake 1.13 milligrams, allowance 1.0 milligrams
7. Riboflavin intake 2.11 milligrams, allowance 1.5 milligrams
8. Niacin intake 12.5 milligrams, allowance 10.0 milligrams
9. Ascorbic acid intake 88 milligrams, allowance 60 milligrams

Nine-Year-Old Subjects

Table IV shows the calculated mean dietary intakes for fifteen nine-year-old subjects participating in this study in comparison with recommended allowances of the National Research Council. Intakes and allowances for nutrients were:

TABLE III

Mean Dietary Intakes of Twelve Eight-Year-Old Subjects Compared With Recommended Dietary Allowances

Subject and Number	Year	Age	Height ins.	Weight lbs.	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.
12-S.T.	1956	8	46.75	48.75	1859	86.4	80.5	217.3	984	1244	10.3	4214	1.07	1.96	13.5	47
13-A.J.	1956	8	52.00	55.00	1971	85.4	76.4	235.8	1255	1641	12.2	5610	1.51	2.74	12.4	69
15-M.T.	1956	8	50.25	58.00	2404	77.2	77.8	352.8	943	1317	12.6	12475	1.48	1.93	15.7	156
16-P.B.	1956	8	49.50	60.00	1997	67.2	95.1	219.0	1077	1318	8.1	4048	0.91	1.79	12.5	89
22-C.D.	1956	8	53.25	74.00	2323	93.5	87.6	294.0	1693	1940	16.3	16299	1.69	3.23	18.3	181
23-E.T.	1956	8	52.50	70.25	1666	64.5	76.9	182.1	896	1135	8.1	3876	0.88	1.80	13.9	94
25-P.C.	1958	8	54.00	75.00	1709	64.0	76.0	169.9	1125	1306	9.1	5537	1.02	2.02	9.9	102
28-S.K.	1958	8	48.75	54.00	1800	64.5	88.1	192.2	1088	1183	7.3	3304	0.98	1.81	10.4	58
29-J.E.R.	1958	8	50.75	60.25	1837	72.3	90.0	177.3	725	1260	8.0	2897	0.93	1.86	8.7	19
30-R.B.	1958	8	51.75	58.75	2421	87.5	108.9	280.2	1393	1746	10.1	5143	1.14	2.33	12.8	91
31-V.K.	1958	8	50.75	59.25	1694	59.9	64.1	224.1	931	1128	7.8	4249	0.96	1.96	10.3	82
33-A.M.	1958	8	52.25	64.75	1817	69.5	80.8	209.5	1000	1263	8.2	4742	1.05	1.94	11.5	70
Average			50.95	61.50	1958	74.3	83.5	229.5	1092	1373	9.8	6041	1.13	2.11	12.5	88
N.R.C. Allowance			51.00	59.00	2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

TABLE IV

Mean Dietary Intakes of Fifteen Nine-Year-Old Subjects Compared With Recommended Dietary Allowances

Subject and Number	Year	Age	Height ins.	Weight lbs.	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.
14-B.S.	1956	9	49.75	54.75	2117	82.9	100.5	219.0	1168	1539	11.0	7360	1.09	2.32	12.7	73
17-B.B.	1956	9	48.75	58.00	1808	79.2	79.6	195.2	1140	1370	10.7	6534	2.09	2.14	12.8	142
19-J.S.	1956	9	53.50	69.25	2090	79.6	89.1	243.6	721	1210	12.2	3403	1.62	2.04	13.8	89
20-N.G.	1956	9	53.75	68.50	1957	79.5	83.0	226.0	1139	1409	9.5	6102	1.31	2.30	12.0	87
21-S.H.	1956	9	57.25	69.25	2030	67.5	80.1	262.0	817	1091	10.6	6553	0.98	1.97	11.2	102
12-S.T.	1957	9	48.50	54.50	1828	61.5	72.6	244.1	1229	1232	9.0	4947	0.89	2.00	8.6	74
13-A.J.	1957	9	54.50	61.00	1994	62.5	52.0	329.8	1246	1308	11.1	4302	1.16	2.16	10.6	114
15-M.T.	1957	9	53.00	66.25	2025	69.4	61.5	309.2	1035	1163	9.7	5335	1.31	1.86	14.7	132
22-C.D.	1957	9	55.50	83.00	2105	73.8	69.7	310.5	1364	1599	12.9	14676	1.26	2.30	11.5	102
23-E.T.	1957	9	54.75	78.75	1521	62.8	59.7	191.8	932	1000	8.1	4335	0.81	1.56	11.7	91
24-M.V.	1957	9	52.00	57.00	1484	58.7	61.0	178.5	1090	981	6.9	5737	0.74	1.50	9.6	79
32-S.W.	1958	9	50.25	63.00	2007	82.2	99.2	206.7	819	1169	11.5	3329	1.14	1.66	13.3	61
34-F.M.	1958	9	51.75	66.75	2602	87.1	101.9	342.0	1267	1435	13.1	5160	1.59	2.14	14.4	119
35-S.J.R.	1958	9	53.75	75.75	2086	71.2	93.3	253.5	980	1212	9.0	2920	1.19	1.74	11.5	56
18-M.M.	1958	9	53.75	93.25	2068	90.6	90.8	262.2	1246	1532	12.3	7294	1.71	2.31	12.5	185
Average			52.71	68.00	1988	73.9	79.6	251.6	1079	1283	10.5	5999	1.26	2.00	12.0	100
N.R.C. Allowance			53.00	66.00	2100	63.0			1067		10.7	3833	1.10	1.60	11.0	65

1. Calorie intake 1988, allowance 2100
2. Protein intake 73.9 grams, allowance 63.0 grams
3. Calcium intake 1079 milligrams, allowance 1067 milligrams
4. Iron intake 10.5 milligrams, allowance 10.7 milligrams
5. Vitamin A intake 5999 International Units, allowance 3833 International Units
6. Thiamine intake 1.26 milligrams, allowance 1.1 milligrams
7. Riboflavin intake 2.0 milligrams, allowance 1.6 milligrams
8. Niacin intake 12.0 milligrams, allowance 11.0 milligrams
9. Ascorbic acid intake 100 milligrams, allowance 65 milligrams

Summary of Dietary Intakes

Table V shows the mean dietary intakes and range of intakes for each age group studied.

Food Habits

Computation of the two-week dietaries of the subjects of study indicated that the subjects were meeting the recommended allowances of the National Research Council and therefore they would be acceptable for use in the metabolism study to follow. In analysis of individual dietaries it was evident that the quantity and variety of foods eaten was limited except for milk when compared with allowances for this age group (24,25). The subjects drank from three to five cups of milk daily which fact was actually responsible for their attaining the recommended allowances of the National Research Council.

In comparing them to children in other sections of the country, they rated above the average but had tendencies toward similar characteristics:

Mean Dietary Intakes and Range of Intakes for Each Age Group

Age	No. of Sub-jects	Calorie		Protein gms.		Fat gms.		CHO gms.		Ca. mg.		P. mg.		Fe. mg.		Vit.A. I.U.		Thiamine mg.		Riboflavin mg.		Niacin mg.		Ascorbic Acid mg.	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
7	5	2103	1847-2292	77.4	57.1-92.3	90.9	71.9-106.0	248.4	196.3-297.2	1173	723-1847	1361	921-1805	10.6	8.4-12.1	6118	3381-11324	1.22	0.96-1.38	2.59	1.39-4.71	12.0	9.2-12.7	97	72-164
8	12	1958	1666-2421	74.3	59.9-93.5	83.5	64.1-108.9	229.5	169.9-352.8	1092	725-1693	1373	1128-1940	9.8	7.3-16.3	6041	2897-16299	1.13	0.93-1.69	2.11	1.79-2.74	12.5	8.7-18.3	88	19-181
9	15	1988	1488-2602	73.9	58.7-90.6	79.6	52.0-100.5	251.6	178.5-342.0	1079	721-1364	1283	981-1599	10.5	6.9-13.1	5999	2920-14676	1.26	0.74-2.09	2.00	1.50-2.32	12.0	8.6-14.7	100	56-185

"Diets of many children need improvement, particularly in regard to calcium, iron, vitamins C, A, and D . . . . Among the meals, breakfasts and snacks are especially in need of improvement" (26). Although the subjects met recommended allowances there was great day to day variation and often a daily deficiency in the amounts of vitamin C and vitamin A foods. Vegetables were eaten sparingly and reluctantly and fruits eaten spasmodically. The records of these subjects showed that each one habitually ate a substantial breakfast which fact is in line with the findings of other surveys that point out that contrary to the general practice of adolescent girls, younger girls have better eating habits (24,26). Educational efforts should be made to get these children to continue good breakfast habits. Country-wide breakfasts need improvement. They are likely to become poorer as children grow older. In the Iowa study (26) only one child in five who had a poor breakfast was able finally to have a good day's diet. Children who did not have a good source of vitamin C at breakfast usually did not get it at other meals and hence did not have it for the day.

Vegetables and fruits added to the daily diets of the subjects reported in this study would increase the vitamin A and ascorbic acid intakes. Due to the amount of milk consumed daily the subjects studied met allowances in spite of the snacks which generally consisted of potato chips and bottle drinks.

In comparison of dietaries by age groups, the seven-year-old subjects showed higher intake of each nutrient (except thiamine) than the eight or nine year old ones.

Iron Consumption

Table VI shows a comparison of hemoglobin per hundred cubic centimeters of blood with milligrams of iron intake for twenty-six subjects. Intake of iron was compared with grams of hemoglobin per hundred centimeters of blood. Average hemoglobin for this age sex group is listed as 13 grams per hundred centimeters of blood with a range of 11 to 15 grams per hundred centimeters (27). As shown in Table VI, the hemoglobin content of the blood for the subjects of this study averaged 12.9 grams per hundred centimeters with a range of 11.5 to 15.5[1/]. Calculated iron content of foods was averaged 10.2 milligrams daily with range of 6.9 to 16.3 milligrams. As measured statistically by the paired t-test there seemed to be little relationship between iron intake and hemoglobin content at this level of intake. This was due to the fact that although for these subjects the range of daily iron intake was from 6.9 to 16.3, none of the iron intakes were low enough to deplete the blood of its hemoglobin. Evidently iron intake as recommended by National Research Council is high enough for great individual difference (28).

Implications

Even though the nutritional intakes of the preadolescent girls used in this study were above national average, efforts should be made to see that they continue good eating habits and not follow the national pattern of teen age girls whose eating habits are recognized as being poor (24).

1/ Hemoglobin determined by laboratory technician using calorimetric method of Sahli Hellige.

TABLE VI

Comparison of Hemoglobin Per Hundred Centimeters of Blood

With Milligrams of Iron Intake For Twenty-Six Subjects

Subject and Number	Age	Date	Gms. Hg. Per 100 cc Blood	Iron mg.
18 M.M.	7	1956	13.2	10.4
26 B.D.	7	1958	14.0	12.1
27 B.A.O.	7	1958	11.5	12.0
36 B.L.	7	1958	14.0	8.4
24 M.A.	7	1958	12.0	10.0
12 S.T.	8	1956	13.8	10.3
13 A.J.	8	1956	11.5	12.2
15 M.K.T.	8	1956	13.2	12.6
16 P.B.	8	1956	12.4	8.1
22 C.D.	8	1956	11.7	16.3
23 E.T.	8	1956	11.8	8.1
25 P.C.	8	1958	15.5	9.1
28 S.K.	8	1958	13.5	7.3
29 J.E.R.	8	1958	12.5	8.0
30 R.B.	8	1958	13.0	10.1
31 V.K.	8	1958	14.0	7.8
33 A.M.	8	1958	13.0	8.2
14 B.S.	9	1956	11.7	11.0
19 J.S.	9	1956	13.2	12.2
20 N.G.	9	1956	13.8	9.5
21 S.H.	9	1956	12.7	10.6
17 B.B.	9	1956	12.4	10.7
12 S.T.	9	1957	11.7	9.0
13 A.J.	9	1957	12.4	11.1
15 M.K.T.	9	1957	12.6	9.7
22 C.D.	9	1957	12.4	12.9
23 E.T.	9	1957	12.4	8.1
36 M.V.	9	1957	12.4	6.9
18 M.M.	9	1958	14.0	12.3
32 S.W.	9	1958	12.5	11.5
34 F.M.	9	1958	15.0	13.1
35 S.J.R.	9	1958	14.0	9.0
Total			413.8	328.6
Average			12.9	10.2
Range			11.5-15.5	6.9-16.3

"Good nutrition during childhood and adolescence is particularly important for girls, for the childbearing age begins in adolescence. Many girls marry at eighteen or nineteen years of age, and many babies are born before their mothers are twenty (26).

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

The purpose of this experiment was to study the self-selected dietary intakes and some of the food practices of twenty-six preadolescent girls as determined from two-week dietary records and to compare the calculated self-selected intakes with Recommended Dietary Allowances of the National Research Council (3).

Subjects between the ages of seven and nine years and in the height-weight range considered normal for this sex-age group were chosen. After different methods of dietary survey were considered the two-week record of food intake was used. Forms and instructions for recording data were given to the mothers and they recorded foods consumed by the subjects in household measurements. Nutrient intakes for each subject were calculated using United States Department of Agriculture Handbook Number 8 (23).

The mean dietary intakes for all subjects were equal to or above allowances of the National Research Council. The seven year old group had higher nutrient intakes than the eight or nine year old groups.

Food habits were studied. The consumption of about a quart of milk per day per subject and the practice of eating substantial breakfasts were practices to which credit was due for above average rating in nutrient intake.

Since girls in this study were to be subjects in a metabolism balance study to follow, it was imperative that their typical food intakes be at least equal to and compare favorably with the average for this age group. Their dietary histories and their physical examinations proved them to be entirely acceptable.

Recommendations

Tendencies to follow the national pattern and to outgrow good eating habits indicate a need for vigilance of those responsible for the nutrition of girls between the ages of seven and nine. The consumption of vegetables and fruits needs to be stressed. Good food habits should become a part of the eating practices of all preadolescent girls so they can enter the next age of life with full resources of minerals and vitamins known to be so important during adolescence.

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APPENDIX

Records of Two-Week Dietary Intakes of Subjects Studied in 1958

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thiamine mg.	Riboflavin mg.	Niacin mg.	Ascorbic Acid mg.
18-M.M.	9	53.50	93.25	5/31	1821	81.4	81.4	797.4	1488	1563	9.0	4953	1.97	2.42	7.4	303
				6/1	2693	114.1	122.6	286.7	971	1595	16.9	7083	1.60	1.90	17.5	160
				6/2	2228	95.7	87.2	250.9	1585	1826	11.5	12775	2.08	2.70	16.2	235
				6/3	2493	77.1	86.8	343.6	1704	1573	12.1	7404	2.00	2.69	11.4	213
				6/4	1886	89.7	82.1	201.8	1621	1628	9.9	8206	1.57	2.83	16.1	137
				6/5	1513	59.3	65.4	155.2	947	1093	8.5	6827	1.64	1.86	4.6	249
				6/6	2697	124.1	112.4	280.6	1264	1766	19.6	6002	1.84	2.40	8.8	235
				6/7	2041	58.7	75.4	280.4	958	1034	11.4	2749	1.25	1.93	9.7	117
				6/8	1710	83.0	76.5	180.7	1040	1375	13.0	8761	1.19	1.93	15.6	251
				6/9	1749	113.1	73.3	159.2	885	1544	12.5	2320	1.68	2.05	12.2	115
				6/10	2453	92.8	138.8	203.1	1166	1569	12.9	7133	1.76	2.39	18.0	174
				6/11	1319	69.2	64.8	119.5	1185	1321	8.1	4735	0.74	2.07	5.1	91
				6/12	2305	96.7	112.9	213.9	1044	1457	15.6	16630	2.70	2.26	13.8	210
				6/13	2053	113.5	92.0	198.4	1583	2115	10.8	6537	1.94	2.98	18.5	97
Average					2068	90.6	90.8	262.2	1246	1532	12.3	7294	1.71	2.31	12.5	185
N.R.C. Allowance					2167	63.0			1067		10.7	3833	1.10	1.60	11.0	65

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
24-M.A.	7	47.50	48.00	5/31	1542	67.5	91.3	111.9	1047	1046	7.1	2610	0.79	1.88	9.5	18
				6/1	1593	69.0	82.9	145.8	1109	1247	6.7	3270	0.61	1.92	12.5	57
				6/2	1942	79.7	89.7	207.5	1311	1366	8.8	2595	1.13	2.52	10.3	75
				6/3	1870	76.6	90.0	193.9	1693	1452	11.6	18980	1.32	3.30	10.0	109
				6/4	1976	86.3	93.0	189.0	1526	1594	6.7	2650	1.68	2.52	13.6	29
				6/5	1768	67.9	103.9	169.0	1729	1765	6.9	12193	1.03	2.56	7.2	68
				6/6	2108	76.1	103.7	221.6	1341	1448	8.5	3610	0.73	2.06	6.9	60
				6/8	1749	61.7	86.0	193.7	1094	1166	7.1	3837	1.03	1.84	6.5	52
				6/10	3421	150.2	196.0	263.6	1032	1813	22.0	2252	1.83	2.52	28.6	15
				6/11	1815	71.6	91.8	184.6	1118	1314	10.7	4388	1.77	2.61	9.9	290
				6/12	2407	110.1	100.5	279.2	1550	1740	13.4	3942	1.92	2.48	12.0	274
Average					2017	83.3	102.6	196.3	1322	1450	10.0	5575	1.26	2.38	11.5	95
N.R.C. Allowance					1866	56.0			1000		9.4	3166	0.90	1.40	9.0	56

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
25-P.C.	8	54.00	75.00	5/31	1932	70.8	89.9	225.8	1156	1252	12.6	3954	1.43	3.11	10.3	334
				6/1	1474	41.9	46.9	225.8	807	895	7.2	13046	1.22	1.60	7.0	114
				6/2	1663	70.5	60.9	217.4	1134	1284	9.2	8207	1.13	1.68	8.8	91
				6/3	1266	41.1	47.4	169.6	2632	970	7.3	15709	1.14	1.34	5.6	107
				6/4	1699	72.0	65.8	189.7	1109	1447	9.2	3738	1.02	4.74	12.0	137
				6/5	2204	77.3	93.7	286.4	1301	2325	8.5	3500	0.97	1.74	10.4	118
				6/6	1595	60.6	75.3	172.1	1149	1186	8.0	8599	0.87	1.83	6.0	67
				6/7	2074	65.3	92.5	243.2	981	1168	7.8	1253	0.74	1.40	9.8	8
				6/8	1649	45.2	77.0	199.5	1024	1108	11.4	2608	0.76	1.45	6.5	42
				6/9	1769	84.8	87.1	186.6	664	2041	13.4	2651	1.29	2.42	25.8	140
				6/10	1905	80.0	103.7	160.5	1097	1424	9.7	3299	1.06	2.00	9.7	34
				6/11	1416	57.6	56.8	175.4	738	1000	9.5	2992	0.82	1.44	10.5	45
				6/12	1406	58.7	52.3	160.3	793	873	6.3	2460	0.89	1.40	6.9	135
				6/13	1881	71.2	115.2	144.6	1163	1304	7.7	5510	0.94	2.16	10.5	67
Average					1709	64.0	76.0	196.9	1125	1306	9.1	5537	1.02	2.02	9.9	102
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
26-B.D.	7	48.00	52.25	5/31	1749	75.2	84.4	173.0	874	1280	12.7	34174	1.44	3.89	18.2	192
				6/1	2109	66.1	101.0	232.0	1156	1584	9.7	4860	1.24	2.21	13.7	31
				6/2	2076	90.1	108.8	191.1	1147	1468	11.1	3938	1.26	3.16	13.6	39
				6/3	2434	82.7	93.9	314.7	1084	1339	11.8	2599	1.04	1.89	14.5	84
				6/4	2351	67.9	100.4	300.4	1282	1370	11.0	3509	0.92	2.38	7.1	61
				6/5	2103	72.2	89.7	255.8	842	1099	20.9	3317	1.33	2.00	12.3	33
				6/6	1932	65.4	85.0	207.1	1088	1320	10.8	2483	1.64	1.98	11.7	32
				6/7	2538	95.8	122.7	259.7	1106	1649	13.8	9800	1.19	9.43	16.4	106
				6/8	2411	83.2	130.3	260.5	584	998	14.5	1208	1.06	1.41	14.6	23
				6/9	2509	78.3	96.7	348.5	1145	1335	12.3	5303	1.03	1.84	10.0	102
				6/10	2917	89.5	154.4	299.2	1331	1613	10.2	4151	1.71	2.33	10.7	53
				6/11	2699	80.1	111.5	345.6	1014	1327	11.3	8770	0.95	2.22	12.6	99
				6/12	2134	76.4	96.9	244.9	1069	1323	9.9	4134	1.48	2.07	11.2	105
				6/13	2124	79.2	109.2	219.8	1290	1393	9.3	6975	1.47	2.41	11.4	96
Average					2292	78.7	106.0	260.9	1072	1364	12.1	6802	1.27	2.80	12.7	75
N.R.C. Allowance					1866	56.0			1000		9.4	3166	0.90	1.40	9.0	56

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
27-B.A.O.	7	50.25	54.25	5/31	2225	92.6	106.0	214.9	923	1157	10.6	1323	1.28	1.96	16.4	85
				6/1	1746	70.7	53.0	245.4	880	1268	9.2	4557	0.88	1.80	19.5	64
				6/2	2411	97.7	99.6	287.5	866	1460	17.1	1270	1.38	1.77	19.0	63
				6/3	1932	71.2	43.7	330.4	1274	1568	14.5	6455	1.16	1.85	14.3	145
				6/4	2160	81.8	57.3	326.6	1055	1504	14.0	1590	1.50	1.68	12.6	65
				6/5	2240	91.7	86.2	293.5	838	1220	14.0	7670	1.48	1.89	18.7	50
				6/6	2078	86.1	70.2	274.2	1259	1443	10.8	1908	1.18	2.16	14.8	21
				6/7	1882	62.0	65.8	270.1	873	1190	11.1	1000	1.01	1.42	9.5	27
				6/8	2342	68.9	118.9	261.2	1157	1429	9.5	6106	1.12	1.98	9.5	191
				6/9	2292	54.2	55.7	399.6	688	854	8.9	2175	1.14	1.26	10.3	26
				6/10	3569	106.1	153.3	451.6	655	1535	21.6	2960	1.63	1.44	21.2	69
				6/11	2149	68.0	92.0	281.7	1004	1294	8.1	2230	1.10	1.72	11.6	18
				6/12	1732	67.8	52.4	255.1	731	1180	13.5	3728	1.39	1.63	16.1	113
				6/13	1397	30.1	26.7	268.8	441	657	5.7	6144	0.91	0.88	8.5	79
Average					2154	74.9	77.2	297.2	903	1268	12.0	3508	1.22	1.67	14.4	72
N.R.C. Allowance					1866	56.0			1000		9.4	3166	0.90	1.40	9.0	56

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
28-S.K.	8	48.75	54.00	6/2	2203	73.5	90.3	277.7	1448	1355	13.5	4897	1.18	2.19	11.7	84
				6/3	2100	75.3	88.0	241.5	1042	1148	7.5	1745	1.08	1.57	13.4	57
				6/4	1448	70.4	116.0	185.1	1015	1164	6.9	4672	0.77	1.80	13.0	61
				6/5	1705	64.2	77.9	191.8	788	1088	7.1	2566	1.18	1.99	15.5	36
				6/6	2111	55.1	87.3	257.2	907	1016	7.0	2258	0.77	1.42	10.9	68
				6/7	2109	64.5	115.0	209.9	1216	1228	6.5	2898	0.67	1.99	9.6	29
				6/8	1501	59.5	75.0	136.8	984	1131	7.4	2721	1.25	1.70	9.9	68
				6/9	1413	53.5	60.6	168.7	1358	1340	4.9	3724	0.59	1.86	5.8	74
				6/10	1653	59.4	73.6	175.3	1189	1234	7.1	6734	1.36	2.03	8.0	99
				6/11	1909	69.0	99.6	166.0	1060	1109	7.8	2220	0.77	1.84	10.3	37
				6/12	1749	68.1	83.1	186.1	779	1091	4.9	2460	0.72	1.40	8.0	58
				6/13	1697	62.1	90.7	164.2	1269	1295	6.9	2759	1.45	1.98	9.6	22
Average					1800	64.5	88.1	192.2	1088	1183	7.3	3304	0.98	1.81	10.4	58
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
29-J.E.R.	8	50.25	60.25	5/31	2086	83.8	101.5	195.0	1120	1248	9.0	1979	0.93	2.06	9.6	24
				6/1	2129	92.7	107.3	203.5	1695	1827	9.5	5496	0.61	1.29	13.4	54
				6/2	1429	56.8	76.6	130.4	1058	1132	6.6	2488	0.97	1.93	5.9	27
				6/3	1901	91.2	99.0	145.9	1464	1542	7.9	3727	1.18	2.67	7.4	21
				6/4	1873	75.2	81.4	212.2	1379	1406	8.1	2992	0.69	2.04	9.5	11
				6/5	1823	72.6	67.4	240.9	1267	1182	6.1	4763	1.36	2.02	8.1	16
				6/6	1827	66.4	84.8	176.2	1174	1264	7.0	1935	1.23	1.95	8.3	22
				6/7	2040	61.2	86.7	237.3	1114	1343	9.8	3783	0.79	1.85	7.2	15
				6/8	1804	71.2	84.5	189.7	1337	1354	7.2	2560	0.96	2.17	9.4	26
				6/9	1808	59.3	94.2	174.7	680	904	7.4	1803	0.67	1.30	8.8	12
				6/10	2147	88.6	131.9	148.3	722	1132	11.8	1705	0.85	1.67	15.7	18
				6/11	1794	73.4	85.3	157.4	672	991	8.5	2037	1.14	1.55	8.9	7
				6/12	1419	48.7	77.2	127.2	918	971	5.8	2488	0.70	1.53	4.5	9
				6/13	1644	71.7	83.1	143.3	1153	1348	7.0	2803	0.93	2.10	5.7	9
Average					1837	72.3	90.0	177.3	725	1260	8.0	2897	0.93	1.86	8.7	19
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
30-R.B.	8	51.75	58.75	5/31	2771	108.5	122.8	307.7	1509	1902	12.0	3755	1.43	2.68	14.4	133
				6/1	2481	69.8	123.5	274.9	944	1226	7.6	3933	1.22	1.87	7.5	101
				6/2	2098	70.0	100.4	244.0	1298	1302	10.7	8302	0.84	2.06	8.4	80
				6/2	2607	96.7	122.5	285.1	1415	1596	13.3	3265	1.01	2.48	14.6	67
				6/4	2718	92.1	112.0	334.2	1401	1700	9.7	1712	1.57	2.19	18.8	16
				6/5	2108	87.6	108.9	199.2	1418	1542	10.0	3162	0.94	2.77	10.4	21
				6/6	1610	62.9	80.3	164.9	1451	1410	6.6	3652	1.02	2.31	8.3	199
				6/7	2243	77.2	94.4	277.6	1191	1364	9.4	8463	1.01	2.03	14.2	101
				6/8	2521	100.1	117.3	317.2	1488	1821	11.2	5488	1.25	2.72	16.6	186
				6/9	2644	110.5	123.4	275.0	1968	4003	11.8	7711	1.59	2.18	15.8	69
				6/10	2452	74.8	96.8	331.0	1111	1260	8.7	2722	0.78	1.98	9.8	35
				6/11	2576	88.9	112.1	313.6	1274	1600	10.8	10296	1.09	2.45	17.0	49
				6/12	2644	98.0	102.1	318.9	1638	1969	10.3	4406	1.09	2.57	11.2	129
Average					2421	87.5	108.9	280.2	1393	1746	10.1	5143	1.14	2.33	12.8	91
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
31-V.K.	8	50.75	59.25	5/31	1415	66.2	50.6	161.2	971	1160	5.6	2514	0.66	1.61	4.8	36
				6/1	1196	57.6	50.3	129.9	761	935	5.0	9126	0.60	1.33	11.4	111
				6/2	1215	46.3	51.4	143.4	408	602	10.2	8472	1.36	1.11	9.9	93
				6/3	1815	58.4	101.2	173.1	1005	985	6.8	4456	0.77	1.58	6.3	45
				6/4	1437	59.4	49.5	205.7	1005	942	5.6	2548	0.96	1.65	7.5	127
				6/5	1820	58.3	76.9	229.0	1148	1166	6.5	2316	1.48	1.85	7.6	99
				6/6	2416	60.4	70.7	399.5	989	1358	16.1	3763	0.87	3.83	12.1	59
				6/7	1850	65.4	68.2	239.7	543	1038	9.4	1872	1.11	1.11	20.1	173
				6/8	1391	57.1	51.7	178.7	1262	1192	7.9	5826	0.75	1.93	10.4	67
				6/9	2022	56.4	64.6	327.4	992	1049	10.4	2442	0.93	1.64	8.2	120
				6/10	1475	55.8	56.6	184.0	898	1826	5.9	5187	1.31	1.49	8.4	55
				6/11	2044	72.5	78.3	262.0	923	1237	7.4	1790	0.55	1.49	16.3	26
				6/12	1924	64.7	63.7	279.3	1197	1178	5.0	4925	1.10	1.90	10.5	62
Average					1694	59.9	64.1	224.1	931	1128	7.8	4249	0.96	1.96	10.3	82
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
32-S.W.	9	50.25	63.00	6/1	1457	63.0	55.7	176.0	884	1084	14.8	2036	1.04	1.45	13.2	73
				6/2	2633	120.0	124.9	259.3	988	1725	19.2	1015	1.94	1.92	23.8	30
				6/3	1585	70.0	149.3	149.1	1181	1161	8.3	12645	1.03	1.96	7.5	38
				6/4	2349	86.3	98.5	256.9	755	1188	12.0	1282	1.10	1.65	16.7	12
				6/5	1779	79.0	91.5	159.9	1077	1218	7.8	2030	1.14	1.94	9.4	9
				6/6	1548	58.6	52.1	214.7	794	1023	9.2	1790	0.83	1.44	6.8	13
				6/7	1394	57.7	57.5	164.2	1247	1248	5.6	2395	0.78	1.87	7.4	14
				6/8	2341	85.9	109.2	233.1	644	1202	11.4	2603	0.72	1.62	13.1	26
				6/9	3211	122.3	170.0	312.4	830	1514	17.7	3000	1.20	2.05	17.6	38
				6/10	2167	101.5	117.3	185.8	535	1092	13.1	2783	1.71	1.60	16.3	149
				6/11	2085	76.3	103.7	195.0	297	823	12.1	8730	1.35	1.16	16.1	213
				6/12	1812	70.2	97.9	163.0	903	1030	7.8	2450	0.71	1.72	9.5	15
				6/13	1735	78.1	61.8	217.8	517	896	10.3	1515	1.26	1.22	15.2	162
Average					2007	82.2	99.2	206.7	819	1169	11.5	3329	1.14	1.66	13.3	61
N.R.C. Allowance					2167	63.0			1067		10.7	3833	1.10	1.60	11.0	65

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
33-A.M.	8	52.25	64.75	5/31	1828	75.8	82.2	200.4	1343	1420	6.6	2869	0.74	2.37	7.3	34
				6/1	1969	62.7	69.7	280.7	1089	1165	6.2	1993	0.72	1.57	8.5	14
				6/2	2022	96.3	104.4	174.4	1194	1570	12.4	1742	1.71	2.31	12.9	111
				6/3	1592	63.0	75.6	157.0	1052	1175	7.9	2298	1.17	1.84	8.4	38
				6/4	2033	83.3	90.2	229.5	1182	1448	11.7	5280	1.29	2.21	11.6	126
				6/5	1845	74.0	94.8	178.9	1018	1283	8.6	2702	0.85	1.83	11.0	127
				6/6	1845	78.7	81.9	199.9	896	1230	9.7	1695	1.12	1.84	13.8	109
				6/7	1815	68.8	83.1	189.5	766	1175	6.6	2067	0.79	1.51	15.6	10
				6/8	2416	70.8	111.8	285.3	960	1651	8.8	2142	1.05	1.72	14.7	40
				6/9	1750	56.6	66.1	235.0	898	1172	5.4	1063	0.78	1.41	12.0	8
				6/10	1579	64.5	70.5	174.0	821	1046	8.1	2534	0.92	1.53	11.4	184
				6/11	1932	82.9	75.9	230.2	924	1386	13.5	31924	1.69	4.11	20.0	35
				6/12	1492	44.8	53.6	198.3	803	826	4.4	4734	0.72	1.27	6.4	127
				6/13	1627	50.7	72.0	200.8	1061	1144	5.5	3353	1.17	1.64	7.8	15
Average					1817	69.5	80.8	209.5	1000	1263	8.2	4742	1.05	1.94	11.5	70
N.R.C. Allowance					2000	60.0			1000		10.0	3500	1.00	1.50	10.0	60

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
34-F.M.	9	51.75	66.75	5/31	2304	80.3	104.1	269.1	1055	1269	10.4	3929	1.51	2.21	13.7	188
				6/1	2255	95.1	96.7	268.4	1611	1583	13.6	12263	1.81	2.93	13.6	173
				6/2	3302	105.7	128.9	442.2	2108	2103	10.9	9440	1.57	3.03	16.1	237
				6/3	3398	94.7	127.4	488.6	1799	2022	16.7	3590	1.88	2.42	15.8	256
				6/4	2837	84.1	71.0	480.1	1643	1694	15.3	3287	2.38	2.38	12.7	160
				6/5	2331	72.9	99.8	298.6	954	1079	9.4	1701	1.53	1.69	10.9	52
				6/6	2145	65.2	77.0	319.2	1377	1415	10.0	2223	0.94	1.93	7.3	185
				6/7	2759	94.7	120.9	320.9	1336	1536	13.5	17223	1.43	2.48	13.7	63
				6/8	3031	87.6	121.4	393.5	1422	1835	17.8	2434	1.80	1.95	16.9	29
				6/9	2559	85.5	109.3	302.1	700	1003	11.2	7175	1.60	1.65	16.7	18
				6/10	2839	121.6	137.2	275.6	884	987	17.3	1652	1.88	2.19	25.3	46
				6/11	2819	87.8	106.7	381.9	1105	1313	15.6	1595	1.56	2.01	16.6	28
				6/12	1869	80.2	68.7	232.3	1018	1248	8.7	1731	1.51	1.78	12.3	70
				6/13	1976	63.5	57.6	316.1	728	1009	13.0	4010	0.86	1.37	10.5	168
Average					2602	87.1	101.9	342.0	1267	1435	13.1	5160	1.59	2.14	14.4	119
N.R.C. Allowance					2167	63.0			1067		10.7	3833	1.10	1.60	11.0	65

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
35-S.J.R.	9	53.75	75.75	6/2	2127	79.3	79.4	289.1	1424	1600	11.2	4780	1.72	2.34	13.9	72
				6/3	2438	83.8	119.1	272.6	1642	1730	9.8	4013	1.66	2.59	9.9	27
				6/4	1898	82.0	97.5	171.5	871	1123	9.4	1097	1.66	1.70	14.4	8
				6/5	2893	72.0	123.7	380.7	1273	1450	8.8	3255	1.82	2.01	9.4	29
				6/6	1492	43.5	57.7	205.3	1030	956	4.4	2695	1.08	1.61	4.9	21
				6/7	1732	64.3	67.0	220.1	876	1142	7.8	4875	0.93	1.62	8.5	79
				6/8	2032	70.0	97.2	218.2	449	837	9.8	1629	0.50	1.15	10.0	59
				6/9	2001	73.7	103.0	197.0	1027	1172	7.9	1788	1.27	1.88	10.9	63
				6/10	1883	70.9	82.8	210.8	775	1034	8.9	1626	0.47	1.48	9.8	53
				6/11	1396	56.0	93.3	143.8	378	772	8.6	2050	0.59	0.76	12.9	97
				6/12	2722	78.7	98.3	384.4	916	1245	10.3	1955	1.32	1.68	12.2	99
				6/13	2428	80.7	101.7	310.8	1105	1480	11.3	5278	1.37	2.02	20.7	65
Average					2086	71.2	93.3	253.5	980	1212	9.0	2920	1.19	1.74	11.5	56
N.R.C. Allowance					2167	63.0			1067		10.7	3833	1.10	1.60	11.0	65

Subject and Number	Age	Height in.	Weight lb.	Date	Calories	Protein gm.	Fat gm.	CHO gm.	Ca. mg.	P. mg.	Fe. mg.	Vit.A. I.U.	Thia-mine mg.	Ribo-flavin mg.	Niacin mg.	Ascorbic Acid mg.
36-B.L.	7	48.75	48.00	5/31	2085	72.3	97.5	230.6	1160	1269	8.8	2841	1.27	2.64	8.7	57
				6/1	1702	50.3	73.2	214.7	730	858	5.8	1402	0.59	1.11	7.0	117
				6/2	1726	70.3	59.9	237.6	588	868	14.0	1930	0.99	1.43	12.7	98
				6/3	1915	57.9	58.9	296.5	855	989	9.3	2186	0.90	1.47	10.2	91
				6/4	1546	47.7	61.9	207.2	253	610	7.7	4039	0.94	0.68	8.8	49
				6/5	2642	96.7	91.9	346.1	909	1234	12.6	1967	1.59	1.88	12.3	92
				6/6	2335	76.7	99.2	301.3	958	1183	10.4	2058	1.01	1.75	14.8	144
				6/7	1811	60.3	65.3	252.1	898	1128	7.9	1394	0.96	1.57	14.2	56
				6/8	1970	58.4	78.6	245.1	756	1108	7.9	4141	0.95	1.35	10.1	134
				6/9	1335	29.0	61.9	169.1	290	445	5.7	12301	0.55	0.90	4.2	23
				6/10	2361	63.8	92.6	329.2	950	1092	9.0	3365	0.61	1.56	8.1	113
				6/11	1481	39.9	48.2	224.5	406	611	7.1	4089	1.12	0.81	6.2	68
				6/12	1111	34.0	33.4	170.8	534	602	5.0	1122	0.83	0.94	5.9	23
				6/13	1845	50.4	84.4	222.5	840	902	6.6	4199	1.15	1.48	5.8	55
Average					1847	57.7	71.9	246.2	723	921	8.4	3381	0.96	1.39	9.2	80
N.R.C. Allowance					1866	56.0			1000		9.4	3166	0.90	1.40	9.0	56

T-Test

Hemoglobin Values

1. Obtain d_i when $d_i = X_{1i} - X_{2i}$

2. $-d = \sum_{i=1}^{n} \frac{di}{n} = \frac{85.2}{32} = 2.66$

3. $sSd = \sum_{i=1}^{n} di^2 - \frac{(\sum di)^2}{n} = 364.90 - \frac{7259.04}{32} = 364.90 - 226.84 = 138.06$

4. $s^2d = \frac{S\,Sd}{n-1} = \frac{138.06}{31} = 4.45$

5. $s_{\bar{d}}^2 = \frac{Sd^2}{n} = \frac{4.45}{31} = 0.14$

6. $s_{\bar{d}} = \sqrt{s_a^2} = \sqrt{0.14} = 0.37$

7. $t = \frac{\bar{d}}{s_{\bar{d}}} = \frac{2.66}{.37} = 7.19$

If $t_{31}^{(n-1),\alpha}{}_{.01}$ < Calculated t, reject

t = 2.750 < 7.19, therefore there is no significant relationship between the paired figures.

DIETARY INTAKES OF TWENTY-SIX PREADOLESCENT GIRLS

ABSTRACT

Frances Walmsley Gee

DIETARY INTAKES OF TWENTY-SIX PREADOLESCENT GIRLS

The purpose of this experiment was to study the self-selected dietary intakes and some of the food practices of twenty-six preadolescent girls as determined from two-week dietary records and to compare the calculated self-selected intakes with Recommended Dietary Allowances of the National Research Council.

Subjects between the ages of seven and nine years and in the height-weight range considered normal for this sex-age group were chosen. After different methods of dietary survey were considered the two-week record of food intake was used. Forms and instructions for recording data were given to the mothers and they recorded foods consumed by the subjects in household measurements. Nutrient intakes for each subject were calculated using United States Department of Agriculture Handbook Number 8.

The mean dietary intakes for all subjects were equal to or above allowances of the National Research Council. The seven year old group had higher nutrient intakes than the eight or nine year old groups.

Food habits were studied. The consumption of about a quart of milk per day per subject and the practice of eating substantial breakfasts were practices to which credit was due for above average rating in nutrient intake.

Since girls in this study were to be subjects in a metabolism balance study to follow, it was imperative that their typical food intakes be at least equal to and compare favorably with the average for this age group. Their dietary histories and their physical examinations proved them to be entirely acceptable.