A STUDY OF THE ADEQUACY OF THE DIETS OF FOREIGN AND AMERICAN WOMEN LIVING IN COLLEGE DORMITORIES

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by

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INTRODUCTION

The problem of human dietary requirements has been a consideration of research investigation for more than half a century. In recent years it has been recognized that subnutrition is an important cause of the poor physical status of a large part of the human race. The studies based on the spontaneous consumption of food , composition of food and balance studies with human beings, are some of the ways by which the investigators have established requirement levels of nutrient intake for the various age groups.

However it has been the hope of the nutritionists that eventually standards can be established in improving the food intake of the students. One of the most adequate standards, which is commonly used is the one set by the National Research Council. It attempts to furnish guidance for the nourishment of the body at desirable level.

One avenue leading towards such a realization is that of a wise selection of foods. But there is an evidence of marked discrepancy between the dietary practice of both American and Foreign students and the dietetic standards which are advocated for them. Several analyses made by the students of their own eating practices, have indicated that these habits do

represent an important part of their adjustment to a new way of living.

The study made in this paper of the diets of both American and foreign students, living in one of the college dormitories, and taking meals in a cafeteria supervised by the dietitions, shows that their dietary habits, to a certain extent, reflect upon their family patterns.

PURPOSE OF THE STUDY

The purpose of this problem is two-fold:

1. To study the adequacy of the diet selected by foreign women living in college dormitories and eating in the cafeteria where meals are planned by dietitions.

2. To compare the adequacy of their diets with those of the American students eating in the same cafeteria.

METHODS OF DIETARY STUDIES

There are several methods used for dietary studies. Some of the methods that have commonly been used by investigators, are:

1. The inventory method
2. Balance studies on human beings.
3. Individual food records.

These methods will briefly be summarized.

The inventory method: It can be done by two ways- either to circumvent the waste item by basing all calculations upon the food as served and weighing back the uneaten portions or to estimate the waste and to deduct it from the dietary calculations made upon the food as purchased.

Balance studies: The food to be eaten is weighed after cooking and just before serving. At the time of serving samples of each food are removed to a small pyrex jar and sealed immediately. These are taken to the laboratory and on the same day a small portion of the food is weighed into composites which are dried, ground and mixed for analyses. The excreta of the subjects are also collected into weighed glass containers and analysed for the substances eliminated from the body.

Individual food records: Food consumption records are kept both at and between meals, for a period of

seven days including Saturday and Sunday. The longer the period of study, the more accurate the results are. The data are collected and the food groupings are made, then using the N.R.C. standards the estimation of calories, carbohydrates, protein, fat, calcium, iron, ascorbic acid and vitamin A. is made.

The first two methods give the greater amount of accuracy but they are time consuming methods, the last one is conveniently done but the results are not too reliable and accurate because the approximate measurement of food is kept.

The method used in this study is the one by which the individual food records are kept and calculations are made for the dietary intake.

REVIEW OF LITERATURE

Several noteworthy studies have been made to consider the adequacy of the diets of college students. Alberta Borthwick-1917 (4) studied the diet of Montana State College girls. The problem was to work out the cost of food per capita per month and per day for seven months. The percent of income spent on specific food stuffs was also considered. The entire food served for eight days, was computed in terms of calories, protein, calcium, phosphorus and iron content. The results in Table I show that the calories and protein values are much higher than the Sherman and N.R.C. standards.

A dietary study was made by Ann Louis Macleod and Mary A. Griggs in 1918. (20) at Vassar College with an object to obtain an accurate data as to the amount, kind, and the quantity of food consumed by the students. The number of students for the study were 115 and the inventory method was used for the calculation of the figures. The results are in Table I which indicate an adequate supply of food. The values for calories, protein, calcium, and iron are considerably higher than the Sherman and N.R.C. standards.

Othe studies have been made by Isabel Bevier-1920 (3) author of "A Dietary Study" at the University of Illinois. These studies involved 300 people living in sorority, church and co-operative houses. The work was carried on according to approved methods for seven

TABLE I

COMPARISON RESULTS OF CERTAIN DIETARY STUDIES

Taken from- "Nutritive Value and Cost Of Food Served to College Students".- Edith Hawley

Investigators	Dietaries Studied	Nutritive Value per Man per Day of—									
		Energy		Protein		Calcium		Phosphorus		Iron	
		Amount	% of Std.	Amount	% of Std.	Amount	% of Std.	Amount	% of Std.	Amount	% of Std.
	Number	Calories	%	Gm.	%	Gm.	%	Gm.	%	Gm.	%
Standard (Sherman) for Safety.		3,000	100	67	100	.68	100	1.32	100	.015	100
Richard and Talbot	1	3,690	123	135	201	1.10	162	2.12	161	.023	153
Macleod and Griggs	1	3,840	128	141	210	1.11	163	1.95	148	.021	140
Borthwick	1	3,190	106	91	136	.70	103	1.23	97	.019	127
Kramer and Grundemeir	20	2,890	96	82	122	.53	35	1.24	94	.014	93
Bevier	9	3,140	105	87	130	-	-	-	-	-	-
Benedict and Farr											
Practice House		1,630	55	61	91						
Restaurant		2,050	.63	73.8	109						
Standard N.R. C.		3,000	100	70	100	.3	100			.012	100

day period. Twelve studies were made. The data showed that the quantity of food was fairly satisfactory both in caloric value and amount of protein, fat and carbohydrates. Results are shown in Table I. They indicate a high intake of calories and protein.

Edith Grundmeir and Martha Kramer made a study of boarding houses and fraternity houses at Kansas State College. It included 60 organizations or about 465 students in all who managed without assistance of a dietition. The record of the food intake was kept by the students themselves. The results are recorded in Table I. It was found that the protein was sufficient but none of the minerals were adequate for more than one half of the group. Sufficient amount of money was spent for vegetables and fruits but the selection was poor as was indicated by the extravagant use of canned fruits.

Francis G. Behedict and Gertrude Farr in 1929(1) determined the energy and protein content of foods regularly served in a college community. Three types of eating places were represented: the restaurant where standardized meals at fixed prices were served, the college cafeteria and the drug store where ice-cream and sandwiches were sold. Studies of the "practice house" and the food eaten between meals were also conducted. The comparative results are listed in Table I. It was shown that 34 cafeteria dinners furnished 517 to 1610 calories and from 10 to

60 grams of protein while 29 dinners from 3 commercial restaurants contained 456 to 805 calories with 19 to 43 grams of protein. The meals served in the home economics practice house averaged 2450 calories and 61 grams of protein.

The question of adequacy of diets of college students has been studied widely by investigators in various part of the country. The studies done since 1932 have been briefly summarized in Table II.

Hetler-1932(14), Coons and Schiefelbusch-1932 (5) on the basis of normal weight, Kramer etal.(16) and Latzke (17) all found mean protein intakes of college women to be below the Sherman standard of 1 gm. per kg. day. Wheeler and Mallay-1935 (30) McKay and Patton-1938 (21) Morris and Bowers-1939(22) reported mean protein intake equal to or above this standard. The same results are true when the values are compared with the N.R.C. standard.

In the studies of Coons and Schiefelbusch (5) Kramer(16) Wheeler and Mallay(30) and Morris and Bowers(22) the mean daily calcium intakes were above the standard of 0.68 gm.per kg. Intakes of phosphorus were more or less low as reported by Coons and Scheifelbusch(5) Latzke(17) Morris and Bowers(22) whereas Kramer etal.(16) and Wheeler and Mallay(30) found them to be adequate or above.

The studies made by Pittman-1941(25) show that

TABLE II. MEAN VALUES FOR CALORIC, PROTEIN, AND IRON INTAKE OF COLLEGE WOMEN

Taken from-"Food Intake of College Women." * - Scouler and Foster

Author:	Date of Publication	No. of Subjects	Caloric Intake	Protein	Calcium	Iron	Method of Study	Length of Period	Place of Study
				gm	gm	mg.		Days	
Coons & Schiefelbusch	1932	13	1990	56.0	.93	-	Weighed, Analysed	4-7	Oklahoma A&M College
Pittman et al.	1941	27	2038	71.0	1.08	--	Weighed, Analysed	7-10	Kansas State College & Ohio University
Leverton & Marsh	1942	69		59.2	.84	10.44	Weighed, Analysed	7	Univ- of Nebraska
McKay et al ---	1942	124		63.12	.94		Weighed, Analysed	7-10	U. of Neb. & Ohio State Coll.
Hetler--	1932	85	1700				FoodRecords Calculated	3-7	Univ. of Illinois
Morris & Bowers	1939	100	1305	60.71	.717	8.86	FoodRecords Calculated	7	Utah State College
Greenwood and Losinger	1941 1942	203	2016	64.6	.829	10.34	FoodRecords Calculated	7	Oklahoma A&M College
Goddard et al. 1st period	1934	89	3699	91.0	.51	13	Inventory: Calculated	8	U of Califor: Los Angeles
Goddard et al. 2nd period	1934	89	2501	75	.75	13	Inventory: Calculated	8	U. of Califo. Los. Angeles
Wheeler & Malloy	1935	23	2397	70	.92	11.8	Inventory: Calculated		Vassar College
Donelson et.al.	1940	1013							Kansas & mid West
Scouler & Foster 1st, Period	1945	93	2445	93.9	1.45	18.20	Inventory: Calculated	14	No. Texas State Teachers Coll.
Scouler & Foster 2nd. Period	1945	94	2410	99.1	1.36	21.8	Inventory Calculated	14	No. Texas State Teachers Coll.

* Heights and Weights have been omitted from this Table.

differences between subjects intakes of nitrogen, calcium and phosphorus were significantly greater than periods for the same subjects. No subject had a mean calcium intake below the Sherman adult standard.

A study made by Morris and Bowers(22) of one week's dietary for 100 Utah State Agriculture College students. Standards of comparison were those recommended by Sherman, Rose, Daniell and Munsell. It was found that the diets of all groups were generally lower than standard used for comparison. There was consistent low intake in phosphorus, iron, vitamin B, and ascorbic acid.

The above results show that amounts of nitrogen, calcium and phosphorus eaten by college women are below the standards set by Sherman.

Some investigators calculated the food intake of college women by the inventory method. Wheeler and Malloy(30) used this method. They made their study on 28 undergraduate college students who chose their own food in a Co-operative house. The results show that this group of women ate little meat,a moderate amount of milk, very little cereal food and considerable amount of fruit especially oranges at breakfast and apple in the evening.

Goddard etal.-1934(9) made a dietary study over two eight-day periods in a dorm occupied by 105 university women in University of California. The nutritive values of food were determined by inventory method. The

results showed that the dietary fulfilled the food requirements of the group and the meals were highly satisfactory.

McKay and Patton(21) did their experiment on 15 Freshman College women in Ohio State College University. They were asked to keep their daily intake of food from 3 to 20 weeks. The data were tabulated to show the average weekly intake of milk,fruits, vegetables, whole-grain cereal,eggs and meat. Average amount of milk used was from 0.8 to 17.3 cups; green and yellow vegetables, an average of 2.6 to 10.3 pounds weekly;potatoes were used sparingly; citrus and tomatoes were used less freely than other fruits; eggs were not used by any except by one girl; whole cereal products were used infrequently; and the daily use of meat was indicated in 12 out of the 15 records. The above information proves that the food intake of the students is not satisfactory and a lot has to be done to improve it.

Mary Margaret Shaw(27) made her study on 90 college women who kept a food record of their meals for a period of two days. Reports were evaluated by advanced class in nutrition on the basis of a list of foods set up by a class as minimum requirements of a college student. The results showed that of the 80 students whose records were studied 32% had no breakfast, 16% inadequate lunches, 13% inadequate dinners while for 6% all three meals appeared inadequate.

Also some of the minerals and vitamins were lacking in the diets of a large percentage of this group of students.

Other studies have been done on the diets of college women in relation to caloric needs. Coons and Schiefelbusch-1932(5) in analysis of the self-chosen diets of 18 Oklahoma College women show that the protein of the diets was more deficient than was the caloric content. Further study of the amounts of protein ingested by college women was carried on at the University of Illinois by Arnold(14). Determination was made of the urinary nitrogen, basal metabolism and protein and caloric intake of 85 women students. There appeared no definite interrelationship within the group between protein intake and basal metabolism rate. The average intake of protein was low. Studies done by Ohlson, Nelson and Swanson -1937(23) of the diets eaten by the women of Iowa State College showed the same trend in the relation between the calories and protein.

An extensive survey of college women was carried out by Reynold and associates-1942(24) as a part of the Reginol Project of the North Central States relating to the Nutritional status of the college women. Survey was made from 1936 to 1940. The data were secured from 3,432 students who kept a record of the food intake for seven consecutive days. The records were analysed for frequency of occurance of milk, green vegetables, citrus fruit or tomatoes, meat, fish or

poultry and whole-grain cereal. The study of the data indicates that meat was chosen most frequently by the largest number of students and the whole grain products were least selected. Next in preference was milk and then green and yellow vegetables and the citrus fruit groups. It is evident from the study that the food intake of the college women is inadequate.

The experiment done by Greenwood and Losinger-1944(11) was concerned with the caloric intake and energy requirements which was based on seven days food record of 203 college women living on self-selected diets. The mean caloric intake of the students, was found to be 2015.9 calories. The caloric intake was considered to be adequate or slightly inadequate when compared with expected intake and existing standards.

Young(31) studied the dietary of groups of 10 Cornell University women, living under five different conditions- sorority house, private homes, campus controlled cottages, dormitories and graduate house. Each student was asked to keep a careful record of her food intake both at and between meals, for seven consecutive days. It was found that eventhough the caloric intake of all the women was low, the range and average intake of specific nutrient compared with N.R.C. allowances. Protein, iron and thiamin values were low and the figures for vitamin C.were high. Of all the individuals studied, there was no one who did not take

some milk, two-thirds had one or more serving of meat, one-third did not eat any egg, remaining four-fifths ate 1 to 3 eggs per week. About one-third women had whole grain cereal. Nearly every one had one serving of fruit, two-third of women had two or more serving of vegetables.

The studies of Scouler and Foster(26) were done on 106 college women students living in Oak Street Hall, North Texas State Teachers College. The length of the period of study was 14 days and for calculating the food intake, the inventory method was used. The studies show that there was a high protein, calcium and iron intake value, which may be due to the high proportion of the amount spent on eggs, cheese,meat and lower caloric intake was due to the smaller amount of money spent on cereal, fat and sugar.

Thus a brief review of the dietary studies by different investigators seem to be exploratory and more fundamental researches are neccessary. These studies show a definite dietary trend which prevails among the college students.

METHOD

Groups of seven foreign and American women students each were observed in studying the dietary habits of the women living in two different women's dormitories and eating in college cafeteria. The foods served in both the dormitories were the same. The groups studied were representatives as to age and college year. Among the foreign women five were graduate students, one senior and one junior. Their ages varied from 24 to 35 years. Among the American students there were five seniors and two juniors and their ages varied from 19 to 24 years.

Each student was asked to keep a careful record of her food intake. In order to get the maximum amount of accuracy in their data, they were asked to fill in a rough form first, later each student was supplied with mimeographed forms in which she was instructed to keep a record of her food intake, at and between meals, for seven days. The record sheet included the amount of food eaten, approximate amount in household measurement of servings and ingredients in mixed dishes like mecaroni and cheese, beef stew.

The record was taken during the time when the students were not engaged in either midterm or final examination. It was hoped that the study would be conducted for 14 days but due to the fact that there was

sense of unwillingness on the part of some of the students, to keep the data of food intake, it was not possible to carry it out for more than seven days.

Saturday and Sunday were included in the study because Leverton and Marsh(19) found that omitting data for these two days would result in distorted estimates.

The record was analysed by finding the weekly average of the intake of specific nutrient of each student and a daily average for each student, using Donelson and Leichsenring(6) short method for dietary allowance.

The average was compared with the N.R.C. allowances for moderately active women.

The record was further analysed and food groups were made according to the frequency of occurance under the following heads:

a) Cereals

b) Dairy Products

c) Desserts

d) Fruits

e) Meats,fish and poultry

f) Vegetables- green and yellow

h) Beverages

The amount of food consumed by each student was calculated for calories,protein, calcium, iron, vitamin A, ascorbic acid, thiamin and riboflavin. They were then compared with N.R.C. recommended allowances.

The study was also made of the frequency of

occurance of certain foods which were commonly listed in dietary patterns which also depended on their food habits.

Seven foreign women from India, China, Norway, New-Zealand and Sweden were interviewed to get an estimate of their dietary practices at home. Each individual was asked to submit the following information:

a) One day's typical meals.

b) Time and regularity of meals.

c) A list of individual food for frequency of use.

d) Method of preparation and storage.

RESULTS AND DISCUSSION

After a careful study of the data obtained, the average intakes of the specific nutrients for each group was calculated.

Table III shows the average intake of specific nutrients for each individual and a comparison of these figures with the N.R.C. daily allowances.

Table IV shows the range and average intakes of the nutrients of each group for a period of 7 days and a comparison of these with the N.R.C. recoomended allowances.

In the case of the individual foreign students, it is evident from the figures that their caloric intake is much below the N.R.C. standards. However it is necessary to mention that these women are smaller in stature than the American women. Their average height and weight is 5'3" and 114.4 lbs. respectively. Thus their surface area is less and the basal requirement is lower too. They are healthy and moderately active women, It can be possible that the N.R.C. standards for calories for these women is high.

Since the students kept an approximate measurements of food intake, there is a possibility of some error in the estimation of the dietary intake of each individual.

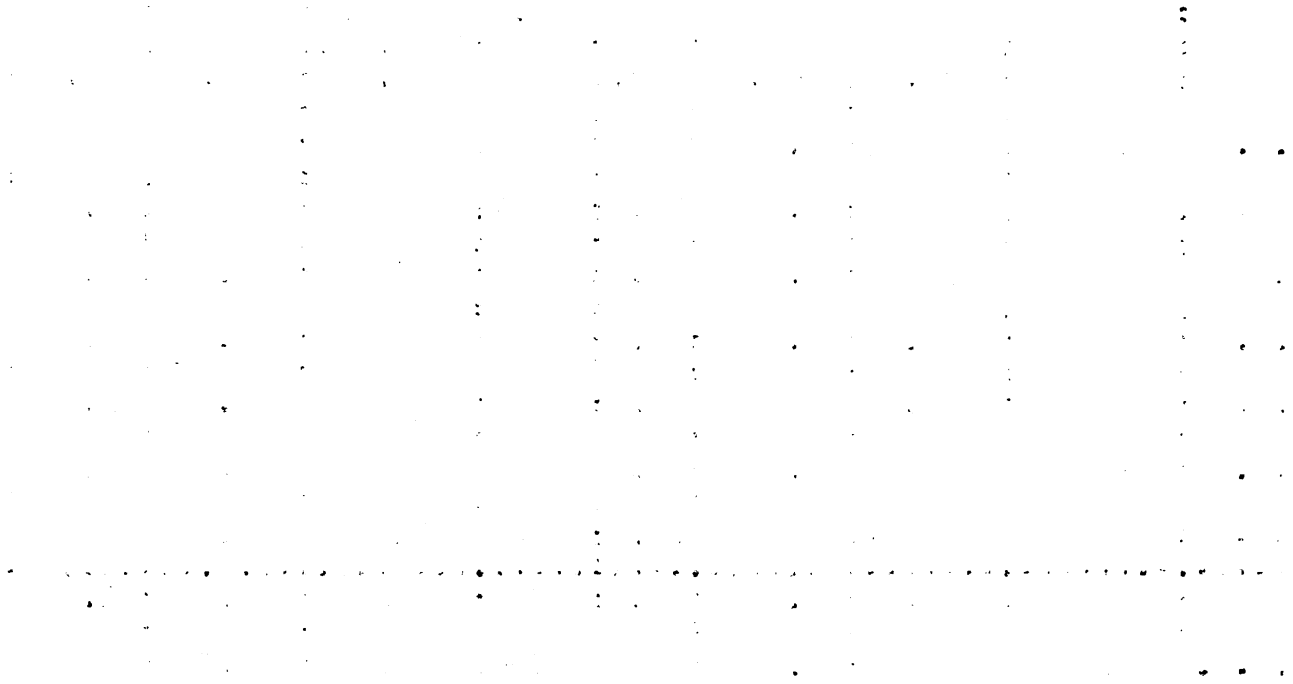
Considering the protein intake of these individuals

TABLE III. THE AVERAGE DAILY INTAKE OF SPECIFIC NUTRIENTS FOR FOREIGN WOMEN

Subjects	Calories	Protein	Calcium	Iron	Vit.A	Ascorbic Acid	Thiamin	Riboflavin
		gm.	gm.	mg.	I.U.	mg.	mg.	mg.
A.S.	1550	45.0	.82	7.16	5811	120	1.92	1.71
Z.S.	1807	60.5	.70	11.3	9111	52	1.01	1.61
M.T.	2039	62.2	.90	9.6	6317	47	1.09	1.83
C.C.	1957	67.3	.93	10.9	4149	66	1.02	2.53
A.W.	2028	64.5	.90	8.4	2379	50	.96	2.26
T.G.	1625	60.0	.42	9.7	7943	63	1.01	1.17
T.Y.	1657	65.3	1.06	11.4	4049	112	1.26	2.20
Average	1809	60.0	.83	9.9	5680	73	1.18	1.90
N.R.C.	2500	60.0	.8	12	5000	70	1.5	2.2

THE AVERAGE DAILY INTAKE OF SPECIFIC NUTRIENTS FOR AMERICAN WOMEN

Subjects	Calories	Protein	Calcium	Iron	Vit.A	Ascorbic Acid	Thiamin	Riboflavin
		gm.	gm.	mg.	I.U.	mg.	mg.	mg.
M.R.	2408	88.8	1.07	14.5	5871	98	1.42	3.05
E.P	1949	72.7	1.02	11.1	3819	70	1.02	2.75
M.G.	2061	81.3	1.00	14.1	5426	72	1.31	2.10
L.P.	2263	75.3	1.06	10.5	6701	76	1.09	3.16
J.D	2399	87.6	1.21	12.6	4607	53	1.28	3.65
R.N.	2247	81.9	1.13	13.3	4732	106	1.46	3.39
M.K.	1824	67.1	0.87	10.9	3283	51	..98	2.66
Average	2150	79.2	1.06	12.4	4634	75	1.22	2.97
N.R.C.	2500	60	.8	12	5000	70	1.5	2.2



it is interesting to note that the figures of the two individuals agree with the N.R.C. standards, four individuals have slightly high intake, while one individual has extremely low intake. It is due to the fact that the subject with low intake has religious belief against the consumption of meat, fish and poultry. No supplement is taken to replace the deficiency of nutrients derived from those products. However considerable amount of milk is consumed by her which accounts for adequate amount of calcium and riboflavin in her diet.

The calcium intake of one individual satisfies the N.R.C. standard; four individuals have higher intake because of higher consumption of milk by them than the other individuals; two have low intake. The least intake of calcium is by that individual who does not drink milk at all, consequently the intake is dangerously low.

The iron value of all the individuals is within the two-thirds of the N.R.C. allowances which is used as the minimum requirement.

The vitamin A. intake of four individuals is considerably high because the dietary report indicated that they ate greater amount of vegetables and fruits. Three individuals have slightly low intake of vitamin A.

In regard to ascorbic acid, two individuals have considerably high value due to the fact that they consume little more than one serving of citrus fruit every day. Five individuals have slightly low intake.

However the intake of ascorbic acid is rather irregular from day to day and also much is destroyed during the cooking of foods.

With the exception of one individual, the thiamin value of all the individuals is within the N.R.C. requirements.

Regarding the riboflavin intake, three individuals have almost the same value as the N.R.C. allowances; four satisfy the minimum requirements; but the least value is of the individual whose calcium intake is very low. This is due to the low consumption of milk.

The individual figures for the American students are better than the figures obtained from the record of the foreign students. The caloric intake of all the individuals is low. These women are much larger in size than the foreign women. Their average height is 5'.11". and the weight is 155 lbs. However their figures are within the minimum requirements set by the N.R.C. standard. These women are all healthy and moderately active women and so it is possible that the standard is high for them too.

The value of protein in the case of each individual is markedly high because a greater amount of milk and milk products are consumed by these women.

The calcium intake of each individual is high for the same reason.

Considering the iron intake of each individual

it was found that the four students had higher intake, and three had slightly lower intake than the N.R.C. standard. This is due to the variable quantities of vegetables and meats consumed by these individuals. The vitamin A intake of three individuals is high and of four individuals is slightly low.

The ascorbic acid value is high in the case of four individuals and low in the case of two. Only one value compares exactly with the N.R.C. standard. Since the value of ascorbic acid is irregular it is very hard to judge the exact quantity consumed by an individual .

The riboflavin value is considerably high in all cases because of the greater amount of milk and milk products included in their diet.

The thiamin intake compares well with the N.R.C. allowances-except in one case.

However it is evident from all these figures that on the whole the students are consuming considerably decent amount of nutrients although there are a couple of individual cases that need to alter their food habits in order to have an adequate amount of specific nutrients in their diets.

The average figures of the food intake of the foreign women as indicated in Table IV show that their figures compare quite well with the N.R.C. standards, while the figures for the American women are much higher. It is because a considerable amount of food is eaten

TABLE IV THE RANGE AND AVERAGE WEEKLY INTAKE OF SPECIFIC NUTRIENTS FOR FOREIGN WOMEN

Subjects	Calories	Protein	Calcium	Iron	Vit. A	Ascorbic Acid	Thiamin	Riboflavin
		gm.	gm	mg	I.U.	mg.	mg.	mg.
Foreign Women	1809 (1550 - 2039)	61.0 (47.0-67.3)	.83 (1.06-.52)	9.79 (7.44 11.40)	5680 (2379 9111)	73 (47-120)	1.18 (.96- 1.92)	1.76 (1.17- 2.53)
N.R.C.	2500	60	.8	12	5000	70	1.5	2.2

THE RANGE AND AVERAGE WEEKLY INTAKE OF SPECIFIC NUTRIENTS FOR AMERICAN WOMEN

Subjects	Calories	Protein	Calcium	Iron	Vit. A	Ascorbic Acid	Thiamin	Riboflavin
		gm.	gm.	mg.	I.U.	mg.	mg.	mg.
American Women	2150 (1824 * 2408)	79.2 (67.1 * 88.8)	1.05 (.87 - 1.21)	12.4 (7.44 11.4)	4634 (3283 * 5871)	75 (51 - 106)	1.22 (.98 - 1.46)	2.97 (2.10- 3.65)
N.R.C.	2500	60	.8	12	5000	70	1.5	2.2

between meals by these women.

The average caloric intake of the foreign women is much lower than that of the American women although in both cases they are lower than the N.R.C. allowances. However it may be due to the fact that the fat used in the preparation of vegetables is not included in the calculation thus there is some underestimation. Also the data have been kept by individual students and so there can be error in judging the size of the servings of food. Thus there is every possibility of inaccuracy of figures.

The average calcium and protein intake of the foreign women satisfies the N.R.C. standards while it is much lower for the American women.

However the iron intake of the foreign women is lower than the average amount consumed by the American women. The mean iron intake of foreign women is 9.79 and for the American women it is 12.4. It is due to the fact that there is lower intake of meat in the diet of the foreign women.

It is interesting to note that the vitamin A value of food intake of foreign women is higher than that of the American women and even greater than the N.R.C. allowances. The mean vitamin A intake of foreign and American women is 5680 and 4634 respectively.

The average ascorbic acid intake of the foreign women is slightly lower than the intake of the

American women and both the values are much higher than the values presented by the N.R.C. standards.

The thiamin and riboflavin intake of the foreign women are much lower than that of the American women due to the reasons already given in the previous pages.

Thus comparing the average intake of the two groups of women it is seen that the foreign women have met the N.R.C. standards. It also reveals the fact that inspite of their having a different cultural background and food habits than that of the American women, yet they have adjusted themselves considerably well to the food situation.

Comparison to dietary pattern

There are several food groupings which can be used as a guide to adequate diet. One of the commonly chosen as a basis for comparison is:-

Meat, fish and poultry..... one serving daily.
Eggs ..... preferably 1 daily or 3to 4 a week.
Milk..... 3 to 4 cups daily.
Fruit and vegetables....4 to 5 servings daily, one of which should be citrus fruit or tomato, and at least one green, leafy or yellow vegetable.
Whole grain cereal ;.... 2 servings at least/day
Butter ..... . one tablespoon daily.

Bearing the above standard in mind, a careful examination of the food intake of specific foods in the food records

TABLE V AVERGE DAILY INTAKE OF SPECIFIC FOODS FOR FOREIGN WOMEN

Subjects	Meat, fish poultry	Eggs *	Milk	Fruits & Vegetable	Whole grain products	Butter
P.A.	0	1	2.0	3.0	1.4	.9
M.T.	1.4	3	1.0	3.1	1.3	.4
T.Y.	1.3	3	2.6	4.4	3.3	1.3
A.W	1.3	2	2.6	3.1	4.0	1.0
Z.S.	1.4	2	1.9	3.0	1.7	.9
T.G.	1.4	3	-0	4.7	1.4	.9
C.C	1.4	2	2.6	5.7	2.3	.4
Average	1.1	2.3	1.8	3.8	2.2	.7

The value is expressed in servings. Eggs consumed per week.

AVERAGE DAILY INTAKE OF SPECIFIC FOODS FOR AMERICAN WOMEN

Subjects	Meat, fish poultry	Eggs *	Milk	Fruits & Vegetable	Wholegrain products	Butter
L.P.	1.4	2	2.6	3.2	3.5	2.1
J.D.	1.1	2	2.6	2.6	2.4	1.7
M.R.	1.6	3	3.0	5.6	3.1	1.1
A.P.	1.4	3	3.0	5.3	3.1	1.7
M.G.	1.7	2	2.2	3.3	3.6	1.1
R.S.	1.9	1	1.7	4.7	4.0	1.4
M.K.	1.6	2	1.6	4.0	3.7	0.9
Average	1.6	2.1	2.4	4.1	3.3	1.4

The value is expressed in servings
* Eggs consumed per week.

of the foreign women, was made. They explain certain interesting facts about the figures for specific nutrients. Table V gives figures for the average weekly intake of specific foods.

Of the seven individuals studied, there was one individual who did not eat any meat, fish, and poultry group foods. The reasons has already been given in the previous discussion. Out of the six individuals, four had an average of 1.4 servings daily and two had 1.3 servings daily of the meat, fish and poultry.

In the case of the same individual who did not take any meat, there was just one serving of egg a week-this also accounts for the low protein intake in her diet. Three individuals had three servings of egg a week while the rest had servings of egg a week.

Of all the foreign students, there were three who had taken an average of 2.6 glasses of milk daily, one had 2 glasses daily; and one individual had none at all. It is interesting to note that it is not a common practice to include milk in the regular diet of an individual in the foreign countries, represented by this group, chiefly because it is expensive and scarce and is not a usual custom to serve milk with the meals. However these foreign students have become accustomed to drinking milk with their diet- except in one particular case. It should be pointed out that only milk used as beverage was included in the tabulation. Consequently

figures should be some what higher if milk used in cooking were also included.

The fruit and vegetable intake of the individuals was considerably adequate. One individual had an average of 5.7 servings of fruit and vegetable daily; two had 4.7 and 4.4 servings respectively; two had 3.1 and two had 3 servings daily. The vegetable included both green or leafy or yellow vegetable. It was also interesting to note that all had at least one serving of fruit daily which included both fresh and canned fruits; but the intake of citrus fruit was not satisfactory according to food groupings mentioned before. One individual had 9 servings of citrus fruit a week; two had 6; one had 4; one had 3; one had 2 and one had only once a week. The chief reason for such a variation and irregularity is because the citrus fruit is chiefly served at breakfast and the records indicate that most of these students do not take any breakfast.

Of all individuals, one had an average of 4 servings of whole grain cereals; one had 3.3 servings one had an average of 2.4 servings and the rest had from 1.3 to 1.7 servings daily.

It was surprising to note that 5 out of 7 students did not take even one serving of butter daily. They took an average of .4 to .9; two individuals took 1 serving of butter daily.

Considering the dietary pattern of the

American students it was found that one individual had an average of 1.9 serving; one had 1.7 servings; two had 1.6; two had 1.4 and one had 1.1 servings of meat, fish and poultry groups of food.

Regarding the consumption of eggs- two had 3 servings a week; 4 had two and one had one a week.

The American students drank more milk than did the foreign students. Two had 3 glasses daily; two drank an average of 2.6; one had 2.2 servings while two had an average of 1.6 to 1.7 servings respectively.

Two individuals had 5.3 and 5.6 servings of vegetables and fruits daily; two had 4.7 and 4.0; two had 3.3 and 3.2 and one had 2.6 servings daily. They all had atleast one serving of citrus fruit daily.This indicates that these students were more regular about eating breakfast when citrus fruit is served than did the foreign students.

A great quantity of whole grain cereal was taken by this group of students. One had an average of 4 servings daily; five had from 3.1 to 3.7 servings and one had 2.4 servings daily. These higher figures may be due to their habit of eating breakfast regularly.

The data on butter intake show that one individual had two servings of butter daily; five had about 1.1 to 1.7 servings daily and only one had little less than one serving daily.

Thus it can be estimated from the above information that the American women had much higher intake of all the specific food group than did the foreign women. The figures are markedly high in milk, meat, whole grain cereal and butter, there is very little difference in the consumption of the rest of the food.

EATING HABITS

In order to have a precise picture of the eating habits of the individuals it will be interesting to analyse their data separately.

Foreign Women: The results in regard to breakfast were rather surprising. Three out of seven individuals did not eat any breakfast. Two individuals were irregular in their habit of eating breakfast which was not adequate, while two individuals had adequate breakfast every day.

An interview with the students regarding eating breakfast, showed that they were not too keen on getting up on time to go for breakfast which was served daily in the dormitory from 7:20 to 7:35 A.M.

American Women: The American women had better breakfast eating habits than the foreign women had. None of the women missed any breakfast. Three had adequate breakfast regularly, two had adequate breakfast but missed just one day each, while two had both adequate and inadequate breakfast.

Between Meal Eating: It was not confined to any one

group. Every student did some eating between meals.

Regarding the foreign women the range was from 4 to 20 times a week, the average of .06 to 2.8 daily.

Where the American women were concerned the range was from 4 to 26 times a week and the daily range was from .06 to 3.7.

Evening was the most favorable time for between meal eating. The food that was most popular between meal times was Sundae, milk-shake, cookies, candy, coke and Hamburgs. Coffee was quite frequently drunk by almost all.

Thus the eating habits of the women described in this paper are very typical of college girls.

Home Dietary Practices Of Foreign Women.

A brief summary of foreign women's home dietary practices will be given in order to have a better understanding of their eating habits.

India: The food habits of the people in India, are affected by geographical factors thus it is difficult to make any generalized fact regarding their dietary habits. But the foods that are frequently eaten in India, are rice,baked wheat bread (unleavened). Meats such as mutton,poultry and fish. Beef and pork are rarely used due to the religious beliefs of the people* against eating those kinds of meats. The kinds of vegetables used in India are the same as the ones used in the States. Fruits such as oranges,grapes, bananas, guava, pears, apples, grapes, peaches and mangoes are commonly eaten. Milk is not the part of the regular diet. Eggs are rarely used because they are expensive. Both coffee and tea are consumed as beverages.

The methods of preparation of foods is very different from the way it is prepared in the States. Both meats and vegetables are thoroughly fried and browned.in clarified butter and spices. Foods are very highly seasoned. Desserts are not usually included in the diet.

Canned foods are seldom used because India has not yet developed her canning industry. Freezing of food is rare too. Hence the preservation of food is done by drying,seasoning and salting the food. Due to the lack of such fascilities people are more dependent on fresh

* Hindus and Muslims only

fruits and vegetables.

Lentils and pulses are very commonly consumed throughout India.

China: People in China eat a lot of rice, pork, fish and poultry and a little beef. Mutton is seldom used. The commonly used vegetables are Chinese cabbage (celery cabbage) potato, beans, peas, and turnips. They eat many varieties of green vegetables and bean sprouts. Fruits such as peaches pear, apple, dates and persimon are frequently used. Green tea is used as a beverage. Desserts and cow's milk are not included in the regular diet of a Chinese. Soya beans are used in several forms such as soya-bean milk, soya bean oil and soya bean cheese. Butter is seldom used. Whole grain cereal and noodles are also used frequently.

Meats and vegetables are usually stewed, sautied and fried. Baking is uncommon. Food is preserved by drying and salting as freezing of food is an expensive process.

Norway: The Norwegian student who was contacted for the dietary history represented the farm family. The recorded information indicated that usually meals are taken four times a day- 7:30 A,M., 12 Noon, 4 P.M., and 7:30 P.M. - the second and the last meals being heavier than the other two.

The foods which are frquently used in the diet are:- dark and white bread, meat such as pork, mutton and veal, and fish such as sardines and herrings.

Vegetables such as potatoes(every day) peas, carrots and beans etc. Berries and other fruits are usually eaten in place of desserts. Coffee is used as beverage.

It is evident from the information recorded that milk as such is not included in the regular diet of an individual. However, brown cheese made from goat's milk is used very regularly. The use of vitaminized margarine and herring oil are very common. Hot cereals such as barley and oats cooked in milk are also included in their diets.

The method of preparation of meals is little different than what the people in this country are used to. Usually salted and fried meats amd fish are eaten. Dried fish is also very popular. Vegetables are generally boiled and sometimes fried.

Sweden: According to the information given by one of the swedish girls, it was understood that the peple in Sweden have practically the same type of dietary habits as the people in Norway have. They eat almost the same kinds of foods. One of the typical foods of the people in Sweden is that they eat a lot of wheat bread(unleavened) which they prepare during one particular season of the year and eat it throughout the year. They are preserved in big tins. They are usually hard and dry. They also eat a lot of fish and salted meats.

New Zealand: The dietary pattern of the food eaten in New Zealand is very much the same as that of the United

States. The time of meals also corrosponds with that usually practiced by the Americans.

However the meat that is frequently eaten in New Zealand is mutton and lamb. Beef and pork are very unpopular and poultry is used very rarely. Oysters are a favorite food of the people. Milk is not included in regular diet of an individual. The vegetables consumed are the same as used in homes in the States. A lot of fruits especially apples are commonly eaten. Bread taken three times a day. Milk puddings are a popular form of desserts.

The method of preparation is the same as prevalent in the States but where storage of food is concerned , it is little different because there is no deep freezing units or lockers as in this country. A great deal of canning of meats, fruits and vegetables is done in New Zealand.

It is important to mention that all these informations are gathered from the foreign students who who were subjects in this study. It can be possible that the information mentioned in this summary is little inaccurate as the students were concerned with only that area where they came from. These facts may not be all applicable to the whole part of the country.

One of the important facts to notice from this information is that all these students are not use to eating beef, desserts and butter. Milk is not commonly drunk

with regular meal. This leads us to think why there is lower intake of protein and calcium and riboflavin in their diets. All these students are used to eating fresh fruits and vegetables rather than canned foods. However they are familiar with the fruits and vegetables and meats that are eaten in this country. Their method of preparation of foods is quite different too. All these factors have affected the food intake of these students in this country. It needs to be stated that they have made quite a good deal of adjustment where intake of food is concerned.

SUMMARY

Groups of seven foreign and American women students each were observed on studying the dietary habits. All of them lived in two different dormitories and ate their meals in college cafeteria. Each student was asked to keep a careful record of her own food intake at and between meals for seven days. The record was analysed by finding the weekly and daily average of the intake of specific nutrients of each student, using the Donelson and Leichsenring Short Method for dietary allowances.

The results indicated that the American Women had higher values of calories, protein, calcium, iron, thiamin and riboflavin than had the Foreign Women. But when the figures were compared with the N.R.C. standards, the figures for American women were higher.- The foreign women met the N.R.C. standards.

It is neccessary to mention that there is a possibility of error in the calculation of figures due to the fact that the approximate measurement of food was kept and since each individual kept her own food record there can be a lot of variations in approximating the measurements of the serving of food.

The data were also tabulated to compare the figures with the dietary pattern. It was found that the American women had taken higher quantities of milk,

whole grain products and butter than did the foreign women. The daily average servings of milk, whole grain products and butter were 2.4, 3.2 and 1.4 respectively. The foreign women consumed the daily average of 1.8, 2.2 and .7 servings respectively. One foreign woman did not eat any meat, egg or poultry group foods, one did not drink milk at all.

Regarding the eating habits of the foreign women and the American women, only two out of seven foreign women ate adequate breakfast regularly, two ate inadequate breakfast and two did not eat breakfast at all.

The American women had better breakfast eating habits - five ate adequate breakfast and two had iadequate breakfast.

Thus it can be concluded from the data that on the whole the American and foreign students had adequate intake of food although there are some special cases that have low intake of certain specific nutrients. A careful examination of the meals served in the dormitories showed that the meals were reasonably adequate and the low intake of nutrients in the diet of the students may be due to their dislikes for certain foods.

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