FAT IN THE DIETS OF YOUNG WOMEN

by

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INTRODUCTION

One of the major health problems in the United States today is atherosclerosis, which often leads to coronary heart disease (CHD). Although atherosclerosis affects elderly persons most often, there is an increasing incidence of its occurrence in younger populations (1). The major emphasis in the study of CHD has been on men. However, CHD kills more women, as well as men, at all ages than any other factor (2).

Recommendations for dietary changes to combat atherosclerosis have been made by the American Heart Association (AHA) (3), the Food and Nutrition Board of the National Academy of Science (4), and the Council on Foods and Nutrition of the American Medical Association (5). Specific suggestions include: a) caloric intake should be balanced for maintenance of optimum weight, b) dietary cholesterol should be reduced to less than 300 mg/day, c) calories from fat should not exceed 35%, and d) saturated fatty acids should supply no more than 10% of total calories and polyunsaturated fatty acids (PUFA) should supply at least 10% of total calories.

In spite of the recommendation for decreased dietary fat, food fat available/person/day in the United States continues to rise (6). However, saturated fatty acids are accounting for a smaller share and linoleic acid for a larger share of total fat available. The 1965-66 United States Department of Agriculture (USDA) Household Food Consumption Survey reported the proportion of calories from fat in the food eaten by individuals to be above the 35% level thought to be desirable (7).

The objectives of this study were to: a) determine amounts and food sources of dietary fat, b) estimate distribution of calories among fat, protein, and carbohydrate, and c) determine P/S ratio (polyunsaturated to saturated fat) in the diets of a group of young women.

REVIEW OF LITERATURE

Dietary Study Methods

There is no generally accepted method of measuring the dietary intake of free-living individuals. The literature on dietary survey methodology is vast (8). Mann et al. (9) stated, "a superficial examination of the technical problems experienced in measuring dietary intake meets such a morass of conflicting opinions that the first inclination is apt to be a decision for abandonment." Comparisons of dietary survey methods have been made, but they were comparisons between methods whose accuracy and reliability are not known (10).

Commonly used methods of dietary survey include: a) the dietary history and its variations, b) the 24-hour recall, and c) the dietary record. In estimating food intake of individuals, results among methods vary with the population group studied and with specific foods and nutrients; there is no consistent pattern of variation (11-13). Therefore, it is impossible to predict with any accuracy, results that would be obtained by one method by projecting values obtained by another method. There is no proof that one method is more reliable than any other (10). Young et al. (11) found that the 24-hour recall and 7-day record could be used interchangeably to obtain a group mean. The method chosen should depend on the objectives of the study. Only one method should be used within a particular study (10).

The Dietary History

The dietary history attempts to determine average dietary intake over a considerable time period through the use of an extensive interview.

Information is obtained in regard to the subject's health habits and other factors that relate to nutrition. The interviewer attempts to learn the subject's usual eating pattern and tries to integrate weekly and seasonal variation. Information obtained by this method often is compared with clinical and laboratory findings. Taking dietary histories is time-consuming and it assumes that the subject has well-established food habits (9, 14).

The 24-Hour Recall

This method consists of a brief interview in which the subject is asked to recall all food intake over the past 24 hours, starting with the last meal or other food intake. The 24-hour recall provides for savings in time of collection, calculation, and analysis of data. Since it requires little of the participant's time and cooperation, a more representative sample may be possible (11).

The Dietary Record

The dietary record is a common survey tool that can be used in any area where people are literate (15). The food may be weighed, measured, or estimated and reported in household measurements. Estimating amounts of food consumed has certain advantages: a) it is less demanding than weighing or measuring, b) a high degree of cooperation is possible, and c) no special equipment is necessary (8).

The record must be as complete as possible. Failure to enter information or to describe the details of the measurements makes the record less valuable (8). The subject's recording of food intake introduces error depending on his ability to estimate, his degree of interest, and the care

he takes. Error in estimating portion sizes is the largest source of error (16). Young et al. (16) compared calculated nutritive value of "actual" or measured food intake with that of the subject's estimation of intake on both a group and an individual basis. On a group basis, when food intake was converted to calculated nutritive values, the subject's errors in estimation of food portions seemed to contribute relatively little as a source of error. In studying the nutrient intake of an individual, the subject's ability to estimate food portions could become a large source of error.

In planning to use the dietary record as a survey method, one must decide on the time period to be covered. Chalmers et al. (17) stated that the time period should be long enough for adequacy, but not so long as to lose the subject's interest and cooperation. When characterizing the dietary intake of a group, one day is sufficient. To obtain greater precision, it is more efficient to use more subjects than to take more days. The number of days needed to characterize the dietary intake of an individual depends on the precision required and differs with every individual.

As to which days should be used, Chalmers et al. (17) found no differences among days for some groups and certain trends in daily intake for other groups. For example, college students' food intake decreased on weekends. Eppright et al. (18) found that weekend eating habits of school children from 3 states in the North Central Region differed significantly from weekday habits. Chalmers et al. (17) concluded that there is no consistent "day effect"; thus, it is immaterial which days are selected for a dietary record as long as no distinct tendency for a specified population is observed. The absence of a day effect might be expected, but should not be

assumed without investigation. In determining food intake of individuals, the presence or absence of a day effect depends on the individual.

The adequacy of a 7-day survey in assessing an individual's average dietary intake is questioned. Adelson (19) compared the results of dietary records kept by a group of business and professional men in Minneapolis-St. Paul for two consecutive weeks, and concluded that one week proved satisfactory for obtaining a group picture of dietary intake. However, when attempting to assess an individual's average intake, workers found considerable weekly variation in calorie and nutrient intake (20-22). The degree of variation differed with dietary component and subject (21, 22). Huenemann (20) concluded that no single dietary record is "typical" of food intake of an individual over a period of time. Records should be repeated several times during the year rather than for several consecutive weeks to give a sufficiently accurate assessment of average intake by an individual (20, 21).

Tables of Food Composition

Nutritive values of diets are obtained by chemical analyses of the foods or calculated from tables of food composition. Murphy et al. (23) discussed the availability, uses, and limitations of tables of food composition. Data in Handbook No. 8 (24) and Home and Garden Bulletin No. 72 (25) are representative values based on a) review of information from previous publications, b) examination of new information available from unpublished material and from the literature, and c) derivation of values that are most nearly representative of a food for year-round nationwide use (23). Data

in tables can be considered representative of foods as marketed or consumed. Nutrient losses during processing are accounted for (23).

Data presented in food tables are not precise enough for use in metabolic studies. Food tables are useful in a number of ways, including assessing the nutritive value of diets over a period of time, conducting surveys of household food consumption, and assessing an individual's food intake for a brief period to serve as an index to the nutritive value of his diet for an extended time (23).

Some discrepancies between values obtained by calculation from food tables and those obtained by chemical analyses are expected, because of limitations of food tables (26). The more common or usual the foods in the diet, and the more simply they are prepared, the more representative will be the values calculated for them. Ingredients of mixed dishes made commercially or in restaurants are often sources of error (27). Stock and Wheeler (28) found that items such as fried foods, soups, and sauces, which have high and variable fat content, made major contributions to differences in calculated and analyzed values of fat intake. Fried foods presented a particularly difficult problem because the fat content depended largely on cooking procedure. The range of differences between calculated and analyzed values was smaller for individuals who chose "simple" diets with few foods and used few multi-ingredient and fried foods. Stock and Wheeler (28) concluded that considerable variation in fat content, and hence, energy content of many cooked foods, has to be accepted as inherent in dietary surveys. They estimated that in a 7-day survey, calculated protein and energy intakes will fall within ± 20% of the analytical value in 90% of individuals.

Groover et al. (29) compared calculations of total calories and calories from fat in various diets, individual diet samples, and individual food items with actual number of calories, as measured by the bomb calorimeter. The majority of calculated values were higher than the analyzed values, the largest error being made in calculating calories from fat. More recently, Marshall et al. (30) analyzed meals used in a metabolic study and compared the results to protein, carbohydrate, fat, and cholesterol values calculated using Agriculture Handbook No. 8 (24); analyzed and calculated values were exceptionally close.

Dietary Fat and Health

Dietary Fat and Atherosclerosis

Epidemiological studies provide evidence that dietary fat, among other factors, plays a definite role in the etiology of CHD (31). When each of the major risk factors is weighted according to its contribution to atherosclerotic disease complication, serum cholesterol is one of the most important (32). The influence of food patterns and eating habits on serum cholesterol level and the prevalence of atherosclerosis has been demonstrated by studies of many population groups. Keys (33) studied CHD in middle-aged men living in 7 countries, and concluded that 80% of the serum cholesterol variability among those groups could be explained by the different proportions of saturated fat in the diets. Scrimshaw and Guzman (34), upon examination of epidemiological data, found significant correlations between atherosclerosis and percentage of calories derived from fat, atherosclerosis and serum cholesterol levels, and percentage of calories derived from fat and serum cholesterol levels.

Information about coronary atherosclerosis in young women is limited. Engel et al. (35) found a family history of myocardial infarction, hypertension, or diabetes present in 95% of the atherosclerotic young women they studied. Eighty-six percent of the women had 3 of the following 5 risk factors: family history of myocardial infarction, hypertension, or diabetes; hypertension; hyperlipidemia; glucose intolerance; and cigarette smoking. Oliver (36) studied 145 young women with ischemic heart disease and found hypercholesterolemia to be the most common risk factor; it was present in 46% of the women.

Biological Effects of Polyunsaturated Fatty Acids

Cholesterol-lowering effects. The influence of PUFA on cholesterol metabolism has been explored widely. It is established that PUFA have a lowering effect on serum cholesterol. However, there are conflicting reports as to whether there is a reduction of cholesterol or merely a redistribution of cholesterol between the plasma and the tissues. Connor et al. (37) accounted for serum cholesterol reduction in enhanced fecal steroid excretion. However, in other studies (38, 39), the fall in serum cholesterol could not be accounted for in fecal losses of cholesterol and its metabolic products.

Effects of hydrogenation. Commercially, oils high in PUFA undergo partial hydrogenation to stabilize against autoxidation. The PUFA are converted to the more stable monoenoic and saturated fatty acids through addition of hydrogen at the double bonds. Many of the double bonds are isomerized and the naturally occurring cis-fatty acids are converted to the trans form. The trans-fatty acid content of hydrogenated products varies.

Kummerow (40) reported that stick margarine contains from 25-35%, tub margarine 15-25%, shortenings 20-30% and salad oils 0-15% trans-fatty acids. He estimated the total trans-fatty acid intake from visible fat in the American diet to be approximately 8%.

Though hydrogenation and production of trans-fatty acids are considered desirable from a technological point of view, the nutritional implications are being questioned. Biologically, trans-fatty acids are reported to function differently from cis isomers (41). The difference in spatial configuration between cis and trans isomers reportedly causes trans unsaturated fatty acids to be less effective in lowering blood lipids than cis isomers (42). When human subjects were fed a hydrogenated fat (as 40% of total calories) which contained 35% trans-fatty acids, serum cholesterol levels were increased (43). However, Mattson et al. (44) found no change in plasma cholesterol or triglyceride levels over a 4-week period in men fed a diet high in trans-fatty acids. Much more study is needed before conclusions can be drawn as to the effects of trans-fatty acids in the diet.

Potential adverse effects. There have been reports of potential adverse effects of consuming a diet excessively high in PUFA. Those effects include premature aging, tissue damage, increased vitamin E requirement, and carcinogenesis (45, 46). Pearce and Dayton (47) noted an increased incidence of cancer and mortality in persons who were following diets containing 16% of calories as PUFA. However, no statistical association was found and work by other researchers does not support those findings (48).

Michael et al. (49) found that heating oils with a high PUFA content produced toxic and potentially carcinogenic substances. Feeding oils that have undergone prolonged heating caused severe ill effects in laboratory

animals (50, 51). Sugai et al. (52) demonstrated that laboratory-heated oil may act as a co-carcinogen. However, Nolen (53) observed that commercially-used frying fat had minute amounts of toxic substances and produced no appreciable ill effects on laboratory animals.

Use of Food Fats and Oils in the United States

Fat in the Food Supply

National food supply statistics (54) on the U.S. diet since the beginning of this century show how changes in food consumption have resulted in changes in level and sources of dietary fat. To estimate the fat content of the U.S. diet, appropriate food composition values are applied to quantities of food available/person based on amounts of food that disappear into civilian channels. Those amounts represent food used up in an economic sense. Although not a measure of fat actually ingested, such estimates are useful for showing trends in overall patterns of consumption (6).

On examination of food supply statistics, several trends become evident. Food fat in the U.S. food supply has increased approximately 1/4 over the past 6-1/2 decades on a per person/day basis. This large increase primarily is attributed to use of more vegetable fats. There have been large decreases in consumption of butter and lard, but that has been offset partly by increases in fat associated with greater consumption of meats; thus, animal fats continue to provide the largest share of the calories provided by fat (6, 54).

From 1909-13 to 1972, the proportion of calories derived from fat in the American diet rose from 32 to 42%, but calories from protein remained the same, 12% (6, 54). Although the American diet contains more fat than it

did 60 years ago, total saturated fatty acids now account for a smaller share of the total fat, 36% today as compared with 40% in 1909-13. Saturated fatty acids account for 15% of total calories in the diet, up from 13 to 17%, and for linoleic acid, up from 3 to 6% (6, 54).

Projections for 1985 indicate that the present trends in the use of food fat in the U.S. will continue (55). The use of table spreads (butter and margarine) is projected to remain steady, with margarine continuing to displace butter. Cooking fats are projected to increase about 2 pounds per capita, with gains in shortening more than offsetting the lard downtrend. Cooking and salad oils will continue to lead the increase in consumption of food fat products with a potential of 5 pounds by 1985.

Fat in the Diets of Individuals

Average daily intake of fat by men, women, and children of various ages was determined in the 1965-66 USDA nationwide survey of diets of individuals by means of 24-hour recall (7). The level of fat in the diets paralleled the amount of food eaten, measured in calories. No consistent differences in fat intake were noted for persons living in urban and rural areas. With few exceptions, the level of fat increased with increased income. Contributions of fat to total calories in the diets ranged from 39% for infants to 45% for men 20-64 years of age, with women 20-34 years old deriving 43% of calories from fat (6, 7).

METHODS

The survey sample consisted of 60 young women randomly selected from approximately 430 females with American cultural background who were residing in Jardine Terrace, the married student apartment complex at Kansas State University. The instrument consisted of: a) background information and b) instructions and forms for completing a 7-day dietary record. Copies of the various forms are in the Appendix. The survey was conducted by one interviewer between February 15 and April 15, 1976. The interviewer contacted each woman personally and presented her a letter of introduction. The purpose of the study and requirements of participants were explained briefly and the woman's cooperation was requested. If she agreed to participate, she was asked to sign an agreement and release form.

Background information obtained included: date of birth, citizenship, height, weight, occupation, and number in household. When a woman was on a special diet or did not have an American cultural background, an alternate subject was selected.

Instructions and forms were given for keeping the 7-day dietary record. The interviewer explained the procedure and pointed out frequently-made errors. The subject was asked to contact the interviewer if she encountered any problems in completing the record. The records usually were picked up daily at which time incomplete or unclear information was clarified.

Dietary intakes of calories, protein, total fat, saturated fat, oleic acid, and linoleic acid were calculated for each subject from food composition data in Home and Garden Bulletin No. 72 (25). Because of sampling variation, it was not considered meaningful to use simple means for

estimates of population parameters. Therefore, ninety percent confidence intervals were used to estimate daily nutrient intakes for the entire population of women living in Jardine Terrace. Ninety percent confidence intervals also were calculated to estimate the P/S ratio for the entire population.

The factors of 4, 9, 4 for protein, fat and carbohydrate were used to estimate the number of calories derived from those nutrients in the diets of each subject. Then ninety percent confidence intervals were calculated to estimate the percentage of calories derived from fat, protein, and carbohydrate for the entire population of young women.

The percentage of dietary fat derived from seven major food groups was calculated for each subject and ninety percent confidence intervals were used to estimate those percentages for the entire population. The major food groups included: milk and milk products; meat, poultry, and fish; other protein foods (eggs, legumes and nuts); vegetables and fruits; grain products; fats and oils; and sugars and sweets. The "fats and oils" group was divided further into butter, margarine, lard, vegetable fat, salad oil, salad dressing, and imitation cream products.

RESULTS AND DISCUSSION

Sample Characteristics

Sixty young women completed 7-day dietary records. Their ages ranged from 18 to 35 years with a mean of 22.3 years. Height ranged from 60 to 74 inches (152 to 187 cm) and weight from 95 to 190 pounds (43 to 86 kg) with means of 65.2 inches (166 cm) and 132.6 pounds (60 kg). Thus, average weight for the group was within the range of suggested weights for height of women (56). However, 28% of the sample women were overweight and 12% were underweight compared to their suggested weight for height. Though none of the women was on a special diet, many commented that they were "trying to cut down" on food consumption.

As to household composition, 45 women were living with their husbands, 10 with their husbands and 1 child, 3 with a child only, and 2 women were living alone. Twenty-eight of the group were students, 24 were working outside the home and 8 were neither students nor employed outside the home.

Nutrient Intake

Estimated daily intakes of food energy, protein, fat, saturated fatty acids, oleic and linoleic acids, and carbohydrate for the population are presented in table 1. Ninety percent confidence intervals were used to allow for reasonable sampling error. For example, it is estimated that the true average food energy intake for the population sampled is between 1507 and 1761 kcal. Unless an unusual (1 in 10) sample was obtained, that interval is correct. Caloric intake fell below the recommended dietary

allowance (NRC-RDA) (4) for this age group whereas protein intake exceeded the NRC-RDA. The caloric intake observed in this study is in fairly close agreement with that reported for 20- to 34-year-old women in the $3000-$4999 income range in the 1965 USDA survey (7). The First Health and Nutrition Examination Survey (HANES) (57) indicated that 18- to 44-year-old women living above the poverty level had a mean caloric intake of 1,680, which fell within the interval estimated in the present study. Protein intake was slightly lower than that observed in the two studies cited above. Fat intake was lower, but carbohydrate intake was in line with the 1965 USDA data (7). Values for total calories, fat, protein, and carbohydrate were all lower than those reported by O'Leary and Lee (58) for single university women living at home. However, whereas their sample was chosen to exclude students who prepared their own meals, all but 8 of the women in the present study were students or working wives who were responsible for preparing meals for themselves and their families.

TABLE 1

Estimated daily nutrient intakes for a population of young women

Nutrient	*Confidence interval*[1]
Food energy (kcal)	1507 - 1761
Protein (g)	59 - 66
Carbohydrate (g)	174 - 212
Fat (g)	64 - 75
Saturated fatty acids (g)	21 - 25
Oleic acid (g)	23 - 27
Linoleic acid (g)	10 - 13

[1] Ninety percent

It is recommended that calories derived from fat not exceed 35% of total calories (3-5), but 37 to 40% of the calories consumed by this population were derived from fat (table 2). However, calorie intake from fat for the group was lower than the mean (43%) observed for young women in the $3000-4999 income level in the USDA 1965 survey (7) and similar (38-40%) to that reported by O'Leary and Lee (58). Percentage of calories derived from protein was the same as in the two studies cited above. Carbohydrate contributed more calories to these diets than observed in the USDA survey (40%), but was similar (44-46%) to the contribution observed by O'Leary and Lee (58).

TABLE 2

Estimated percentage of calories derived from fat, protein, and carbohydrate for a population of young women

Source	Confidence interval[1]
Fat	37 - 40
Protein	15 - 17
Carbohydrate	45 - 48

[1]Ninety percent.

The percentage distribution of calories derived from fat, protein, and carbohydrate for the 60 women in the sample is shown in table 3. There is wide variation (20 to 60%) in the percent of calories derived from fat, but 40% of the women derived 35-40% of their calories from fat. Protein supplied 15-20% of total calories for 53% of the subjects. Carbohydrate supplied 40-55% of total calories for 75% of the sample.

TABLE 3

Percentage distribution of 60 young women by calories from fat, protein, and carbohydrate

	Percent of total calories									
Source	9.9-15	15.1-20	20.1-25	25.1-30	30.1-35	35.1-40	40.1-45	45.1-50	50.1-55	55.1-60
Fat	-	-	1.7	-	23.3	40.0	26.7	5.0	1.7	1.7
Protein	36.7	53.3	6.7	3.3	-	-	-	-	-	-
CHO	-	1.7	-	-	3.3	8.3	26.7	25.0	25.0	10.0

It has been recommended that the P/S ratio in the diet be 1.0 (3-5). However, only 6.7% of the subjects had a P/S ratio above 0.80 (table 4). The mean for the population is estimated, with 90% confidence, to lie between 0.46 and 0.54.

TABLE 4

Percentage distribution of 60 young women by P/S[1] ratio

P/S	0.00-0.20	0.21-0.40	0.41-0.60	0.61-0.80	0.81-1.00	1.01-1.20
%	3.3	30.0	33.3	26.7	5.0	1.7

[1]Polyunsaturated to saturated fatty acids.

Sources of Dietary Fat

The major food groups that supplied fat in the diet were meat, poultry, and fish; grain products; fats and oils; and milk and milk products (table 5). More fat came from milk and milk products, grain products, sugars and sweets, and fat and oils than was reported for 20- to 34-year-old women in the 1965 USDA survey (7). The USDA survey reported 42.3% of dietary fat derived from the meat, poultry, and fish group, whereas in the present study it was estimated that only 22-26% of dietary fat was derived from meat, fish, and poultry.

Approximately 1/2 of the fat contributed by the fats and oils group was derived from margarine and almost 1/3 from salad dressing (table 6). Vegetable fat and salad oil combined contributed approximately 1/10 of the fat from this group. The contributions of butter and lard were small, as was that of imitation cream products. The fats and oils group may

TABLE 5

Percentage of dietary fat derived from various food groups for a population of young women

Food group	Confidence interval[1]
Milk and milk products	16 - 20
Meat, poultry, and fish	22 - 26
Other protein foods (eggs, legumes, and nuts)	5 - 7
Vegetables and fruits	8 - 11
Grain products	18 - 22
Fats and oils	16 - 25
Sugar and sweets	1 - 2

[1]Ninety percent.

TABLE 6

Percentage of fats and oils derived from various food sources for a population of young women

Source	Confidence interval[1]
Butter	4.5 - 8.7
Margarine	46.1 - 55.0
Lard	1.0 - 3.3
Vegetable fat	1.5 - 4.4
Salad oil	6.5 - 8.0
Salad dressing	28.1 - 31.0
Imitation cream products	0.6 - 1.3

[1]Ninety percent.

contribute more to dietary fat than is indicated in this study because fats and oils used as ingredients in grain products and in some mixed dishes are tabulated with the group of the principal ingredient.

Because table fat (butter and margarine) and the milk group contributed appreciably to dietary fat of the women, those fats were studied in detail (table 7). The subjects recorded brand names of margarines used, which made it possible to check labels and determine ingredients of the products in local grocery stores. When more than one table fat was used by a woman during the week, the fat that predominated was used for the tabulation. Tub margarines were used by more than 1/3 of the subjects with approximately 2/3 of the tub margarines listing their first ingredient as partially hydrogenated vegetable oil. Stick margarines were used by 1/2 of the subjects. Approximately half of the stick margarines listed their first ingredient as partially hydrogenated vegetable oil, with 1/3 listing their first ingredient as liquid vegetable oil. The remainder of the table fat used consisted of margarine containing animal fat, diet margarine, and butter, with a few subjects not reporting the use of a table fat during the week.

Forty-five percent of the subjects used whole milk, 30% used milk that contained 2% fat, and 17% used products containing 1% and 1/2% milk fat, skim milk, or nonfat dry milk. Eight percent of the subjects did not report using milk as a beverage or in cooking.

Food Intake Frequency

Frequency of food intake was examined. The dietary record form had blanks for breakfast, lunch, dinner, and between-meal snacks. If a subject recorded food under the heading, "breakfast," and if at least one serving

TABLE 7

Percentage distribution of 60 young women by kind of table fat and milk used at home

Food	Percent of sample
Table fats	
Tub margarine	
A[1]	23.3
B[2]	13.3
Stick margarine	
A[1]	26.7
B[2]	16.7
C[3]	6.7
Diet margarine[4]	3.3
Butter	3.3
None	6.7
Milk	
Whole	45.0
2% milk fat	30.0
1% milk fat	1.7
1/2% milk fat	6.7
Skim	6.7
Nonfat dry milk	1.7
None	8.3

[1]First ingredient: partially hydrogenated vegetable oil.
[2]First ingredient: liquid vegetable oil.
[3]First ingredient: hydrogenated lard.
[4]First ingredient: water; second ingredient: partially hydrogenated vegetable oil.

from the basic 4 food groups was included, it was tabulated as a "meal." For lunch and dinner, a "meal" had to include servings from 2 of the basic 4 food groups. Otherwise, it was classified as a snack. Percentage distribution of the women by daily average number of meals and snacks is shown in table 8. A small percentage of subjects averaged only 1.1-1.5 meals daily. Eighty-five percent of the women averaged more than 2 meals daily, whereas 58% averaged 2.6-3 meals daily. Most of the subjects averaged 0 to 2 snacks daily.

TABLE 8

Percentage distribution of 60 young women by daily average number of meals and snacks

Factor	Daily average number					
	0-0.5	0.6-1	1.1-1.5	1.6-2	2.1-2.5	2.6-3
Meals	-	-	3.3	11.7	26.7	58.3
Snacks	20.0	23.3	26.7	21.7	6.7	1.7

Food Eaten Away from Home

Because food eaten away from home often is eaten at "fast food" restaurants, specializing in fried foods, it could influence fat intake. Thus, the percentage of meals or snacks eaten away from home was examined. Meals and snacks eaten away from home included food purchased in restaurants, "carry-out" food establishments, and from vending machines. Home-prepared food eaten at the home of another individual or from a sack lunch was included with food eaten at home. Percentage distribution of subjects by meals and snacks eaten away from home is shown in table 9. Slightly more than 1/3 of the subjects ate less than 10% of their meals away from home; 1/4 ate 11-20% of their meals away from home; and about 30% of the women ate 20-40% of their meals away from home. A few subjects ate more than half their meals away from home.

Because breakfast usually was eaten at home, percentage of lunches and dinners eaten away from home was calculated as a separate category. Exactly 1/3 of the subjects ate 10% or less of their lunches and dinners away from home, whereas almost 20% of the subjects had more than 40% of lunches and dinners away from home.

TABLE 9

Percentage distribution of 60 young women by meals and snacks eaten away from home

	Percentage of meals or snacks									
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Total meals	36.7	25.0	16.7	15.0	-	3.3	3.3	-	-	-
Lunches and dinners	33.3	15.0	21.7	11.7	8.3	8.3	-	1.7	-	-
Snacks	41.7	20.0	8.3	11.7	5.0	6.7	-	1.7	1.7	3.3

Approximately 60% of the women ate 20% or less of their snacks away from home. A few subjects ate more than 70% of their snacks away from home.

Adherence to Recommendations of the AHA

Conclusions drawn in relation to whether the young women who reside in Jardine Terrace are following the recommendations by the American Heart Association and others (3-5) for dietary changes to combat atherosclerosis include:

a) The average weight of the women indicated that they are balancing caloric intake to maintain desirable body weight. However, 28% were overweight and as they grow older and less active, more of the women may not be able to maintain desirable weight.

b) The mean percentage (37-40) of calories derived from fat for this population exceeds the recommended 35%, which indicates that many of these women are ingesting excess amounts of fat. One way to reduce dietary fat is to consume milk products low in fat. However, half the women who used milk were using whole milk. Fried foods eaten away from home contributed substantially to dietary fat for some subjects.

c) Not only are these women consuming more fat than is recommended, but the ratio of polyunsaturated to saturated fatty acids is lower than desirable. It might be expected that the P/S ratio for this group would be higher than 0.46 to 0.54 because the meat, poultry, and fish group contributed less to dietary fat than usually is observed in population groups in the United States. However, the use of dairy products, particularly whole milk, increased the saturated fatty acid content of the diets. Margarine was the major contributor of dietary fat in the fats and oils group; however, the women were not using margarines high in PUFA.

SUMMARY

Seven-day dietary records of 60 young women living in a university married student apartment complex were studied to determine amounts and food sources of dietary fat; distribution of calories among fat, protein, and carbohydrate; and P/S ratios. Food energy, protein, carbohydrate, total fat, saturated fat, oleic acid, and linoleic acid intakes were calculated from food composition tables. Sources of dietary fat and types of table fat and milk used were examined. Meal frequency and percentage of meals and snacks eaten away from home were tabulated. Ninety percent confidence intervals were used as estimates of population parameters.

Mean daily nutrient intakes for the population were: food energy, 1507-1761 kcal; protein, 59-66 g; carbohydrate, 174-212 g; and fat, 64-75 g. Fat was divided further into: saturated fatty acids, 21-25 g; oleic acid, 23-27 g; and linoleic acid, 10-13 g. The mean P/S ratio was 0.46 to 0.54. The mean percents of calories derived from the three major nutrients were 37-40 from fat, 15-17 from protein, and 45-48 from carbohydrate.

The major food groups that supplied fat in the diet were meat, poultry, and fish (22-26%); grain products (18-22%); fats and oils (16-25%), and milk and milk products (16-20%). Margarine contributed 46-55% of the fat supplied by the fats and oils group, but only about 30% of the margarine had liquid vegetable oil as its first ingredient. Forty-five percent of the subjects consumed whole milk and 30% consumed 2% fat milk.

In general, the women ate 2 to 3 meals and 1 to 2 snacks daily. The women, with a few exceptions, ate most of their meals at home.

As a group, the women were not adhering to dietary changes recommended by the American Heart Association to combat atherosclerosis. One-fourth of them were not balancing calorie intake and energy expenditure to maintain desirable body weight. The mean percentage of calories derived from fat exceeded the recommended 35%. The ratio of polyunsaturated to saturated fatty acids was lower than desirable.

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APPENDIX

KANSAS STATE UNIVERSITY

Manhattan, Kansas 66502

Department of Foods and Nutrition

Justin Hall

Dear Jardine Terrace Resident:

Would you be willing to participate in a food intake study at Kansas State University? You were selected by random sampling of the women residents of Jardine Terrace. You will be asked to record food eaten for seven consecutive days.

I would appreciate an opportunity to explain the research project in greater detail at your convenience.

Sincerely yours,

Connie Elliff
Graduate student
Dept. of Foods and Nutrition

Approved:

_____ _____

Head, Dept. of Foods and Nutrition Date

_____ _____

Major Professor Date

INFORMED SUBJECT CONSENT

SUBJECT'S NAME _____

SUBJECT'S ADDRESS _____

_____

PERSONNEL: Beth Fryer, Professor

Connie Elliff, Graduate Student

1. I, _____, being of sound mind and _____
   name
   years of age, do hereby volunteer to participate in the food intake study to be conducted by the Department of Foods and Nutrition, Kansas State University.
2. I am willing to keep a record of all the food that I consume over a 7-day period. I understand that I should continue my normal pattern of eating during this time.
3. I realize reports will be made of the study and I consent to publication of such without disclosure of my name.
4. I have been completely informed as to and understand the nature and purpose of the research which should furnish information on food intake patterns and kinds of fats used by adult women. The researchers have offered to answer any further inquiries I may have.
5. I understand that I will be permitted to discontinue participation at any time.

_____ _____

Date signed

BACKGROUND INFORMATION

NAME _____ DATE _____

ADDRESS _____

PHONE _____

DATE OF BIRTH _____

CITIZENSHIP: U.S. _____ OTHER _____

HEIGHT _____ WEIGHT _____

OCCUPATION _____

NUMBER IN HOUSEHOLD: ADULTS _____ CHILDREN _____

INSTRUCTIONS FOR KEEPING DIETARY RECORD

Estimate and record amount eaten or drunk for seven (7) consecutive days.

KIND OF FOOD - See instructions for recording specific foods.

AMOUNT EATEN - Record amount eaten or drunk using the following measurements:

teaspoon (t)
tablespoon (tbsp)
cup (c)
slice (sl)
number
Record only amount eaten.

HOME PREPARED? - Check "yes" or "no." Examples of home prepared foods are casseroles, mixed dishes, homemade baked products.
If you check "yes," use separate form for listing ingredients. List food item as it is listed on dietary record form. List ingredient, amount used in recipe, and brand name of ingredient. If the ingredient is a fat, be sure to indicate type of fat (tub margarine, regular stick margarine, whipped stick margarine, diet margarine, butter, hydrogenated shortening, oil, lard, bacon fat, etc.). Under "yield of recipe" indicate tht total amount yielded by the recipe. Examples: 15 biscuits, 9" pie, 3 cups spaghetti sauce, 6 cups casserole.

BRAND NAME - Give brand name of all foods except such items as fresh fruits and vegetables, milk, bread, eggs.

FAT USED WITH FOOD - This column is for fat added to a food item. Examples: fat used to fry or scramble eggs, fat added to plain vegetables, margarine or butter used on bread. Indicate type of fat (tub margarine, regular stick margarine, whipped stick margarine, diet margarine, butter, hydrogenated shortening, oil, lard, bacon fat, etc.). Indicate the estimated amount that you actually ate and the brand name.

EATEN AT HOME? - Check "yes" or indicate where food was eaten. Examples: McDonalds, K-State Union Cafeteria, friend's home, church supper, sack lunch eaten at school.

INSTRUCTIONS FOR RECORDING SPECIFIC FOODS

Below are instructions for recording specific foods. Food categories are listed alphabetically.

Beverages
- list all kinds of beverages as whole milk, chocolate milk, buttermilk, carbonated drink, fruit flavored drink or mix
- record estimated added milk, cream, or sugar to coffee and tea
- record by cups or tablespoons

Bread
- list kinds of breads or rolls as whole wheat, rye, white, or hamburger bun
- record bread in number or parts of slices
- record rolls and crackers by number

Butter, margarine spreads
- estimate the measurement and record butter, margarine, peanut butter, jam, jelly, mayonnaise

Cereals
- list kinds of cereal as raisin bran, cornflakes
- record added milk, cream or sugar
- list macaroni, rice, spaghetti by cooked measurement
- record by cups

Desserts Sweets
- list kind of dessert as apple pie, chocolate pudding, frosted angel food cake
- record puddings and ice cream by cups (1/4, 1/3, 1)
- record cupcakes and cookies by diameter, as 2-3/4" diameter
- record pies in fraction as 1/8 of 8" pie

Eggs
- record number and method of preparation as fried, scrambled, poached, hard cooked in shell

Fish, meat and poultry
- list kind and method of preparation as broiled lamb chop, fried chicken
- record in inches as 2" x 3" x 1/4" or 1 wing, 1 drumstick, 3" diameter hamburger patty
- record number of shrimp, fish sticks

Fruits and fruit juices
- list the form (fresh, frozen, canned) and kind of fruit
- if fresh fruit, specify if small, medium, large
- list the form (fresh, frozen or canned) and kind of juice
- if fruit flavored drink or mix, specify kind
- if sugar added, indicate amount

Miscellaneous
- list kind and size of candy bar
- list kind and number of nuts, pieces of candy
- record amount of popped corn by cups

Mixed foods casseroles, salads
- list any prepared from a combination of ingredients
- record amount you eat
- record proportion of ingredients in recipes on separate form

Vegetables
- list form (fresh, canned, frozen) and kind of vegetable as broccoli, potatoes - baked, fried, mashed
- if fresh, specify small, medium, or large
- record added butter or sauce
- record cooked vegetables by portions of cups or tablespoons
- record potato chips and French fries by number

DIETARY RECORD

NAME _____ DAY _____ DATE _____

TIME OF DAY	KIND OF FOOD	AM'T EATEN	HOME PREPARED		BRAND NAME	FAT USED WITH FOOD			EATEN AT HOME?	
			yes*	no		TYPE	AM'T	BRAND	Yes,	If no, where?
BREAK-FAST										
A.M. SNACKS										
LUNCH										
P.M. SNACKS										
DINNER										
NIGHT-TIME SNACKS										

* List ingredients on separate page.

NAME ______________________________ DAY _____________ DATE __________

INGREDIENTS OF FOOD ITEMS PREPARED AT HOME

FOOD ITEM	INGREDIENT	AMOUNT USED	BRAND NAME	YIELD OF RECIPE

TABLE 10

Average daily intake of calories, protein, fat, saturated fat, oleic acid, linoleic acid, and carbohydrate for each subject

Subject	Food energy	Protein	Fat	Saturated fat	Oleic acid	Linoleic acid	Carbo-hydrate
	kcal	g	g	g	g	g	g
007	1129	48	55	22	20	7	94
015	1707	70	72	25	26	10	197
070	1804	73	84	28	32	15	183
079	1913	70	75	24	26	12	248
091	1198	50	59	18	24	8	118
109	586	40	20	6	6	3	61
111	2954	77	115	39	47	17	424
116	1262	80	81	31	31	10	55
122	1316	54	52	22	20	5	169
137	1436	61	72	24	28	11	144
141	1653	60	74	26	28	9	171
149	1777	94	79	26	30	9	164
151	1296	59	61	18	21	11	131
152	803	33	38	11	14	7	87
155	1129	54	55	15	16	10	103
156	2036	100	90	32	31	10	213
157	1103	44	48	19	20	6	126
162	1152	46	46	18	17	8	137
164	2280	92	96	32	35	17	270
165	2028	68	95	28	36	21	240
178	1639	64	61	22	24	9	213
194	1767	75	74	26	30	9	212
205	1337	56	70	20	27	13	135
207	1378	46	56	15	16	11	175
210	3857	112	153	56	58	27	518
212	600	25	28	8	10	5	66
213	1859	68	81	30	31	11	220
218	710	31	29	10	11	2	82
224	1808	69	78	25	29	14	208
226	2813	81	120	33	41	24	359
230	1956	64	74	20	24	14	274
236	1954	74	95	31	31	12	173
243	921	49	33	14	12	1	110
244	1418	50	55	13	17	10	156
250	1163	38	42	16	17	4	163
256	1434	50	60	19	22	11	184
294	1117	62	42	17	16	5	125
300	1283	70	50	18	17	7	143
310	1419	52	86	23	35	18	112
312	2214	85	87	30	32	14	284
328	1736	57	75	26	30	9	214
333	1192	49	55	15	22	9	132

TABLE 10 (cont'd)

Subject	Food energy	Protein	Fat	Saturated fat	Oleic acid	Linoleic acid	Carbo-hydrate
	kcal	g	g	g	g	g	g
342	2042	95	84	33	32	8	238
357	2141	82	86	23	28	14	273
358	1284	41	58	17	20	14	155
364	1370	48	65	20	21	12	156
369	2137	74	84	28	29	16	272
378	1080	42	44	12	16	7	139
381	2275	66	92	24	30	25	298
392	1974	55	74	23	25	16	281
403	1414	64	63	18	21	8	154
408	1380	62	69	22	25	7	133
409	1680	69	61	22	23	5	226
416	1194	43	51	16	17	13	144
417	2025	80	97	36	37	16	217
420	1851	70	67	22	26	13	246
432	2735	79	133	38	47	34	306
440	2323	64	84	27	34	14	339
463	1393	53	53	21	19	8	180
468	1594	63	44	16	16	7	224

TABLE 11

Percentage of calories derived from fat, protein, and carbohydrate and P/S ratio for each subject

Subject	Fat	Protein	Carbohydrate	P/S ratio
007	44.2	16.9	33.4	0.31
015	38.0	16.4	46.1	0.41
070	42.0	16.3	40.5	0.52
079	35.3	14.7	51.9	0.50
091	44.2	16.7	39.5	0.47
109	31.2	27.7	41.4	0.46
111	35.0	10.4	57.4	0.43
116	57.8	25.5	17.4	0.31
122	35.6	16.4	51.4	0.22
137	45.4	16.9	40.2	0.45
141	40.4	14.6	41.4	0.36
149	39.9	21.2	36.8	0.34
151	42.3	18.3	40.4	0.60
152	42.9	16.3	43.1	0.62
155	43.8	19.1	36.5	0.68
156	39.8	19.6	42.4	0.30
157	38.8	16.2	45.8	0.31
162	36.3	16.0	47.7	0.46
164	38.0	16.1	47.4	0.55
165	42.3	13.4	47.3	0.73
178	33.3	15.6	51.9	0.43
194	37.5	17.0	47.9	0.33
205	47.4	16.8	40.5	0.66
207	36.6	13.4	50.8	0.72
210	35.7	11.7	53.7	0.48
212	41.3	16.9	43.8	0.58
213	39.1	14.7	47.3	0.36
218	36.4	17.4	46.2	0.20
224	38.6	15.3	46.1	0.57
226	38.4	11.6	51.1	0.73
230	34.0	13.0	56.0	0.71
236	43.8	15.2	35.4	0.39
243	31.8	21.3	47.6	0.05
244	34.7	14.3	44.1	0.77
250	32.3	13.2	56.0	0.28
256	37.8	14.0	51.3	0.61
294	34.3	22.2	44.6	0.30
300	34.9	21.7	44.6	0.38
310	54.7	14.6	31.6	0.80
312	35.4	15.4	51.3	0.45
328	39.0	13.1	49.4	0.34
333	41.9	16.4	44.4	0.60
342	36.9	18.6	46.6	0.24
357	36.1	15.3	51.0	0.62

TABLE 11 (cont'd)

Subject	Fat	Protein	Carbohydrate	P/S ratio
358	40.4	12.9	48.2	0.83
364	43.0	13.9	45.4	0.64
369	35.4	13.8	51.0	0.57
378	37.0	15.4	51.4	0.62
381	36.6	11.5	52.4	1.02
392	33.6	11.2	57.0	0.69
403	40.1	18.2	43.5	0.45
408	45.1	18.0	38.5	0.31
409	32.7	16.4	53.8	0.24
416	38.8	14.5	48.2	0.81
417	43.0	15.8	42.9	0.45
420	32.8	15.2	53.1	0.57
432	43.8	11.6	44.7	0.90
440	32.5	10.9	58.4	0.52
463	34.2	15.3	51.6	0.40
468	24.8	15.9	56.2	0.42

TABLE 12

Percentage of fat derived from various food groups for each subject

Subject	Milk and milk products	Meat, poultry, fish	Other protein foods	Vegetables, fruits	Grain products	Fats, oils	Sugar, sweets	Miscellaneous
007	26.3	21.1	-	8.0	9.5	32.2	2.6	-
015	22.6	24.4	2.2	1.0	26.1	23.7	-	-
070	8.5	28.8	8.6	9.5	17.3	21.2	6.1	-
079	17.9	16.0	2.8	2.3	29.5	30.6	1.0	-
091	7.0	38.8	4.4	1.7	16.5	26.3	5.3	-
109	28.9	23.9	1.4	1.4	14.8	29.5	-	-
111	12.8	12.3	3.0	5.9	46.1	17.5	2.2	-
116	27.7	38.9	8.5	1.2	1.0	22.6	-	-
122	45.3	12.6	17.0	2.2	16.8	6.0	-	-
137	16.6	34.1	2.8	11.4	18.1	16.8	0.2	-
141	11.8	11.8	20.0	4.8	15.2	35.5	1.0	-
149	15.4	33.6	3.1	5.3	26.0	16.7	-	-
151	8.2	42.2	8.7	14.3	10.1	16.2	-	0.2
152	9.3	26.5	4.5	11.9	12.3	35.4	-	-
155	17.4	24.2	6.5	9.6	17.9	24.4	-	-
156	30.7	26.9	1.0	6.3	14.3	19.3	1.4	-
157	17.1	50.2	-	6.3	18.0	5.4	3.0	-
162	28.6	30.5	-	25.5	8.9	6.5	-	-
164	23.5	21.7	6.1	3.4	14.7	30.4	0.1	-
165	11.7	12.0	8.7	12.9	28.0	26.2	0.3	0.1
178	12.0	29.4	6.1	6.6	21.6	23.8	0.5	-
194	23.9	20.8	2.9	6.0	32.8	13.6	-	-
205	26.8	7.3	20.9	15.2	6.9	22.9	-	-
207	9.4	35.7	3.1	21.9	16.3	12.9	0.5	-
210	14.7	18.7	6.3	16.5	31.6	9.9	2.1	0.2
212	16.1	16.1	6.2	9.3	21.2	31.0	-	-
213	29.2	17.8	9.7	10.4	24.2	5.9	1.8	1.1
218	14.9	43.8	15.4	4.0	10.4	11.4	-	-
224	6.3	26.5	12.3	5.9	11.0	38.0	-	-
226	12.4	13.8	6.1	7.0	30.7	30.1	-	-
230	4.6	25.7	3.9	9.3	37.4	19.0	-	-
236	15.5	30.6	5.4	0.8	15.1	30.6	1.8	-
243	49.6	33.3	5.3	-	11.8	-	-	-
244	5.2	33.9	8.6	8.9	17.8	25.6	-	-
250	18.2	14.0	-	14.4	37.7	8.2	7.5	-
256	10.4	23.4	4.0	10.4	40.8	10.9	-	-
294	36.9	22.5	9.1	0.3	11.4	19.8	-	-
300	16.1	32.5	-	13.5	12.9	24.7	0.3	-
310	4.5	31.1	20.0	5.0	8.1	31.3	-	-
312	22.8	22.0	3.3	10.0	25.1	16.1	0.7	-
328	4.2	29.6	7.2	4.0	27.5	27.0	0.6	-
333	14.2	16.5	12.9	6.0	10.0	39.1	-	1.3

TABLE 12 (cont'd)

Subject	Milk and milk products	Meat, poultry, fish	Other protein foods	Vegetables, fruits	Grain products	Fats, oils	Sugar, sweets	Miscellaneous
342	29.7	27.5	10.8	1.5	14.0	16.6	-	-
357	13.1	26.2	6.5	7.0	19.8	27.2	0.2	-
358	5.7	19.8	-	16.6	20.6	23.6	13.6	-
364	16.8	23.8	1.1	10.5	16.4	30.1	-	1.3
369	24.0	16.2	9.9	13.6	13.9	16.8	5.6	-
378	15.1	22.5	2.9	15.4	21.2	22.5	-	0.3
381	9.6	20.1	4.0	34.5	13.9	12.2	5.7	-
392	20.0	12.4	6.6	10.5	38.2	12.4	-	-
403	13.4	34.2	3.4	8.9	27.0	13.1	-	-
408	15.7	32.2	5.2	1.0	26.8	17.3	1.6	-
409	36.3	13.6	7.0	2.1	17.1	23.8	-	-
416	14.2	13.6	6.9	13.3	40.8	11.1	-	-
417	20.4	25.5	4.0	13.6	19.0	15.8	1.8	-
420	16.1	16.1	3.4	3.8	29.4	27.0	4.0	-
432	10.6	16.4	2.2	28.7	13.8	17.8	9.5	0.8
440	25.9	5.3	7.7	9.5	24.9	26.7	-	-
463	27.0	25.1	8.9	8.3	6.8	23.8	-	-
468	24.1	30.6	-	26.0	14.0	5.2	-	-

TABLE 13

Percentage of fats and oils derived from various food sources for each subject

Subject	Butter	Margarine	Lard	Vegetable fat	Salad oils	Salad dressing	Imitation cream products
007	38.5	-	6.5	31.0	11.2	12.7	-
015	-	62.4	-	5.9	-	31.6	-
070	6.6	55.2	-	-	-	38.2	-
079	-	28.8	2.6	2.6	8.8	48.4	8.8
091	1.9	55.5	-	-	12.9	29.6	-
109	-	69.2	-	-	16.6	14.2	-
111	22.3	46.3	-	-	-	27.4	4.0
116	-	60.2	-	-	-	37.6	2.2
122	55.0	-	-	-	18.3	26.6	-
137	-	79.8	-	-	20.2	-	-
141	47.9	45.6	-	-	6.5	-	-
149	14.4	38.9	-	-	15.0	31.7	-
151	-	33.3	-	-	20.4	46.3	-
152	-	67.5	-	13.6	-	18.9	-
155	8.6	34.0	-	-	14.8	42.9	-
156	9.8	39.4	-	-	-	50.8	-
157	-	77.8	-	-	22.2	-	-
162	-	100.0	-	-	-	-	-
164	-	49.3	-	-	-	50.6	-
165	-	40.0	7.2	-	12.6	38.9	1.1
178	10.9	61.3	25.6	-	-	2.1	-
194	-	98.5	-	-	-	1.5	-
205	-	62.9	-	-	37.1	-	-
207	-	37.2	-	1.6	-	61.2	-
210	-	54.5	-	-	4.0	22.2	19.2
212	-	60.0	-	-	-	40.0	-
213	-	89.8	-	-	-	6.8	3.4
218	-	100.0	-	-	-	-	-
224	-	52.4	25.3	-	-	22.4	-
226	-	54.8	-	1.7	11.0	32.6	-
230	-	50.5	-	13.2	-	36.3	-
236	21.6	33.3	12.7	-	20.6	11.8	-
243	-	-	-	-	-	-	-
244	-	71.5	-	-	-	28.5	-
250	100.0	-	-	-	-	-	-
256	-	52.3	-	-	-	47.7	-
294	-	28.8	-	-	38.9	32.3	-
300	30.4	27.9	-	-	-	41.7	-
310	-	34.5	-	-	-	65.5	-
312	3.7	63.4	-	-	1.2	27.3	4.3
328	47.8	50.7	-	-	-	1.5	-
333	-	73.1	-	25.6	-	-	1.3

TABLE 13 (cont'd)

Subject	Butter	Margarine	Lard	Vegetable fat	Salad oils	Salad dressing	Imitation cream products
342	-	65.1	-	-	-	34.9	-
357	-	64.0	-	-	-	36.0	-
358	-	16.9	-	-	14.8	68.2	-
364	-	82.7	-	-	10.0	-	7.3
369	-	11.9	-	-	28.6	59.5	-
378	-	54.2	5.8	-	-	40.0	-
381	-	50.8	-	-	4.9	44.3	-
392	-	40.3	-	-	-	59.7	-
403	-	53.4	-	22.1	-	24.4	-
408	-	40.5	4.6	-	-	42.8	12.1
409	-	95.4	-	-	3.8	0.8	-
416	17.1	-	-	-	70.3	7.2	5.4
417	-	29.7	-	24.0	13.3	32.9	-
420	-	-	-	15.6	21.8	61.1	1.5
432	-	55.6	-	-	8.4	36.0	-
440	-	72.6	-	-	-	27.3	-
463	9.2	8.0	14.7	-	-	68.1	-
468	-	75.0	-	-	-	25.0	-

FAT IN THE DIETS OF YOUNG WOMEN

by

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AN ABSTRACT OF A MASTER'S THESIS

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Seven-day dietary records of 60 young women living in a university married student apartment complex were studied to determine amounts and food sources of dietary fat; distribution of calories among fat, protein, and carbohydrate; and P/S ratios. Food energy, protein, carbohydrate, total fat, saturated fat, oleic acid, and linoleic acid intakes were calculated from food composition tables. Sources of dietary fat and types of table fat and milk used were examined. Meal frequency and percentage of meals and snacks eaten away from home were tabulated. Ninety percent confidence intervals were used as estimates of population parameters.

Mean daily nutrient intakes for the population were: food energy, 1507-1761 kcal; protein, 59-66 g; carbohydrate, 174-212 g; and fat, 64-75 g. Fat was divided further into: saturated fatty acids, 21-25 g; oleic acid, 23-27 g; and linoleic acid, 10-13 g. The mean P/S ratio was 0.46 to 0.54. The mean percents of calories derived from the three major nutrients were 37-40 from fat, 15-17 from protein, and 45-48 from carbohydrate.

The major food groups that supplied fat in the diet were meat, poultry, and fish (22-26%); grain products (18-22%); fats and oils (16-25%) and milk and milk products (16-20%). Margarine contributed 46-55% of the fat supplied by the fats and oils group, but only about 30% of the margarine had liquid vegetable oil as its first ingredient. Forty-five percent of the subjects consumed whole milk and 30% consumed 2% fat milk.

In general, the women ate 2 to 3 meals and 1 to 2 snacks daily. The women, with a few exceptions, ate most of their meals at home.

As a group, the women were not adhering to dietary changes recommended by the American Heart Association to combat atherosclerosis. One-fourth of them were not balancing calorie intake and energy expenditure to maintain

desirable body weight. The mean percentage of calories derived from fat exceeded the recommended 35%. The ratio of polyunsaturated to saturated fatty acids was lower than desirable.