

A Diet Record Technique

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A DIET record technique adapted by us for use in a study of the dietary habits of Trappist and Benedictine monks is described in this report. The study was undertaken to determine whether the dietary habits of the two monastic populations differed sufficiently, especially as regards fat intake, to make them suitable for investigating the relationship between the development of atherosclerosis and dietary habits. No detailed analysis of the diets is given in this paper.

Participation in the study was on a completely voluntary basis. Sixty-five Benedictines (93 percent of the community) and 82 Trappists (97 percent of the community) participated in the study.

The Trappist community abstains from eating meat and consumes a lacto-ovo-vegetarian diet. Previous studies (1,2) of the Trappist diet suggested that it was much lower in fat content than the one consumed by most Americans. The Benedictine community, on the other hand, is omnivorous, consuming a diet which in outward appearance is typically American.

Both monasteries are cloistered and their regulations prohibit women from entering the community. Since we did not have a male nutritionist to conduct individual dietary interviews, the dietary history technique described by Burke (3) was not feasible. The size of the

communities, the long-term aspect of the study, and the lack of personnel and of laboratory facilities precluded the use of detailed balance studies involving measured food intake and fecal and urinary output. These unique circumstances required that a suitable technique be devised for obtaining reliable and valid individual diet characterizations. The repetitive diet record technique (4) described below was felt to be the most suitable for our purpose.

The two religious communities have many things in common regarding the preparation and serving of food. However, there were certain differences which required that the dietary record technique be modified slightly in each monastery.

The Qualitative Aspect

In both the Trappist and Benedictine monasteries the monks eat in a common refectory, and the food is prepared in a central kitchen. There is no selective menu in the sense of a choice of foods. Their only choice is whether or not they eat what is served and in the quantity of each item consumed.

The information obtained from the monastery cook in the central kitchen during the study is termed by us the "qualitative aspect" of the diet record. The method of deriving this qualitative information was as follows in both monasteries. On the day selected for dietary study the physician (Quinlan), acting as liaison between the monastery and the research nutritionist (Goodloe), obtained from the monastery cook the following information:

1. The recipes for each food prepared, including brand and trade names of the ingredients used.

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2. The total amount of each food prepared and served to the community.

3. The number of monks who ate the meal.

4. The amount of each food which was returned to the kitchen as waste.

5. In the case of individual food servings, the weight, size, or number of items in a serving (for example, the weight of one pork chop, the number of peach halves in a dessert serving, the weight of a slice of bread, and so on).

The Quantitative Aspect

Although both monasteries prepared their food similarly in a central kitchen, the method of serving the food differed in the Trappist and Benedictine communities.

In the Trappist monastery the main food items were served from a common table. Each monk received an equal amount of each food and drink. Thus each monk received one serving of potato, one bowl of soup, one tin of coffee, one dessert, and so on. The Trappists were not allowed second helpings of these basic foods. There were, however, a few items, such as bread, sugar, and peanut butter, which could be taken as desired.

The food in the Benedictine monastery was served in a different manner. The food prepared in the central kitchen was placed on the common refectory table, and each monk took as much or as little of each food as he desired.

Many of the foods had been divided in the kitchen into individual servings (for example, one baked pork chop, a brick of ice cream, and so on), although there were a few foods, such as mashed potatoes and string beans, which were served in bulk form.

The information obtained from each monk during this study has been termed the "quantitative aspect" of the diet record. This quantitative information was obtained in both monasteries from diet records kept by the monks. On the day selected for dietary study each monk was given a mimeographed menu listing all the food items which were being served on that particular day. Each monk took this menu with him to the refectory and noted during the meals the number of servings of each item which he consumed. Additional space was allotted on the diet questionnaire to indicate foods which were provided on special diets or eaten between regular meals.

Standardization of Food Servings

Since each monk reported bulk items in his quantitative diet record in terms of the number of servings consumed, it was necessary to standardize the amount represented by "a serving."

This standardization of servings was not difficult in the Trappist monastery since each Trappist monk was served the same amount of food from a common table. A sample meal was

Method used in a dietary record technique for deriving average caloric intake per person per day in a Trappist monastery

Type of day	Calories per diet	Average value for each type of day	Frequency of each type of day during year ¹	Total yearly value for each type of day (in calories)
Fast day:				
Diet No. 1	2, 383	} 2, 375	103	244, 625
Diet No. 3	2, 367			
Feast day:				
Diet No. 4	4, 421	4, 421	60	265, 260
Regular day:				
Diet No. 2	3, 350	} 3, 394	202	685, 588
Diet No. 5	3, 508			
Diet No. 6	3, 324			
Total				1, 195, 473
Daily average (total ÷ 365)				3, 275

¹ Represents the method of weighting the caloric intake for each type of day.

brought from the Trappist monastery to the research nutritionist who measured the amount of each serving by weight and volume. Items such as sugar and peanut butter, which were available in any quantity desired, were reported according to the number of spoonfuls consumed, using a standard soup spoon which we supplied the monastery. The capacity of all ladles, scoops, drinking mugs, and soup bowls used in serving the food was carefully measured.

The standardization of food servings at the Benedictine monastery was difficult only for those items which were not prepared as individual servings but were presented in bulk form. In order to standardize these servings, standard food models were demonstrated at the monastery showing the monks several examples of what we considered one standard serving. They were requested to keep this idea of a serving in mind when they filled in the quantitative diet record.

Reproducibility and Accuracy

A review of repetitive diet records shows that individual monks regularly eat the same amount of certain foods such as bread, sugar, and coffee. This fact strengthens the argument for the reliability of this diet record technique (5).

In order to check the accuracy with which the participants filled in the quantitative diet record sheet, the amount of a given food item reported by all the monks was totaled (for example, the total number of servings of mashed potato reported consumed by the whole community). This figure was compared with the total quantity of this food item which the cook reported he had prepared minus the waste which was returned to the kitchen. It was found that these two figures agreed closely when checked many times with different foods.

It is interesting that the results obtained for the Benedictine monks, whom we considered to be consuming an average American diet, checked closely with dietary studies (6,7) of other populations elsewhere in this country as regards total calories and percentage of calories from fat, protein, and carbohydrate.

Technique of Dietary Computation

The recipes obtained from the monastery cooks were analyzed, and the calories and nu-

trients in a serving of each food were calculated by using standard food tables (8-11). In addition, two food items in common usage were analyzed by the Georgia Department of Agriculture. The wheat grown by the Trappists and used in making bread, which is a staple item in their diet, was analyzed for fat and protein content (fat, 1.4 percent; protein, 13.0 percent). The milk in use at each monastery was analyzed for fat content (Trappist, 5 percent; Benedictine, 5.4 percent).

This information was combined with the quantitative aspect of the diet record filled out by each monk, and a complete dietary analysis for each individual was computed for that day in terms of the following dietary components (9):

Calories	Vitamin A, IU
Animal protein, gm.	Thiamine, mg.
Vegetable protein, gm.	Riboflavin, mg.
Animal fat, gm.	Vitamin C, mg.
Vegetable fat, gm.	Saturated fatty acids, gm.
Cholesterol, mg.	Unsaturated fatty acids,
Carbohydrate, gm.	gm.: linoleic acid, gm.;
Calcium, gm.	linolenic acid, gm.; ara-
Phosphorus, gm.	chidonic acid, gm.
Iron, mg.	

Selection of Days for Study

The diet in both monasteries is affected by seasonal variation and religious tradition (1,2). The winter and summer diets differ, and these in turn may be subdivided into fast days, feast days, and regular days. The study days in each community were selected arbitrarily with the provision that both summer and winter, and fast, feast, and regular days were represented. Care was taken to space the study days throughout the year. Weekends, periods of fast (such as Fridays and Lent), and special feast days were equally represented in the diet study days chosen in each community.

On several occasions the monastery cook was requested to keep a 10-day record of the foods which were served in the monastery. These 10-day surveys were reviewed to make sure that the study days differed in no way from the menus which were being served in the monastery on days which were not being studied.

In calculating the average diet for the year for each monk the results of the individual daily

diets studied were weighted in proportion to the frequency with which that type of diet appeared during the year. For instance, six diets were studied for each individual in the Trappist monastery; one feast day, two fast days, and three regular days were represented. The weighting of each diet in obtaining the average diet for the year was accomplished as follows.

There were 202 regular days in the year. The nutrients on three of these days were averaged and multiplied by 202. These total values for regular days were added to the total values for the same nutrients on feast days and fast days weighted in the same fashion, and the yearly total was obtained. Dividing any one of these totals by 365 yielded the average daily consumption of this particular nutrient by this individual monk (see table).

Preliminary Results

A wide variation in dietary habits between monks within each group has been observed, and this has led us to believe that any epidemiological study of the relationship between diet and atherosclerosis must take into consideration the average individual dietary intake and not the average food habits of that particular group. Therefore, on planning further study of these two groups it is felt that continued individual diet analysis will be necessary.

Repetitive diet records were obtained for 82 Trappist monks and 65 Benedictine monks. Six diets were calculated for each Trappist and 4 for each Benedictine. Preliminary results were:

<i>Calories</i>	<i>Benedictine</i>	<i>Trappist</i>
Average per day-----	2, 896	3, 203
Fat (percent)-----	45	26
Protein (percent)-----	13	10
Carbohydrate (percent)-----	42	64

Statistical analysis in relation to fat content of the respective diets has shown that the two groups differ significantly in their percentage of calories derived from fat (*t* test: $P < 0.001$).

Summary

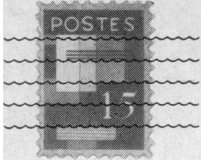
In a repetitive dietary record technique adapted for use in a study of Trappist and

Benedictine monks, quantitative and qualitative dietary records were used in calculating average daily individual dietary intake. Results indicate that the method is a substantially reliable and accurate one.

Preliminary findings show a significant difference in the fat content of the diet of the two communities. It is concluded that the two groups are suitable for the study of the relationship between dietary habits and atherosclerosis.

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INTERNATIONAL MAIL POUCH

Yaws in Gwagwalada

A request by medical authorities at Kaduna, capital of the Northern Region of Nigeria, for a survey of prevalence of yaws brought me to the small territory of Abuja where, shortly after 6 a. m., I met the local emir. He asked me, as a personal favor, to examine and treat the members of his household. At his harem, I examined his four wives, relatives, servants, and a great number of children; my nurse gave each the prescribed injection of penicillin.

An hour later, we packed our equipment into the Land Rover, and, followed by the emir in his car, drove 75 kilometers to Gwagwalada. Several hundred people were waiting, sitting quietly on the ground in the village square. They had come from 15 or 20 different villages. Some had walked 10 to 15 kilometers that morning. I set up my table in the square, with the emir on my left and on my right a nurse who noted the results of the examinations on a separate record for each patient.

It is not strictly necessary to give treatment when making a survey of this kind. But these people had come so far and so seldom see a doctor that we had agreed, although it meant extra work, that each man, woman, and child should get an injection of penicillin. It would cure yaws and many other ailments, such as ulcers, infected sores, pneumonia, and gonorrhea.

One patient followed another in a steady stream. After being examined and registered, they went to the treatment hut where a male nurse scrubbed each right buttock with soap and water and an assistant dried and swabbed it with alcohol. The patients then placed both hands on a waist-high horizontal bar while a specially trained nurse gave the intramuscular injection of the dose prescribed. The villagers laughed and joked as they passed along the line.

As I worked I noticed that the farther the villages were from the road, the more their people suffered from yaws. Gwagwalada had only 1 percent of infectious cases and 4 percent of yaws of all types; villages 10 to 15 kilometers away showed rates of 7 percent and 13 percent.

At 4 p. m. new groups of men and women, carrying their children, began to arrive. They came from an almost inaccessible village, reached only by fording 2 or 3 big rivers. They had not been told to come, but, hearing about a doctor who was giving away a marvelous remedy which would cure many ills, they had set out forthwith on their long, hard trek. One of them, an old man carrying a child of 5 or 6 years, told me it was the first time anything like this had happened to his people.

The day's work ended at 6 p. m., and we were very tired. Since early morning we had seen and treated 2,125 persons. Our supply of penicillin was finished, and the treatment hut looked like a battlefield.

—DR. JEAN FRAISEE, *medical director of the anti-yaws campaign in Nigeria, summarized from his report published in World Health, September–October 1958.*

Rehabilitation Bookshelf

The International Society for the Welfare of Cripples and the Committee for the Handicapped of the People to People Program has given a 43-volume rehabilitation bookshelf to the Faculty of Medicine, Istanbul University. It is the first such gift to a library in another nation.

In behalf of the society and the committee, William C. Gorthy, director of the Institute for the Crippled and Disabled in New York City, presented two token volumes to Dr. Uveys Maskar, acting dean of the faculty in Istanbul, on November 20, 1958.

The token volumes, tooled, stamped, and hand-bound in fine leather by handicapped clients receiving training in the institute's vocational rehabilitation service, were Rehabilitation Center Planning, published by the Department of Health, Education, and Welfare, and Rehabilitation, A Community Challenge, by W. Scott Allan.

Correction: The editors regret the error that linked the campaign against rats in Korea, reported in February, to the typhoid fever program. The error was not the author's.