Research on Food Habits and Aging in Different Cultures in Europe: An Exploration


Department of Human Nutrition, Wageningen Agricultural University, 6700 EV Wageningen, The Netherlands

The ultimate goal of research on "better nutrition and aging" is to improve quality of life for the elderly. Quality of life is a personal matter and depends on the various ways in which people live in different cultures, climates, and under different socio-economic conditions. Quality of life, however, as far as food and nutrition in the elderly are concerned, also means improving or maintaining health with good nutrition and enjoyable meals. Studies on dietary habits of older populations in various cultures and their health status may provide insight in which factors might be involved in the relation between nutrition and quality of life in the elderly.

The European community (EC) concerted action on nutrition and health initiated a study in elderly people in Europe on food habits, aspects of lifestyle, and health because of the great variety of existing food patterns, environmental factors, and medical characteristics in people in different European countries and sometimes also within these countries (1). This chapter concentrates on problems we encountered in assessing cross-cultural food habits—the selection of a method, the development of a questionnaire, treatment of data, including conversion into energy and nutrients, and what these problems mean for the interpretation of some results.

OBJECTIVE AND DESIGN OF THE EUROPEAN STUDY

The European study on nutrition and the elderly was defined as "an explorative study on dietary patterns in the elderly living in different European communities, in relation to health and performance." Regarding food habits, the research questions were:

---

1 The work discussed in this chapter is part of the Euronut SENECA Study on Nutrition and Health of the Elderly in Europe.
What are the differences in food habits (purchases, preparation, meal patterns, food avoidances, and supplement use) in the different communities studied?
What is the extent of differences in intake of energy, nutrients, and foods of elderly people living in these communities?

Nineteen centers in 12 countries agreed to participate (see the map in Fig. 1). The centers were asked to select a "traditional" small town with 10,000 to 20,000 inhabitants. By "traditional" was meant one with limited immigration. Moreover, the selected town should have a socioeconomic structure comparable to that in the country as a whole. The design of the study allowed for partial participation of two birth-year cohorts (1913, 1914) and complete participation involving six birth-year cohorts (1913–1918). The latter design was planned in order to conduct a follow-up study. The number of subjects aimed for, 60 in the partial study and 220 in the complete study, was selected randomly from the eligible population by a standardized procedure. For a complete description of the design of the study see reference 2.

Selection of the Method and Design of the Questionnaire

The aim of the European study in the elderly required information on food consumption, energy intake, and nutrient intake to be related to data on the nutritional status and health as well as on habits in food purchases, preparation, food avoidances, use of therapeutic diets, and any other food habits that might be relevant to adequate or inadequate nutrition.

An adapted dietary history method was selected to assess meal patterns, food patterns, and energy and nutrient intake. It is well known that a dietary history gives information on the habitual food intake rather than the actual food intake. For this study this was the required piece of information, but the disadvantage of this method is that the quality of the data collected depends on the capacity of the individuals to recall their habitual food pattern (3). Some principle investigators in the study doubted if it would be possible to collect valid data by this method. Therefore, we decided to combine the method with a 3-day record method. The elderly participants were asked to complete these records before the dietary history interview. This combination of methods had the advantage that participants had thought about their food consumption and were less likely to forget important foods during the interview. Furthermore, the interviewer could use the 3-day record for questions on the dietary patterns and food use. The reference time in the dietary history was the past month, portion sizes of foods frequently used were checked by weighing, and conversion into nutrients was done by using local food tables. The method was validated against a 3-day weighed method. Food habits were assessed by a general questionnaire. About 20 questions on shopping, meal preparation, visits to restaurants, use of (prescribed) diet, avoidance of special foods, use of health foods, drinking habits, and so on were incorporated in the general questionnaire.
FIG. 1. Map of Europe with the 19 participating centers in the Euronut-SENECA study.
Standardization of the Method

Much attention has been paid to standardization of the questionnaires used in this study. A working group developed and worked out the adapted dietary history and questionnaire on food habits in English. The questionnaires were translated into the local language, after which they were tried out in the field by all participating centers and returned with comments to the coordinating center. A training course was then organized in which the persons responsible for the field work in all the centers participated. The aim of the course was to reach agreement and understanding of all the questions used. As a final check all the questionnaires were translated back into English.

Problems Encountered in the Treatment and Interpretation of Data

The dietary history should give information on meal patterns and mean daily food, energy, and nutrient intakes.

Meal Patterns

The problem with assessing meal patterns was that not all centers were able to work with meal codes. For these centers we have data on only mean food and nutrient intake per day. Nevertheless, for detecting characteristic differences between meal patterns in Europe, a sufficient number of centers have been able to use a meal code. For instance, in three centers most subjects eat on three occasions during the day and some subjects eat only twice. This is in contrast with two other centers—in more well-to-do countries—in which the majority of elderly people eat five or six times during the day and sometimes as often as eight times. This leads to large differences of energy intakes per meal. In the near future we may test one or more hypotheses on the effect of nibbling versus meal eating on these subjects (4).

Foods

For describing foods used during the day and at meal times we used the Eurocode (5), which can be attached to all European nutrient databases. However, for the

---

**FIG. 2.** Mean intake of calcium (A), milk and milk products (butter and cheese not included) (B), and cheese (C) in elderly people aged 70 to 75 years living in 14 of the 19 participating centers in the Euronut-SENECA study. Abbreviations: B, Hamme, Belgium; DK, Roskilde, Denmark; FS, Haguenau, Strasbourg, France; GrA, Markopoulo, Greece, near Athens; GrI, Anogio, Archanes Iraklion-Crete; H, Monor, Hungary; I, Italy, near Rome; NL, Culemborg, Netherlands; N, Elverum, Norway; P, Villa Franca de Xira Portugal; E, Bestanzos, Spain; CHY, Yverdon, Switzerland; GHBu, Burgdorf, Switzerland; CHBe, Bellinzona, Switzerland.
description of foods we could only use the main food groups: milk, eggs, meat, poultry, fish, fats and oils, grains, vegetables and fruits, pulses and seeds, sugar and sugar products, beverages, alcoholic drinks, and food for special nutritional use (diet products). This information gives us a rough idea of the main sources of nutrients. Only major differences between centers could be detected; for instance, differences in calcium intake as determined by intake of dairy products (see Fig. 2A–C, preliminary data). Difficulties encountered in this field are, among others: (i) inconsistencies in the Eurocode that made it impossible to include all foods used and reported in the study, and (ii) the categorization of mixed dishes in raw ingredients taking into account nutrient losses and gains during food preparation.

Nutrient Databases

It was decided to use local nutrient databases for the conversion of foods into nutrients, because of the expected differences in the different national food composition tables, especially with regard to manufactured foods. It was recognized that there are many inconsistencies between these tables due either to different systems of analysis or sampling procedures, or to differences in factors applied to convert analyzed values to nutrients. Since it was important to know how nutrients were calculated in the different centers, a short questionnaire was developed to investigate the differences that exist between the food composition tables in the various centers. The differences considered were:

- the conversion of macronutrients into energy
- the conversion factors for nitrogen into protein
- the determination of carbohydrates, and data available on polysaccharides and mono- and disaccharides
- the determination of dietary fiber
- the nature of the fatty acids included in saturated, monounsaturated, and polyunsaturated fatty acids and the way in which fatty acids are expressed (e.g., in g fat/100 g fat or in g fatty acids/100 g fat)
- the use of retinol equivalents.

The effects of differences in food composition tables were checked using a sample of the food intake data from three countries. The data from Hungary, Norway, and Portugal were converted into energy and macronutrients by the local database as well as by the Dutch nutrient composition database. The test was conducted only with macronutrients because it was hypothesized that true or biological differences between foods would mainly exist among the micronutrients. Table 1 shows the differences found with this procedure. The differences were all less than 10% for the components considered. This was not as great as we had expected.
FOOD HABITS AND AGING

TABLE 1. Difference in means of energy and macronutrient intakes of 21 elderly people from three centers in Europe, as calculated using the Dutch nutrient database and local nutrient databases

<table>
<thead>
<tr>
<th>Food components</th>
<th>Local data minus Dutch data</th>
<th>Difference %*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean 90% confidence limits</td>
<td></td>
</tr>
<tr>
<td>Energy MJ</td>
<td>0.6 0.4; 0.9</td>
<td>9</td>
</tr>
<tr>
<td>Protein g</td>
<td>4.4 1.8; 7.1</td>
<td>7</td>
</tr>
<tr>
<td>Fatty acids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated g</td>
<td>0.4 -2.2; 3.6</td>
<td>2</td>
</tr>
<tr>
<td>Monounsaturated g</td>
<td>0.02 -2.6; 2.5</td>
<td>0</td>
</tr>
<tr>
<td>Polyunsaturated g</td>
<td>-0.2 -1.2; 0.9</td>
<td>-2</td>
</tr>
<tr>
<td>Carbohydrates g</td>
<td>17.1 7.7; 26.6</td>
<td>8</td>
</tr>
<tr>
<td>Dietary fiber g</td>
<td>-0.8 -2.8; 1.3</td>
<td>-5</td>
</tr>
</tbody>
</table>

* Difference as percentage of the local nutrient database.

Questionnaire on Food Habits

The main problems in assessing food habits in this European study were differences in the translation and interpretation of the questions. The list in Table 2 shows the most common translation problems, which were detected by translating the local questionnaire back into English. From this list it is clear that some problems are more serious than others (e.g., animal products may actually be the expensive foods). The fact that errors appear in different parts of the questionnaire must generate caution in the interpretation of the results. In addition to mistakes in the translation, errors of interpretation may also exist and may be caused by the fact that some items have alternative meanings in the various cultures. Some examples of possible pitfalls are discussed below.

Example 1. According to the question on food purchases, more than 75% of the subjects had shopping facilities close by or within walking distance. Shopping prob-

TABLE 2. Examples of translation errors in the questionnaire used in the Euronut-SENECA study

<table>
<thead>
<tr>
<th>Description of items</th>
<th>English questionnaire</th>
<th>Local questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foods</td>
<td>Canned foods</td>
<td>Tinned foods</td>
</tr>
<tr>
<td></td>
<td>Expensive products</td>
<td>Animal products</td>
</tr>
<tr>
<td></td>
<td>Health food</td>
<td>Natural foods</td>
</tr>
<tr>
<td>Meat</td>
<td>Burned meat</td>
<td>Grilled, roasted, or browned</td>
</tr>
<tr>
<td>Margarines</td>
<td>Diet margarine or high in PUFA</td>
<td>Low fat</td>
</tr>
<tr>
<td>Dairy</td>
<td>Buttermilk</td>
<td>Dairy cream, whey</td>
</tr>
<tr>
<td>Plant products</td>
<td>Fruit</td>
<td>Greens</td>
</tr>
<tr>
<td>Supplements</td>
<td>Doses in micrograms</td>
<td>Doses in $10^{-1}$ micrograms</td>
</tr>
<tr>
<td>Dentures</td>
<td>Removable</td>
<td>Natural</td>
</tr>
</tbody>
</table>
lems were more often due to budgeting problems than to the availability of shops. The fact that distance to shops was not a major problem for food shopping may reflect the selection of a "traditional town" by the study design. It is clear that budgeting problems may cause difficulties in shopping. It is not clear, however, how serious the problem is in our study, because the item "shopping" has been translated erroneously in a few centers (translated as a question on the availability of money rather than the availability of shops, which was the original question).

Example 2. Also connected with the use of "traditional towns" in the study design might be the fact that in all but one center half or more of the elderly participants consumed home-produced foods. Some preliminary data suggest that the use of home-produced foods is advantageous for dietary intakes as well as for health status (6). Whether "the use of home-produced foods" means production by elderly people themselves or mainly by family or friends needs to be examined. Furthermore, it is important to determine whether the apparent positive consequences for health status are related to physical activity or to dietary intakes or both.

Example 3. For the great majority of elderly people in all centers, the preferred place of eating is their own home. Interest in food preparation and in a daily cooked meal is sometimes used as a quick indicator for an inadequate diet (7). Problems may arise in cross-cultural comparisons due to the fact that in some cultures two cooked meals per day are traditional whereas in others only one cooked meal per day will be consumed. For instance, in the Netherlands only one cooked meal per day is eaten and, moreover, it is regular practice that on Saturday no cooked meals are consumed at all. (The kitchen should be kept clean for Sunday.) If we want to test in this study the hypothesis that irregular meal patterns are related to inadequate dietary intakes, then the term "irregular meal pattern" should be defined differently for the various centers.

CONCLUSION

In this chapter we have discussed some of the problems in assessing food habits cross-culturally. The chapter is based on problems of this kind encountered in the European study on nutrition and health in the elderly. Among these were the following:

- problems with the standardization of the dietary history
- problems with compatibility between the national food composition tables
- problems with the translation of the questionnaire into the local language and the adaptation according to local practice
- problems with the interpretation of the results in the various cultures.

ACKNOWLEDGMENT

We are greatly indebted to Dr. Haller from Hoffmann-La Roche & Co Ltd. for the translation of the local questionnaires back into English. We would also like to
thank Désirée Welten for her help in the comparison of nutrient data bases of the various centers.

REFERENCES


DISCUSSION

Dr. Steen: Your study is a major contribution to the understanding of transcultural food habits. Could you say something about how representative your results were? What information do you have about non-response?

Dr. van Staveren: This is an important question. Response was certainly a problem in some centers. We had centers with 100% response and others with only 50%. We did a small non-response survey that indicated that health and education were factors in non-response. Our statistician adjusted for these factors but we did not find large differences between the weighted medians and the "raw" (or "unweighted") data for many of the questions posed.

Dr. Hodkinson: Why did you choose small towns of 10,000 to 20,000? It seems to me that in industrialized countries such small towns are likely to be rather non-representative of the general population.

Dr. van Staveren: We expected that if we examined the smaller traditional towns we would find greater differences in dietary patterns.

Dr. Berry: I think this is a remarkable study but it does highlight the problems of finding objective markers of dietary intake. Will you have an opportunity to proceed with some “invasive” procedures? By this I mean blood testing for albumin, transport proteins, and maybe T3 concentrations, and possibly adipose tissue biopsy for fatty acid analysis for the quality of dietary fat? This is a relatively non-invasive procedure, it does not hurt, and it has the advantage over blood testing that you can never miss!

Dr. van Staveren: We are well acquainted with the use of fat biopsies, but we did not do them in this study. However, we have blood samples and intend to validate some of the dietary findings against them, although we have not done this yet.

Dr. Guesry: The countries in your survey come from an area stretching almost from the North Pole down to the south of Greece. I assume there are huge differences in diet in these different countries. It is commonly said that the Mediterranean diet is healthier than other diets, but I wonder if this is because the circumstances of life have changed less in the
Mediterranean than they have in northern Europe. In other words, could it be that the diet is no longer well adapted to lifestyle in the industrialized parts of Europe, and that it is more difficult to change diet than it is to change lifestyle?

Dr. van Staveren: Our study will not answer this question but I believe that there are other studies that show that diets rich in saturated fats are compatible with good health in people doing heavy physical work.

Dr. Meredith: How did you deal with the problem of reliability of reporting in older people with impaired memory? And was there a seasonal influence on your results?

Dr. van Staveren: People with dementia were not involved, and the study was done in only one season, the winter.

Dr. Steen: It is appropriate to mention that a transcultural study of nutrition in the elderly is at present underway under the auspices of the International Union of Nutritional Sciences. Studies of eating behavior are taking place in several countries, for example China, Greece, Australia, Sweden, Iceland, and some African countries, and in communities in the vicinity of New York and in Texas. One of the purposes of this transcultural study is not only to measure nutrient intakes, but also to assess the ways in which food is eaten—with whom, where, in what surroundings, and so on.

Dr. Nestel: Have you distinguished between n-6 and n-3 fatty acids? There is a tendency to lump them together but we now know it is very important to distinguish between them, in the light of recent studies showing an inverse correlation between n-3 fatty acid intake and mortality from a variety of diseases, including coronary artery disease and some cancers.

Dr. van Staveren: This will have to be the subject of a special project due to the problems I have already shown relating to local food composition tables. However, we are very interested in this subject and plan to investigate it, if not in all centers then at least in some of them.

Dr. Havlik: In terms of future studies, are there any plans to do substudies in certain centers and is the European Community working to produce a common set of food tables that can be used throughout Europe?

Dr. van Staveren: Subsidiary studies will certainly be done in several centers. For example, some will perform a more extensive evaluation of hematology, others of bone density, immunology, and so on.

As to food tables, the European community is supporting a project to make these more compatible between EC countries. We are at present working hard on this.

Dr. Schlierf: When evaluating data on energy intake it is important to know something about energy expenditure. How did you do this?

Dr. van Staveren: We administered a questionnaire on physical activity that we validated against other measures. We were not able to quantify energy expenditure but there were some interesting differences between centers in time spent on various activities.

Dr. Edwardson: Did you collect any data on past eating habits? Historically, the patterns of eating are changing quite dramatically even in quite small communities and if the health of old people is in some way dependent on their lifetime nutritional experience, then maybe the variation over, say, the last 40 years is more important than the current cultural variation.

Dr. Davies: This is one of the questions that has been taken up in the IUNS studies mentioned by Dr. Steen. We are examining past as well as present food habits and food beliefs.

Dr. Steen: The question of beliefs about food is a very important one and is one of the
most prominent differences between countries. In a rather sterile country like my own, people do not tend to have many beliefs about what is good or bad to eat, but in countries like Greece or China there are hundreds of food items that are believed to be good or bad for your health. This is one of the major differences between countries.

Dr. van Staveren: It is clear from our data that it is more common for people to avoid foods for health than it is for them to eat foods for health.