THE NATURE OF CROSS - CULTURAL FOOD AND HEALTH RELATIONSHIPS

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26.1   INTRODUCTION

The International Union of Nutrition Sciences (IUNS) cross-cultural project "Food Habits and Health in Later Life" is a major research undertaking that can be justified on the basis of anthropological and ethnological criteria and can provide valuable data on dietary habits that reflect rich but threatened cultures. However, the objective of this short chapter is to assess the value of the database which is being developed for epidemiological purposes, rather than to examine, in detail, the whole range of primary and secondary aims of the project. The history of the whole project is presented in Chapter 1, whereas Chapter 2 describes the protocol and the multi-dimensional instruments of the project. Among the explicit and implicit objectives of the study are:

•   to focus attention to elderly people in traditional societies, their diet and the way it is related to functional aspects of their life;

- to highlight cross-cultural differences in diet that may be important determinants of health and well-being;

- to examine the applicability of culture, diet and health oriented research instruments, under extremely variable sociocultural conditions;

- to explore the interdependence of nutrition, cultural factors, objective health parameters and self perceived health as they shape needs and demands for primary health services;

- to determine the range of variation of several physiological and biochemical variables under different geographical, ethnological and cultural situations.

- to document the dietary aspects of intact ancient cultures;

- to test whether nutrient descriptors or food patterns are more important determinants of self perceived and objectively documented health status; and

- to investigate whether variance in food intake is an independent predictor of objective and subjective health status, by providing information over and beyond that imparted by indicators of average level of food intake.

26.2   THE EPIDEMIOLOGICAL CONTEXT OF THE IUNS PROJECT

The whole study has attributes of an ecological epidemiological investigation with ethnological and anthropological components, blended together with attention and respect to cultural identity and tradition. Ecological studies are frequently considered as inherently weak from the methodological point of view [1,2]. Indeed, they may have occasionally misled the scientific community by suggesting causal relations that have not been confirmed by analytic epidemiologic studies - notably with respect to fat intake and breast cancer [3-5]. However, it must be remembered that many important etiological associations in human health and disease have been suggested by ecological correlations as, for instance, the inverse relation between moderate wine intake and incidence of coronary heart disease (CHD) [6], the positive association between animal fat intake and CHD [7,8] or cancer of the large bowel [3], the role in sunlight in the occurrence of skin cancer [9] and the importance of aflatoxin in the causation of hepatocellular carcinoma [10].

It can be argued that strong relations, expressed with high values of effect parameters line the relative risk, when they concern widespread exposures like diet, tobacco smoking, magnetic fields and sunlight, must generate strong ecological correlations with the respective disease outcomes [11]. Individual food items may not be strongly associated with particular diseases and may or may not be frequently consumed by the population groups under investigation. However, dietary patterns impart the converging effect of several food items and thus can generate high

relative risks [12]. Furthermore, dietary patterns, like, for instance, the Mediterranean diet [13], are by definition widespread in particular population groups and may be expected to give rise to ecological correlations. By contrast, analytic epidemiological studies can rarely examine whole dietary patterns and focus, instead, on single food items or nutrients. The problem in analytical settings (case-control or cohort designs) is further complicated by the fact that the range of variation of many food items or nutrients within population groups is usually small, making it difficult to demonstrate statistically inherently weak causal relations [14].

26.3   LIMITS OF ECOLOGICAL STUDIES

In ecological studies, the unit of analysis is, or refers to, a group of people rather than a single individual. In principle, the important effect parameters which are routinely calculated in analytical epidemiological investigations, notably the relative risk and the population attributable risk, can also be calculated in ecological studies [2,15]. In the most common type of these studies, the average exposure level (X) and the disease rate (Y) are available for several population groups. The association can then be expressed through a simple regressive model:

$$Y = B_o + B_1 X.$$

The relative risk can subsequently be estimated at:

$$RR = 1 + B_1 / B_o$$

Ecological analyses are subject to a common and frequently substantial bias in effect estimation, which has been termed "ecological fallacy." This fallacy is the result of "aggregation bias", due to the grouping of the individuals and to "specification bias," due to the confounding effect of one or more of the groups under consideration [2]. Thus, it is conceivable that populations groups with high total fat intake have low mortality (e.g. because both variables reflect high socio-economic development) whereas within groups, individuals with high fat intake have higher disease risks.

This problem of confounding can also exist in analytical epidemiological studies. However, in the latter studies, confounding can be controlled through stratification of individuals whereas in an ecological design, groups represent the units of observation and cannot be broken down to statifiable individuals. There are other problems in ecological analyses. Frequently, group (average) measurements are less reliable than individual measurements. For example, per capita fat intake values, calculated from Food Balance Sheets [16], are notoriously inaccurate [5], since a large portion of fat is discarded rather than consumed. However, in other instances, grouped data are more reliable than individual information as, for example, with respect to tobacco and alcohol intake [2,17,18]. Finally, another problem may be faced in ecological studies when the exposure data (e.g. diet) and the outcome data (e.g. incidence of, or mortality from, one or more diseases) do not refer to the same group or to groups that are mutually representative. Thus,

national incidence or mortality rates may not be applicable to the population groups that have been investigated with respect to dietary intakes. A variant of the same problem exists when the exposure and outcome data refer to the same time period, whereas the latency of the exposure-related disease can be measured in decades.

26.4   THE IUNS PROJECT AS AN EPIDEMIOLOGICAL RESOURCE

An important advantage of ecological studies over analytical epidemiological investigations in the field of nutrition is the range of variation of the nutritional exposures under consideration can be much higher among population groups than within any particular group. It has been argued that important ecological associations concerning diet and coronary heart disease or cancer at various sites can not be demonstrated in observational epidemiological studies within populations because the inter-individual variation of dietary intakes in any particular socio-cultural context is relatively small [4].

Indeed, many supporters of hypotheses and inferences derived from ecological studies believe, that the results of these studies could reach a much higher level of reliability if the data concerning dietary exposures were of higher quality and more relevant in terms of postulated latency periods [14]. In this context, data of the IUNS study "Food Habits and Health in Later Life" represent a unique epidemiological resource of at least the same quality and in a larger scale compared with the nutritional data assembled during the course of the Seven Countries Study.

Furthermore, since in the IUNS project dietary intake data are obtained from elderly people who tend to preserve their traditional diets, ecological correlations between these dietary patterns and various indicators of chronic disease occurrence are biologically relevant even when the postulated disease latencies are in the order of a few decades. In addition, changes in dietary habits have been recorded and can be used in order to reconstruct, reasonably well, past dietary patterns. Although elderly survivors are likely to have somewhat different dietary habits compared to non-survivors in the same population, these differences are probably much smaller than those between population groups. The nutritional and sociocultural data assembled in this study can also be used with little incremental investment for the undertaking of a prospective cohort study on diet and health among the elderly. This study would be unique in scope and could generate valuable results in the not too distant future. Even though the total cohort is not large, the incidence density of disease and death among the elderly is inherently high and thus the power of the study would be disproportionately high. Furthermore, the broad cross-cultural study base should lead to results unusually generalisable.

A cohort study of diet and disease among the elderly would not be just another cohort study, smaller in size than several others that are already under way. The fact that elderly people represent a cohort of survivors and that several nutritional and other risk factors may interact with age in the cause of chronic diseases underlines the potential importance of such a

prospective study. One of the stated objectives of the project was to examine whether variability in dietary intakes is, in itself, an independent predictor of good health. This is a sensible, as well as insightful suggestion, since nutritional variability is advantageous for the individual and is likely to depend on the variability of the available foods. There have been no analytical epidemiological studies addressing this topic and the required methodology has not been adequately developed. The IUNS study could provide some relevant ecological evidence, although the statistical power may not be sufficient for firm conclusions.

Stressing the importance of the data collected in the IUNS study for ecological and prospective epidemiological investigations does not imply that the other objectives of this study are less important. Investigation of a critical and all-pervasive function of life, like diet, in a large and growing segment of a population, represents a priority from an ethical, sociocultural and ethnological point of view. Blending these objectives with more traditional epidemiological aims will benefit all sectors of this large, complex and visionary undertaking.

26.5   SUMMARY

• The objective of this chapter is to assess the value of the IUNS database which is being developed for epidemiological purposes.

• The IUNS study has attributes of an ecological epidemiological investigation with ethnological and anthropological components, with attention and respect to cultural identity and tradition.

• An important advantage of ecological studies over analytical epidemiological investigations, in the field of nutrition, is that the range of variation of the nutritional exposures under consideration can be much higher among population groups than within any particular group.

• When dietary intake data are obtained from elderly people, who tend to preserve their traditional diets, ecological correlations between these dietary patterns and various indicators of chronic disease occurrence are still biologically relevant, even when the postulated disease latencies are in the order of a few decades.

• Although elderly survivors are likely to have somewhat different dietary habits compared to non-survivors in the same population, these differences are probably much smaller than those between population groups.

• The IUNS study can also be used for the undertaking of a 'prospective cohort study' on diet and health among the elderly. Even though the total cohort is not large, the incidence density of disease and death among the elderly is inherently high and thus the power of the study would be disproportionately high.

• One of the objectives of the IUNS project was to examine whether dietary variability is an independent predictor of good health. There have been no analytical epidemiological studies addressing this topic.

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CHAPTER 26

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