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Review

Nutrition economics: An innovative approach to informed public health management

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ABSTRACT

The role of nutrition to optimize the use of scarce resources through its linkage with health and welfare should be considered of interest by healthcare decision makers. A favorable impact of food on non-communicable disorders and general health status will improve healthcare expenditure and quality of life.In health economics, an analysis of the costs and effects of a healthcare technology by means of a cost-effectiveness analysis has become an established tool. Projections about the effectiveness and expected costs of an intervention can be modeled using realistic and explicit assumptions based on outcomes from randomized clinical studies. However, the use of health economic techniques to assess costs and effects is not solely restricted to classic healthcare products such as medicines. To illustrate this we used two published cost-effectiveness studies, which consider respectively a preventive treatment against severe respiratory syncytial virus infection in children at high risk of hospitalization and the use of prebiotics for the primary prevention of atopic dermatitis.These examples illustrate that there is a parallel between the methodologies for extrapolation of intermediate outcomes to long-term outcomes between a cost-effectiveness analysis for pharmaceutical or nutrition, as long as the clinical evidence for nutrition fulfils the requirements for pharmaceuticals. Another requirement is that there is clinical widely accepted evidence that matches a comparable level of epidemiological observations about the link between short-term and long-term outcomes.Better understanding of how nutritional status and behavior may interplay with the socioeconomic environment will ultimately contribute to preserving the sustainability of healthcare provisions.

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1. Introduction

Over the last decade research in the field of nutrition has been developing rapidly and there is an increasing awareness of the relationship between food consumption and public health. An important number of studies are conducted, aiming at improving the understanding of underlying causal mechanisms and metabolic interactions. However, despite the high investment from academic and industrial researchers, most initiatives concern risk assessments and are hardly ever designed to express measurements of the benefits of food as a provider of nutritional constituents and bioactive compounds.

Escalating costs have become a major concern for healthcare professionals, decision-makers and the public, prompting the implementation of new cost containment measures over the last decade. The health authorities in Europe started to establish incentives for efficient healthcare delivery by means of decentralization of the healthcare decision-making process and the implementation of market mechanisms. For pharmaceuticals, medical devices and technologies there is

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an increasing demand for cost-effectiveness data in the decision-making process information in Europe (Drummond et al., 1999). A prominent example is the assessment procedure by the National Institute for Health and Clinical Excellence (NICE) in the United Kingdom, but also The Netherlands, Scotland, Sweden and Portugal have formal requirements for the submission of cost-effectiveness data.

The role of nutrition to optimize the use of scarce resources through its linkage with health and welfare should be considered of interest by healthcare decision makers. A favorable impact of food on nutrition-related disorders and general health status may have a positive impact on the healthcare expenditure, thus improving public health and the sustainability of health systems in general. The development of a discipline like nutrition economics may help policy makers to encourage individuals to adapt more readily a healthy life-style.

The objective of this paper is to provide physicians and healthcare professionals with a better insight on some elements of the nutrition economics. The basic concepts of health economics will be described as well as its applicability to nutrition economics.

2. Basic concepts

2.1. Definitions

The reimbursement of new pharmaceuticals is no longer based on the traditional registration data (efficacy, safety). Since approximately the last 10 years, we can distinguish various additional data requirements, which especially relate to the use of the drug in real daily practice. The most important new data requirements are effectiveness, cost-effectiveness and budgetary impact. Also other considerations may be taken into account depending on the specific indication, e.g. equity in the case of life-style drugs or orphan drugs. Cost-effectiveness data should permit reliable, reproducible and verifiable insight into the effectiveness of a drug, the costs that will result from its use, and the potential savings that will be made compared with other drugs and/or treatments. To do this, health economists use a measurement called the "quality-adjusted life year," or QALY. The lower the ratio of a cost per QALY, the more cost-effective a health intervention is said to be. Even though there is no theoretical or empirical basis for it, values ranging from $50,000 to $100,000 are sometimes used as a threshold in the United States, whereas in the UK NICE (National Institute of Clinical Excellence) has adopted a cost effectiveness threshold range of £20,000 to £30,000 per quality adjusted life year (QALY) gained. The World Health Organization uses gross domestic product (GDP) as a readily available indicator to derive the following three categories of cost-effectiveness: Highly cost-effective (less than GDP per capita); Cost-effective (between one and three times GDP per capita); and Not cost-effective (more than three times GDP per capita) (WHO, 2003). There are several key steps when performing a cost-effectiveness study and interpreting the outcomes. These include 1) defining perspective and time horizon, 2) collecting data on healthcare utilization, 3) costing healthcare resources, 4) analyzing data on utilization and cost, 5) defining and measuring health effects, 6) adjusting costs and effects for inflation and discounting, 7) and evaluating uncertainty. The appropriate execution of a cost-effectiveness analysis for nutrition should correspond with these steps. In cost-effectiveness analysis, the valuing of costs and health effects over time remains a controversial issue. Decisions about the resources dedicated to prevention depend on the weight given to future health in economic evaluations. Future costs and health gains are commonly weighed in relation to the time at which they occur, future costs and effects receiving less weight than present ones. This procedure is called discounting. The choice of discount rates can have varying effects on interventions, depending on the disease area, especially in chronic disease and preventive interventions. It is therefore crucial that appropriate discount rates are used in nutrition economic evaluations. Costing resource units should be viewed as a research exercise in itself, and usually occurs after the collection of medical resources. The ideal cost estimates for each resource use would be their opportunity cost, defined as the value of that good or service in its next best use. Opportunity costs are reflected as the price in a perfectly competitive marketplace. The long list of cost categories can be divided into two discrete resource categories: direct costs and productivity costs. Direct costs reflect the Euro burden of the medical care and nonmedical care expenditures made in response to disease. The cost of pharmaceuticals (and clinical nutrition) is one type of direct medical costs. Other types of direct medical costs include cost of hospitalizations, cost of physician visits, cost of tests and procedures, and cost of durable medical equipment. Direct nonmedical costs include cost to caregivers or the valued time in Euro terms in caring for a loved one. Productivity costs reflect the Euro value of the work lost due to death or morbidity induced by disease or its treatment. The cost-effectiveness analysis can be performed from various perspectives. An analysis from the payer's perspective includes all medical costs, which are reimbursed by the payer (or health insurer). An analysis from the society perspective takes a broader perspective and also includes direct nonmedical costs and productivity loss. The cost-effectiveness guidelines in The Netherlands have a societal perspective, whereas in the UK we have the National Health Service (NHS) perspective. Therefore, productivity cost is especially important for studies conducted from the societal perspective. In some countries, like France, in case of prescribed sick-leave, salary is paid (at least partly) by the Social Security, so productivity loss in those countries also relevant from the payers' perspective.

2.2. Modeling

In practice it is not always possible to derive information from scientifically sound prospective studies. In these cases decision-analytic models may be used to provide the necessary cost-effectiveness information using various existing data sources for clinical and economic information. Modeling studies are based on decision analysis, which is a well-recognized method for analyzing the consequences of decisions that are made under uncertainty (Weinstein and Fineberg, 1980). It is an explicit, quantitative, prescriptive approach to healthcare decision-making and allows both clinical and economic consequences of medical actions and attitudes to be analyzed under conditions of uncertainty. From intervention algorithms a model can be constructed which considers the timings of actions and their consequences over time. In effect, a model shows the consequences of different preventive or therapeutic interventions, and it should correspond as much as possible to the real life situation of the health concern. Projections about the effectiveness and expected costs of an intervention can be modeled using realistic and explicit assumptions based on outcomes from randomised clinical studies. In addition modeling often helps overcome the practical limitations of prospective studies, particularly for chronic conditions that may require longer-term extrapolations of treatment effects and cost implications. Data sources for the variables being used in a model may be meta-analysis, published literature, databases, clinical trials and/or Delphi panels. Sensitivity analysis is currently the most widely used method to deal with uncertainty in health economic modeling evaluations. A sensitivity analysis is based on modification of the basic clinical and economic estimates of parameters to judge the effect on study results of alternative assumptions for the range of potential values for uncertain parameters.

3. Background of nutrition economics

Up to recently, no specific approach has been published for food in general and for food with beneficial effects in particular, in spite of clear needs and important stakes going from policymaker decisions to direct consumer interests. To correspond to the complexity of the health enhancing food sector, there is a need to generate adapted