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Decision-Oriented Health Technology Assessment: One Step Forward in Supporting the Decision-Making Process in Hospitals

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ABSTRACT

Objectives: This article outlines the Decision-Oriented Health Technology Assessment: a new implementation of the European network for Health Technology Assessment Core Model, integrating the multicriteria decision-making analysis by using the analytic hierarchy process to introduce a standardized methodological approach as a valued and shared tool to support health care decision making within a hospital. **Methods:** Following the Core Model as guidance (European network for Health Technology Assessment. HTA core model for medical and surgical interventions. Available from: http://www.eunethta.eu/outputs/hta-core-model-medical-and-surgical-interventions-10r. [Accessed May 27, 2014]), it is possible to apply the analytic hierarchy process to break down a problem into its constituent parts and identify priorities (i.e., assigning a weight to each part) in a hierarchical structure. Thus, it quantitatively compares the importance of multiple criteria in assessing health technologies and how the alternative technologies perform in satisfying these criteria. The verbal ratings are translated into a quantitative form by using the Saaty scale (Saaty TL. Decision making with the analytic hierarchy process. Int J Serv Sci 2008;1:83–98). An eigenvectors analysis is used for deriving the weights' systems (i.e., local and global weights' system) that reflect the importance assigned to the criteria and the priorities related to the performance of the alternative technologies. **Results:** Compared with the Core Model, this methodological approach supplies a more timely as well as contextualized evidence for a specific technology, making it possible to obtain data that are more relevant and easier to interpret, and therefore more useful for decision makers to make investment choices with greater awareness. **Conclusions:** We reached the conclusion that although there may be scope for improvement, this implementation is a step forward toward the goal of building a "solid bridge" between the scientific evidence and the final decision maker's choice.

Key words: analytic hierarchy process, decision tree, Decision-Oriented Health Technology Assessment, doHTA, health technology assessment, hospital-based HTA, multicriteria decision analysis system.

Introduction

Health technology assessment (HTA) arises in answer to the unchecked spread of expensive health technologies (HTs). HTA is a multidisciplinary assessment process aimed at supporting decisions pertaining to the allocation of resources [1]. This is especially in view of the fact that the health system has limited resources, which cannot satisfy all the health demands of a population with a trend toward increasing health needs owing to progressive aging and an enhanced awareness of the availability and potential of new HTs. As a matter of fact, HTA is not a mere research tool, but rather a systematic, rigorous, reproducible assessment process that can be considered a "bridge between the world of research and the world of decision making, particularly policy making" [1]. In view of this, HTA becomes a governance approach aimed at linking decisions to available scientific evidence. This metaphor, often referred to over the years, might well become rhetorical if we cannot define more accurately what connects each end of the "bridge": the start (e.g., available scientific evidence) and finish points (i.e., decision by health care managers and policymakers) are clearly defined, but the pathway connecting who produces the evidence and the final decision makers (that is to say, the standardized methodology of gathering and reporting evidence on the basis of which the decision makers make their choices) is still inaccurate and elusive. One of the main reasons for the gap between the available scientific evidence and the evidence needed by decision makers is the failure to provide decision makers with more efficient and suitable (in other words, appropriate) tools (because they permit a decision in an effective and timely way and take into account all the relevant aspects), enabling them to make a more knowledgeable decision between the different alternatives.

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Admittedly, available evidence cannot always provide useful answers to the questions raised by decision makers. This is even more often the case at the "meso" level—that is to say, when it is necessary to establish whether a technology should be implemented within a hospital, while at the same time trying to forecast the possible impact on its organizational frame. In fact, especially in the case of particularly innovative technologies, while the scientific literature focuses on aspects such as safety and clinical efficacy, hospital managers need to also take into account organizational and economical aspects as well as technical or legal implications.

The application of HTA methodology at the meso level [2], and in particular its implementation at the hospital level (defined as hospital-based HTA) [3], is essential when considering the adoption or rejection of HTs in a hospital because it is aimed at contextualizing both evidences and decisions. The hospital-based HTA is a hospital assessment process for using the available evidence in decision-making processes about the introduction of new or existing technology. Differences in how HTA is perceived, understood, or used in the national or regional health care setting may have an important impact on the way HTA methodology is organized and used within a hospital.

Hospitals should not each implement their own detailed methodology usable only within their organization and suitable only for a limited set of technologies; rather, a standardized methodology that can be applied to all the available technologies and, if possible, be shared among all HTA specialists (hence overcoming barriers in the collaboration of HTA assessment among hospitals) must be structured. Decision makers do not have the time and resources needed for developing an exhaustive HTA program, and, therefore, they require suitable tools for facilitating the adaptation of HTA output from external reports, making their final choice easier [4]. Moreover, because decision makers often take into consideration what is being done in other systems or in other countries, it is desirable to reach standardized outputs to assess the HT impact at its different levels by means of a shareable and adaptable method to each health context (national, regional, local) or health care organization.

In 2004, the European network for Health Technology Assessment (EUnetHTA) was established by the European Commission and Council of Ministers to create an effective and sustainable network for HTA across Europe and help to develop reliable, timely, transparent, and transferable information to contribute to HTAs in European countries. As part of its mission, the EUnetHTA developed the Core Model, a methodological framework for shared production and sharing of HTA information. Although the Core Model is confirmed as an accurate and important guide for the assessment of an emerging technology, it has some limits. These limits are found especially when it is applied within a hospital context (the meso level [3]): specifically, its implementation would lead to results that would be difficult to understand and could not be easily or immediately applied. In fact, the literature results, which are the outcome of analyses carried out by colleagues who have previously tested the applicability of the Core Model [5–7], consist mainly of lists of answers (i.e., "issues"). Despite being important and indicative of the technology under consideration, these do not provide a tangible understanding of how the decision maker will then decide whether to adopt a given technology. Moreover, although the EUnetHTA Core Model becomes more specific and detailed when it comes to operationalizing the questions pertaining to a given technology, the purpose of such questions is often not applicable to the decision makers' needs and unlikely to point out the data of the evaluation context.

Furthermore, asking a health organization (HTA multidisciplinary team as well as every unit that conducts HTA) to answer about 200 questions (such as those posed in the EUnetHTA Core Model) would require a great amount of resources (in terms of both cost and time). This is, however, necessary to comply with the accuracy and time constraints of the Hospital Management/Board of Directors or of the HTA project's sponsor. An HTA report previously elaborated by other institutions (though compliant with the Core Model) could not be shared among different levels (national, regional, local) or organizations because it is usually not reported in a defined, standardized, and structured output. Actually, between the presentation of results based on the Core Model guidelines and the final decision, there is a gap that could be bridged by carrying out further analyses and using models that would allow the assessment to be concluded by defining a classification of the assessed alternatives.

In view of this, the HTA Research Unit of the Bambino Gesù Children's Hospital in Rome, Italy, devised the Decision-Oriented Health Technology Assessment (doHTA) method to guide and support the introduction of innovative HTs in hospitals. The doHTA is a new implementation of the EUnetHTA Core Model that integrates multicriteria decision analysis (MCDA) by using the analytic hierarchy process (AHP). Although key parts of the Core Model remained substantially unaltered, the new approach considers the repositioning of "domains," "topics," and "issues," redefining them in a new goal-oriented framework [8]. It has been developed to introduce a standardized methodological approach as a valued and shared tool to support health care decision making within a hospital. The aims of this article were 1) to illustrate a detailed new implementation of the EUnetHTA Core Model by also describing the main features of the AHP approach in a hospital context and 2) to explain how the results of the doHTA application can closely support health care decisions. No previous analysis has shown the results of the integration between AHP methodology and the Core Model application as a part of the HTA process within a hospital setting.

Methods

The EUnetHTA Core Model

The EUnetHTA Core Model has been devised mainly to promote the standardization of HTA results, usable in all member states of the European Union, to spread and share evidences and results obtained. The EUnetHTA Core Model is built to focus on assessment elements that describe the technology or the consequences of its use in order to supply the information needed to decide on the use or nonuse of any selected technology [9]. The model combines several methods of analysis developed within each discipline involved: epidemiology, cost-effective analyses, safety and technical assessment, social science, ethics, and so forth. The model aims to accurately organize the collected evidence about the technology considered in different "assessment elements" made up of domains (i.e., health problem and current use of technology, technical characteristics of the technology, safety, clinical effectiveness, costs and economic evaluation, ethical analysis, organizational aspects, social aspects, legal aspects), topics, and issues [5,10]. Each assessment element "defines a piece of information that describes the technology or the consequences or implications of its use" [9].

Given the substantial differences between the domains listed above, the nature of assessment elements can therefore differ considerably because of the methods of investigation and analysis adopted to study each of them. Each domain is composed of different topics, and each topic can concern more than one domain. The topics represent more specific aspects within the domain and can, in turn, be described by one or more issues. An issue underlies a specific factor within a topic. This combination accurately organizes the collected evidence about the technology