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Pharmaco-economics analysis, as a strategy on facilitating choices between health and non-health programs in the establishment of the national health care system

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Abstract Due to the significant boost in community expenditure with health topics, mainly regarding drugs, numerous countries, have already put into operation, or are in the process of arguing the adoption of actions to guarantee the excellence of health care provided to the population. One of the less risky strategies-is the adoption of economic procedures applied to health, more specifically, pharmaco-economics analysis.

This paper aims to contribute to the dissemination of notions and techniques of economic study with a view to integrate these into strategy decisions of payment rationalization and the search for clinical effectiveness. It includes a literature review covering the category of expenses and reimbursement in health issues, the methodologies of pharmaco-economics revision, cost-minimization, cost-benefits, cost-effectiveness and cost-utility analysis, as well as its main characteristics, advantages, disadvantages and applicability.

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Contents

1. Introduction

Pharmaco-economics is a sub-discipline of Health Economics that associates clinical concepts of efficacy, safety and quality of various procedures in health care, with measures of economic cost.[1] A second, more specific definition is: 'Pharmaco-economics is the description and analysis of the costs of drug therapy to health care system and society.[2] Also, it could be defined as an ''application of economic theory to pharmacotherapy'' or ''economic evaluation of drugs'' or, it could be placed at the interface between two large traditional areas, health and economy.[3]

It is a tool that helps to select more efficient options (with a good cost/effect relationship) and could help in the distribution of health resources in a more just and balanced manner. Pharmaco-economics contributes to the rational use of medicines by incorporating cost to questions on safety, efficacy and quality of different medical therapies, and to the search for a better relationship between costs and results. While making use of the word ''pharmaco'' (drug) in its nomenclature, it presents tools that can be equally utilized for the consideration of medicines, health programs and even of governmental schemes, provided that the characteristics inherent to each application are observed.[4] In representing an area of intersection, ''conflicts'' are obvious due to the diverse forms on how health is measured. Conventionally, the professions associated to the health area are centered on distinctive ethics, according to which health has no price and a life saved justifies all attempts. Then again, the economy is under joined by the ethic of common safety or public ethics. The origin of these differences resides in the attitudes of each group regarding resource utilization, but both have a vision for the future that incorporates resource rationalization and improved care rendered in health issues.[5] Countries that have invested in the training and specialization of human resources to act at the economy/health interface have achieved higher rationalization rates in the process of management and quality of health services.[6–8]

2. How the government handles this good/cost effect relationship

Management of the health/illness course has required ever higher amount of incomes especially those spent for medicines, caused by different variables. Included in these variables are the development of new technologies, efforts to increase access to health systems, strategies for the promotion of new medicines directed at both the prescribing and the consuming classes and also population aging and the consequent rise in chronic-degenerative diseases.[5]

In general, increases in public expenses with pharmaceuticals, tend to be higher than inflation or increases in Gross Domestic Product – GDP, leading to apprehension among governments.[6,9]

In this context, worldwide countries adapted different pharmaco-economics methods, for their health care policies, in order to be less damaging for their GDP.

The cost of defending U.S. malpractice claims is estimated at $6.5 billion in 2001, only 0.46% of total health spending. The two most important reasons for higher U.S. spending appear to be higher incomes and higher medical care prices.[10] In the USA, health expenses surpassed 1.3 trillion dollars in 2000, reaching 2 trillion in 2006, a value equivalent to 16% of the GDP. According to projections, this percentage is set to increase to 20% by 2015.[10]

In the United Kingdom, the growth in health expenses is higher than in other sectors of the economy, although the NICE politics applied on healthcare system. In 2001 and 2002, expenses with health represented 17% of public expenditure, the greatest proportion since 1948.[11,12,10] Italy, has imposed since 1997 an economic analysis within the pricing and reimbursement of pharmaceuticals, although, this country is not benefiting from the best decisional process using pharmaco-economics measures.[13,14]The total expenditure with medicines increased 11% in 2005, reaching 24.8 billion dollars.[15] In the face of amplified operating cost and the need of at least preserving the value of health services, governments will be obliged to implement supporting financial measures including tax hikes, cut backs in other areas and charging consumers.[16] Medical drugs consume a considerable portion of the country's resources, having a strong impact on overall health expenses.[16]

Adopting these less damaging strategies, such as the economic analysis during the process of choosing higher priority alternatives can supply information, helping managers compare alternatives and decide about the best option for their program needs, in a bid to associate rationalization of expenses to clinical efficiency. Clinical efficiency means maximal attention to quality and user satisfaction, with the least possible social costs.[17]

A lot of countries developed lately the politics on pharmaeconomics. For instance in Turkey, medical curriculums are being developed in a multidisciplinary approach focused on

the physician-patient relationship[10], in Morocco[18], in a low-income country, the direct cost of care per patient with breast cancer was estimated from $1451.35 to $1615.29; in Algeria[19] there are government attempts to reduce the drug price (Algeria is part of the Top Fifteen Developing Countries list with the Highest Pharmaceutical Tariffs). The mean (SD) family size of household respondents from Saudi Arabia was 6.60 (3.20) members, with 0.32% reporting no medicines present in the household, 81.8% of households reporting five or more medicines, and 29.9% of respondents reporting having at least 10 medications at home. When analyzed on the basis of total medication cost, medication wastage was 19.2% and 25.0% in Saudi Arabia and other Gulf countries, respectively. The mean out-of-pocket expenditure (based on the percentage of annual income) for medications was 0.72% for households in Saudi Arabia compared with 0.48% in other Gulf countries. Families in Saudi Arabia and other Gulf countries spent a total of ~US $150 million on medications that were never consumed. However, there appear to be no immediate solutions to the problem of medication wastage's impact on health care costs[20]

The association of quality and user satisfaction with the lowest possible social costs demarks the clinical efficiency on economical strategies. This tool helps on implementing the health care cost, but this tool does not bring an immediate solution to the problem of wastage's impact.[21,22] As other authors[23], we think that the use of generic alternatives should be promoted in the national level, in order to attempt an alleviation of the costs on pharmaceuticals,

3. Types of pharmaco-economics evaluation

3.1. Cost minimization analysis

Cost Minimization Analysis (CMA), one of the simplest economic evaluations, is utilized when the result of two or more interventions is the same in terms of their clinical consequences. In CMA, only costs are submitted for comparison, because the efficacy or effectiveness of comparable alternatives is equal.[12] This approach is justified when alternatives of comparable programs or therapies produce clinically equivalent results, as in taking decision on pharmotherapeutic guides.[24] For instance, it may be applied in the process of developing pharmacotherapeutic guidelines, for two or more products with proven equivalence in safety and efficacy. Thus, the first critical step prior to conducting a CMA is to determine the therapeutic equivalence of the interventions. When intervention results differ, it is not possible to proceed to cost minimization analysis. An example of CMA is the analysis of administration costs of the same medicine given using different routes of administration.[9] But again this example is not valid in all cases (for instance one route may be used for emergency situations or to initiate treatment, while the other may be more appropriate for maintenance of treatment).

3.2. Cost benefit analysis (CBA)

Cost Benefit Analysis (CBA) establishes the relationship between costs associated to treatment and financial benefits generated by it. All cost (investments) and benefits (consequences) of alternatives are measured in monetary terms so that it will be possible to verify whether the benefits exceed the expenses for each intervention.[25] Among other aspects, the return of applied resources in a health issue may be compared with gains obtained by investments made in other areas of the economy.[26] Examples: (i) the relationship of treatment costs and the economy of resources resulting from shorter patient hospital stay; (ii) the costs of a vaccination program and the resources yielded by the reduction of absence from work or the number of hospital admissions; (iii) the costs of a program of early treatment of diseases versus delayed treatment or its complications etc. The results of cost-benefit analysis are present in the form of liquid benefits, that is, benefits of the intervention minus the costs of intervention.[27] This type of instrument evaluates the economic viability of social projects, it can be applied to a given program or to various alternative ones in order to compare them in terms of their ''social profitability'.[27] This presumes the concept of programs in the social area (health, education etc.) as investments in human capital, in the sense that these programs, whether for empowering or rendering the work force healthier or increasing their productivity, boost the productivity of the economic system as a whole.[28] The theoretical basis of this technical instrument therefore becomes evident: the theory of human capital and the methodology of the economic analysis of investments.[29]

Thus, these studies show the theoretical advantages of facilitating choices between health and non-health programs (for example, between subsidizing a new drug and increasing funds for school transportation), and of providing subsidies to public administrators and to society for taking better informed decisions and enabling the optimization of resource utilization.

This type of analysis has the inherent inconvenience of the difficulty attributing monetary value to the results and to life, not permitting simultaneous comparisons of products with more than one indication.[30] Intangible benefits, such as the subjective health expression of each patient and the value of human life, are obviously very difficult to be expressed in monetary terms. Furthermore, the evaluation of benefits to persons that do not have an economic activity becomes impaired.[31] This type of analysis has often been criticized for ignoring important benefits resulting from health programs and for concentrating on items of easy measurement. Initially, it was the most used analysis, but due to the difficulty of attributing monetary values to human life, cost-effectiveness is currently more utilized.[32]

3.3. Cost effectiveness analysis (CEA)

Cost Effectiveness Analysis (CEA)[33] concerns the relationship between the cost of a treatment, measured in monetary units, and its clinical benefits (effectiveness) to the patient. Results are expressed in non monetary units, that is, in terms of improved health or natural units (lengthened life span, number of lives saved, clinical cures, and days free of symptoms or pain, cost/hour of nursing time, cost/mercury millimeter of altered arterial blood pressure).[34] Thus, the unit of measurement selected will depend on the objective of the program or treatment evaluated.[35]

In general terms, CEA is the most appropriate technique when the choice has to be made between two or more competing options, for which the gains expected in health can be expressed in terms of a measuring common effect.[36] Therefore,

CEA is always comparative and considered in the choice of the best strategy to attain the same objective. Examples include the relationship between costs of treatment by different antihypertensive agents and the respective degrees of effectiveness in decreasing the patient's arterial pressure, or costs of different chemotherapy treatments against cancer and their respective degrees of effectiveness in saving or extending lives.[37]

CEA represents the type of analysis most utilized in pharmaco-economics, because it enables to use, in daily practice, the same units utilized in clinical assays.

The calculation of the cost-effectiveness ratio expresses the additional cost required to reach an extra unit of clinical benefit and is expressed by the difference between the cost of two interventions, divided by the difference between their consequences in terms of health (effectiveness).[38]

Another measurement unit of cost-effectiveness is the quality of life related to health (QLRH).[39] The two major types of QLRH are: (a) those which are specifically named, formulated to evaluate improvements in the quality of life produced by a specific treatment; and (b) those generically named, developed to evaluate variations in life quality produced by any type of intervention.[40]

However, in several studies that work with effects (such as the number of deaths prevented) and not with products (vaccination, number of houses attended with sewers, etc.) this restriction may be effectively overcome in the sense that strategies of intervention are compared with totally distinct products (expansion of the health system, immunization, maternal-infant care, for example).[41]

3.4. Cost utility analysis (CUA)

Cost Utility Analysis (CUA)[2] considers the relationship between costs of a treatment and its benefits to the health-related quality of life of the patient (utility), as well as the risks of adverse drug reactions. This method combines patient satisfaction and preference with cost-effectiveness analysis.[42] It is applicable in studies aimed at comparing different treatments mainly targeted to chronic patients. Examples include relationship between the cost of different cancer treatments and their respective life quality indexes, related to patient health during the extra years that they have gained; cost for a rheumatoid arthritis treatment and the health-related quality of life the patient started to lead following pain reduction and improved mobility.[43] However, it does not allow comparisons between different sectors, for example, health costs in relation to education.

In Cost Utility Analysis, cost to obtain "one year of healthy life" is calculated with different treatments that is, it incorporates the amount and also the quality of life in the years that were saved by means of a treatment. The results (output) are expressed as the cost for the "years of healthy life" or "years of life adjusted for quality "(QALY – quality-adjusted life-years). QALYs are calculated by the years of life gained, multiplied by a quality index, verified by means of specific questionnaires.[44] Modern medicine is concerned about the improvement of life quality and not only about longevity of life.[45]

The use of life expectancy adjusted for quality enables the evaluation of situations in which there is increased survival under health conditions that are not perfect or therapies that do not alter survival, but improve quality of life.[46]

CUA is presently the economic evaluation approach preferred by specialists, mainly because it allows the comparison of different programs or treatments without the ethical problems occurring in CBA over attributing monetary values to health.[47] The use of lists of treatments and health programs classified according to their cost per QALY, has helped the setting of priorities in health issues.[48] The lower cost treatments per QALY should be implemented first, and those with higher cost per QALY should be considered of lesser priority. However, although useful, this cannot be the sole criterion employed in the setting up of health priorities.[49]

Thus, pharmaco-economics analysis considers the economic factors in the utilization of medicines, but does not exclude clinical and humanistic results as important subjects for evaluation. The real value of an intervention or policy can only be found when all dimensions of the result are measured and taken into consideration.[50] Viewed in this manner, the economic criterion cannot perform the major role.

4. Sensitivity analysis

Sensitivity analysis[51] takes into account the uncertainties common to economic evaluations of health, since the results found in clinical practice can vary in relation to results reported in the medical literature. Thus, this type of analysis recalculates the cost-effectiveness ratios obtained, modifying one or more parameters of the study.[52] Examples of variables are the degree of effectiveness of the intervention, the natural course of the disease, the costs related to the treatment, the expected result in life quality, among others.

The Panel of Cost-Effectiveness in health recommends the use of this technique in economic health evaluations and suggests the calculation of all parameters or variables of the model whose estimation is not precise or whose values may vary in different settings.[53] Sensitivity analysis can be conducted modifying one or numerous variables of the model simultaneously.[54]

If, on varying the values of a given parameter the chosen strategy remains stable, one states that the model is insensitive to this parameter and the lack of precision in its estimate does not decrease the validity of the conclusions obtained by the model.[55]

In developed countries, as Albania, cost analysis is frequently employed for managers to gain adequate information when defining and choosing priority interventions in the health area.[56–58]

Therefore, it is important that the government and health systems become involved with the spreading of concepts and techniques of economic analysis[59], investing in the education and training of qualified human resources[60] and stimulating the production of studies applying these tools, both in public and private sectors, and actually start to incorporate economic analysis into policy decisions on health issues.[61]

Conflict of interest

None declared.

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