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COST ANALYSIS IN ECONOMIC EVALUATION OF METHADONE MAINTENANCE TREATMENT: A METHODOLOGICAL APPROACH

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Abstract – Economic considerations influence the system of substance abuse treatment, and determine not only who gets treatment and for how long, but also what services the patients receive and in what settings. Maintenance treatment reduces risk-taking behaviours such as injection drug use and needle sharing, as well as the mortality rates associated with opiate use. Moreover, it may result in a decrement in costs incurred by social services provision and the criminal justice system. This suggests the need for a more complex economic evaluation of maintenance treatment.

This paper describes methods of economic evaluation in health care and reviews methodology of cost analysis in economic evaluations of methadone maintenance treatment (MMT).
Key words: maintenance treatment, economic evaluation, cost, cost analysis.

Analiza kosztów w ekonomicznej ocenie leczenia substytucyjnego metadonem: zagadnienia metodologiczne

Streszczenie – Zagadnienia ekonomiczne wpływają na system leczenia uzależnień, m.in. poprzez wpływ na to, kto otrzymuje leczenie i przez jaki czas, a także na to, jaki rodzaj usług medycznych jest oferowany i w jakich placówkach. Osoby z zaburzeniami spowodowanymi używaniem substancji psychoaktywnych narażone są na wyższe koszty leczenia w przypadku współwystępowania innych zaburzeń. Z relacji między kosztami leczenia zaburzeń spowodowanych używaniem substancji psychoaktywnych oraz zaburzeń medycznych wynika, że efektywne leczenie zmniejsza koszty opieki medycznej. Leczenie substytucyjne zmniejsza ilość zachowań ryzykownych, takich jak np. używanie substancji drogą dożylną, a także zmniejsza umieralność związaną z

przedawkowaniem opiatów. Może to zmniejszać koszty ponoszone przez opiekę społeczną i organa sprawiedliwości. Są jednak inne czynniki, które mogą nie zmniejszać w sposób istotny kosztów opieki zdrowotnej. Jednak generalnie leczenie zaburzeń spowodowanych używaniem substancji psychoaktywnych może zmniejszać koszty leczenia współwystępujących zaburzeń. Z drugiej strony, dłuższa przeżywalność leczonych uzależnionych przyczynia się do zwiększenia kosztów medycznych. Wydatki na leczenie nadużywania substancji psychoaktywnych i innych współwystępujących chorób są tylko częścią kosztów ponoszonych w związku z używaniem substancji psychoaktywnych. Te inne koszty związane są m.in. z przedwczesnymi zgonami, zmniejszeniem produktywności, przestępstwami, wypadkami samochodowymi, alkoholowym zespołami płodowymi i AIDS. To wszystko wymaga bardziej kompleksowego podejścia do ekonomicznej oceny leczenia substytucyjnego.

Artykuł opisuje metody ekonomicznej ewaluacji opieki zdrowotnej i jest przeglądem metodologii obliczania kosztów przy ekonomicznej ocenie leczenia substytucyjnego.

Słowa kluczowe: leczenie substytucyjne, ocena ekonomiczna, koszty, obliczanie kosztów.

INTRODUCTION

Economic considerations influence the system of substance abuse treatment, determining not only who gets treatment and for how long, but also what services the patients receive and in what settings (4). The maintenance treatment is not sufficiently accessible to drug-addicted patients: out-of-pocket payments by patients are an important source of treatment revenue, and failure to pay these costs is an important reason why the treatment is discontinued.

Methadone maintenance (MMT) is an effective treatment for opiate abuse (2, 3, 5, 6, 17, 18, 28) that reduces risk-taking behavior, such as injection drug use and needle sharing, as well as the mortality associated with opiate abuse by injection (3, 5, 6, 8, 9, 10, 11). It is recognized that MMT decreases the costs incurred by both social services provision and the criminal justice system (14, 15, 16, 20, 25). Economic evaluation is one of the tools helping to choose wisely from a range of alternatives in order to implement efficient resources. Public policy makers will be interested in such an economic analysis.

This paper describes methods of economic evaluation in health care and reviews methodology of cost analysis in economic evaluation of MMT.

Economic evaluation in health care

It is no longer sufficient to say that a new treatment should be introduced simply because the outcomes are better since the value of the improved outcomes must justify the expense. It is also inappropriate to say that an innovation should be implemented just because it reduces costs. The cost savings must be balanced against any changes in out-

comes. Even if it is decided that substance-abuse treatments cannot be judged on parity with medical care treatments, economic evaluations will be useful (4). They will help decision makers allocate the scarce resources for substance abuse treatment among patients and treatment types in a way that will yield the greatest benefit.

Economic evaluation in health care involves the identification, measurement, valuation, and then comparison of the costs (inputs) and outcomes of two or more alternative treatments or preventive activities. Economic evaluation can differ in many aspects. The following are the most important ones (13, 19, 21, 29):

– *Level* – A comparison of different treatment modes vs. a comparison of different treatment systems.

– *Time* – Effectiveness as measured between the start and end of maintenance treatment vs. one-year follow-up

– *Perspective* – Costs to the maintenance treatment provider and patient vs. costs to society.

In economic evaluation the costs and consequences of alternative interventions are compared to examine the best use of the scarce resources. The specific questions being addressed may include (13, 21):

– A comparison of the costs and outcomes between treatment and law enforcement activities

– A comparison of the costs and outcomes between treatment and prevention activities

– A comparison of the costs and outcomes of a new intervention to some current therapeutic approach

The conceptual framework of economic evaluation differs according to the type of decisions which it helps to clarify. Some interventions can have negative effects or no effect. Losses can accrue to society, to the patient or the patient's family. Economic evaluations are concerned mainly with the total benefits or damage arising from our actions (21).

Methods of economic evaluation

Four main types of economic evaluation can be distinguished (13, 21):

Cost-minimization analysis. The aim is to decide the cheapest way of achieving the same outcome when the consequences of the intervention are the same and only inputs are taken into consideration.

Cost-effectiveness analysis. The aim is to compare competing interventions in terms of cost per unit of consequence common to all alternatives, but achieved to different degrees. Costs are measured in monetary units but effects are measured in natural units (e.g. abstinence, drug-free days, etc.).

Cost-benefit analysis. The aim is to relate the costs to the benefits of one alternative or between several alternatives even outside health care with respect to single or multiple effects not necessarily common to all alternatives. Costs are measured in the same monetary units as outcomes.

Cost-utility analysis. The aim is to compare different interventions in terms of both: quantity and quality of life, as we express them as utilities. In this case, competing interventions are compared in terms of cost per utility (e.g. cost-per-QALY).

All methods of economic evaluation have one principle in common: they examine one or more possible interventions and compare the inputs or resources necessary to carry out such interventions with their consequences or effects. The main difference between the four types of full economic evaluation is how the benefits to the individual are measured and valued (21).

Methodological considerations for cost analysis of methadone maintenance treatment

A number of studies have estimated the effect of MMT on economic costs by comparing the activities of individuals before and after starting the treatment. After treatment the patients were less likely to use health care, depend on welfare, or commit crimes. Economic analysts have pointed to the reduction in costs of the medical care, criminal justice and social services systems, as well as the economic value of reduced property theft and other crimes. Some analyses considered also the beneficial effects of MMT on employment (4), but still there are differences in estimating costs. Attempts have been made to estimate MMT cost-effectiveness retrospectively, using literature reviews, budgetary lines items and national reports on salaries. The data come from different studies and countries with different accuracy of data collection. This can lead to a misinterpretation of the real cost of intervention.

For the provision of any type of MMT resources are needed. Resources are anything that the society owns and uses to provide such programme. Values are assigned to resources by defining costs. These data must be collected at the same time and with the same degree of accuracy as outcome data.

Cost valuation. It is the economic definition of costs that should be used in cost valuation, and not the financial definition. The former is based on the concept of „opportunity cost", i.e. the value forgone by not utilizing the same resource in its next best alternative use (22, 23, 24). The concept implies that all resources consumed by an intervention should be valued, not just those constituting a budgetary line item.

A cost analysis requires information on the costs of each intervention singly and also in combination with other related interventions. In evaluating costs both capital items (buildings, equipment etc.) and recurrent items (drugs, materials, money etc), tangible and intangible items must be taken into account, regardless of whether they are used by and accrue to health services, society or the single individual. However, it is important to avoid double counting. Difficulties in evaluation arise from lost productivity. For long residential treatments, these costs must be considered in the analysis because substance users in treatment may have been unemployed for some time. Valuation of these costs depends on estimates of the value of time or on risk of unemployment (21). Number of problems also arises in applying values to tangible items. Costs for some resources may vary because of market forces such as e.g. rent

TABLE 1
Cost categories in the cost sheet for MMT.

Categories	Description
Capital	
Building	Space used and reported in terms of the total square meter surface area allocated.
Equipment, furniture and implements	The number of office equipment items, their storage and distribution, maintenance, cleaning and other capital equipment. If they are only partly used, should be allocated as same as for building space.
Other items	Any other capital resources used by the programme.
Recurrent	
Personnel	Personnel time allocated to each intervention is netted out from the time spent by the personnel in other interventions. Personnel time used in the start-up and post start-up periods should be expressed in person-months.
Rented buildings	In case buildings are rented, both the total square meter surface area of the buildings and the duration of rental (in months) are used.
Utilities	The amounts of utility items allocated to the intervention. Examples of utility items are electricity, gas, and water. The allocation of the quantities used by the programme is based on the square meter surface area used by the programme, after applying any further allocation needed if the space is shared with other programmes.
Materials	Materials and supplies in terms of the quantities used for the intervention.
Transport operating costs	Transport is measured in terms of total kilometres travelled per mean of transport
Equipment operating cost	In cases when equipment is rented, the number of equipment items and the duration of rental (in months) are reported.
Miscellaneous items	Any other category of recurrent resources used that is not provided in the list must be reported by identifying the item and the quantities used.

or exploitation. It is recommended to present results not only in monetary values, but also in the quantity of resources used.

Problems result also from difficulty in identifying hidden or unknown costs and consequences. Not all costs and consequences can be measured in appropriate physical units as some interventions have intangible consequences, such as the reduction of abstinence syndrome or the increase in the quality of life or decrease in participation in criminal activities of the client participating in the maintenance program (21). All positive outcomes benefit the individual or society and costs of the benefits must be measured appropriately (Table 1).

Overhead costs. The simplest way to identify intervention-specific overhead costs is to identify shared resources used by the different interventions and use joint costing rules or some basis of allocation related to the usage of the overhead item (13). The percentage of time devoted to each individual intervention is used to allocate personnel costs and the share of equipment used. Similarly with buildings and equipment, the proportion of intervention-specific utilization to total utilization is used (12, 13). This implies that the resources are divisible, or can be shared across interventions (e.g. it is feasible to use 0.1 computer for an individual intervention). This is appropriate since most resources can be shared across interventions and programmes, and particular types of personnel, transport, and buildings can be hired in the short term or rented out to other users.

Capacity utilization. The extent to which capital and labour are used can critically influence unit costs (1, 13, 22). Capacity utilization is defined as the proportion of the total target workload time a resource is actually used; for example, a computer used 5 hours in a 10-hour work day has a capacity utilisation of 50%. In comparing different interventions, it is important to ensure that the observed differences are due to the intrinsic characteristics of the intervention rather than the extent to which capital and labour have been utilized in the environment in which the interventions were evaluated.

Discounting. To allow comparability across different interventions, a 3 % discount rate must be used as recommended by most guidelines (13).

DISCUSSION

Choosing an appropriate study design in economic research and using it in practice can be problematic. In particular, studies using differences between before and after treatment, with no control group, tend to overestimate treatment benefits. While this is increasingly becoming the practice, most studies have either attempted to estimate costs for alternative therapies retrospectively, or model costs and consequences for the alternatives being considered using literature reviews of effectiveness data and models of resource costs. This should be avoided in the economic analysis. The benefits are also overestimated if only those who complete treatment are included in the study. For more complex analyses, cost data should be collected at the same time and with the same degree of accuracy as outcome data. When estimating longer-term benefits, some modeling and model predictions will always be required.

Economic studies of substance abuse treatment have to take into account the effect of treatment on the utilization of other mental health services and on other health care indicators (including the incidence of HIV/AIDS, hepatitis and other associated diseases), as well as its impact on the cost of public programmes, including criminal justice, welfare, and social services. In themselves, economic components of the research need not be excessively expensive. There is, however, a great merit in examining the economic design from the beginning of the research planning process, since results may affect not only the overall design of the study, but also the details of data collection. The study must compare the cost of substance abuse treatment with other costs incurred by individuals with substance use disorders. As the motivation for decision makers it should be suggested that the treatment should be available for all, if its cost is offset by cost reductions in other areas.

Estimating costs of alternative maintenance treatments or treatment modes retrospectively, using literature reviews for data effectiveness and for costs should be avoided in the economic analysis. Cost data should be collected at the same time and with the same degree of accuracy as outcome data.

The economic design must be established from the beginning of the research planning process, as well as the details of data collection. Economic components of the research need not to be excessively expensive.

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