Mental health economics: current methodological issues

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Background: Investment in innovative mental health care services requires the use of scarce resources that could be used in alternative ways. Economic evaluation is essential to ensure that such an investment is appropriately compared with investment elsewhere.

Method: A non-systematic review of mental health evaluations identifies key methodological issues pertaining to economic studies.

Results: Economic evaluations require the measurement and combination of costs and outcomes, and clarity about how this measurement is undertaken is required. Regarding costs, important considerations relate to the perspective to be taken (e.g., health service or societal), method of measurement (patient self-report or use of databases) and valuation (actual costs, fees or expenditure). Decision makers frequently need to compare evidence both within and between clinical areas and therefore there is a tension between the use of condition specific and generic outcome measures. Quality-adjusted life years are frequently used in economic evaluations, but their appropriateness in mental health care studies is still debated.

Conclusions: Economic evaluations in the area of mental health care are increasing in number and it is essential that researchers continue to develop and improve methods used to conduct such studies.

Introduction

Mental health problems rank highly in terms of global burden. The World Health Organisation estimated that in 2004 unipolar depressive disorder was the third leading cause of disability across the world and alcohol use disorders ranked 17th (World Health Organisation, 2008). There is a geographical division; in low-income countries depression ranked eighth, while in high-income countries it was the leading cause of disability with dementia being the fourth and alcohol use disorders fifth. By 2030, unipolar depression is estimated to be the leading cause of disability across the world.

The substantial impact of mental health problems on the lives of individuals is reflected in the large economic cost of these conditions. Cost can be divided into direct costs and productivity costs with the former being indicative of the care that is provided, while the latter is due to the conditions adversely affecting work and education. This simple division is of course somewhat limited. Mental health problems may also lead to engagement in social and leisure activities being hindered, which too may have an adverse economic effect. Various studies have sought to estimate the cost of different conditions. Unfortunately, these costs vary substantially across settings. This will to some extent reflect differences in types of care provided, but may also be due to methodological differences in how such costs are calculated.

The recognition that mental health problems have a major economic impact has led to an interest in the economic evaluation of specific interventions. Such evaluations are crucial because the resources required to provide inpatients beds, psychological therapies, medication, etc. could be used to treat different patients with mental health problems and indeed patients with other conditions (e.g., cancer, asthma and diabetes). Healthcare resources are limited in their supply and yet the demand for these resources is fairly unlimited. This has always been the case, but is particularly important given the period of austerity that many countries are going through at present. Ensuring that economic evaluations are conducted in such a way that decision makers are able to organise care using the best available evidence is imperative.

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This paper explores a number of key methodological issues that are of current interest in the area of mental health economics. It is by no means an exhaustive review or is it a systemic appraisal of these particular issues. Rather it is intended to highlight various points of interest for the purposes of continued discussion. The next section discusses various considerations and approaches for measuring costs. Costs are only one element of an economic evaluation with outcomes being the other. Many would consider outcome measurement to be more an area of clinical interest rather than economic interest, but it is vital that outcomes be measured in such a way as to make them suitable for inclusion in an economic evaluation and the next section addresses this issue.

Cost measurement

Perspective

Determining the appropriate perspective is crucial when calculating the costs associated with particular mental health problems and when conducting economic evaluations of interventions to address them. Care provided to people with mental health problems is multi-faceted, involving different agencies. Types of agency and care provided differ across, and sometimes within, countries. However, certain types of care are commonly provided: *specialist mental health care* (e.g., inpatient beds, day care, psychiatrists, psychologists, psychotherapists and mental health nurses), *medication* (e.g., antipsychotics, antidepressants, anxiolytics and hypnotics), *general medical services* (e.g., primary care physicians and specialist doctors), *social care* (e.g., social workers and specialist accommodation) and *criminal justice services* (e.g., police contacts and prison stays). This is understandably a limited list and most people with mental health problems would perhaps only receive some of these. For most, it is likely that some services would never be required (e.g., despite media publicity, contacts with criminal justice services are rare).

Family and friends are frequently key care providers. Obviously, the extent of this depends on availability. It is known, for example, that many people with schizophrenia are living alone and so provision of such care may not be possible, while in other areas such as dementia sufferers may have built up a family/social network that consists of potential caregivers. Such care certainly has a value and hence can and should be costed (although as we shall see below this is far from straightforward).

Mental health problems may also affect the ability of an individual to work or to remain in education. Such impacts have cost consequences, although the extent of these is unclear and different approaches to measuring productivity costs will be discussed below. These costs may be substantial. For example, in England, it has been estimated that around 58% of the total costs of mental health problems are due to lost work time (McCrone *et al.* 2008), and this excludes reduced productivity while at work (so-called 'presenteeism').

Numerous cost-of-illness studies have been conducted over the years, including a number that have focused on mental health conditions (e.g., see reviews by Knapp *et al.* 2004; Sabes-Figuera *et al.* 2010). Such studies do not themselves inform us as to how resources should be used (Byford *et al.* 2000), but they do have their uses in highlighting the extent of a problem and serving as a baseline against which interventions can be assessed. Clearly, for a cost of illness study to be useful, it should take a broad societal perspective and include the elements described above. Similarly, economic evaluations of specific interventions need to assess the broad impact of these interventions and hence need to include all relevant services and indirect effects. However, some policy makers and commissioners of research will have their own remits which will influence the perspective that is adopted. For example, in England, the National Institute for Health and Clinical Excellence (NICE) is responsible for making recommendations about how National Health Service funds should be used and so requires a health and social services perspective. This means that costs to other agencies (including carers) often do not enter into the main cost-effectiveness analyses used by NICE in its deliberations (National Institute for Health and Clinical Excellence, 2008). Other countries (such as The Netherlands) promote a broader perspective while decisions made by agencies such as Health Maintenance Organisations in the United States may be concerned with a narrower array of services. For economists, the preferred approach is to assess costs at the societal level, and this of course, then, allows for analyses using subsets of these costs.

Measurement

Once the perspective is decided, it is then necessary to measure the use of relevant services, and indirect effects, over an appropriate period of time. This duration depends on the condition and intervention being investigated and the source of the information. The time should be long enough in order to capture the use of lesser-used services, which may however be expensive (e.g., inpatient care for patients with anxiety disorders), but shorter enough to allow for accurate reporting (if data are collected from non-routine sources). The period of service use data should also ideally cover the whole follow-up period of a study.

In some settings, much information on service use can be obtained from administrative databases (especially when funding is via an insurance-based system) or from case-registers. One of the best examples of the latter has been the case-register in Verona, Italy which has been in existence since 1978 (Amaddeo *et al.* 1997). The advantage of such records is that the use of services can be obtained with some accuracy and over a prolonged period of time. However, an important disadvantage is that the *breadth* of information will be limited. For example, registers may have few details about social care contacts and use of complementary healthcare, almost nothing on care from family members and few details of the indirect effects of mental health problems on employment and education (although employment *status* can be recorded). In certain countries, hospitals and primary care centres will also maintain administrative data that can be used for the purposes of economic evaluations. However, linking databases from different agencies together may be particularly challenging.

In order to move beyond just costing specialist mental health care, it is likely that data have to be obtained directly from patients and/or their families. Indeed in some settings this may be the *only* source of service use data. The main options for collecting such information are diaries or questionnaires. Diaries allow patients to keep a record of service contacts as they occur and so may address any recall problems. However, they may forget to complete them and indeed there may be little incentive to do so.

Questionnaires are used more frequently and have the advantage that they can be either self-completed or administered by an interviewer. The latter may be particularly appropriate if service use data can be collected alongside information on clinical outcomes. The use of questionnaires can help to ensure that a broad range of data is collected, but the major concern is around recall accuracy. Respondents may be asked to recall services used 3, 6 or 12 months ago and while for some services this will not be a problem, for more frequently used services it may be difficult to remember the exact number or the duration of contacts. Inpatient stays may be more memorable, but the level of ill-health at the time may make recall of exact number of days in hospital problematic. A small body of literature has been produced, which has investigated the reliability of self-report service use data in comparison with administrative data records. The results are generally encouraging although with some differences apparent (Calsyn *et al.* 1993; Goldberg *et al.* 2002; Patel *et al.* 2005; Byford *et al.* 2007). The difficulty with these comparisons is that there is often an assumption that administrative data records are accurate, but this may not be the case. The pragmatic approach to collecting

appropriate service use data is likely to be one where self-report and administrative data are both used and rules are developed as to how to address discrepancies.

Whatever method is used to collect data, the requirements are that as comprehensive an assessment of costs can be made as possible. For inpatient care, it is necessary to know the number of days spent in hospital, whereas for ambulatory services the number of contacts, and sometimes their duration, is required. For most formal services, the type of data to be collected will be fairly self-explanatory. Informal care though presents a particular challenge as determining exactly what amount of care is provided because of the patient's illness as distinct from care that would have been provided anyway may be hard to achieve. Exact precision is unlikely to be obtained and we therefore may have to be satisfied with best estimates. Many versions of the Client Service Receipt Inventory (Beecham & Knapp, 2001), a frequently used questionnaire in the UK and elsewhere, ask respondent to estimate how many hours of care per week they have received from family members or friends *specifically because of their health problems*. In an attempt to make this estimation easier, the time is broken down into different areas such as personal care, childcare, help inside the home and help outside the home.

Valuation

Measurement of service use is undoubtedly the most complex aspect of producing cost data. In order to complete the process, however, the data need to be combined with appropriate unit cost information. Given that service use information will typically relate to face-to-face contacts the unit costs used should do the same. This is not a trivial point because the cost per hour of a professional's time will differ substantially depending on whether their costs are divided by total working hours or hours spent with patients (with the latter leading to higher unit costs). The costs that are divided by this time should include salaries and administrative and capital overheads and ideally the costs of training. In some countries, unit costs have already been calculated (e.g., UK and The Netherlands), while in others there are no routinely collated costs and so best estimates have to be made. One option is to use fees or charges. This may be appropriate for services provided by private agencies that will need to cover all of their costs, but state provided services that charge for care may be subsidised and so the amount of subsidy should also be included.

Care provided by family/friends has a value even if no payment is made. Measurement of care time has been described above. The value to be placed in this time is a major issue of theoretical debate

(Koopmanschap *et al.* 2008), with two main approaches used. The *replacement cost method* uses the cost of a professional (e.g., nurse, cleaner and homecare worker) as a proxy value for the care provided. The assumption here is that if the family member or friend was not available then a paid professional would need to provide the care (although this paid professional also may not be available). Alternatively it could be assumed that the family member or friend could themselves be paid to provide this care for others. The *opportunity cost method* focuses on what the carer is giving up and uses the value of that as an estimate of the value of informal care time. If work is given up then this is a relatively straightforward. However, what about giving up leisure time? This has a value but is itself far from straightforward to value.

If someone takes time off work to do mental health problems then this can be valued using the human capital approach whereby the total number of days lost is multiplied by the age- and gender-specific wage rate. This assumes that the wage rate reflects the value of production, but this in turn rests on the assumption of a perfectly functioning labour market. It also attaches a higher value to lost work for those who get paid more and there are age, gender and other inequalities in such wage rates. Using wage rates that are not gender- or age-specific would address this to some extent, but a fundamental concern remains with this approach. This is that it ignores the possibility that production is not reduced substantially when someone loses their job or takes time off work because they are 'replaced' by someone who was previously unemployed. The *friction cost approach* assumes that lost production only occurs in the period during which someone is recruited to take the place of the person who is unable to work (Koopmanschap & Ineveld, 1992). This theory has some appeal, but of course people who are recruited may well have been working elsewhere rather than being unemployed and so a chain of friction-cost periods may be incurred (and it is feasible that these may add up to substantial costs).

Uncertainty will exist around particular unit costs and it is therefore good practice to conduct sensitivity analyses around figures that may be particularly influential in a particular study. In single site studies, uncertainty around costs can readily be addressed in this way, while for multi-site studies involving different countries the complexities are increased substantially.

Outcome measurement

Economic evaluations require cost information to be combined with outcomes. Clinical evaluations will typically use measures that are condition specific such as the Beck Depression Inventory or the Positive and Negative Syndrome Scale. Combining costs with such measures may be of benefit to those making decisions as to how best to treat specific disorders, and will be to some extent clinically interpretable. However, the use of condition-specific measures does not allow resource allocation decisions to be made across different clinical areas and this is something that has to occur, even if not in an explicit manner. To aid such decision making, economic evaluations need to use generic measures of outcome that can be applied in diverse areas such as schizophrenia, bipolar disorder, cancer, stroke, etc. The most commonly used generic measure of outcome is the quality-adjusted life year (QALY) that combines duration of time with an indicator (anchored by 1 representing full health and 0 representing death) of health-related quality of life experienced during that time. Therefore, spending 2 years in a health state where the quality of life is rated 1.0 or 4 years with a rating of 0.5 or 10 years with a rating of 0.2, each lead to a gain of two QALYs. Dividing the difference in costs between two interventions by the difference in QALYs gained indicates the extra cost incurred for one intervention to produce one extra QALY.

If QALYs can be generated for interventions in all clinical areas then they are a very powerful tool. This is though reliant on the measures used to generate QALYs being appropriate for use in all areas and being *equally* sensitive to change. If QALYs do not reflect real change in one clinical area then the cost per QALY for interventions in that area will be disproportionately high which may have an adverse effect on funding decisions. In Europe, the most frequently used QALY measure is the EQ-5D (Williams, 1995). This is a five-domain scale covering mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each of these is rated as 1 (no problem), 2 (moderate problem) or 3 (major problem). The resultant five-figure scores are then converted into a scale anchored by 1 and 0. The EQ-5D is recommended for use in health technology assessments in England by NICE (National Institute for Health and Clinical Excellence, 2008) and has been used in numerous healthcare evaluations including those of mental health interventions (e.g., Knapp *et al.* 2008). Some authors have found the instrument to be acceptable for severe mental health problems (e.g., Barton *et al.* 2009), while others have raised concerns over its appropriateness (e.g., Brazier, 2010), and perusal of its domains does indicate a focus on physical health. Alternatives to the EQ-5D exist such as the SF-6D (Brazier *et al.* 2002), which can be derived from the SF36, and measures that aim to focus more on general well-being or capabilities such as the ICECAP (Al-Janabi & Coast, 2009).

Recent analyses have been conducted to compare the utility values generated from the EQ-5D and SF-6D for patients with schizophrenia (McCrone *et al.* 2009). These found that the mean scores were remarkably similar. However, the distributions showed clear differences with the EQ-5D being skewed with a peak at the maximum score, while the SF-6D scores followed a normal distribution. The findings demonstrated a potential ceiling effect for the EQ-5D with this particular patient group.

Conclusions

This paper has summarised some of the key methodological issues that exist with regard to the conduct of economic evaluations in the area of mental health care. To be succinct, the focus has been on cost and outcome measurement. Some important issues have not been discussed and these are clearly important. These include the use of willingness to pay methods to value outcomes and health states, discrete choice experimentation to value care process, and decision models as an alternative or supplement to trials or observational studies. The fact that economic evaluations in the area of mental health care research have become more prominent is to be welcomed. This though makes it increasingly important to continue to develop methods that make such evaluations of use to decision makers.

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